

# UC Berkeley

## UC Berkeley Electronic Theses and Dissertations

### Title

Grounded critical digital literacies: Youth countering algorithmic and platform power in school and everyday life

### Permalink

<https://escholarship.org/uc/item/676170j3>

### Author

Adams-Grigorieff, Jessica

### Publication Date

2023

Peer reviewed|Thesis/dissertation

Grounded critical digital literacies:  
Youth countering algorithmic and platform power in school and everyday life

By

Jessica Adams-Grigorieff

A dissertation submitted in partial satisfaction of the

requirements for the degree of

Doctor of Philosophy

in

Education

and the Designated Emphasis

in

New Media Studies

in the

Graduate Division

of the

University of California, Berkeley

Committee in charge:

Professor Glynda A. Hull, Chair

Professor Claire Kramsch

Professor Abigail de Kosnik

Spring 2023



## Abstract

Grounded critical digital literacies:  
Youth countering algorithmic and platform power in school and everyday life

by

Jessica Adams-Grigorieff

Doctor of Philosophy in Education  
and Designated Emphasis in New Media Studies

University of California, Berkeley

Professor Glynda A. Hull, Chair

With recent advances in generative artificial intelligence, it may come as no surprise that AI influences our society in profound ways. This dissertation project examines how educational and social media platforms and their algorithms shape educational practices and the identity, digital literacies and views of middle school youth participants. Through a digital ethnography (Pink et al., 2016) rooted in sociotechnical and discursive theories of agency and power (Foucault, 1994; Latour, 2005), the study is one of few to empirically explore how participants shape and are shaped by these technologies. The study focuses on the experiences, development and views of 6th grade participants in a California Bay Area K-8 school as they 1) attended virtual schooling during the pandemic and used the educational platform Google Classroom and 2) as they participated in an online afterschool club and developed critical digital literacies (CDL) to counter algorithmic processes.

One key finding of the study is the lively presence of youth agency in the face of the seemingly overwhelming power of algorithms and platforms to shape and control our lives. Youth participants crafted and enacted identities and digital literacies in ways that disrupted algorithms through literacies that, for example, crossed platforms or hacked algorithmic processes. Teachers and students “made-do” with Google Classroom in ways that subverted, transgressed or denied the technically-embedded business model. Youth participants developed critical digital literacies rooted in a sociotechnical discourse about algorithms that enabled them to unearth patterns in social media algorithms and begin to understand how platforms tracked and profiled them. The actor-networks in which participants, platforms and algorithms were embedded provided opportunities for youth agency to manifest. At the same time, the study empirically documents how participants were reciprocally shaped by these technologies in ways that oriented teaching and learning toward narrow academic goals and that aligned participant identities with the algorithmic identity on their favorite platforms.

This study contributes to a range of scholarship critically examining the impact of technology and artificial intelligence on education and society. Specifically, it shows the importance of studying agency in relation to algorithmic and platform power and the importance of conducting empirical research to document how such technologies actually shape education and society. The study also identifies a new concept for CDL researchers and theorists: grounded critical digital literacies. A key implication of the afterschool program is that CDL programs



should be rooted in youth participants' existing algorithmic imaginaries (Bucher, 2017). A grounded CDL sharpens youths' existing critical competencies with technology and suggests that CDL programs should fold sociotechnical orientations to technology into their budding critical digital literacy practices

## Table of Contents

<b>CHAPTER 1: AUGMENTED INTELLIGENCE</b>	<b>1</b>
THE PRESENT STUDY	2
<b>CHAPTER 2: CONCEPTUAL FRAMEWORK</b>	<b>4</b>
THEORETICAL FRAMEWORK	4
POWER & AGENCY IN DISCOURSE	4
POWER & AGENCY IN TECHNOLOGY	6
LITERATURE REVIEW	8
PLATFORMS IN EDUCATION	10
ALGORITHMIC POWER	12
ALGORITHMIC AGENCY	14
YOUTH AND TECHNOLOGY	16
RESEARCH QUESTIONS	22
<b>CHAPTER 3: METHODS</b>	<b>23</b>
METHODOLOGY: DIGITAL ETHNOGRAPHY & ACTOR-NETWORK TRACING	23
RESEARCH CONTEXT	25
ST. JACOBS SCHOOL	25
MRS. TURNER'S SIXTH GRADE CLASSROOM	26
THE CRITICAL MEDIA CREATOR CLUB	27
PARTICIPANTS	28
RESEARCHER ROLE	31
DATA COLLECTION PROCEDURES	32
FIELD NOTES	33
INTERVIEWS	33
RECORDINGS	34
ARTIFACTS	35
SURVEY	35
ANALYSIS PROCEDURES	35
CODING	35
VISUAL NETWORK ANALYSIS: MAPPING ACTOR-NETWORKS	36
CRITICAL DISCOURSE ANALYSIS	38
<b>CHAPTER 4: GOOGLE CLASSROOM IN THE CLASSROOM</b>	<b>40</b>
GOOGLE CLASSROOM AS AN EDUCATIONAL PLATFORM	40
GOOGLE CLASSROOM IN CONTEXT	42
GOOGLE CLASSROOM AS THE MIDDLE SCHOOL HUB	42
PLATFORM IMPRINTING: INTENSIFYING TRADITIONAL ACADEMIC FORMS	44
USERS MAKING PLATFORMS ACT	52
NO APIs HERE: ACTUAL USES, IMPROVISATION AND DENIAL	52
FRAGMENTED PEDAGOGY: THE STUDENTS-TEACHERS-PLATFORM TRIAD	54
PLAYING PRETEND: FRIENDSHIPS AND ROLE PLAY ON GOOGLE CLASSROOM	58
DISCUSSION	63
<b>CHAPTER 5: NAVIGATING ALGORITHMIC IDENTITIES</b>	<b>64</b>
IDENTITY CONSTRUCTION WITH AND AGAINST THE ALGORITHMIC IDENTITY	64
PLATFORM POWER CO-CONSTITUTING IDENTITY	65

ALGORITHMIC IDENTITIES IN ACTION	71
CURATING THE ALGORITHMIC SELF: NATASHA’S CASE	71
THE HACKER’S DILEMMA: SEAN’S CASE	75
CROSS-PLATFORM COLLAGING: DELILA’S CASE	78
POSSIBILITY IN “RANDOM CRAP”: KEVIN’S CASE	81
DISCUSSION	85
<b>CHAPTER 6: SHAPING ALGORITHMIC IMAGINARIES IN CMC</b>	<b>87</b>
ALGORITHMIC FOLK THEORIES	87
CREATOR-CENTRIC THEORIES	88
PLATFORM-CENTRIC THEORIES	92
EDUCATIONAL DISCOURSES SHAPE FOLK THEORIES	94
TECHNICALLY SPEAKING	94
INVESTIGATING YOUTUBE	98
MORALIZING ALGORITHMS	102
STUDENTS TAKE UP DISCOURSES	104
STUDENT DEFINITIONS	105
STUDENT VIEWS ON ALGORITHMS	106
THE THIRD EYE & OTHER CDL PRACTICES	109
DISCUSSION	111
<b>CHAPTER 7: CONCLUSION</b>	<b>113</b>
SUMMARY OF FINDINGS	113
CONTRIBUTIONS TO SCHOLARSHIP	114
RECOMMENDATIONS FOR PRACTICE	116
DIRECTIONS FOR FUTURE RESEARCH	118
<b>REFERENCES</b>	<b>121</b>
<b>APPENDICES</b>	<b>132</b>
APPENDIX A	134
APPENDIX B	135
APPENDIX C	136
APPENDIX D	132
APPENDIX E	137
APPENDIX F	143

## List of Tables and Figures

**Table 3.1** *Platforms and Pedagogical Use in Mrs. Turner's Class*

**Table 3.2** *Information on Youth Participants*

**Table 3.3** *Information on Undergraduate Collaborators*

**Figure 3.1** *Student Created Word Cloud About Mrs. Turner*

**Figure 4.1** *Google Classroom Grid*

**Figure 4.2** *Teacher View of Google Classroom Tabs*

**Figure 4.3** *Mrs. Turner's Week 15 Module*

**Figure 4.4** *Mrs. Turner's Slide Activity on Bud, Not Buddy*

**Figure 4.5** *Week 18 Module from Field Note*

**Figure 4.6** *Teacher Coursework View*

**Figure 4.7** *Student Coursework View*

**Figure 4.8** *The Five Student GCs Delila Managed*

**Figure 4.9** *Selena Posts an Announcement with a "Get to Know You" Quiz*

**Figure 4.10** *An Invited Student Responds to the Assignment on the Stream*

**Figure 4.11** *Student Created Assignments*

**Figure 5.1** *My YouTube Homepage Padlet Prompt*

**Figure 5.2** *The Me and My Data Padlet Prompt*

**Figure 5.3** *Natasha's YouTube Homepage Screenshot*

**Figure 5.4** *Delila's YouTube Homepage Screenshot*

**Figure 5.5** *Sean's YouTube Homepage Screenshot*

**Figure 5.6** *Eloisa's Data Identity*

**Figure 5.7** *Kevin's YouTube Homepage Screenshot*

**Figure 5.8** *Natasha's Pinterest Recommendations*

**Figure 5.9** *Las Comadres Jalapeño Scene*

**Figure 5.10** *Delila's Data Identity*

**Figure 5.11** *Delila's Roblox Favorite Game Art*

**Figure 5.12** *Delila's Collage in her Roblox Favorite Games Page*

**Figure 5.13** *Kevin's YouTube Suggestions During the Interview Walkthrough*

**Figure 5.14** *Kevin's Data Identity*

**Figure 6.1** *Veronica's Sticker Art*

**Figure 6.2** *Screenshot from a Deutsche Welle News Video Defining Algorithms*

**Figure 6.3** *The Spider-Like Algorithm in the Deutsche Welle News Video*

**Figure 6.4** *Instructor's Sociotechnically Annotated Instagram Screenshot*

**Figure 6.5** *CMC Timeline*

**Figure 6.6** *Video Character Posts About a Bikini on Facebook and Sees Diet Ads*

**Figure 6.7** *This or That Data Slides*

**Figure 6.8** *Meme Used in Student Video*

## Acknowledgements

Wow! What an undertaking a dissertation project is! This multi-year project has been one in which I have learned and grown as a researcher, writer, mentor and mentee, and as a person. Though dissertations are at times quite personal and solitary undertakings, these projects could not be completed without a host of others along the way.

My first set of acknowledgements are to my study participants. A huge thank you goes to “Mrs. Turner,” the St. Jacobs middle school grade teacher who made my dissertation study possible. Launching a research study during a pandemic was quite challenging and I nearly thought I would have to re-envision my entire study. Fortunately, I met Mrs. Turner during an online summer program and she opened her arms and classroom to me during the 2020-2021 school year. In addition to Mrs. Turner, I want to thank the many staff members and faculty at St. Jacobs that shared their experiences with education technology and who helped to open doors for me and my research project. I also want to thank the many student participants in my study and my undergraduate collaborators. I appreciate the willingness of the study participants to try out and attend the critical media club and I thank them for sharing a piece of their lives, in and out of school, and for providing their fascinating thoughts and ideas about topics covered in this dissertation. I am truly amazed by the youth in this study!

The next set of acknowledgements goes to the Hull Research Group: Jeeva Roche, Colette Samimi, Adrienne Herd, Marnie Higgins, Rian Whittle, and the many undergraduate student workers. I enjoyed working with you all and I appreciate the support and guidance you provided throughout the many research projects we implemented in local schools, including this dissertation. A special shout out to Jeeva Roche who has been a mentor to me since I started working on the Global Schools Project back in 2015. Jeeva has been invaluable to my growth as a researcher, pedagogue and even as a mother!

There are many other colleagues I would like to thank for making an impact on my doctoral journey and for demonstrating the value of collaborative work. To the UC Links network, thank you for sharing your compelling after school projects and a special thank you to UC Links Directors Charles Underwood and Mara Mahmood who expanded my horizons by connecting me with members in the network. In addition, I thank the afterschool staff who I worked with for many years as a UC Links coordinator. I would also like to thank funders of my research: UC Links for funding our afterschool projects as well as the Soroptimist Foundation.

To my doctoral peers and scholarly collaborators: I have greatly valued learning from you. Devanshi Unadkat Hilsabeck and Danièle Fogel, we have grown as friends throughout the years and experienced the highs and lows of the dissertation journey together. Devanshi, thank you for collaborating on so many projects with me and for being a great friend. Our adventures in India and traveling to several conferences are special experiences I hold close to my heart. Danièle, we made it! Working virtually and occasionally in person this past year is what helped me to chug along and finish this project. There are so many other colleagues who I would like to thank: Sophia Sobko, Noah Katznelson (Vive le France!), Terry Yau, Emily Dutch Linares, Alice Taylor, John Scott, Emily Hellmich, Bryce Becker, Bethany Monae, Phil Nichols, Amy Stornaiuolo, and so many others.

To my dissertation committee and faculty mentors: Glynda Hull, I am so indebted to all of the advising and, perhaps, risk-taking you did on my behalf! Thank you for inviting me in as your advisee and for placing so much trust in me to conduct and lead research projects spanning from the Bowles Hall project to our VR work in India to our work in the Online Minor in

Education. Thank you as well to nurturing me as an educator and a writer. My pedagogical and writing skills blossomed under your tutelage. I look forward to future collaborations and parties! Claire Kramsch, thank you for taking me under your wing all those years ago in my master's program. I have learned so much about what it means to be a critical scholar, and you opened my eyes to the beauty and power of language as Discourse. Thank you for pushing my thinking at every turn. Abigail (Gail) de Kosnik, thank you for taking me on as an advisee. Your passion for media theory, art, and practice invigorated my love for studying technology in education. A special thank you to my M.A. Professors Derek Van Rheenen and Murray Sperber. You were always encouraging of my research interests and helped me to weave together a master's project and education that led to my doctoral studies. Each of my mentors, those listed here and the many mentors across UC Berkeley such as Rick Kern, Erin Murphy-Graham, Barbara Barnes and others, has amazed me in terms of the depth of their knowledge and experience as educators and scholars.

Finally, to my family: Matthew, thank you for supporting our family throughout my doctoral studies. So much has happened over these years including us getting married and having our wonderful little boy. I appreciate you listening to my many presentations, editing many rough drafts, and helping guide me when it all became too overwhelming. Mom and Dad, thank you for helping to support Matt and me over these years—we definitely owe you a dinner or two. And to my little Leon. My love. You have been around since the start of my dissertation project (in utero that is) to now seeing me finish. I cannot wait to see your own educational journey take shape, and I hope many of the lessons I have learned here will help me to guide your intellectual and personal growth.

## Chapter 1: Augmented Intelligence

The media world and scholarship are yet again abuzz with concerns and hopes for Artificial Intelligence's (AI) implications for society. Specifically, ChatGPT<sup>1</sup>, the generative language model that eloquently and rapidly responds to user prompts, is dominating headlines and conversations on AI, and perhaps even taking part in these conversations. The tool both has great promise and poses existential threats such as challenging white-collar careers (Hoff, Mok & Zinkula, 2023), "the future of writing instruction and education" (Golinkoff & Wilson, 2023, p. 1; see also Lonas, 2023), and even the trustworthiness of all information online (McCracken, 2023).

Concern about the effects of AI on society, education and youth have been increasingly present over the past five years. At the start of my dissertation project in 2020, similar concerns and hopes about AI were targeted toward social media algorithms. The foreboding documentary *The Social Dilemma*, for example, focused on how algorithms and Big Tech companies have unprecedented power to control and manipulate us. These fears and concerns about AI feature in directives and action at the policy level. Biden in his State of the Union address in February of 2023, called for more regulations of Big Tech's data collection and targeted advertising practices toward children (Kelly, 2023). This follows on the heels of a White House "AI Bill of Rights" released in October 2022 that outlines five principles to ensure algorithmic transparency by Big Tech (Office of Science and Technology Policy, 2022) and it makes way for a much-needed renewal of outdated protections put in place in 1998 to safeguard children and teens' online privacy (Ng, 2023).

This study explores technology's impacts on education. Unsurprisingly, AI in education is both heralded as a new frontier for supporting teaching and learning and also seen as a peril. The Office of Educational Technology in the White House produced a series of blog posts that explored how AI will increasingly become an assistant to teaching and learning activities (The Office of EdTech, 2022), concluding therefore that AI in education is best understood as an "augmented intelligence." With recent advances in AI there are also grave concerns, which the Office of EdTech acknowledges. ChatGPT, for example, is known for "writing cogent essays, solving science and math problems and producing working computer code" (Roose, 2023, p.1). This has spawned a litany of articles addressing "the possibility of students cheating by having ChatGPT do their homework for them" (McCracken, 2023). As a result, some argue that writing instruction needs to be reworked (Golinkoff & Wilson, 2023) while others reflect more philosophically on what is human about writing (Gero, 2022) and how to harness this. Such questions have similarly been asked by critical scholars of algorithms who question how the meaning of language, communication and literacy are altered in an age where algorithms direct our interaction with texts (Jones, 2021).

This dissertation project contends with how AI in the form of social media algorithms and educational platforms shape young people's worlds—their identities, their literacies and their learning. Questions asked now about AI and its implications for literacy, education and

---

<sup>1</sup> ChatGPT is the fourth generation of a language model technology owned by San Francisco-based company OpenAI. A language model is a type of natural language processing application that predicts the probability that a word will come next in a sequence of words based on its analysis of textual data (Lutkevitch, 2020). While ChatGPT is not the largest or first language model, it is the first to use human prompts to develop its language model through ranking its response to user prompts (Hayworth, 2023).

youth similarly framed my dissertation research: How is discourse in education and on youths' social media feeds framed by algorithms? How do algorithms feed into the rampant misinformation observed online and how does this shape youths' worldviews and knowledge? Are we, as a society, simply controlled or manipulated by BigTech and its AI? Is there anything we can do to work *with* AI, especially in education, to make it work *for* us?

I came to these questions through my research on university and middle school students and through calls in scholarship to attend to algorithmic power. The middle school youth in our digital storytelling programs crafted their projects to mirror social media trends like food eating challenges and university students processed course materials in relation to the multimodal texts sourced through Google Search. AI was shaping learning in and beyond schools, and I wondered exactly how it was shaping students' thought processes.

As I explored algorithmic culture (Seaver, 2017) in my studies, I observed that scholarship on algorithms and popular discourse rarely interviewed youth about their views or observed what youth actually did with these technologies. What are youth actually doing with algorithms or ChatGPT? Are these technologies really altering education or replacing writing and thinking in our younger generations? The near lack of youth voice or empirical research on AI stands in stark contrast to scholarship in New Literacy Studies and youth media, which highlight youth agency through and around technology. In these studies, youth participants masterfully navigated complex and often discriminatory online and offline contexts (e.g., boyd & Marwick, 2011; Hull & Katz, 2006; Lam, 2000). Some in NLS (see Nichols & Stornaiulo, 2019) insist that these agentic accounts, in their focus on users and user-produced discourse, overlook infrastructural power and socio-economic relations. While my study answers this call, I remain anchored to these NLS studies by observing the user in relation to infrastructure and socio-economic relations.

A combination of trends in AI, my observations of learning in university and K-12 contexts and scholarship on algorithms, platforms and literacy led me to design an ethnographic study exploring the interactions of youth with social media platforms and algorithms. This study sought to understand the role of algorithmic power and youth agency in these interactions, both in school through educational platforms and out of school in the use of social media platforms, and in between as there is no clear line separating the use of such platforms. In addition, my study also sought to understand how we might teach students critical literacies around algorithmic power. In this way, it echoes those today calling for us to orient toward AI as "augmented intelligence." Rather than disavow such technologies that are already upon us, how might we learn to live with it, while we simultaneously also understand how it is shaping us.

### **The Present Study**

The present study examined how youth interacted with platforms like YouTube and Google Classroom, including the platforms' algorithms, and how educational practitioners might develop the critical digital literacies needed to bolster student agency in relation to algorithmic and platform power. The study centered on ten 10- to 12-year-olds in a variety of contexts: in remote pandemic schooling, an afterschool critical media program, and in their daily uses of technology. The dissertation project shows through qualitative design and analysis, including ethnographic methods, multimodal discourse analysis, and tracing in actor-network theory, the ways in which youth, platforms, and algorithms work together and against each other to shape educational practice, identity, and digital literacies. Despite much of the scholarship and popular discussion on AI, my dissertation paints a complicated picture of the interrelation of youth with



AI, one that highlights but does not romanticize human agency in relation to powerful and covert technical automation.

The dissertation begins by situating the study in a conceptual framework and its methodology. Chapter 2 covers scholarship on critical studies of platforms in education, debates on algorithmic power and human agency, and critical digital literacies (CDL). Collectively, these scholarships show the need for empirical studies on how youth interact with platform algorithms in schools, beyond and in between, and how we might design CDL interventions. Chapter 3 reviews the study's qualitative methodological approach and the research site context in more detail. Stemming from its postmodern and posthuman conceptual framing, the methods chapter focuses on how I studied the relation between youth and algorithms through discourse analysis and tracing actants.

Three empirical findings chapters follow, featuring different platforms and contexts. Chapter 4 is the first study in the critical educational platform literature to observe how teachers and students use one of the most popular learning management systems in the K-12 context: Google Classroom. This study shows the tensions between actual uses by teachers and those designed and encouraged by GC. In examining these moments of tension, the study shows how GC shapes classroom practice through its infrastructure, but also the ways that teachers and students improvise, deny, and subvert the platform design. Chapter 5 analyzes the youth participants' engagement with social media platforms like YouTube and TikTok. Through multimodal discourse analysis of screen-recordings, student artifacts and interviews, the chapter shows how students negotiated their identities in relation to the algorithmic identities calculated for them on various platforms. Special attention is given to forms of resistance or disruption of the algorithmic identity and racialized algorithmic identities. Finally, Chapter 6 looks at the result of an educational program to develop students' critical digital literacies around algorithms and platforms. Drawing on student artifacts, chat transcripts and recordings, teaching materials, and interviews, the chapter identifies the discourses promulgated in the club that shaped students' algorithmic imaginaries and critical digital literacies. The dissertation synthesizes these findings in Chapter 7 and explores implications for scholarship and educational practitioners.

The dissertation is timely in light of renewed and re-invigorated conversations around AI in education and society. The study project shines a light on how youth, in particular, as well as educators navigate the molding forces of technology in education through educational platforms and in everyday life through social media algorithms. It contributes to a growing body of empirical scholarship that shows the complexity of human-machine interactions, and it carves out space for human agency. The dissertation shows that with technologies like ChatGPT, youth are not doomed to lose the capacity to write or think; rather, their relation with AI is mediated by a range of human and non-human actants that provide them a capacity to use the technology toward their own ends.

## Chapter 2: Conceptual Framework

### Theoretical Framework

*Actor-network theory can also be understood as an empirical version of post-structuralism... Foucault asks us to attend to the productively strategic and relational character of epochal epistemes (Foucault, 1979). The actor-network approach asks us to explore the strategic, relational, and productive character of particular, smaller-scale, heterogeneous actor-networks. (Law, 2009, p.6)*

A “material semiotic” approach undergirds the ontology and epistemology of this dissertation project. While I certainly am not rooted in realist theories, which see reality as external and knowable through positivist scientific methods, I am neither rooted in social constructivism, an approach that often frames social science research, and which sees reality as constructed and only knowable or describable through human culture and discourse (Schwandt, 2003; Whorf, 1956). A material semiotic approach frames reality and knowledge as an interaction and a relationship between symbolic and material forms. The approach “rematerializes the social and takes seriously the agency of the natural” (Tuana, 2008, p. 188), in effect blurring the boundaries between the material and social worlds and emphasizing their inextricable relationality. My dissertation keeps the material and semiotic in balance and has an “understanding the relationship between discourse and matter that does not privilege the former to the exclusion of the latter” (Alaimo & Hekman, 2008, p. 6), nor lose sight of the importance of discourse.

My dissertation explores the relation between algorithms and platforms and digital literacy practices of sixth graders in and beyond school in terms of agency and power. The relation of algorithms and platforms to literacy, as I will explain in the literature review, often is figured as one of domination. Empirical accounts are less common in critical algorithm studies and platform studies, which contributes to the over-inflation of algorithmic and platform power over users. By revisiting how agency and power operate in a material semiotic approach, I show that power is not absolute and that agency is an effect of material semiotic relations, paving the way to show empirically how

The following section defines a material semiotic approach and highlights how agency and power are figured within this approach. My conceptual framework begins by explaining the important work of poststructuralist theories for linking discourse to knowledge, power and agency. The section then reviews materialist theories outlined by actor-network theory, assemblage theory, and new feminist materialisms, which consider material forms of agency and highlight a dynamic *relationality* between semiotic, technical, and material forces. This framework guides my analysis and presentation of findings in the chapters that follow.

### ***Power & Agency in Discourse***

*Discourse can be both an instrument and an effect of power, but also a hindrance, a stumbling-block, a point of resistance and a starting point for an opposing strategy. (Foucault, 1990, p. 101)*

Poststructuralist theory is integral to my dissertation project, theoretically and methodologically, and it informs how I understand the role of the *semiotic* in a material semiotic

approach. Poststructuralism draws a thread between discourse, knowledge, power and agency. Discourse is, broadly speaking, “the ways people build and manage their social worlds using various semiotic systems,” and can be seen “as a tool for performing social practices” (Jones, Chik, & Hafner, 2015, p. 4). Discourses are shared semiotic systems used and produced by social groups, and they are ways of *acting* in and on the world (Austin, 1962). Discourse gives us the capacity to “do things with language, produce effects with language...do things to language”, but perhaps most importantly, discourse is action itself as “language is also the thing that we do” (Butler, 1997, p. 8). Discourse and practice are intimately intertwined.

Foucault, who informs the preceding sociolinguistic definition offered by Jones, is perhaps the most foundational poststructuralist scholar to theorize discourse. What is not readily apparent in the former definition, which focuses primarily on discourse as the tool of “people” to act in and on the world, is that discourse acts on “people” (i.e., subjects) as well. Discourses, in fact, collectively define the matrix or “fundamental codes of a culture” which constitute the conditions of possibility for acting, being, and knowing (in) the world (Foucault, 1994, p. xx). From a Foucauldian perspective, “power and knowledge directly imply one another...there is no power relation without the correlative constitution of a field of knowledge” (1995, p. 27), and this happens through discourse. Whether it be naming, distinguishing, or normatively judging bodies as deviant sexualities (Foucault, 1990) or subjects of discipline (Foucault, 1995), discourse proliferates to generate knowledge about bodies, to create recognizable identities (or subject positions), and to act on bodies and coerce them to act in recognizable ways; in this way, discourse joins power and knowledge, and can be used as a strategy to dominate and control others (p. 26). Discourse, in the poststructuralist view, forms the foundation of reality through creating the means of knowing, representing, and acting in and on the world. Despite the seeming over-determining force of discourse, agency is integral to poststructuralist theory. Unlike its structuralist predecessor, which assumed language was united in a seamless and holistic linguistic system (e.g., Saussure), a defining feature of poststructuralism is that it characterizes discourse as a “series of discontinuous segments whose tactical function is neither uniform nor stable” (Foucault, 1990, p. 100). This creates the condition of language to be a site of *both* power and agency: Its fragmented nature makes it possible for discourse to transmit, produce, and reinforce power, but it “also undermines and exposes it, renders it fragile and makes it possible to thwart it.” (Foucault, 1990, p. 101).

Bakhtin’s theory of language as heteroglot usefully points to the “fragility” of power and “segmentation” of discourse that create the conditions for agency. Language, for Bakhtin (1981), is heteroglossic, having many tongues. Discourse may be a power grid, but it is one that is constantly constructed through “dialogism” and “addressivity.” These concepts refer to the historical and future-oriented nature of language, and its active construction through chains of speech. Dialogism and addressivity take place through the utterance, a moment of discourse; the utterance is always tied to its past and future uses, and “cannot fail to brush up against thousands of living dialogic threads,” arising “out of dialogue as a continuation of it and as a rejoinder to it” (p. 276). Any instance of discourse is locked in a chain of dialogue, responding to and drawing from its prior meanings while simultaneously being “oriented toward a future answer-word” (p. 276). While we are heavily constrained by the weight of dialogism and addressivity, Bakhtin nonetheless affirms heteroglossia in language and *internally* to each individual. Each individual undergoes “an intense struggle...for hegemony among various available verbal and ideological points of view, approaches, directions, and values” (p. 346). This process is referred to as

“ideological becoming”, a process defined by navigating discourses, making words “half-ours” (p. 345) and consequently revealing “ever newer *ways to mean*” (p. 346).

For the poststructuralist, power and agency are intimately interwoven, each being the condition of the other. Through ideological struggles with language, which is tied to knowledge and world views, we contribute to language’s heteroglossia and its power. Below, I will explain the expansion of poststructuralist theory by post-humanist materialists.

### ***Power & Agency in Technology***

*One could conclude, accordingly, that “matter becomes” rather than that “matter is” (Coole & Frost, 2010, p. 10).*

Post-humanist and materialist theories, like those of actor-network theory (ANT), assemblage theory, and feminist new materialisms, contend with and build upon poststructuralist views of reality. As Alaimo & Hekman (2008) write in their introduction to a groundbreaking edited volume on new materialisms, “defining materiality, the body, and nature as products of discourse has skewed discussions of these topics” (p. 3). Posthumanist approaches *expand* beyond the poststructuralist view that reality and discourse are co-constitutive (Fairclough, 1989) to include the material and technical as co-constitutive with discourse and reality. Materialist approaches should not be seen as counter to post-structuralism, but as building on and rectifying oversights in poststructuralism. Like Foucault and Butler, who characterize power as relational and networked and consequently de-center human agency, the materialist or posthumanist stance “begins from the premise that humans never act in isolation, but rather in concert with changing networks of people, objects, histories, and institutions” (Nichols & Campano, 2017, p. 246). The emphasis here though is on not solely locating power, agency, and reality in discourse but materiality as well.

Actor-network theory expands on post structuralism by de-centering human agency through distributing agency among humans and non-human things. This distribution of agency is captured through the ANT concepts of the actor-network and mediating actants. Action and effects are never produced by lone actants, but are a “continuously generated effect of the webs of relations” (Law, 2009, p. 2) between humans and non-humans, or the actor-network. The actor-network is maintained and generated by actants making “*others do things...by generating transformations*” (Latour, 2005, p. 107). Transformation is essential to an actant’s agency. In ANT, actants can either be intermediaries, simply reproducing or passing along an effect from one actor to others in the network, or mediators, which “transform, translate, distort and modify the meaning or the elements they are supposed to carry” (Latour, 2005, p. 39). Mediating actants, whose “input is never a good predictor of their output,” points to the necessity to account for the material specificity of things” (*Ibid.*).

Non-human actants, in their materiality, possess two kinds of agency— a “negative power or recalcitrance” and “a positive, productive power” (Bennett, 2010, p. 1). Its negative power stems from an accepted idea in poststructuralism that matter is not fully graspable by discourse or knowledge; as Butler (1997) writes, the “body is the blindspot of speech, that which acts in excess of what is said, but which also acts in and through what is said” (p. 11). While the body acts through “speech” and “being recognizable,” the body as well as things “refuse to dissolve completely into the milieu of human knowledge” (Bennett, 2010, p. 3). Things are “not simply the hapless bearers of symbolic projection” (Latour, 2005, p 10), and they in fact have a physicality and material specificity that endures over time (Leonardi, 2012) and that shapes how

we discursively construct them. In assemblages, entities form relations of exteriority, meaning that the internal essence of things do not change through their alliance, though certain features may be actualized in the assemblage (DeLanda, 2006). An oft referred to example of this in literacy studies is that modes and things have affordances. Affordances are not merely pre-existing in things, but are qualities that are realized through their relation with human intentions. For this reason, we must look to more than discourse to explain reality, because we overwrite materiality and other heterogeneous entities in the terms of discourse without heeding the recalcitrance and materiality of things.

The materialist identifies another, perhaps more important, power, the “positive, productive power” of materiality. Stemming from assemblage theory and ANT, Bennett (2010) identifies a thing-power, “the curious ability of inanimate things to animate, to act, to produce effects dramatic and subtle” (p. 6). Things themselves are alive, not inert or passive; they have a *vibrancy* characterized by the “tendency to persist” through maintaining and forging association with other things in the face of disruption to these associations<sup>2</sup>. Vibrant matter, its positive, productive force, is an active striving to persist in association with other things in the face of unpredictable disturbances, a persistence requiring not repetition but a “continual invention,” self-transformation and creative resilience (p. 22). Thus, “materiality is always something more than ‘mere’ matter: an excess, force, vitality, relationality, or difference that renders matter active, self-creative, productive, unpredictable” (Coole & Frost, 2010, p. 10).

From these accounts of vibrancy, assemblages, and actor-networks, we can draw a few conclusions about materiality. Materiality *matters*: discourse cannot fully capture the material; material is vibrant, creative, agentic; material works through association, in the form of assemblages or networks; and material agency is *transformative*, never simply relaying cultural or social actions. But discourse matters, too. As Foucault showed us, it is agentic, like material, and it works as part of assemblages and networks, but it does not supersede them. Finally, ANT and assemblage offer several important reconsiderations or qualities of any “social” phenomenon: they are composed of heterogeneous actants, these actants come together in dynamic relationality as networks or assemblages, and causality is a complicated, uncertain effect of these relations, rather than human-produced and linear.

The material semiotic framework allows me to engage with the concerns raised by scholars that algorithms and platforms shape ways of doing, being, and knowing through complex sociotechnical relations. Importantly, new materialism “rejects a conception of materiality which is solely based on the fact that human may touch, feel, see or hear a sensation without mediation” (Van den Boomen et al, 2009, p. 9, *c.f. Reichert & Richterich, 2015*). That is to say that digital technologies, which is often invisible and seemingly “immaterial,” nonetheless are “material” agents in that they “exert agency, affect industries and individuals” (Reichert, & Richterich, 2015). In the educational context of my study, a material semiotic framework allows me to test out such concerns in terms of digital literacy (doing), the formation of identities<sup>3</sup>

---

<sup>2</sup> One of the most illustrative examples in Bennett’s book is tracing how *metal* is vibrant, agentic, and alive: By viewing metal at the scale of atoms and over geologic time— “at a speed or level below the threshold of human discernment” (p. 58)— she shows how the “crystalline structure of metal is full of holes” requiring metal to maintain its crystalline structure in inventive ways, and that its unique structure afforded metallurgists the opportunity to mold metal in ways its material structure enabled.

<sup>3</sup> Identity in this project is modeled after the imagery of the cyborg, “a hybrid of machine and organism” (Haraway, 1985, p. 140): gender and race are neither wholly discursive or performed, but include “lived experience, corporeal practice, and biological substance” (Alaimo & Hekman, 2008, p. 4) as well as the technical materials we engage with.

(being), and learning and knowing. As Nichols & Campano aptly observe (2017), “in literacy education, [posthumanist theory] means broadening our perspective on what factors help shape student learning in our classrooms and teasing out their implications for policy and practice” (p. 248).

## Literature Review

Today, we speak of the Internet and often the digital in terms of the platforms— Twitter, TikTok, Google Classroom— that form the infrastructure of our online participation and exchanges. Platforms form the backbone of the Internet and they are infused in various social realms including education. We live in what José Van Dijk and colleagues Poell and de Waal (2017) call a platform society. Platforms are places where social and economic exchanges occur. As proprietary and closed-systems with a capacity for “connection, programmability, and data exchange” (Plantin, Lagoze, Edwards, & Sandvig, 2018, p. 296), they “process information and communication, channel social traffic, and enable the creation and sharing of user-generated content” (Williamson, 2017, p. 62). As with any sociotechnical infrastructure, a platform is more than its technical components but is a “set of relations” between users, programmers, and companies “that constantly need to be formed” (Van Dijk, 2013, p. 6) and performed.

Platform studies’ “sister” field is critical algorithm studies. One way to examine how platforms impact society is through examining its infrastructure— algorithms and data. My dissertation looks more specifically at how youth engaged with algorithms on the social media platforms they engaged with beyond school. Algorithms are technologies that “make things happen” (Willson, 2017, p. 140). The algorithms that users interface with on platforms operate in tangible ways; they “categorise, search, sort, aggregate, and match people, things, and places in everyday practices.” (Yu-Shan Tseng, 2022, p. 3). From a technical viewpoint, algorithms are mathematical models that form a set of instructions for organizing and filtering data (Moshckovakis, 2001). They are machines “that are programmed to learn patterns in data and use those correlative patterns to analyze and make assessments about new data” (Cheney-Lippold, 2011, p. 171). Their fundamental nature is a technical one in which they operate through models, inferences, predications and statistical processes.

Alongside its technical qualities, scholars have identified several features of algorithms as they are experienced by users and in society. One of the truisms about algorithms today is that they are “black-boxed” (Pasquale, 2015). Their technical functioning is a closely-held company secret where users and researchers alike can only understand how they function by piecing together the link between inputs and outputs. This has generated a host of scholarship and debates about the means by which algorithmic functioning can be made transparent and accountable (e.g., Burrell, 2016; Citron & Pasquale, 2014; Diakopoulos, 2015) and whether transparency would resolve algorithmic concerns (e.g., Ananny & Crawford, 2016). The black-box problem has also led scholars to identify a host of methodological tools for peeking into the black-box (e.g., Diakopoulos, 2014; Sandvig et al., 2014). Some of these methods informed the after school club I designed to develop students’ critical digital literacies; namely the crowd-source methodology, which uses the power of collective and comparative investigations of the algorithm to identify how it functions. Despite sophisticated methods to peek into algorithmic processes, the algorithm’s technical function cannot be truly and fully known due to being “black-boxed.”

The black-box problem does not deter critical studies of algorithms because algorithms are understood as one actant in a diffuse sociotechnical system. In interviews with software

engineers at technology companies, Nicolas Seaver (2017) found that these engineers who worked directly on the algorithm were unable to precisely “locate” the algorithm because algorithms are “collective products” (p. 3) produced by multiple people. In his later work on “knowing the algorithm,” he writes that “the algorithms we are interested in are not really the same as the ones in *Introduction to Algorithms*. It is not the algorithm, narrowly defined, that has sociocultural effects, but algorithmic systems—intricate, dynamic arrangements of people and code” (Seaver, 2019a, 418-9). In other words, the algorithmic effects we are interested in are not just the effects of the formulaic and coded technologies as defined in the field of computer science, but rather the effects of algorithms as they interact with and respond to people and other technologies. As is consistent with an ANT perspective, algorithms have effects through their relation with human and non-human actants— business models, designers, users, other algorithms, and data all come together to create algorithmic effects. This means that studying algorithms includes understanding how people think about and engage with them.

Another important feature of algorithms is that they are biased technologies. Most technology companies try to frame their algorithms as neutral (Gillespie, 2014) and they most often do this from a computational discourse. As Gillespie (2014) writes, algorithmic decisions are “presented both as distant from the intervention of human hands, and as submerged inside of the cold workings of the machine” (p. 181), meaning that they are reliable technologies that are objective and non-discriminatory, unlike humans. In Google Search they are simply finding the most relevant websites based on their formula. Algorithms though are encoded with the biases of their creators and, especially in the case of machine learning algorithms, those of their users. Critical scholars understand algorithms as enacting and encoding capitalistic logics (Kaplan, 2014; Mager, 2012) as well as prejudices like racism or anti-blackness (Benjamin, 2019; Noble, 2018) and homophobia (Ananny, 2011).

Finally, algorithms are multiple, dynamic and constantly updated by their creators. When someone refers to the “YouTube” algorithm, for example, they are in fact referring to multiple algorithms that make different parts of the platform function. There is not a single algorithm to track. Additionally, algorithms are “in a constant flux” (Willson, 2017, p. 148). They are not static entities as they are being retooled and recoded by their designers. Many algorithms today are also created and updated based on the user data they are trained and re-trained on. For this reason, as well as many others above, it is not useful to try to pin down a specific algorithm to understand it, but instead to try to understand how we engage with and understand the “traces” of algorithms— such as the personalized content recommendations on sites like YouTube, which are a byproduct of algorithmic processes.

These qualities— black-box, diffusion, bias, dynamism, and multiplicity— shape the understanding of algorithms in my own study. For this reason, I value what participants understand and say about algorithms as well as what they do with and to algorithms. These are all important components to understand the effects that algorithms have on users. My dissertation examines how youth participants engaged with platforms and algorithms across contexts. Below I review three areas that are central to my dissertation research— critical studies on how platforms shape educational practices, work within critical algorithm studies on human and non-human agency and power, and work on agentive youth digital literacies and critical digital literacies.

## ***Platforms in Education***

One focus of my dissertation is the role of platforms in educational contexts. Specifically, I explore how the youth participants and teachers in my study engaged with platforms in school. Given the increasing role of technology, applications and platforms in education, especially since the pandemic onset (Williamson & Hogan, 2020), critical accounts of platforms in education have budded of late. The critical literature deviates from a well-established literature on Learning Management Systems (Turnbull, Chugh, & Luck, 2021) and Learning Analytics (e.g., Long & Siemens, 2011), which study how to instrumentalize platforms and data for learning. Instead, these critical perspectives examine the social and technical effects of platforms and applications on education (Selwyn, Nemorin, Bulfin, & Jacobson, 2016, 2018). Driven by theorists and researchers within critical studies of technology in education, such accounts attempt to trace the subtle, yet influential ways that, “under the influence of digital platforms, educational practices are gradually *changing form*,” by “altering the meaning, possibilities and potential functions of education” as well as its practices (Decuyper, Grimaldi & Landri, 2021, p. 2).

Sociotechnical accounts of platforms in education have been piecemeal (e.g., Dixon-Roman, Nichols, & Nyame-Mensha, 2019; Selwyn et al. 2018; Williamson, 2017)<sup>4</sup>, but a 2021 special issue in *Critical Studies in Education* helped to gather and solidify the need for critical research on education platforms. This special issue underlined the importance of looking specifically at Educational Platforms (EPs) to understand how the platform logics and protocols are particular to education, which in turn have effects on education that “generic platforms” like Facebook would not produce. For example, they argue that the drive to maximize platform participation on social media sites diverges from how EPs tend to focus on organizational forms of use, like school-wide participation, rather than user-centric types of participation, such as creating forms of addiction in users.

In their introduction summarizing the themes and findings of the special issue submissions, Decuyper and colleagues (2021) identify four defining features of EPs: digital architecture, intermediaries, new types of organization, and investment in forms. Each platform has a digital architecture, or a “sociotemporal constellation” composed of the user-facing interface and the software interface between platforms and applications, which makes possible particular actions (e.g., liking, re-tweeting) as well as forms of data extraction and circulation. As intermediaries, the platforms connect users and other entities such as companies and institutions, and they “set up specific rules and codes of conduct that make such exchange possible” (p. 5). Platforms in addition become organizations or firms unto themselves as they produce and extract data from users as “a means of value production” (p. 6). Finally, EPs invest in making education “dividable, knowledgeable, and actionable...in ways that reformat, redo, restructure, and reconceive what education is or could be about” (p. 7-8). It is this latter element of EPs that I focus on in particular in Chapter 4 on Google Classroom.

The contributions to the special issue aligned in their views and definitions on EPs while offering a diverse range of analytical methods and platforms under consideration. Each article uses a different analytical methodology, such as Foucauldian archaeology, sociology of markets,

---

<sup>4</sup> Williamson (2017) studied how ClassDojo re-engineers student and teacher behavior toward narrow psycho-social values such as grit that are programmed within the application and Dixon-Román and colleagues (2019) examined how EssayHelper perpetuates racializing forces of student writing through machine learning algorithms. Whereas these two authors look at algorithmic practices, Selwyn and his colleagues (2017) examined how technology affects the everyday reality of schooling more broadly, though they do study the impacts of how an Australian learning management system shifts teacher labor, student surveillance, and student-teacher relationships and classroom activities.



and multi-sited ethnography, but all were unified in adopting a “critical platform gaze,” defined as viewing platforms “as connective artefacts constitutive of, as well as constituted by, active socio-technical assemblages that are in the process of significantly transforming the educational sector” (Decuyper et al., 2021, p. 2). Nearly all of the articles analyzed a single platform in isolation from other platforms, such as Blackboard Learn or Google Classroom, or they analyzed a company such as Pearson; notably, one article compared two school performance platforms (Hartong, 2021). None of the articles, however, looked at how platforms interacted with each other in the classroom context. In my dissertation, I show that studies on EPs outside of the contexts in which they are used overlook how platforms actually shape education.

Each of the articles showed how various macro-actors were entwined in the effects of the platform. These actors included companies, educational governing bodies, university ranking systems, or its own platform architecture—specifically, its underlying infrastructure and / or its user-interface. In addition, each article shows how these macro-level actors work together to alter education, such as ordering educational space and time relations (Grimaldi and Ball, 2021), prioritizing self-optimization (Lange, 2021), or aligning education with the goals of platform capitalism (Williamson, 2021). Together, these articles make an impact on the critical study of EPs as they show different ways to analyze platforms, they come to unique conclusions about EPs impacts on education, and they cover a diverse set of circumstances, platforms and actors.

One gap in the special series is that it focuses on high-level sociotechnical analyses, bereft of platforms as they are used in context. Such is not always the case with critical platform studies. One study by Crooks (2019) examined how “dataveillance”, or surveillance of school members through data collection, actually takes place in schools. Crooks found that the data acquired from school systems designed to track teacher performance and student applications to college was heavily contested and at times disregarded. For example, teachers who did not perform as well as others according to the data were still awarded the same bonuses despite policies in place to deduct from their final bonus based on the analytic reports. Crooks concludes that “data cannot speak for themselves, so they must be *made* to speak” (p. 485).

My dissertation operates from the view that platforms, too, must be made to *act*. For this reason, I have focused on empirical evidence of how schools, teachers and students actually use platforms. By examining macro-level socio-technical networks, the recent EP literature risks overlooking how platforms actually change educational forms in context. In fact, the special series acknowledges the importance of empirical studies on EPs: Decuyper and colleagues (2021) mention that “rather than considering digital education platforms as determining *structures*, we approach them as ecologies of *practices* that are both elusive and open-ended,” meaning that platforms’ effects are contingent on actual practices. Furthermore, Perrotta, Gulson, Williamson, and Witzemberger (2021), who examined Google Classroom’s infrastructure, admit that “there is always a tension between the sociotechnical imaginaries of large corporations materialised in digital infrastructures, and the compromised reality of sub-standard practices<sup>5</sup>, improvisation, subversion, denial and transgression” (Perrotta et al, 2021, p. 109, my emphasis). My study shows the tensions around the idealized uses designed by companies and the ways participants actually use EPs that include improvisation, subversion, denial, transgression and other ways of engaging with EPs.

Finally, the EP literature focuses on EPs separately from “generic” platforms like Facebook or TikTok to distinguish their platform logics specific to educational contexts. Overlooking “generic” platforms disregards important ways that such platforms impact

---

<sup>5</sup> I address and counter this particular framing as “sub-standard” in findings Chapter 4.

classroom practices, and vice versa. For instance, Fyfield, Henderson and Phillips (2021) showed how teaching curricula and pedagogical materials posted to Youtube are increasingly shaped by the Youtube algorithm. In their study of teachers searching for educational videos, they found that most teachers scrolled through the first page of findings, and the less knowledgeable on the subject they were, the less critical the teachers were about finding a video according to their own criteria rather than the algorithms. In addition, educational scholar Luci Pangrazio (2019) found that youth's self-representation on Facebook was not only a byproduct of algorithmic processes, but peer friendship culture and cybersafety discourses learned from parents and teachers. The influence of a school-based "cybersafety" discourse countered the interests of social media companies and shows an example of how a school-produced discourse influenced uses of generic platforms. My dissertation looks at the platforms that youth use in and out of school contexts.

### ***Algorithmic Power***

Algorithmic processes are consequential and have led many critical scholars to study "algorithmic power." Algorithmic power works subtly and over time. In a useful metaphor that sidesteps algorithmic power as simply brute coercion, Seaver (2019b) examines the discourse of the Silicon Valley elite to argue that algorithms are "captological technologies": They capture or trap the user. As compared to the speed of animal traps, Seaver notes that "an infrastructure is a trap in slow motion" (Seaver, 2019b, p. 432). Algorithms trap users over time, enticing the user slowly into an environment or world that reflects their interests and tastes. By slowing down the entrapment of the user, "we can see how traps are not just devices of momentary violence, but agents of 'environmentalization' ...making worlds for the entities they trap" (Seaver, 2014, p. 432). Algorithms capture (and re-capture) users into personalized content as the user engages in the system; across time, the user is in a "world" of their own based on data categories assigned to them. Through capturing and trapping the users' attention, big tech evades responsibility of coercing users into particular behaviors and instead persuades them by using their mind and tastes against themselves (p. 427).

Algorithmic power includes the capacity to shape public discourse. Through its encoded decision-making processes, algorithms regulate "what becomes visible and what remains out of sight, and to whom" (Velkova & Kaun, 2019, p. 526; see also Gillespie, 2014; Pariser, 2013). Rodney Jones, who studies how algorithms shape literacy and language, for example, writes that "much of the discourse we find online, in fact, is not produced by humans at all, but by algorithms" (Jones, 2016, p. 4). While it may be overstated to say that algorithms produce most of the discourse online (though they certainly funnel it), it is fair to say that discourse online is shaped by algorithms in concert with humans.

Discourse and knowledge go hand in hand. The meaning of words and our own meaning-making practices shift through algorithmic power. Some scholars have looked at how our language and therefore meaning and knowing are shaped and being shifted by algorithms. Striplas (2015) for example traces how the meaning of culture has shifted as we have placed more cultural production onto technologies. By tracing the shifting meanings of key terms "surrounding the word" culture (p. 398)—namely, the words information, crowd and algorithm—he argues that we are in an algorithmic culture. Our algorithmic culture 'privatizes the processes' (p. 406) of "human thought, conduct, organization and expression into the logic of big data and large-scale computation" (p. 396). In addition to culture becoming more machine-like and machine-produced, our own practices of meaning-making have shifted. The categories of participation made possible by platforms such as searching, liking, filtering, and retweeting

have led to “new forms of communicative action” altogether, which “make us think, internalize, and act along the lines of their particular modes of communicative action” (Anderson, 2018, p. 1135-6).

Algorithmic power also functions by shaping social relations and how these relations are enacted. One of the more notable scholars to argue for the powerful influence of algorithms on behavior, Van Dijk (2013) re-envisioned Jenkins’ (2006) now seemingly utopian vision of platforms as democratic and participatory spaces. Van Dijk concedes that platforms are spaces of user participation and that users’ preferences and actions influence the architecture of platforms, but she urges us to see that participation online is channeled through the platform infrastructure toward behaviors that reflect company business practices and algorithmic protocols. She offers us an alternative concept to reflect the complexity of participation online: “networked connectivity<sup>6</sup>.” Similar to this, Langlois (2013) argues that platforms can be seen as “conduits of governance” that act “as a manager that enables, directs, and channels specific flows of communication” (p. 100). As conduits of governance, platforms and their algorithms shape social relations.

Platforms and algorithms shape our identity. The algorithmic identity is a concept coined by critical algorithm and identity scholar Cheney-Lippold, which refers to an additional identity layer calculated by platforms about the user. Cheney-Lippold (2011) explains that the algorithmic identity is a “statistical commonality model” and “an identity formation that works through mathematical algorithms to infer categories of identity on otherwise anonymous beings” (p. 165). Our moves and clicks online are constantly surveilled and turned into data points; these data bits are clustered with those of other users and turned into “statistical commonality models to determine one’s gender, class, or race in an automatic manner at the same time as it defines the actual meaning of gender, class, or race themselves” (p. 165). Algorithmic identification processes are so powerful that they unsettle identity from their social categories and become defined by clusters of ever-evolving user data (see also Kotilar, 2020). Cheney-Lippold even goes so far to say that the algorithmic identity “moves the practice of identification into an entirely digital, and thus measurable, plane” (Cheney-Lippold, 2011, p. 165). The algorithmic identity thus is an “additional identity layer” that makes us intelligible to platforms and their advertisers, and that also hyper-individualizes our experiences, providing us the content and categories for identity expression (Cheney-Lippold, 2011, 2017; Lake 2017). Underneath our online meandering and acts of identity expression, our identities are being calculated, predicted, and shaped by technical processes.

The algorithmic identity iteratively calculated and assigned to the user shapes the possibilities for digital identity construction by moderating the tools and texts available to users. For this reason, Cheney-Lippold (2011, p. 178) warns that “we are effectively losing control in defining who we are online, or more specifically we are losing ownership over the meaning of the categories that constitute our identities.” The influence of algorithms on identity are particularly concerning considering the prevalence of bias and discrimination perpetuated by algorithms, often in ways that harm women and racial minorities. As professor and data journalist Meredith Broussard explains, “automated systems discriminate by default” because they rely on biased data sets and their designs reflect our social and cultural beliefs (as cited from Gupta, 2019). Professor of Information Safiya Noble (2018), whose recent work showed that

---

<sup>6</sup> This concept parallels Bucher’s (2018) concept of programmed sociality, the idea that “social formations and connections are algorithmically conditioned and governed by the sociotechnical and political-economic configurations of specific media platforms” (p. 7).

Google search results linked black women and girls with pornographic and racist imagery, has argued that such results are not benign, and that they perpetuate oppression of minorities and women.

Across the critical algorithm studies literature, there is a strong case made for the power that algorithms exert on discourse, knowledge, culture, social relations and identity. Given concerns around bias and discrimination, I focus more specifically on how algorithms influence students' development of gendered and racialized identities. These articles are careful to position themselves as not techno-deterministic and always providing a space for agency and resistance by human actors and other actants. With that said, much of the scholarship in critical algorithm studies, especially earlier work, is focused on algorithmic power. In the next section, I review work on agency by human actors in relation to algorithmic power.

### ***Algorithmic Agency***

*In attempting to say something of substance about the way algorithms are shifting our public discourse, we must firmly resist putting the technology in the explanatory driver's seat. (Gillespie, 2014, p 169)*

While the previous accounts highlight the powerful molding force of platforms and algorithms, they overlook user agency. The user affects how algorithms are deployed and how practices emerge around them (Bucher, 2017; Jones, 2021). The scholarship on algorithms has turned toward empirically documenting and theorizing human agency in relation to algorithms. A crucial step toward understanding the agency human actants have in relation to algorithms is Bucher's (2017) notion of the "algorithmic imaginary<sup>7</sup>." Through a series of case studies pulled from interviews with Twitter users, Bucher (2017) showed that the perception of how algorithms function, whether technically accurate or not, affect decision making and user participation online, which in turn shapes technical processes. Bucher accordingly defines the algorithmic imaginary as "the way in which people imagine, perceive and experience algorithms and what these imaginations make possible" (p. 31). This concept creates a space for agency through user beliefs, knowledge and experiences around algorithms, which debunks the need for actors to have technical knowledge to act on them. The algorithmic imaginary is a key lens through which I understood the agency of participants in my study.

Agency manifests in relation to algorithms because they are an actant in a diffuse sociotechnical system. This means that while they influence the sociotechnical system and other actants within it, they are influenced by that system as well. Theorizing algorithms as part of sociotechnical systems opens up the space for human agency. Seaver (2017), for example, in a vein similar to the algorithmic imaginary, understands algorithms as "culturally enacted by the practices people use to engage with them" (p. 5). Cotter (2019) studied this phenomenon empirically by observing the conversations of social media influencers about algorithms. She found that they interpret and debate algorithmic processes through preexisting discourses about what it means to be an influencer (p. 900): she writes that "knowing the [algorithmic] rules does not mandate strategy, instead it informs influencers' decisions in how to best instrumentalize the

---

<sup>7</sup> A concept similar to the algorithmic imaginary is algorithmic folk theories (AFTs). AFTs are the "intuitive, informal theories" or "contextual frames" that "individuals develop to explain the outcomes, effects, or consequences of technological systems, which guide reactions to and behavior towards said systems." (DeVito et al, 2017, p. 3165). Studies on AFTs though are not directly concerned with issues of agency.

rules" (p. 908). In addition, Kapsch (2022) argues through an empirical study on Danish student vlogs that we enact agency through small acts of algorithmic engagement. Kapsch found that the Danish students intentionally used inbuilt platform functions such as liking or viewing content to engineer their algorithmic recommendations. These empirical accounts give credence to the role of human action— through interpretation and small acts— to influence algorithmic functioning.

Some authors go so far as to understand the relationship between algorithms and users as productive and beneficial. Crawford (2016) explores the relation between algorithms and human actants in terms of agonism, suggesting we view the relation between designers, users and algorithms as characterized by a productive struggle and shifting power dynamics. She writes that “the spaces of intersection between humans and algorithms can be competitive and rivalrous, rather than being purely dictated by algorithms that are divorced from their human creators.” (Crawford, 2016, p 82). Tseng (2022) documented such agonistic relations on open-source platforms in Madrid and Taiwan that were designed to facilitate public voice in policy-making. The author found by comparing the two platforms that the algorithms differently limited and empowered the public voice. As a result, the author proposes that there are forms of algorithmic empowerment made possible by the dynamic relation between algorithms and humans on each platform.

Scholarly observations of agonistic relationships have led to a re-theorization of identity formation in relation to algorithms. Unlike the algorithmic identity (Cheney-Lipold, 2011; 2017), which leaves little room for human agency, the “algorithmized self” is a self constructed with and through a user's relation with the algorithm (Bhandari & Bimo, 2022). Bhandari & Bimo (2022) revealed through interviews with 14 TikTok users that users are highly aware of the algorithm on the platform and that they use the platform reflexively to surface content in line with their own sense of self. Similarly, Karakayali, Kostemm & Galip's (2018) study of user comments on last.fm forums (last.fm is a music recommendation website) found that algorithms were at once technologies of control and technologies of the self. Last.fm users trusted the recommendation system and treated it as a companion in forming their music taste. Agency within an agonistic relation is filled with tension but also cooperation.

Agency in relation to algorithmic power is at times discussed in terms of resistance and tactics<sup>8</sup>. Ferrari and Graham (2021) look at how platform workers, like ride-share drivers, create “fissures” in algorithmic power through manipulation, subversion and disruption of platform procedures. They write, in a vein similar to Foucault, that algorithmic power is not absolute: “Algorithmic power enables and constrains social action, it entails domination and counteractions, and it is practised – not possessed” (Ferrari and Graham, 2021, p. 818). Yu, Tréré & Bonini (2022) found that Chinese food delivery workers individually and collectively resisted algorithmic power. Most notably, they offer the term “algorithmic solidarity” to capture the forms of collective resistance that delivery workers enacted through private social networks: they resisted the governance of the platform by sharing news about the platform and real-time traffic data, providing each other equipment and emergency assistance, helping newcomers get started, and collectively unpacking how the platform algorithm works. Ramizo Jr (2022) also focused on agency in relation to ride-sharing platforms, but looked more specifically at “consumer strategies” in ride share apps. Finally, Velkova & Kaun (2019) show how one Swedish student started a campaign to have non-white hands rise to the top of Google search. They frame this act of resistance as a “repair” to “correct existing shortcomings *within* algorithmic culture” (p. 523).

---

<sup>8</sup> Often even in terms of de Certeau's (1988) theory of strategies and tactics (e.g., Willson, 2017)

These more recent studies show that there is a budding literature on forms of agency in relation to the algorithm. In most cases, these forms of agency are framed as kinds of tension—whether productive and in companionship or wrought by resistance to algorithmic governance. Many of these studies offer nuances in how they understand agency— as solidarity, empowerment, agonism, tactical or otherwise. One major gap in these studies that my dissertation fills is understanding how young people in particular respond to algorithms. All of the aforementioned studies observe adults as workers, adult students, or casual users of platforms. There is a missed opportunity by not looking at how those who are beginning to form a sense of self and worldview, often for the first time beyond their familial unit, are navigating this in relation to the powerful molding forces of algorithmic power. My study looks at the agency displayed and expressed by pre-teens to fill this gap.

### ***Youth and Technology***

While there is a gap in critical algorithm studies in relation to how young people navigate algorithmic power, scholars have documented powerful forms of technology use by youth. I focus on scholarship in New Literacy Studies, which looks at the digital literacies deployed by youth. Through many in-depth ethnographic accounts, NLS has shown that digital literacies are different than literacies of its print-based predecessors (see Mills, 2010). NLS scholars have found that digital literacies are often multimodal and more easily lend themselves to translingual practices (Kress, 2003; Lam, 2009); they take place across various contexts, in- and out- of school, at home, across national borders, and across networked publics (boyd, 2007; Bulfin & North, 2007; Hull & Nelson, 2005; Hull & Stornaiuolo, 2014; Ito et al., 2019); they involve new forms of authorship such as remix and collaborative writing (Knobel & Lankshear, 2008; Yi, 2008); and they lead to forms of creativity and meaning-making that develop youths' identities textually (Lam, 2000; Lewis & Fabos, 2005) and counter-hegemonically (Hull, Kenney, Marple, & Forsman-Schneider, 2006). This new ethos of participation, creation, collective intelligence, and decentering authority characterizes much of the agency documented in youth technology use.

One of the main ways that youth learn about and engage agentively through technology is via affinity groups (Gee, 2007). Affinity groups are “groups wherein people primarily orient toward a common set of endeavors and social practices in terms of which they attempt to realize these endeavors, and they arise due to the participatory culture (Gee, 2007, p. 183). These informal groups, like participatory cultures online, are spaces where youth connect with others around a common interest. They learn through peripheral participation and can become authorities in the group. A now canonical example of this is a study of ESL learner Almon who developed his identity as a “global English user” through peer networks on websites devoted to Japanese fandom (Lam 2000). The Connected Learning Research Network Report (Ito et al., 2019) has turned these lessons from informal learning experiences into an educational model that puts youth affinities into relation with authentic connections and real-world opportunities.

NLS scholars have often focused on the expansive possibilities for identity construction via digital tools. On the one hand, research has shown how youth take to digital contexts to manifest identities otherwise unavailable to them in offline spaces, such as the ability to craft more agentive identities (Hull & Katz, 2006) or create identities specific to affinity groups or transnational networks (e.g., Lam, 2000, 2009). There is also work exploring how youth challenge identity categories themselves through digital tools, such as youth authoring their marginalized identities into existence often through fanfiction sites (e.g., Black, 2009; Thomas &

Stornaiuolo, 2016). With that said, digital contexts are porous and present challenges for youth identity construction. For example, danah boyd (2014) observed how context and audiences are collapsed online, making identity construction more akin to “impression management.” More recent work has shown how youth navigate multiple contexts and media to construct their identities, dispelling simple dichotomies between old and new media, online and offline, and in and out of school (Aljanahi, 2019; Low & Rapp, 2021)

Algorithmic power has challenged some of these earlier assumed forms of agency in digital literacy. One of the few studies examining youth interactions with algorithms shows the complex way youth navigate and are shaped by algorithmic processes. As mentioned earlier, educational scholar Luci Pangrazio (2019) found that youth self-representation online was not only a byproduct of algorithmic processes, but navigating peer friendship culture and cybersafety discourses from parents and teachers. In her study, students used likes and comments to maintain peer friendships and as a status-marker of popularity, ultimately deriving from and benefiting Facebook's business model. Pangrazio found that “the functions of the platform were woven into the way relationships were experienced and reinforced” offline (p. 1320), showing the permeability of platform algorithms into social practices more broadly. In addition, Pangrazio found that, in an effort to remain visible in peer networks and garner attention, students uploaded content that revolved around photos of their best self, which would generate more peer attention (through likes and comments) than other multimedia creations on the platform. The content and media uploaded, and the identity crafted by students, were algorithmically shaped. Combined, students’ acts of self-representation were a mixture of algorithmically recognizable content, bonding practices within their peer network, and “cybersafety” discourse learned through school and from parents. These converging influences led students to be careful in the kind of content they uploaded as they were aware that once something was uploaded, it took on a life of its own. This clear influence from a “cybersafety” discourse to carefully consider the permanence and spreadability of uploaded content countered the interests of social media companies looking to match their analytics to the most private elements of the students’ lives.

### **Critical Digital Literacies.**

As recent concerns about platform power and the socioeconomic and political forces underlying digital technologies have grown within the past five years, so too has there been a growing demand for defining and teaching critical digital literacies. While there is no single definition for CDL, there have been defining moments in the literature that shape current views about what CDL is. Below, I detail the influence of critical literacy on current conceptualizations of CDL as well two shifts in CDL theorization that have defined CDL as both a discursive and sociotechnical practice of critique.

The “critical” component of CDL primarily derives from scholarship on critical literacy, which is a variety of literacy that is inspired by Freirean critical pedagogy and which also has roots in neo-marxism and the Frankfurt School. Critical literacy does not have a single definition (Vasquez, Janks & Comber, 2019), but it has oriented itself around the Freirean practice of “reading” and “writing” the world, which entails understanding how the dominant group constructs the world through its own “myths and distortions” as well as “building new ways of knowing and acting upon the world” (Luke, 2018, p. 22). As a result, there have been different models for what critical literacy might entail. Luke and Freebody’s four reader roles or resources has perhaps been the most prominent critical literacy pedagogy (see Freebody and Luke 1990; Luke and Freebody 1999). These roles include the following critical practices with

texts: code-breaking (i.e., alphabetic awareness), participating in texts (i.e., comprehension), using texts (i.e., participating in social practices around the text), and analyzing the text (i.e., “conscious awareness of the language and idea systems that are brought into play when a text is used” (Freebody & Luke, 1990, p. 13)). Another prominent version of critical literacy has included understanding language in terms of domination, access, diversity and design (Janks, 2000). While the former two definitions primarily circulated around exchanges with texts, Lewison, Flint & Sluys (2002) found that critical literacy had also been defined by particular actions with texts such as disrupting commonplace worldviews and interrogating multiple viewpoints as well as critical actions beyond texts and symbolic systems such as promoting social justice and focusing on sociopolitical issues. These definitions nonetheless share the view that critical literacy is a means to teach “learners to understand and manage the relationship between language and power” (Janks, 2000, p. 176).

This orientation within critical literacy toward the relationship between language and power has defined many of the critically-turned definitions of digital literacy. With that said, critical digital literacy as a concept is not homogeneous and in fact has experienced three transitions in thought. The first wave of writing on CDL is perhaps best framed as “critical orientations toward digital literacy,” which started in the 90s through to the mid-2000s and which conceptualized critical literacy and digital literacy as separate concepts that might inform each other. Since the mid-2010s there have been two branches of CDL work. The first branch started with Ávila & Pandaya’s 2013 book, which helped to solidify CDL as a concept in its own right, and which focused primarily on “representational” or discursive forms of CDL. In more recent years, most notably beginning with Luci Pangrazio’s (2016) recapitulation of the three main approaches to critical digital literacy, CDL has followed a second path that turns the critical gaze toward the technology itself rather than view technology as a tool to enact critical literacy or space within which to examine digital texts critically. Though this more recent work focuses on sociotechnical forms of critical digital literacy practice, they do still identify representational CDL practices as crucial to defining the term. It is this latter variety of CDL with which my dissertation aligns.

The earliest work bringing critical orientations to digital literacy distinguished the concepts but saw them as useful for enhancing each other. In a reversal of a now typical orientation that defines digital literacy through borrowing concepts from critical literacy, Peters & Lankshear (1996) saw promise in re-thinking critical literacy through the digital, what they called a “critical literacy in cyberspace” (p. 54). The authors found that digital texts disrupted power relations in print culture such as enabling multimodality, having a radical interactiveness and distributing authorship (among other features), which they believed helped to break critical literacy from its “institutional enclosure” and association with the features of books and print. For this reason, they hoped to re-enliven thinking and discussion about critical literacy through the digital. Other early CDL literature established a tradition whereby digital literacy should look to lessons and orientations from critical literacy. Knobel & Lankshear (2004) for example reviewed some of the major trends with mobile technologies and widely-accessible internet access to show the kinds of literate practices students participated in with technology out of school so as to consider how these practices might be productively brought into schooling contexts. They propose four principles, one of which was critical learning, that of creating a capacity to critique and see the limitations of a Discourse. In this way, they argue that schools should, if bringing in digital literacy practices, attend to critical learning possibilities with new technologies. Fabos (2008) in a prescient article argued that the commercialization and



privatization of the web affected our capacity to access information on the internet (e.g., search engines bid off the top results or insert ads in place of informational links). She critiqued current information literacy approaches as not preparing students to access information outside of commercial interests. Instead, she proposed a critical literacy practice for students engaging in online search so that they could understand that “all texts—including the very complicated text that is the Internet—are built on political and economic foundations” (p.865). Another more recent text in line with this earlier work is Wohlwend & Lewis’s (2013) chapter that examines how critical literacy practices are changing in light of globalization and digital technologies. This earlier work has been fundamental to extending critical literacy to understandings of digital literacy as well as embedding a focus on meaning and discourse in critiquing or creating digital texts, which is the first of two current kinds of CDL I discuss below.

Since the early 2010s, critical digital literacy has become a concept in its own right. Ávila & Zacher’s (2013) edited volume is perhaps best known for identifying critical digital literacies as essential for youth today. They defined critical digital literacies as “those skills and practices that lead to the creation of digital texts that interrogate the world; they also allow and foster the interrogation of digital, multimedia texts” (p. 3). This places CDL as practices with digital texts—their creation and interrogation in relation to changing the world. Such a definition derives from critical pedagogy in its emphasis on the power of texts to create and change our reality, but also firmly centers the digital and digital practices in its definition. The “representational” approach (see Nichols & Stornaiuolo, 2019) to CDL is also apparent in Hinrichsen & Coombs (2013) “five resource” model of CDL, which reworks Luke and Freebody’s resource model for digital texts *and* adds a fifth reader role, which is about managing one’s digital persona. Others have used the representational model of CDL to teach students to counter online radicalisation (McNichol, 2016), to understand and make data personally meaningful (Pangrazio & Selwyn, 2018; Stornaiuolo, 2020), to analyze multimodal messages at the post-secondary level (Talib, 2018), and to craft digital stories responsive to the local and global context, communities and self (Hull & Katz, 2006; Stewart & Gachago, 2016; Truong-White & McLean, 2015). Such CDL practices have also been observed and lauded in youth, particularly youth of color, who deconstruct stereotypical narratives in the media and re-write fiction that tells stories of underrepresented communities (Thomas & Stornaiuolo, 2016) or enact political change through social networking (Garcia, Fernandez, & Okonkwo, 2020). The representational approach to CDL has been a dominant strand and continues to be because it derives from critical pedagogy and literacy studies’ focus on the relationship between language and power.

A second branch of CDL literature has arisen in response to forms of technical power (i.e., economic, material) that are not reducible to discourse, which I call a sociotechnical CDL. This approach focuses less on “the interplay of users, devices, and content” as in typical digital literacy research, and more on “concerns about technical infrastructures and socio-economic relations” (Nichols & Stornaiuolo 2019, p. 14). Scholars within this branch look to interdisciplinary work and theories to frame technology and the digital such as Science and Technology studies (e.g., Garcia & DeRoock, 2021), Infrastructure studies (e.g., Knight, Dooly & Barbera, 2020), platform and critical algorithm studies (Nichols, Smith, Bulfin & Stornaiuolo, 2020), posthumanism (Leander & Buriss, 2020) and even ecological views of technology (Nichols & LeBlanc, 2021). Moreover, many of these scholars critique representational approaches to CDL as necessary but insufficient. For example, Pöttsch (2019), who reviews debates around CDL and proposes a definition that takes “structural aspects of technology into

account” (p. 221), critiques Ávila and Pandya’s foundational representational definition of CDL: They write that digital technologies can enable previously disenfranchised students to critique cultural and political frames or challenge authorities in school contexts and beyond. In spite of their focus on both socially and politically embedded practices and empowerment, the element of critiquing the very technologies in use, and their often-ambivalent affordances, ramifications, and conditions of application, falls somewhat short in Ávila and Zacher Pandya’s argument. (p. 222)

Sociotechnical CDL is wary of the capacity for representational CDLs to prepare students for today’s media environment and the forms of control and manipulation that happen through the technology.

The sociotechnical branch of CDL is also part of a broader paradigm shift within digital literacy scholarship more generally<sup>9</sup>. Notable examples of a sociotechnical turn within literacy studies broadly include studies that focus on the relationship between meaning-making, technology and affect and embodiment (Ehret & Hollet, 2014; Leander & Boldt, 2013) and studies that examine the integral interplay of material objects and digital devices in storytelling, learning to read, and processes of learning (Gourlay, Lanclos, & Oliver, 2015; Nixon & Hateley, 2013). Pahl & Roswell (2011) even proposed the term “artifactual literacy” to make “more explicit the role of material objects in literacy and their thing-like status” (p. 133). Though there is a parallel surfacing of sociotechnical approaches in digital literacy studies, the CDL approaches are distinguished by a focus on “addressing contemporary dilemmas related to surveillance, control, and profit motives in connective environments” (Nichols & Stornaiuolo, 2019, p. 14).

There is not a single definition or approach to conceptualizing critical digital literacies, much like its conceptual benefactor critical literacy. As Pangrazio (2016) writes in an article that I view as shifting the focus of CDL scholarship toward sociotechnical accounts “the very definition of what critical digital literacy refers to is inevitably contested, leading to a variety of academic approaches underpinned by particular values and priorities” (p. 168). Pangrazio herself attempts to rectify three common orientations within CDL— ethical, personal and creative / maker— by suggesting “critical digital design.” This approach at once heeds the goals of representational CDL approaches while at the same time advocates for students to analyze “the general architecture of digital technology and the Internet” (p. 170). From this, she outlines four components of critical digital design (her term for CDL), which includes transcendental critique of technology (i.e., distancing oneself from technology and understanding it in terms of social and political issues), visualizing digital networks to “defamiliarize digital texts, tools and practices” (p.171), critical self-reflection, and interpreting and re-articulating the language around digital media. Pangrazio’s critical digital design, from my view, paved the way for CDL scholars to center *structural critiques* of digital technologies.

Sociotechnical CDL is consistent in advocating for structural critiques of technology, but each has a different theoretical or conceptual emphasis within this approach. Garcia & de Roock

---

<sup>9</sup> This paradigm shift has not been straightforward given literacy studies’ contentious roots in techno-determinism and its turn to social and cultural views of literacy. Early on in the social turn and budding days of the NLS, Brandt & Clinton (2002) began to question the emphasis on the situatedness of literacy as it failed to explain how meaning and texts traveled across global contexts. They turned to ANT to reinstate a “thing-ness” to literacy that made it durable, legible, and transportable across contexts. The thing-ness of literacy concerned some NLS scholars that it might “universalize” literacy (see Street, 2003), and more material approaches were not widely adopted until more recently. Today, several literacy scholars draw from assemblage theory and ANT to explore the materiality of literacy.

(2021) argue that “critical literacy must be reexamined and redefined under the current yoke of platform capitalism and racial capitalism more broadly” (p. 193) and call on CDL to take up an “abolitionist imaginary” (inspired from STS scholar Ruha Benjamin and Black abolitionist movements), which would “interrogate civic platforms: classroom, political sphere, and digital platforms” as well as explicitly connect to social movements (p. 196; see also De Roock, 2020)<sup>10</sup>. These authors therefore view sociotechnical CDL as connected to capitalist and racial lenses as a means of critiquing technology. Within language education, Knight, Dooly & Barbera (2020), who conceptually align with ANT, call for CDL to teach students about the “hidden agents that form part of their daily interactions” (p. 2), and to discuss technology as biased by commercial aims. Similarly positioned within language education and intercultural relations, Darwin (2017) cites the importance of understanding how algorithms and platforms (i.e., technical infrastructures) influence identity construction and forms of exclusion online (see also Dooly & Darwin, 2021). With that said, Darwin’s work typically gives more emphasis to linguistic and ideological analyses and therefore is more aligned with representational CDL. Another angle to sociotechnical CDL, Pötzsch (2019) believes CDL should be defined by contextualizing technology in terms of its “capitalist dynamics”, but also its “environmental ramifications and individual empowerment” (p. 222). And finally, one other focus has been on the sub-screenic level of technology by defining CDL in terms of the ability to navigate various digital scales (Golden, 2017; see also Aguilera, 2017). From these accounts, CDL has looked at digital infrastructures through racial, abolitionist, capitalist, socioeconomic, environmental, scalar, ANT, and / or civic educational lenses.

While literacy scholar Phil Nichols and his colleagues redefine CDL along sociotechnical lines and structural critiques, they also bring into question its limitations. Nichols & LeBlanc (2021) write that “today, concerns over post-truth politics are beginning to make visible the limitations of ‘literacy’ as a guiding idiom for navigating the emerging media landscape” (p. 394). They propose instead ecological orientations to media, which includes looking inward “at the internal functioning of media systems” and also looking outward “to the wider infrastructures that make those systems useable (or inoperable), durable (or fragile)” (p. 396). Nichols & LeBlanc (2021) as well as Nichols et al. (2020) see “literacy” solutions to media problems as confined to representational practices, and, consequently, as only one tool in a wider toolkit for addressing the concerns of algorithmic and platform power. Time will tell how other scholars pick up Nichols and colleagues’ work, but it has the potential to lead to a new branch of CDL that disavows and tries to move beyond it.

In terms of gaps within CDL, much of the work on CDL remains prescriptive and conceptual without showing CDL in practice. One notable example is Garcia, Fernandez & Okonkwo’s study (2020) on the critical digital literacies of black girls, in which the authors analyzed the participants’ narratives about how they view technology. The authors found that black girls used digital technologies to critique dominant ideologies about blackness and gender (e.g., #blackgirlmagic), create future selves, and to advocate for social change. Admittedly, though they present their study as offering a new definition, it seems to offer a view of critical digital literacy already present in the literature, which joins together critical literacy (as re-writing the world) and digital literacy (as the skills and practices with and around digital texts). At this point, there aren’t studies that show how an educational program aimed toward critical platform and algorithm interrogation might foster CDL. My dissertation puts into practice a

---

<sup>10</sup> Somewhat similar to the civic focus in Garcia & De Roock’s (2021) article, Polizzi (2020), who does not extensively engage with New Literacy Studies, advocates for CDL to enhance democratic participation.

sociotechnical approach to CDL to understand what the effect of such a program might have on students' use of platforms and understanding of algorithms. In addition, an area missing altogether is to understand the CDLs of youth in everyday life and use of platforms. My study fills this gap through trying to see what youth do with platforms and algorithms in daily life.

### **Research Questions**

These literatures, in the areas they cover and the gaps they expose, are instructive for my own study. The scholarship on platforms and algorithms has tended to focus on how these technologies control and manipulate users, though more recent scholarship in the past five years has focused on empirically investigating users in relation to platform algorithms. These studies have shown the interplay of power and agency between human and non-human actants. My study examines how study participants, particularly youth though also teachers, engaged with platforms and algorithms in agentive ways, but also how they were shaped by these technologies. It thereby fills a crucial gap in the literature to shine light on how youth in and out of school engage with such technologies.

The studies in NLS and more recently CDL allow me to trace youth agency in relation to technology. In doing so, I also aim to explore how scholars might expand the capacity of youth to engage with algorithmic and platform power agentively through an educational program designed to develop these literacies. Despite much theorization around CDLs in relation to algorithms and platforms, there has yet to be a body of work exploring these definitions in educational practice. My study therefore also explores theoretically and practically what a CDL program might afford youth agency.

Through these literatures, I ask the following questions:

1. How do platforms and algorithms shape the digital literacy practices, identities, and views of young adults and their teachers across informal and formal educational settings? What forms of agency do these participants enact in the face of algorithmic power?
2. What effect can an after school digital storytelling program designed to develop critical digital literacies have on students' capacity to engage with algorithmic processes agentively?

## Chapter 3: Methods

My dissertation started within a few months after the pandemic onset. The pandemic spurred massive closures across the nation affecting several industries and institutions, especially education. In education, schools at all levels worldwide, Pre-K to university, closed and rushed to implement remote instruction. This required many school districts to purchase or otherwise acquire technological resources for students, including laptops, wi-fi, and other devices; teachers to rapidly learn educational platforms and LMSs, re-design their curricula for online learning, and work from home, while often simultaneously attending to children and family; and parents and students to re-organize their daily routine and home environment to support at-home learning. This chaotic and rapid change has led scholars to distinguish remote learning during the pandemic as “Emergency Remote Teaching” (ERT) rather than label it “online learning”, so as to avoid collapsing ERT with meticulously planned, “high-quality online education.” ERT is instead characterized by “a temporary shift of instructional delivery to an alternate delivery mode due to crisis circumstances”, and having educational demands that are unique to a world-wide closure (Hodges, Moore, Lockee, Trust & Bond, 2020, p. 8).

As a result, my dissertation project changed overnight. While I originally intended to work in an afterschool program due to my preceding years of experience, the pandemic blurred school day and after school contexts and additional hours online beyond those strictly necessary for school became a burden on students who suffered from “zoom fatigue” and extensive screen time. Fortunately, during a five-week online summer enrichment program, where I ran a TikTok storytelling program in 2020, I developed a contact with a 6th grade teacher, Mrs. Turner; she served as the English Language Arts instructor for secondary students during the five-week program, and she asked me to assist her in her remote 6th grade course to help design digital literacy activities. Her classroom became one of my dissertation sites.

My research took place over the course of the 2020-2021 academic year and occurred in two distinct phases. The first phase, between September to December 2020, entailed participant observation in Mrs. Turner’s class. I assisted Mrs. Turner in managing and monitoring students, such as answering questions, chatting with them if any concerns arose, and checking GoGuardian, a real-time browser monitoring platform, to ensure students remained on task. I also helped Mrs. Turner design a few assignments, surveys, and lesson plans where she tried different digital teaching strategies. The first phase of my research primarily entailed writing field notes and observing students and teachers use of educational platforms, in particular Google Classroom. The second phase of the research, between January to May 2021, entailed me offering a weekly digital storytelling program with several of the 6th grade students during after school hours, while I continued to assist Mrs. Turner. I expanded research procedures in the second phase by recruiting several student research participants, who I interviewed and observed participating in the club and using social media platforms. The methods chapter explains my underlying methodology, qualitative data collection procedures and analytic approach.

### **Methodology: Digital Ethnography & Actor-Network Tracing**

My dissertation methodology is a digital ethnography and it uses actor-network tracing. Ethnographic research is common in literacy studies. The roots of literacy studies stem from ethnographies in the 1970s and 1980s, which showed how literacy is shaped by “the social, cultural, institutional, and historical organizations of people” (Gee, 2010, p. 5). New Literacy

Studies scholars who research 21<sup>st</sup> century literacy practices like digital literacies have often continued this methodological legacy (see Mills, 2010).

It is thus fitting that my own study on digital literacy in a platform society is also an ethnography. I situate my methodology as a digital ethnography following the “digital social-anthropological” approach outlined by Sarah Pink and her colleagues (2016). A digital ethnography differs somewhat from ethnographic research on digital literacy, as the former takes a more post-human approach to materiality and technology: Digital ethnographic research examines how digital media are entangled with “other things” (Pink et al., 2016, p. 28), whereas the focus of ethnography in digital literacy is on digital forms of literacy and the often digital, social context. Perhaps somewhat counter-intuitively, a key principle of digital ethnographies is that they *de-center* media in order to account for other things. Though the digital ethnographer researches “domains of activity in which digital media are used,” to understand “the implications of digital media,” it must be understood in relation to “the material, sensory and social worlds we inhabit ” (Pink et al., 2016, p. 25).

Digital ethnography has inspired work on education in digital sociology. Digital sociologists like Neil Selwyn and his colleagues (2016, 2018) use a digital ethnographic approach to understand how technology is situated in schools. Instead of focusing on the pedagogical best practices with technology, they instead examine how technology is intertwined with power in schooling contexts. Their research looks at how technology is connected to new forms of labor, governance, and surveillance; the political economy beyond schools; ideologies about the future of society and learning; discourses often stemming from the corporate technology sector; and how the experience of technology differs across gender, race, and more. ANT theory, specifically the practice of tracing, shaped the digital ethnographic approach in my dissertation. ANT rejects the idea that some phenomena are “social” and others, most often objects, “not-social.” ANT does not assume there exists a “distinct domain of reality to which the label ‘social’ or ‘society’ could be attributed” (Latour, 2005, p. 4), and Latour suggests for sociologists to identify the “*tracing of associations...between things that are not themselves social,*” and in fact which are “heterogeneous elements” (p. 5). By tracing associations, it leaves “the task of defining and ordering the social...to the actors themselves” and “not the analysts” (p. 23). Latour explains that, “a good ANT account is a narrative or a description or a proposition where all the actors *do something*” (p.128), which entails following the “traces left behind by some moving agent” (p. 132). Tracing involves identifying mediating actants and following their relationship to other mediating actants, and describing how they jointly do something. In other words, tracing, as a methodological approach, gradually uncovers how actor-networks form, maintain themselves and *act*.

Some literacy research has used actor-network tracing to think beyond the “boundedness” of context in situated accounts of literacy studies. For example, studies on literacy have used tracing to explore movement of literacy practices across space (Nordquist, 2017), local and global contexts (Brandt & Clinton, 2002; Kell, 2011), digital and non-digital environments (Leander & McKim, 2010), and digital contexts online (Stornaiuolo & Hall, 2014; Sobko, Unadkat, Adams, & Hull, 2019). These approaches have followed the interactions of participants, texts, objects, data, and other actants, and some have used maps and visualizations as a means of analysis and identifying actor-networks. For example, my colleagues and I (Sobko et al., 2019) reconstructed an actor-network that made possible small ideological shifts in an online undergraduate group collaboration exploring gendered advertisements. We analyzed back-end data, video- and textual-transcripts, screen-recordings, virtual artifacts, and interviews to

identify key actants. These actants included the group discourse, multimodal elements added to a virtual, shared whiteboard, teacher presence via the slides and in the breakout room, and mediating technologies like zoom and a virtual whiteboard. We described how these actants interacted to push and pull the students' ideological dispositions toward gender. In this dissertation, I use tracing as an ethnographic orientation to data collection and an analytic tool to understand how students and teachers used platforms in and out of school, and to identify the actants that shaped their participation on these platforms. Below I detail the context of the study, the data collection procedures, and how I analyzed the data.

## **Research Context**

### ***St. Jacobs School***

My school site was St. Jacobs, a K-8 catholic school located in the California Bay Area and one of thirty-nine elementary and middle schools that is part of a Bay Area network of catholic schools. St. Jacobs has existed as a school since the 1960s when a priest built a school attached to an already existing church. The school serves approximately 350 students across grades K-8 with class sizes ranging from 20 to 35 students. During the time of my study over half of the students at St. Jacobs were female (193, 55%) and the rest male (160, 45%). The racial and ethnic background of students were primarily white (hispanic and caucasian included, 82, 23%) or multiracial (74, 21%). There were also 57 Asian students (16%), 31 Black students (9%), and 6 American Indian/Native Alaskan and 6 Native Hawaiiin/Pacific Islander (~2% each). Ninety-seven of the students were unclassified.

My advisor's research team had an existing relationship with St. Jacobs. In conversation with more than one member of the research team, I learned that this school had an academically-motivated student population that one director described as "willing to please"<sup>11</sup>, which I understood to mean that they were respectful of authority. The students at St. Jacobs came from a middle-class socioeconomic status (SES), as compared to students from the other two schools in our University-Community partnership who were primarily of low SES. In an informal conversation, the principal explained that it is "a school where the parents have more money and are educated" as compared to its sister schools.

Principal Mrs. E had been at St. Jacobs for two years by the time I began my study. She came from another school within the Bay Area Catholic school network. In our interview, she discussed the role of technology in education, and was surprised that the "poorer" school she had come from had more technology software such as Freckle and Newsela as compared to St. Jacobs. When she came to the school, the technology program had two carts of iPads that rotated between classes, three technology teachers and a computer lab where students received typing and other instruction. Over her two years, of which three months coincided with the pandemic, she prioritized bringing technology and hybrid learning opportunities to the school despite facing initial resistance. At the time of my study, teachers in grades 5-8 used Google Classroom as their primary platform and grades K-4 used ClassDojo, the latter of which allowed for greater interaction with and oversight from parents. The whole school also used other platforms such as a surveillance software GoGuardian and the parent-facing PowerSchool, and teachers adopted applications as they needed for instruction.

---

<sup>11</sup> The characterization (from one program leader in particular) concerned me as potentially classist.

### ***Mrs. Turner's Sixth Grade Classroom***

Mrs. Turner taught English Language Arts for all middle school students. I volunteered and researched her sixth-grade class. Mrs. Turner based her ELA curriculum on the common core standards, which support the development of skills including:

Critical-thinking skills and the ability to closely and attentively read texts in a way that will help them understand and enjoy complex works of literature. Students will learn to use cogent reasoning and evidence collection skills that are essential for success in college, career, and life. The standards also lay out a vision of what it means to be a literate person who is prepared for success in the 21st century. (Common Core, 2022)

Mrs. Turner's class had 31 students with 18 girls and 13 boys. The racial and ethnic makeup of the students according to the school demographic categories were nine multiracial students, six Latin/Hispanic, five black students, five Asian students, three white students, one American Indian, and two unknown. The class met for an hour each morning Monday through Friday at 8:30am, and Mrs. Turner held office hours for 45 minutes directly after class Tuesday-Thursday and a study hall on Wednesdays and Thursdays between 3:30-4:30. The class focused on developing reading comprehension through two books, several articles and the Newsela application, growing vocabulary, learning grammar, and expanding students' writing capacity. Three elective courses were held during Mrs. Turner's one-hour class during the week: On Mondays and Thursdays, the technology teachers and art teacher, respectively, met with students for 30 minutes, and during a five-week period in the first trimester, students met with the school counselor for group socioemotional learning activities. One Friday each month, Mrs. Turner streamed an hour-long mass led by the school priest.

The first and second trimesters were entirely remote. Per the middle school practice, Mrs. Turner sent students a Google Classroom announcement and Google Calendar invite each morning to a new zoom class link<sup>12</sup>. Mrs. Turner and I, as a meeting co-host, admitted students from the waiting room each morning and class typically started within three to five minutes after the half hour. For a brief period before winter break and throughout the third trimester, the school moved to a hybrid model. The students were split into two cohorts of approximately 10-15 students. Students in "Cohort 1" went to campus on Mondays and Tuesdays while "Cohort 2" joined by zoom; this was reversed for Wednesdays and Thursdays. Fridays were purely remote, and there were four students and their families who chose to attend class entirely remotely throughout the week.

Mrs. Turner used several educational applications throughout the school year. The LMS, per middle school practice, was Google Classroom. Mrs. Turner prepared a new slide deck each week and added one or more slides each day as the week progressed. Students also did most of their classwork on Google Slides and Docs. Other applications Mrs. Turner used were Freckle and Newsela, which are ELA-focused apps, and occasionally she used FlipGrid and Padlet for multimodal forms of expression and Kahoot for competitive test preparation. During class, Mrs. Turner used GoGuardian to monitor students' browsers during tests and to make sure students were focused on class. Finally, the school used Powerschool as an interface to register grades and communicate them with parents. See Table 3.1 for a list of all applications.

### **Table 3.1**

---

<sup>12</sup> The new zoom link was a safety precaution. This practice was reinforced by a mysterious 7th grade zoom bomber located in the Midwest, who surprisingly stopped appearing after the 7th grade students were notified that legal action would be taken to protect the class from the zoom bomber.



### *Platforms and Pedagogical Use in Mrs. Turner's Class*

<b>Platforms</b>	<b>Pedagogical Use</b>
GoogleClassroom and the GSuite	Assignments
Newsela, Freckle	ELA-focus
Kahoot	Entertainment, Test prep
FlipGrid, Padlet	Student expression
GoGuardian	Synchronous class monitoring
Powerschool	School-wide parent interface

### ***The Critical Media Creator Club***

Over a two-and-a-half-month period between February to April 2021, I conducted an after-school club for a total of 11 sessions. The club, called the Critical Media Creators club (CMC), was open to sixth grade students in Mrs. Turner's class and fielded 11 participants, all of whom were the student participants in my study. In addition, I worked with three undergraduate students from a Bay Area university education course. These undergraduate students were also participants in my study

The club aimed to develop students' critical digital literacies through two distinct components: an investigation component and a creative component. The first five weeks were focused on investigating the YouTube platform and its algorithm. We selected YouTube since all of the students reported using it unlike other platforms like TikTok or Instagram. Each week, the students responded to a Padlet<sup>13</sup> prompt before the session: the first five weeks included prompts about their favorite media, their YouTube viewing practice, and the data categories tracked about them. During club sessions, I discussed the technical protocols of YouTube and explored the many technical and social influences on our media interests and habits, and I asked students to discuss and investigate the platform in large and small groups. The small groups were led by undergraduate students, referred to as Undergraduate Collaborators, and the slides and handouts guided such discussions. Some sessions asked students to investigate why they saw certain videos on their front page while other sessions asked them to discuss if the data collected about them on Google's ad personalization or YouTube ads were accurate or not, and why.

During the second half of CMC, students worked in groups to research a topic of their choice and create a video about it. All student groups were asked to connect their topic to algorithms or data in their videos. There were three groups, each led by an undergraduate student. The groups worked together for five weeks, with extra meetings scheduled during the weeks leading up to the video presentations. The students imagined and produced videos that examined the popular gaming site Roblox, how website cookies work, and a comedic performance about different generations arguing over the definition of an algorithm.

---

<sup>13</sup> Padlet is a virtual bulletin board where participants can post multimodal content for all members to see.



often remarked in the 1st trimester that she could not cover as much material online as she normally would in-person. In subsequent trimesters, Mrs. Turner and I worked more closely together to create online learning activities, including assignments that used multimodal resources and in class activities that engaged students in conversations about Google Classroom, their digital likes and dislikes, and memes.

In addition to Mrs. Turner, I interviewed, formally and informally, any willing middle school teachers and administrative staff to understand the broader experience for teachers. Through these conversations, I learned about how St. Jacob’s began to use Google Classroom. I talked with the middle school math teacher, who helped teach others about how to use Google Classroom, and the tech team, both in their capacity as middle school drama instructors and as the technology coordinators. In addition, I informally talked to the principal, Mrs. E, to learn more about the school’s struggles and their use of platforms.

**St. Jacobs Sixth Grade Students.**

The students in my study were 6th graders in Mrs. Turner’s class who participated in CMC. The students attended school between 8:30-2 pm or 3 pm daily. They took ELA (8:30-9:30), social studies and religion (10:30-11:30), science OR math (12:30-2), and an elective course (between 2-3 on Mondays and Wednesdays). Teachers often held afternoon office hours, which many students attended. During the 3rd trimester, the school no longer required students to take an elective due to extensive screen time and homework demands. The students were quite busy throughout the day with school and office hours.

There were eight young women and three young men in the study with ages ranging between 11 to 12. In addition, there were two white students, seven latina students, one pacific islander student, and one who identified as other. The students came from diverse socioeconomic backgrounds: though I do not have access to their reported socioeconomic status, based on their reported parent’s career and the number and type of digital devices in the household, I was able to reasonably determine that most of the students could be classified as middle socioeconomic status, but there were at least two to three students who were from lower socioeconomic backgrounds.

All of the students used social media to varying extents and all regularly used YouTube. The male students reported using only one or two social media sites, and one male student, Kevin, very minimally used social media due to strict parental oversight. The female students reported using at least two or more social media websites. Five students created content on some of the social media sites they listed such as TikTok, YouTube, or Instagram. Other popular websites that students used were Pinterest, Discord, and Roblox. The three most popular social media sites were YouTube, TikTok, and Pinterest, in order of popularity.

**Table 3.2**

*Information on Youth Participants*

<b>Student Name</b>	<b>Gender and Racial Identity</b>	<b>Social Media Sites Student Uses</b>	<b>Site Chosen for Interview Walkthrough</b>
Delila	F, Latina	YouTube, Roblox, Pinterest, Goodreads	Canva, Roblox

Sonia	F, Latina	YouTube, TikTok, Discord, Pinterest	TikTok
Selena	F, Latina	YouTube, Instagram, TikTok, Roblox, Pinterest	Instagram
Oscar	M, White	YouTube, Roblox	Scratch, YouTube
Kevin	M, White	YouTube	YouTube
Sean	M, Pacific Islander	YouTube, Splatoon ink	Chadsoft.uk, YouTube
Eloisa	F, Latina	YouTube, Pinterest	YouTube
Veronica	F, Latina	YouTube, Instagram, TikTok, Pinterest	Instagram, Pinterest
Nayeli	F, Other	YouTube, TikTok, Roblox	TikTok
Natasha	F, Latina	YouTube, TikTok, Pinterest	Pinterest
Sheila	F, Latina	YouTube, TikTok, Pinterest	TikTok

### **The Undergraduate Collaborators.**

There were three undergraduate students who volunteered in CMC. The undergraduate students took an education course that required them to volunteer weekly in an educational context and to research youth literacy practices. In CMC, the undergraduate students were referred to as “collaborators” to position them as mentors involved in learning, investigating, and creating *with* the youth participants. Each week, I met with the collaborators on Friday to debrief that week’s CMC activities and jointly plan for the upcoming week. In our Friday meetings, we often discussed how to engage the students and elicit more conversation from them beyond the zoom chat. The collaborators helped to frame our club sessions and activities, and we decided together to remain neutral about how students should view algorithms.

During CMC sessions, the collaborators facilitated small group discussions and participated in investigation and creation activities with the youth participants. The undergraduate students focused on engaging youth participants in conversation and they shared their own experience with YouTube and other platforms. During the last five weeks, when students were creating their projects, the collaborators were matched with a group (see Table 3.3). I created the youth groups based on student temperaments and project interests, and the collaborators chose which group they wanted to oversee. The collaborators helped to brainstorm, write, and even edit the final videos of each of the groups.

I interviewed two of the three collaborators at the end of the club to learn more about their background as mentors, their experience in the club, and their views and experience with technology and platforms. One of the students, Michelle, did not proceed with the interview. Dylan additionally assisted in data collection for this dissertation due to his interest in learning about educational research. His father was a university professor, and Dylan was interested in

becoming a professor in the sciences, so he desired to learn more about the research process. Consequently, he helped interview youth participants with me, revised interview questions, and discussed the results with me.

**Table 3.3**

*Information on Undergraduate Collaborators*

<b>Student</b>	<b>Gender and Racial Identity</b>	<b>Major</b>	<b>Prior experience with kids</b>	<b>CMC Student Group</b>
Dylan	M, White	Bioengineering	Swim instructor, science tutoring	Super happy fun fun CMC (Oscar, Nayeli, Kevin, Sean)
Juan	M, Latino	History	Volunteered in elementary school classes, tutoring, art instruction for elementary students	Las Comadres (Veronica, Eloisa, Natasha, Sheila)
Michelle	F, White	unknown	Volunteering in afterschool middle school programs	Gum Sublings (Delila, Sonia, Selena)

**Researcher Role**

I began participant observation in September and continued throughout the remainder of the school year until June. I was a full participant (Glesne, 2016) as I attended the class daily until April when I attended only twice a week. In an effort to benefit research participants, I helped Mrs. Turner with daily course management tasks: I took role, addressed student questions and concerns, monitored student browser activities via GoGuardian, and occasionally helped with notetaking and announcements on Google Slides and Classroom. I was referred to as a “teaching assistant” though students in my study came to know me more closely as a club leader and researcher.

In addition, I occasionally worked with Mrs. Turner on Fridays to discuss observations about the students and plan activities for the following week. I also offered advice for making multimodal and collaborative activities as well as considerations for how she might conduct her hybrid classroom. For a brief period, I led a few activities related to digital literacy, which we called a “Digital Friend Group” (DFG). The DFG engaged students in answering personal questions about their multimedia use, often prefaced by them posting about themselves on a virtual bulletin board called Padlet. Some of the activities included “would you rather” activities, where we would ask students what they would prefer to do between two choices. We also conducted a Google Search discussion and demonstration to address concerns about how students searched for images in a vocabulary assignment.

Taking on the identity “teacher’s assistant” as a full participant observer presented advantages and disadvantages for the study. In terms of advantages, this helped me to develop familiarity with students and Mrs. Turner’s instruction. I believe this familiarity made me more successful in recruiting students to participate in CMC because I had already worked with them, chatted with them privately and as a whole class, and became a familiar face by the time I began recruiting in January 2021. In addition, I was able to use Mrs. Turner’s Google Classroom to post announcements to CMC participants about Padlet activities, surveys, and scheduling interviews, which would have likely gone unnoticed in students’ inboxes. My relation with Mrs. Turner also likely helped to legitimize my research and reduce concerns around trustworthiness as I emailed parents with Mrs. Turner copied and presented myself as a member of the classroom community.

On the other hand, my identity as a teacher assistant did minimize my role as a researcher and as a potentially “unbiased” outsider. Monitoring students’ participation on GoGuardian, reporting to Mrs. Turner, and enforcing classroom policies did position me as an authority figure, which might have potentially limited how open students were about their thoughts on online learning and their participation with technology in and out of school. I noticed for example that one student repeatedly explained how she safely posted to YouTube when I queried about her use of social media; I believe my role as an assistant teacher encouraged the student to mention the extra caution she used on social media. Despite these potential drawbacks to full participant observation, as a researcher I believe deeply that there must be a reciprocation of services to avoid reinscribing power relations between the researcher and participants (Lincoln, 1995).

Another equally important positionality that influenced the research was my whiteness. The majority of my research participants were Latin, some of whom spoke Spanish. I found that my linguistic limitations and ignorance of Latino culture did at times hinder my relation with and understanding of these participants. In addition, Critical Race Theory and LatCrit (Bernal, 2002; Solorzano & Yosso, 2001) point to the fact that racism is structural and endemic, and by not looking through a racial lens we perpetuate whiteness; my whiteness makes me liable to perpetuate whiteness, especially if not attended to (DiAngelo, 2018). In an effort to counteract this, I encouraged students to use the full breadth of their linguistic repertoire (see Bernal, 2002) and positioned Latin students and other students of color in the club as being in a position of “knowingness.” Too often, students of colors and multilingual students are viewed through a deficit lens, and their experiences and knowledge are overlooked or even viewed as harmful to their learning (Moll et al., 1992). One aim of this study is to uncover how race and gender were experienced and re-produced through platforms and their algorithms with a goal to guide educators, theorists and, perhaps even, media justice groups. With that said, my whiteness positioned me as an outsider to the meaning of some of the racialized experiences students encountered with platforms. Most notably, “Las Comadres” was a group of young Latina women led by a Latin undergraduate collaborator; I found that while I encouraged students to foreground racial, linguistic and gendered experiences to guide the group project, I may have also inadvertently encouraged racial-gender platform power. I discuss more about this in Chapters 5 and 6.

## **Data Collection Procedures**

### ***Field Notes***

I wrote field notes about Mrs. Turner's 6th grade class and the CMC. The majority of my observations in Mrs. Turner's class were collected between September to January and over a few weeks as the classroom turned to hybrid learning in the late spring. Overall, I collected approximately 22 weeks of notes and field notes, with most of my observations documenting the structure of class activities, the use of Google classroom in daily activities, student participation that I observed through GoGuardian and during class discussions. I also wrote notes, some of which became full field notes, for each week of the CMC and I collected CMC field notes from the undergraduate students. My CMC field notes primarily recounted interactions I observed between students and with their undergraduate collaborators, and I paid particular attention to how students engaged and spoke about platforms. The undergraduate student field notes covered a range of topics from observations about online learning, working with students and how to engage them, to recounting their interactions in small group activities. It is these latter observations, about small group work, that I was focused on analyzing.

### ***Interviews***

I conducted a total of three teacher interviews, 19 youth participant interviews, and two undergraduate interviews. In addition, I had several informal conversations with Mrs. Turner and an informal conversation with the technology team and principal to learn more about the school's needs and technology use. The teacher interviews (see Appendix A) focused on the teacher's backgrounds, their experience and views about the pandemic and using technology in education, and more specifically their experience with and use of Google Classroom. These interviews helped me to understand more about how teachers viewed and used technology — including the school lore around a 3-day schoolwide conversion to Google Classroom (though they used Class Dojo for K-5) in the early days of the pandemic.

The St. Jacob student interviews happened in two rounds (see Appendices B and C). Once in late January and early February and again in April after the CMC. In the first interview, I asked questions that helped me construct their digital literacy actor-network. Questions circulated around students' hobbies and interests, their use of technology and social media, and the influence of family, friends, and school on their use of technology. I also tried to gauge their understanding of how their favorite platforms work to see what change if any might occur over CMC. Each student walked me through at least one of their favorite platforms and I asked them about their understanding of social media algorithms and data tracking, and how they operated on the website they showed me. The second interview focused on the video they made in CMC, their takeaways from the club, and their views about algorithms. Nearly all of the students had a much deeper understanding of platforms and algorithms in this latter interview.

The undergraduate student interviews (see Appendix D) occurred in April and June and covered their teaching backgrounds with and without technology, their experience in CMC and helping their group, and their use of social media. I unfortunately was not able to interview all St. Jacobs study participants a second time and one of the undergraduate students did not respond to requests for an interview. Nonetheless, the interviews are rich and informed my analysis and dissertation findings.

### **A Special Note on Walkthroughs.**

In order to understand how students engaged with platforms and traces of the algorithm, I had each student "walkthrough" one or two platforms of their choice. To walkthrough a

platform, students shared their screen and showed how they used the platform; I guided the conversation through a semi-structured interview approach to learn more about how students used the platform, what they thought about their recommendations and how they observed algorithms on the platform. The walkthrough method is ideal as it makes “explicit the otherwise implicit and (by design) apparently seamless process of engaging with a digital media object” and, by focusing on the participants’ narrative of the platform, they could “give away hidden affordances and tricks” in using it (Light, Burgess, Duguay, 2018, p. 885). Students shared platforms that they used regularly and included social media sites like YouTube and TikTok, the gaming site Roblox and even the MIT coding site Scratch.

My approach to walkthroughs combines features of the Science and Technology Studies “walkthrough” method (Light et al., 2018) and “user walkthroughs” in Human-Computer Interaction (e.g., Nickerson and Landauer, 1997). Like the STS walkthrough, I approached the students’ platforms as a “sociotechnical artifact” that embeds and derives from cultural meanings *and* operates according to mechanical and technical processes. I did not follow the STS-informed method outlined by Light and colleagues (2018) to focus on how the researcher, rather than the user, walks through the intended uses and meanings of the application. For this reason, I leveraged work in HCI, which typically focuses on the users’ experience of an application, to align the users’ experience with the application designers’ intentions. My goal of the walkthrough was to focus on the participant’s experience of and meaning-making about the platform in conjunction with the technical and social meanings that arise from the platform itself. For example, I was curious how students made sense of their recommendations, which are produced through algorithmic processes but also has “embedded cultural references” (Light et al., 2018, p. 882) through its design to catch the user’s attention, *and* whether they engaged with the algorithmically-produced content like their “For You” page or content recommendations.

### **Recordings**

Recordings were a pivotal part of the data collection procedure. I took or gathered recordings from every facet of the study: select sessions from Mrs. Turner’s class, each CMC session, interview “walkthroughs”, undergraduate weekly meetings, and occasional recordings of student browsers through GoGuardian (most often during office hours). Per school policy, Mrs. Turner recorded each class session. Not all of these class sessions were useful for my data collection, so I asked for specific recordings from Mrs. Turner such as when students engaged in digital literacy activities designed by Mrs. Turner and me. In CMC, I recorded each session and collected recordings from the undergraduate students in their breakout sessions<sup>15</sup>. As described above, I asked students to record their screens during the platform walkthroughs. Students also recorded their screens for some of the CMC Padlet responses. On occasion, I recorded browser activity by study participants during office hours after Mrs. Turner’s class. These browser recordings helped me to design a digital literacy session with Mrs. Turner about how the Google Image Search algorithm works. Finally, I recorded each of the weekly sessions where I met with UG students. This helped me to keep track of undergraduate observations and growth in the program.

---

<sup>15</sup> This includes many but not all group sessions as one of the undergraduate students struggled with recording his sessions.



### ***Artifacts***

I acquired artifacts primarily through CMC and Mrs. Turner's Google Classroom assignments. In CMC, students responded to seven Padlet prompts, which included activities such as recording their use of YouTube, sharing a favorite meme, and sharing a topic they were interested in for their group project. The Padlets were designed as a data collection tool to learn more about each student's values and technology use, and also a pedagogical tool to engage students in activities prior to our synchronous session. During the CMC sessions focused on creating their group video, students worked with undergraduates to complete slides with guiding questions. The final videos themselves are also artifacts.

From Mrs. Turner's class, I had access to all Google Classroom assignments and the Google Classroom itself. I also acquired access to the math teacher's Google Classroom for comparative purposes. The Google Classroom assignments include digital literacy activities Mrs. Turner and I co-taught as well as information about the students in their weekly writing activities and early class assignments that asked them to share about themselves.

### ***Survey***

Finally, there is some survey data from CMC that helped to provide a more complete picture of the St. Jacob student participants. In CMC, I gave a pre-survey (see Appendix E) to learn more about students' habits with social media and technology, and their views and beliefs about how platforms and algorithms work. The post-survey (see Appendix F) repeated some questions about student beliefs and knowledge on platforms and algorithms so as to reveal any changes and there were also questions about their experiences in CMC. These surveys helped to inform my analyses about students' development of critical digital literacies and they helped to organize interview questions about students' social media habits.

### ***Analysis Procedures***

I used three analytical methods to answer my research questions: iterative coding (Bogdan & Biklen, 2007), visual network analysis to diagram actor-networks and make sense of sociotechnical relations, and critical discourse analysis. Coding served as an entry point to understand key themes in my data and how I might group data to answer my questions. In addition to using coding to find patterns in my data, I also coded recurrent or influential discourses and actants, which enabled me to employ one or both of the other two methods.

### ***Coding***

My approach to coding was both deductive and inductive (Miles, Huberman, & Saldaña, 2014). To begin coding, I re-read through my research questions, literature review, and current literature so as to deductively identify codes that would help me answer my research question. Examples of deductively produced codes were critical digital literacy, platform literacy, platform power, user agency, platforms and identity, and actants. During the first round of coding, I used the deductive codes while remaining open to codes "that emerge progressively" in the act of coding (Miles, Huberman, & Saldaña, 2014, p. 81). In other words, I created codes inductively as I read through the data and these inductive codes were most often child codes to the deductive codes discussed above. For example, under "critical digital literacy" I identified the practices I saw students employing such as theorizing about the platform, asking questions, hacking / breaking, experimenting, using multiple user accounts, being careful, and noticing the algorithm. A key parent code that arose inductively from the data, including its child codes, was "student

algorithm commentary,” which occurred when students gave their opinion or thoughts about algorithms. Below, I explain the two other analytic methods.

### ***Visual Network Analysis: Mapping Actor-Networks***

A central goal of my analysis was to understand the sociotechnical actants and processes that shaped participants’ literacy practices on platforms. To achieve this, I focused on identifying actants through data collection procedures (e.g., following actants and designing interview questions to elicit information about influential actants on students’ uses of platform) and mapping the actants’ relationships through analysis procedures. The latter required identifying key moments in the data that helped me to answer my research questions, disassembling the actants involved in those key moments, and re-assembling the actor-network through visualizations (i.e., mapping) and / or description.

Through coding, I identified key actants (e.g., parents, teachers, hardware, material objects, platforms) within participants’ digital literacy actor-networks. From there, I mapped several actor-networks to explore how platforms and participants mutually acted on and with each other in combination with other actants. Visual Network Analysis (VNA) is a mapping analytic tool that aids qualitative researchers to make sense of actor-networks and their effects (Decuyper, 2020). Unlike Social Network Analysis (see Scott, 2017), which focuses on mathematical and quantitative mapping of social networks, VNA is a way of visualizing qualitative data to “trace the complex entanglements by means of which specific practices are constituted” (Decuyper, 2020, p. 87). VNA is an analytic tool for sociotechnical-oriented qualitative researchers to visualize actants, their relations and the effects they have.

VNA adopts a “flat ontology” (see Latour, 2005). Actor-networks do not assume hierarchical relations between actants. The map of an actor-network is 2-D and focuses on showing the emergent interactions between actants that make up a social practice, rather than hierarchical relations and social structures. This flattening of social relations also disrupts linear time and boundedness of space: multiple times and places can be present in a visualized actor-network (Decuyper & Simons, 2016). The focus of a visualization is “to scrutinize and visualize practices without giving (causal) powers to social structures” and understand “how practices are constant effects of relations” that span time and space (Decuyper, 2020, p. 87).

VNA is not mimetic, but creative. The goal of VNA is not to reflect or represent reality, but to (re-)present “how a practice is relationally composed by heterogeneous actors” (Decuyper, 2020, p. 76). It is an “active presentation” rather than a “passive reflection”, “where that which is presented creates something new” (Decuyper & Simons, 2016, p. 379). In other words, a visualized actor-network, while trying to capture the actants, their relations, and its effects, transforms what it depicts. For this reason, “the figures in a diagram act as tools of inquiry rather than as full-fledged answers” (Decuyper & Simons, 2016 p. 381).

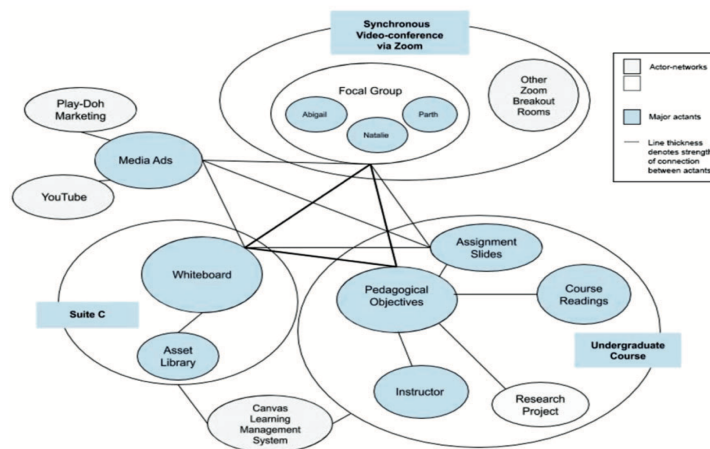
Pragmatically speaking, to visualize the actor-network, researchers can focus on depicting a particular group of actors, a particular relation, a particular activity or any combination of these (Decuyper, 2020, p. 78). I focused more specifically on the actor-networks that upheld students and / or teachers’ practices on platforms so as to situate how algorithms shaped their digital literacies. Using qualitative data from interviews and interactions where students discussed platforms, I traced and mapped the actants and relations that characterized these participants’ digital literacies. This included asking interview questions where students could detail the various influences on their online activity and in their life more broadly, and coding data to identify key actants that would then inform the visualization.

This visualization methodology is “open, flexible and descriptive” and used as a means to “assist in giving an account of a particular practice under investigation” (Decuyper, 2020, p. 75). There is no single way to map an actor-network. Examples of actor-network maps in educational literature include sketches that focus on the relation of technology amongst classroom participants (Sørensen, 2009), networks that use a software algorithm to map codes (Decuyper & Simons, 2014), and provocative and disruptive visualization of relations such as depicting relations via knots (de Freitas, 2012). VNA aims to create a thick description of the relations and their effects and “to raise questions with respect to the distribution of various educational settings and what this distribution then shows” (Decuyper, 2016 p. 13).

Interpretation of the visualization is also an important analytical step. Researchers can focus on regions or centers within the actor-network, the density or interface of relations, or observe the overarching infrastructure of the actor-network. My approach in this dissertation follows that of an actor-network I drew with colleagues (Sobko et al., 2020) depicted in Figure 3.2. We mapped the actor-network of an online undergraduate collaboration using video footage, discourse analysis, and multimodal analysis of student artifacts. The map depicts regions, interfaces and density of relations, as well as the overarching structure that made “small but noteworthy shifts in students’ perspectives and thinking” (p. 36).

**Figure 3.2**

*Sobko and colleagues (2019) Actor-Network Visualization of an Online Group Collaboration*



VNA in this dissertation similarly focuses on key activities and disassembles and reassembles the actants present in the activity. I focus on identifying the actants guiding participants' use of platforms and digital literacy practices more broadly, and to understand how the algorithm fits into the actor-network (if at all). For example, in findings Chapter 5, I use student platform walk-throughs, interviews, and observations from class and club sessions to show the interface of relations and the infrastructure that sustains student platform participation.

### ***Critical Discourse Analysis***

My third analytic approach is critical discourse analysis. Discourse analysis is a “forensic activity” that “offers a means of exposing or deconstructing the social practices that constitute ‘social structure’ and what we might call the conventional meaning structures of social life” (Jaworksi & Coupland, 2014, p. 5). In other words, discourse analysis, which focuses on deconstructing linguistic and multimodal texts and interactions, enables researchers to uncover meaning and trace this to social structures, ideology and practices (or the foundations for and social patterns of meaning-making). Jones, Chik, and Hafner (2015)<sup>16</sup> identify four main elements that discourse analysts account for: texts, or a “collection of semiotic elements” that is coherent (socially recognizable) and cohesive (parts of the text are interconnected, held together); contexts, the “social and material situation” of text production and consumption; actions and interactions, “what people do with texts” and to each other; and power and ideology, the use of texts to dominate, control, and create versions of reality (p. 4-5). Each of these elements are complicated in digital environments with texts being multimodal and often loosely cohesive (e.g., YouTube comment threads), contexts being multiple and at times unknown to the text producers (see Jones, 2016), and action being channeled by the ideological and technical configuration of opaque platform algorithms.

My ANT-inspired approach to discourse analysis means that instead of trying to link discourse to presumed broader social structures, I lay discourses flat and alongside other actants to understand and re-assemble the social. Discourses are actants (they do things, see Austin, 1962), and this approach additionally adds the mutually constitutive nature of not only humans and texts to affect discourse, but material and technical things. This means, for example, that analyzing “actions and interactions” requires me to not only account for what participants do with texts and each other, but also to account for how non-human actors, like platforms, algorithms and hardware, shape texts and human interactions, and vice versa. More specifically, I used critical discourse analysis to understand how the words and texts that filled my data, such as students' views about algorithms or the multimodal Padlet responses they created, link to broader discourses. Below I detail the specific approach I took to multimodal texts and language data.

Critical discourse analysis (CDA) is concerned with ideology and power, and it connects texts and interactions (the contexts and patterns of production and reception) to broader discourses that animate these texts. Fairclough (2001), the originator of CDA, explains that “language connects with the social through being the primary domain of ideology, and through being both a site of, and a stake in, struggles for power” (p. 12). It is through ideology that power is exercised. CDA seeks to uncover the common-sense assumptions in texts and interactions to show the hidden “connections between language, power and ideology” (p. 4).

CDA uncovers these hidden connections through a three-part analytical process. It typically begins at the level of the text and starts by describing the “formal properties” of the text such as the grammatical and textual structures. The analyst then moves into a phase of interpreting the relationship between the text and context of production and reception, or how a text is socially meaningful, its intended force as a speech act, and how it relates to other texts. The context online is complicated, having at least three layers— a sub-text (algorithm), pre-text

---

<sup>16</sup> In their book on rethinking discourse analytic methods in digital environments, the authors argue that traditional approaches in discourse analysis that focus on textual data removed from context are inadequate to understand meaning-making in digital environments; instead, they are “not surprised, that many of the contributors [to their edited volume] opt for more ethnographic approaches to data gathering” (p. 15).

(user interface designed to entice users' providing data), and context (users engagement in online practices)— and is intimately linked to offline contexts (see Jones, 2016). The context and pretext are perhaps the most readily visible aspects of platforms. To capture the influence of offline contexts and the subtext, I used walkthroughs and interviews to understand more about the broader network of actors that influence participants' digital literacies and recorded sessions from CMC allowed me to compare platforms across contexts, which can reveal how the personalization algorithm shapes the user-facing interface. Finally, the CDA researcher connects the text and context to broader social structures, or discourses and ideologies, to explain the relationship between a textual interaction and the social context. This was particularly useful to understand discourses that emerged to explain and make algorithmic operations common sense, and to see how these discourses acted on participants in, for example, their sense of privacy and safety.

Accounts of discourse are essential to tracing digital literacy, identity, and ideological becoming in relation to algorithms. Algorithms and data, like discourses, filter and organize the texts we engage with and channel our interactions with others. CDA provided me tools to explain how platforms, algorithms and other actants shape literacy by helping me to make sense of what participants said and thought about algorithms (i.e., their algorithmic imaginaries), the texts they produced on platforms and in CMC, and their interactions with others. In addition, the platform's "pretextual" environment, which entices users to click, like, post, take surveys, etc., is ripe for discursive analysis. The advantage of CDA is that the pretext can be linked to power and ideology stemming from its underlying algorithmic base (e.g., company intentions) and also the patterns of ideological formation of its users. Agency as well is always present in these interactions. As much as platforms are designed to channel and predict behavior, the algorithm cannot stifle human creativity nor how they choose to engage in the "algorithmic game." Critical discourse analysis can, for example, capture user's agentic practices, including how they interpret texts according to other social and ideological discourses than those intended by platform producers.

Digital ethnographic methods, tracing, coding, VNA and CDA are a powerful combination of tools that I use in this dissertation to account for how algorithms come to influence students and teachers in school and beyond. They also enabled me to capture moments of agency. The following chapters detail my findings about the practices, ideologies, and identities of students and teachers as they engage with school-based platforms and with platforms in their everyday lives.

## Chapter 4: Google Classroom in the Classroom

In this chapter, I explore how Google Classroom influenced and shaped educational practices at St. Jacobs. My chapter shows that Google Classroom and its influences are intertwined with various actants as well as other schooling platforms. Whereas the budding critical literature on educational platforms (EPs) tends to focus on macro-actors, my chapter will present empirical evidence as to how actants, large and small, animate Google Classroom; specifically, actants that shaped educational practice and the use of Google Classroom included the pandemic, other platforms like Zoom and PowerSchool, and student and teacher relationships and aims. My chapter, like the critical EP literature, shows how Google Classroom influenced “educational forms,” in this case classroom practices. However, by being rooted in empirical research my findings extend beyond this literature. The EP literature thus far has presented accounts of how platforms seemingly change education according to platform business models; instead, I show that how platforms influence classroom practices is based on actual uses, which often can be characterized as “improvisation, subversion, denial and transgression” (Perrotta et al., 2021, p. 109).

I demonstrate in this chapter that there is a need for empirical research on the actual uses of EPs. Through my account of Google Classroom at St. Jacobs, I propose that the budding field of critical platform studies in education focus on situated accounts of platforms in education to understand how EPs alter educational practices. Whereas the work on EPs to date is valuable for empirical researchers, I believe we are missing how EPs actually shape education by focusing on macro-level actors and platform effects divorced from actual educational contexts.

In this chapter, I analyze how St. Jacobs middle school used Google Classroom, which school members, including students, teachers, IT staff and administration, characterized as the “hub” of educational activities in the middle school. Google Classroom played an important role in Mrs. Turner’s class and the middle school more broadly such that shortly after starting my research, I expanded my scope to not only observe students’ engagement with social media platforms, but to also understand how Google Classroom influenced students as well as teachers and classroom practice. I show in this dissertation that EPs as well as social media were important forces in my participants’ lives. In the following sections, I show how Google Classroom shaped classroom practice and how various actants shaped its impact on St. Jacobs.

### Google Classroom as an Educational Platform

Throughout this chapter, I engage with a recent and comprehensive platform analysis of Google Classroom<sup>17</sup> so as to suggest an alternative direction for the future scholarly study of EPs—my dissertation shows the needs for empirically situated accounts of EPs as, I argue, a platform and its effects are only revealed when acted on by users. The study, performed by international researchers Carlo Perrotta, Kalvero N. Gulson, Ben Williamson, and Kevin Witzemberger (2021), looks at how Google “configures new forms of pedagogic participation according to platform logics” (p. 97), or how pedagogy is shaped by Google Classroom’s<sup>18</sup> technical infrastructure and corporate model.

---

<sup>17</sup> This is the only analysis of Google Classroom that I found in the EP literature.

<sup>18</sup> Google Classroom is a relatively new application within the G Suite series and was established in 2014. Google’s foray in education precedes this by several years as Google worked with teachers to promote G Suite tools in school districts, particularly in Chicago (Singer, 2017).

Perrotta et al. (2021) perform a “technographic inquiry” of GC’s infrastructure to understand its effects. Their technographic inquiry “distinguishes itself from ethnography by concentrating on the suggestive and anticipatory qualities of sociotechnical systems” (p. 100). The authors analyzed four sources of data: GC terms and conditions, technical documentation, media articles about GC, and official guidance for educational platform users like teachers and parents. They identified three influential and essential components of the GC interface that structure pedagogic participation on its platform. These are corporate imprinting, the Google Classroom API, and the fragmentation of pedagogic responsibilities via the platform. Corporate imprinting is the process whereby Google’s corporate interests shape institutional practices and policies. This is most notable in Google’s data extraction efforts, which “are moderated by some legal constraints, but still operate indirectly in ways that benefit the overall revenue model” (p. 102). APIs are the plug-and-play configurations between the platform and various applications and developers; Google Classroom is a platform that offers a basic educational tool for instructors, and it can be added on to through integrating other applications such as plagiarism checkers, connections to school information systems, parent tools, etc. APIs benefit teachers by allowing them to construct the platform according to their own uses, though school platform administrators enable or disable which applications can be connected to Google Classroom. Simultaneously, APIs benefit Google and the developers by creating new forms of data creation and extraction. Finally, Perrotta and colleagues (2021) argue that pedagogy, which has already been fragmented by administrative and accountability measures sans technology, is further fragmented by Google Classroom: the system itself requires oversight by administrators who enable or disable what teachers can do on the website; parents and guardians are required to help students navigate and engage with GC; the platform itself co-opts some of the pedagogic responsibilities through APIs and its interface; and finally, there is a “shadow laborer” performed by distant data analysts who extract user data and alter the platform via data insights.

Perrotta and colleagues (2021) acknowledge that their technographic account of Google Classroom’s infrastructure does not reveal the “hidden truths” of the platform, which might be gleaned by ethnographic methods, nor does it analyze the “misalignments and forms of resistance in the actual manifestations of pedagogic participation” (p. 109). They acknowledge that “there is always a tension between the sociotechnical imaginaries of large corporations materialised in digital infrastructures, and the compromised reality of sub-standard practices, improvisation, subversion, denial and transgression” (P. 109). In so doing, Perrotta and colleagues lend credence to the importance of ethnographic methods while simultaneously affirming the importance of their work to identify key infrastructural elements that lay the ground rules for pedagogic participation.

I contend here with the authors’ framing of “actual manifestations of pedagogic participation” as “sub-standard.” This framing derives from the limitations of their technographic inquiry. Sub-standard indicates that such practices are errant and below a “standard” use. The connotation is that these practices may be born of incompetence and are *lesser*. My dissertation shows that the standard (as in typical) pedagogical practices with GC occurred in ways that were *unanticipated* by the EP owner and designers and in ways that ignored the designers’ suggested uses. These practices also do not easily fall into the alternative framings of “improvisation, subversion, denial and transgression.” Instead, my research shows that everyday pedagogical practices with EPs in my research are anything but “sub-standard.” They are context-dependent and inventive and I instead refer to these everyday uses as “actual practices.” In so doing, I aim

to provide a corrective to the technographic framing and I underscore the importance of empirical research into EPs.

In the following section, I examine GC as the key platform in Mrs. Turner’s 6th grade class and the middle school that shapes classroom practice and pedagogic participation. While I focus centrally on GC, I also show how GC’s impact on educational practice is relational: its effects are produced via a network of relations with other platforms, users, and technology. My approach works from the “bottom up”, or the classroom itself, to identify EP impacts. Through my analysis, I argue that understanding GC in an empirical context helps us to identify which parts of the EP infrastructure come to matter and influence change. Furthermore, I show that an empirically-based account reveals a more complex and unpredictable web of relations than anticipated by the most recent trends in the EP literature.

## **Google Classroom in Context**

### ***Google Classroom as the Middle School Hub***

This section shows how school members viewed Google Classroom as both the middle school hub of learning activity and in positive terms. Wide-spread use of GC across the middle school was a pandemic-response<sup>19</sup>. At St. Jacobs there were varying accounts of how the middle school transitioned to using GC over a short time span in response to the pandemic closures. One narrative was the “three-day transition,” espoused by the school principal. In this narrative, the school went from relatively sparse technology use to switching systems online in a three-day span. This meant teachers shifted lesson plans to online formats, launched and outfitted their Google Classrooms, and learned as much as possible about technology in response to a speedy transition required by pandemic school closures.

An alternative narrative was rooted in a longstanding “teacher resistance to technology.” Espoused by technology advocates in the school— namely the IT team and the middle school math teacher— this narrative asserted that while the transition was relatively speedy, GC had been a consideration and point of contention for several years and particularly in the weeks leading up to school closures. One IT coordinator, Mrs. Serrano, explained that the transition was “just like magic” when considering the years of teacher resistance to Google Classroom. A few weeks prior to the pandemic closure, a Google representative trained the teachers and staff on Chromebooks and Google Classroom. The Google staff member encouraged the IT coordinator and teachers to think about distance learning because, as Mrs. Serrano quoted of the Google staff member, “they’re already doing it in China.” This encouragement accompanied by a “successful” training and signs that schools might close started to shift teachers’ hesitancy to Google Classrooms a week or so before the pandemic closures.

By the time I started my research, the middle school already had used Google Classroom during the previous spring, meaning that students and teachers were acquainted with the platform. Mrs. Turner herself had used Google Classroom since she started teaching middle school three years prior. In the years leading up to her use of GC during the pandemic, Mrs. Turner explained that she used Google Classroom to help organize her class and that each year she learned more about the platform:

---

<sup>19</sup> K-5 used Class Dojo and the middle school Google Classroom. Class Dojo better facilitated communication with parents while Google Classroom relied more on student independence (an important learning objective for middle schoolers) and assignment distribution.



Each year [I] grew a little bit more with it. And [my use of it was] definitely not as in depth as it is now, obviously. But I was just starting to, you know, really start to use it as much as I could to help me, not so much them [the students]. But really, it was about me getting it and having things more centrally located. So, it was less paper. And it was easier to keep track and easier to grade and things like that.

Prior to the pandemic, Mrs. Turner used Google Classroom primarily for herself to *centralize* grading and assignments and “keep track.” Somewhat similarly, the math teacher Mr. Salinger used Google Classroom at the start of the 2019 AY (before the pandemic) to help students “with organization” by putting assignments, due dates and video links in “a place where they could look.” In other words, GC, for both of these teachers, served as a centralized “place” for students and educators, even before the pandemic onset.

The theme of Google Classroom as a *central* location or a platform that *centralizes* classroom activities only intensified after the pandemic. When asked how their use of Google Classroom was different at the time of the study, they stated:

*Mrs. Turner:* **“I use it for everything.** Whereas before, I was just kind of selectively using it for things.” Later in the interview she said, **“It’s the hub. Yeah, I think Google Classroom is my central location.** If someone were to go, ‘Well, what is- what does Mrs. Turner do in class, let’s see what she does’ you could go to google classroom.”

*Mr. Salinger:* **We’re all in now.** Before it was an extra tool. Now it is the **hub** of not only my classroom, but the middle school.

During the pandemic, the middle school teachers went “all in” with Google Classroom. For these two teachers it became the “hub” of their activity as teachers and even, as Mrs. Turner explains, reflects everything she did as an instructor. It is no surprise that a learning management platform, in this case GC, became the hub during forced remote learning— it acted as a much-needed means of connection and communication between teachers and students during distance learning.

A similar theme of centralization was echoed by the students. When asked to explain what Google Classroom is, students commented that: “it brings different platforms together” (Eloisa); it helps them to “keep track of [their] homework” (Natasha); and it is a place to “access all of your assignments” (Sean). As one student described, “it is basically an online classroom, except you don’t see your teachers face to face” (Sonia). For many students, Google Classroom was the hub for assignments and their learning over the remote year. In each of these instances, GC acted as a place that drew platforms, students and teachers, and learning activities together. While GC acted as a hub for many, some students described it as more of a supplement to the classroom. Selena for example claimed that it is “an online school resource, which is used for like, work, obviously.” Despite claiming that GC is now being “used as a primary thing” due to the pandemic, Oscar hesitated to “call it a virtual classroom”:

I find **Google Classroom was just an assistant for virtual classrooms.** I don’t find it as a way like you could use that as a replacement for classrooms, a virtual replacement. You definitely could when it comes to asynchronous online learning, but the way we’re doing it, I find Zoom to be more of a virtual classroom in a way.

In either case, as a hub or resource, GC played a vital role in students and teachers’ experiences at the 6th grade level. Notably, for Oscar, the application Zoom played a defining role in virtual learning due to its synchronicity as compared to GC. One key finding about GC as well as other platforms that I argue in this dissertation is how platforms animate each other and make possible

their influence on other actants; Oscar’s point here alludes to this and the impact of Zoom, GC and other key platforms on each other.

The descriptions of GC as a “hub” or “resource” for the (virtual) classroom accord with GC’s intended aim. Google “said they envisioned the app [Google Classroom] as a kind of ‘mission control’ dashboard where teachers could more efficiently manage tasks like assigning and correcting homework, freeing teachers to spend more time with students<sup>20</sup>” (Singer, 2017). In St. Jacobs’ case, Google achieved its vision to intertwine with educational and pedagogical practices and become a “mission control.”

In contrast to critical discourses around EPs and platforms in education research, all of the St. Jacobs’ members who I spoke with viewed GC in positive terms. Though teachers and some students were able to identify a few “disadvantages” to GC (after being prompted to provide some in interviews) such as not easily transferring grades to PowerSchool, the school-wide information system, or lacking an easy mechanism to connect parents to the platform, most of the critiques centered around (fixable) aspects of its utility. Students often framed GC as “helpful” and “professional,” and in one instance a student claimed that it “helped her to achieve her goals” (Natasha). The appreciation, trust, and at times even enthusiasm for GC by school members indicates that EPs served a necessary and useful function in this school space, even while GC subtly altered educational practices.

In the following sections, I bring my data into conversation with the three processes outlined by Perrotta and colleagues (2021)— corporate imprinting, the API and the fragmentation of teaching— to show how GC shaped “pedagogic participation.” Through this account, I show both 1) how Google Classroom, in concert with other platforms, users, and technology, shaped classroom practices, and on the other hand 2) how teachers and students used GC in ways that shaped the EP itself. In terms of my second aim, I reveal that the ways teachers and students used the platform often deviated from the “ideal” uses suggested or anticipated by GC designers. I refer to these “deviations” as “actual uses” as opposed to the framing by Perrotta and colleagues as “sub-standard.” I also show how teachers and students regularly used GC in ways that could be characterized as “improvisation, subversive, denial and / or transgressive” (Perrotta et al., 2021, 109).

### ***Platform Imprinting: Intensifying Traditional Academic Forms***

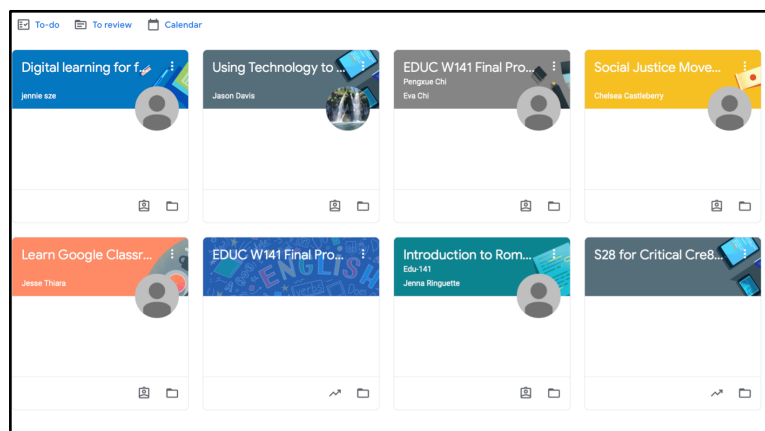
GC has a relatively simple user interface. By navigating to [classroom.google.com](https://classroom.google.com), GC opens to a page where students and teachers can view a grid-like representation of the classrooms to which they were invited and joined.

---

<sup>20</sup> In fact, Google’s centralization in classroom practices did not free Mrs. Turner to spend more time with students, as managing, routinizing, and using the app itself required copious amounts of time and training.

**Figure 4.1**

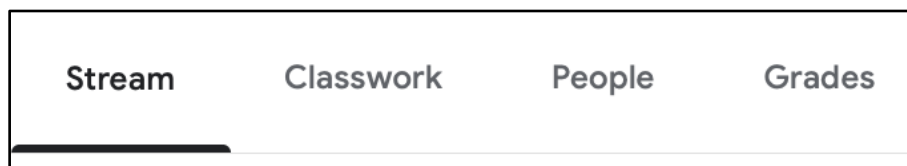
*Google Classroom Grid*



Upon entering a google classroom, the user sees three or four tabs depending on if they are a teacher or student: “Stream,” “Classwork,” “People” and, if the user is a teacher, a fourth tab called “Grades” (see Figure 4.2). The stream is a running collection of announcements sent out to course members The classwork tab is where teachers can post modules and assignments and course materials or links (internal and external to the course). The people tab lists course members and the grading tab is where teachers access student work and can grade and comment on submissions.

**Figure 4.2**

*Teacher View of Google Classroom Tabs*



These features of the platform influenced the asynchronous learning that took place in Mrs. Turner’s class. Specifically, Mrs. Turner used these tabs to guide her pedagogic activity. Mrs. Turner, for instance, made regular use of the course stream and classwork tabs. In her class, only teachers posted announcements on the stream including teacher assistants, myself, and the primary poster, Mrs. Turner<sup>21</sup>. Mrs. Turner sent out announcements to provide the daily Zoom link with a description of class activities, offer follow up instructions or clarifications from class, or share other miscellaneous information about school or class. Underneath these

<sup>21</sup> This contrasts with Mr. Salinger’s GC. He only occasionally posted on his stream while the 6th grade students were the primary posters on the stream. Students used Mr. Salinger’s GC stream to ask questions about homework or study hall to other students. On occasion, students directly asked Mr. Salinger in the post about study hall times and assignments. Some posts were not related to the class, such as occasional posts with an incomprehensible jumble of letters or posts that said “hi.”

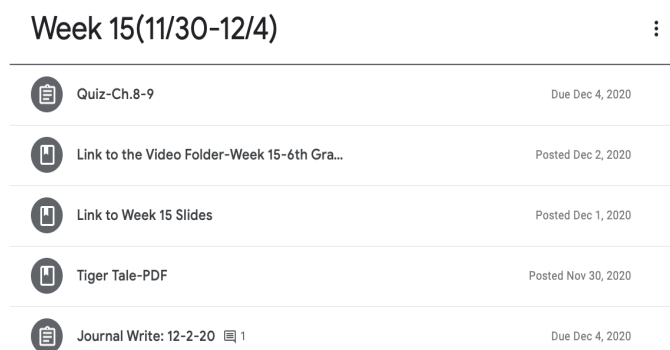
announcements, students would often add comments directed toward Mrs. Turner such as reporting issues logging into the zoom session, questions about assignments or a “thx” (i.e., thanks) for her announcement. Students also wrote to each other on the announcements, which were most often a series of “Hi’s” posted by several students.

In the classwork tab, Mrs. Turner capitalized on the organizational possibilities of GC by creating weekly modules (titled with the week and dates of the week) that contained assignments, quizzes or surveys, and her weekly course slides. There were a few miscellaneous modules, including a tab for school-wide newsletters, “Distance Learning Resources” with information on Chromebooks, “About This Class” (including pdfs to central documents and the course syllabus), and a module called “St. Jacobs Student Study,” which I created to interact with study participants and assign club participants tasks, interview appointments, and surveys<sup>22</sup>. Mrs. Turner regularly referred to the module for the week during synchronous course meetings and she often used a time-release feature for assignments or quizzes to post during the live session.

Finally, Mrs. Turner used the grading tab and its commenting feature to communicate with students about assignments. She at times used other means to communicate with parents and students in or after class such as through Zoom and through other messaging systems like Gmail or Google Chat.

### Figure 4.3

*Mrs. Turner’s Week 15 Module*



Nonetheless, Mrs. Turner employed GC as a primary communication tool. When thinking back about how she used the platform prior to fully remote learning, Mrs. Turner commented that she never thought of it as a tool that would become “the sole way to communicate with students.” Contrary to her former views, during remote learning GC became the key way to communicate with students. For example, she noted that the process for giving grading feedback has become nearly entirely virtual and consequently more arduous:

Whereas when I was in class, even if I didn't use Google Classroom, I call them up really fast and be like, “Oh, my gosh, okay, so you did really well on this, this and this, and I just need you to work on this, this and this.” And I didn't have to type it down. Yeah, if I typed it out, it would be a lot easier for them to like know later on. But

<sup>22</sup> I found that the students were highly responsive to GC tasks, but very few regularly checked or responded to their email. I used GC to boost response rates and communicate with the students.

they could always ask me the next day, it wasn't that big of a deal. **But because they're not with me every day that needs to be a little bit more in depth. So, I felt like I had to leave comments more often.**

Mrs. Turner felt compelled to provide more feedback—in terms of depth and quantity of comments—via the GC grading system, necessitating greater time on the platform. The impulse to leave comments through GC meant for Mrs. Turner that the “grading has exploded. And the amount of time that I spend on things is astronomical.” Whereas Mrs. Turner could speak with students directly in the in-person setting, remote learning enabled via one-hour Zoom classes presented relatively few opportunities to provide such feedback. As a result, GC helped to fill this crucial gap of connecting students and teachers, consequently, giving greater influence to the GC interface to structure her pedagogical practice and the student-teacher relationship.

While GC influenced asynchronous classroom activity, Mrs. Turner also regularly adopted GC into synchronous class time over Zoom, which was another avenue for the platform to imprint its protocols in classroom activity. This coincides with Perrotta and colleagues' (2021) observation that GC “does not eliminate teachers’ labour, but reconfigures it by generating new tasks that require teachers to synchronise effectively with the platform” (p. 108). The synchronization was facilitated by establishing Google Classroom routines, which were classroom expectations and practices that spanned asynchronous and synchronous spaces. As Mrs. Turner noted, using GC required establishing routines, which only intensified during the pandemic:

I would say in class, “Alright, go to your Google Classroom, I just assigned this or I just assigned this,” where with pandemic, we had to establish like, “this is what you're going to do morning, noon and night.”

GC took on a greater role during the remote circumstances of the pandemic. This was in part due to the centrality of GC in students’ out of school activities, requiring more time and a greater need to establish student practices around GC.

Along with the remote context of learning during the pandemic, another key actant that led to Mrs. Turner establishing routines around Google Classroom was Mrs. Turner’s pedagogical practices more generally. Mrs. Turner’s attention to organization as a teacher became embedded in the GC through her use of the classwork tab, where she posted course content in a familiar day-by-day and week-by-week format, as well as the classroom routines around the platform.

The use of GC was bolstered by class practices and expectations that spanned asynchronous and synchronous learning activities. Over the course of the year, students were expected to do the following: show readiness for class activities by being logged into Google Classroom and often on a specific assignment, master the G Suite tools for homework completion and post all of their homework (physical copies included) into Google Classroom, visit PowerSchool “at least once a day and go to google classroom 3 times a day, once in the morning, afternoon and later in the day” (Field Note from October 14th), regularly “check their to dos and their done list and to also look at teacher comments” (Field Note from October 7th), show their parents their Google Classroom assignments and feedback, review assignment instructions before reaching out to teachers, and advocate for themselves by checking their grades and feedback regularly, among yet other expectations.

During class, Mrs. Turner also used G Suite tools to center students’ attention. Each week Mrs. Turner created a slide deck, which she would add to throughout the week and which served as a resource for in class activities and beyond class. During nearly each class, Mrs. Turner

would share her screen and show her Google Slides and the weekly module. The slides provided information and also were a way Mrs. Turner corralled student participation. For example, during the first trimester the 6th graders read the book *Bud, Not Buddy*. One representative activity was having the students look at images or empty boxes on her slides and respond to questions she posed. Mrs. Turner would then enter their responses on the slide. During one such class, Mrs. Turner had the students look at an image and share questions the image made them wonder. The following excerpt is taken from my field note:

The class switched over into looking at a picture and filling in things they wondered or assumed. Some of the questions / wonders students had were: “What is the box thing?” (that they were sitting on), “When was this taken?”, “What are the boys eating?”, “Where was this taken?”, “I wonder what the boys are wondering or thinking?”, and another “if the car is parked or passing by.” Mrs. Turner added these suggestions on the left-most box (the students had already filled out a box on the right-hand side). There were other observations in the chat that went unaddressed such as:


- 08:51:18 From Eloise: who are the boys
- 08:51:27 From C: I wonder what they are looking at
- 08:52:00 From T: Why are they there
- 08:52:02 From S: i kinda want to know what type of car that is :p
- 08:52:06 From Vanessa : Where are they, because it looks like there is a fence.

**Figure 4.4**

*Mrs. Turner’s Slide Activity on Bud, Not Buddy*

What do you wonder about the photo?

- \*What are the boys eating
- \*what is that box thing in the back
- \* When was this taken
- \*Where was this taken
- \*Why is one boy not wearing shoes
- \*What are the boys thinking about, is the car parked or just passing by



Take a look at this photograph and type in the box below what you notice.

- \*two boys
- \*sticks
- \*car
- \*dirt
- \*porch of a house

During the Great Depression, more than 200,000 vagrant or orphaned children wandered the country as a result of the breakup of their families.

In Mrs. Turner’s class, Google Slides often played a central role. This was in part due to the practice of documenting class activity in a communal document, which Mrs. Turner uploaded to the week’s module. For many of their class activities— vocabulary, responses to readings, and writing activities— Google slides became a key component of classroom time and activity.

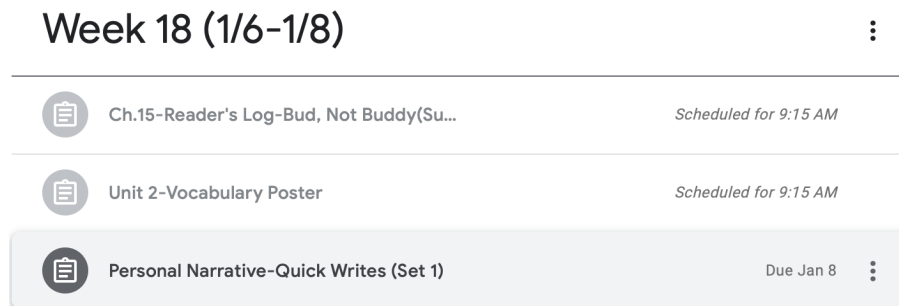
Another way the design of the GC interface imprinted on the class was through a GC time-release feature, which directed the class pacing. On January 6th for example, Mrs. Turner

asked students to navigate to Google Classroom and look at the assignments released at 9:15 am. She wanted students to read the instructions for each assignment together, saying:

“Everyone should be in Google Classroom right now, looking and reading along with [a student selected to read].” About half of the students went to the attachment and not where the student was reading (i.e., the assignment instructions)

### Figure 4.5

*Week 18 Module from Field Note*



Another student read after being asked by Mrs. Turner. Mrs. Turner then announced to the students, after seeing through GoGuardian that some of them were on other websites, “your teachers are putting a lot of direction for you and hoping you will be able to find your answer in these directions. A lot of you are not reading these directions. Whenever you see a new assignment, you need to read these directions.”

...

The rest of the class was spent asking students to read over the instructions and talking through the released activities. (January 6th Field Note)

Reviewing and reading through assignments posted to GC occupied a significant amount of time in class and the assignments also structured the flow of class. Ensuring that students understood the assignment and its direction was often a key task for Mrs. Turner. In the instance quoted above, she became wary when she noticed through GoGuardian that several students had navigated to another website or did not have the Google Classroom with the assignment and directions viewable; the wariness derived from the need for students to show engagement by following along in Google Classroom on the “correct” page.

Google Classroom routines were so ingrained that students fretted when there were deviations from this norm. For example, on October 8th, the following occurred:

At the beginning of the class, one of the students asked where the slides for *Bud, Not Buddy* Chapter 5 were [so they could complete their homework]. I had noticed the evening prior several students asked where the slides were on the Google Classroom announcement. Mrs. Turner explained in class that they didn’t have slides and they were just supposed to read the book. (Field Note, October 8th)

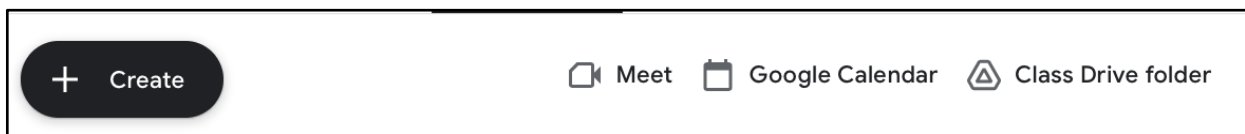
Each of these instances— the use of slides, time-release, showing participation by following along in Google Classroom, and expecting G Suite tools to accompany assignments— reveals how Google Classroom organized classroom practice via routines and expectations.

These excerpts show just how embedded Google Classroom was in classroom practice.

The corporate imprinting of Google Classroom’s shaped classroom practice by *intensifying narrow traditional academic forms*. Google Classroom helped to center pedagogic activity around assignments, tasks and grades. The interface itself directed pedagogic participation toward these goals: the key tabs to navigate were the stream (where communication about class and assignments took place), classwork, and grading (again, for teachers only). Within classwork, Mrs. Turner was prompted to “create”, or assign work, quizzes, and materials within modules (see Figure 4.6). Students in turn were directed to their to-do list and many viewed the purpose of Google Classroom as an assignment and task organizer (see Figure 4.7).

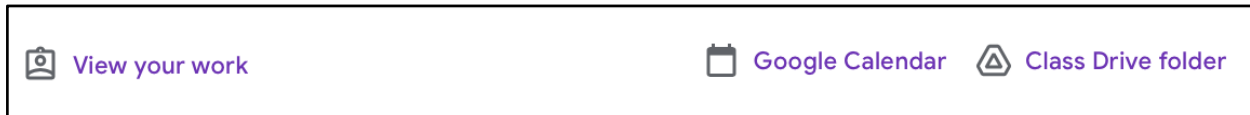
**Figure 4.6**

*Teacher Coursework View*



**Figure 4.7**

*Student Coursework View*



Students and teachers defined or characterized Google Classroom as a platform for assignments. Mrs. Turner aptly summarized in our interview, “Google Classroom has helped my students become more successful in homework completion and assignments. I think if I were to really say, what the most useful piece is, is that students have a better way of knowing what's due, what's expected of them, and a way to come back and reference things when they're not sure about what they should be doing.”

Each student I interviewed also referred to Google Classroom as a site for assignments and / or completing homework. Here are a few excerpts from students when asked to define Google Classroom:

*Selena:* That is very helpful for the teachers and students, because it's much more easier to assign homework and keep track of your homework.

*Veronica:* It is “a way for teachers to post assignments and check in with us.”

*Sean:* It is “just a website where you can access all of your assignments from your teachers.”

*Delila:* I think it's just for school, like to keep our assignments like, so we can, like, be more organized, because Google Classroom is really organized. And like, we can see all our assignments, and the day they're due.



In each of these quotes, the students refer to GC as a place for assignments. According to the students it was a place to assign, keep track, communicate about, access, and organize homework. GC was central to pedagogic activity, which gave GC ample opportunity for it to imprint its infrastructure on learning activities. This consequently intensified the presence of assignment-based learning protocols in the classroom. As Perrotta and colleagues write, “the pedagogy of teachers and students, understood as a form of educational and developmental agency, is becoming equated with pedagogy in the use of platforms, e.g. signing on, assigning tasks, looking for tasks, submitting items, moderating interactions in the classroom ‘stream’ (Google Classroom’s equivalent of Facebook’s Timeline) and so forth” (p. 108).

### **Convening Actants.**

Despite the demonstrated influence above, it was not just Google Classroom’s interface and corporate model that shaped pedagogic activity. Rather, there were several actants that helped to centralize the interface in classroom practice. The pandemic and the school culture were actants that led to the adoption and centralization of GC.

In terms of the pandemic, the teaching modality and an “achievement gap” discourse reinforced implementing academic protocols as defined by GC. In terms of the modality, nearly all instruction was remote<sup>23</sup>, which required a technological solution to create connections across distance. Hence, GC, *but also* Zoom, GoGuardian, the G Suite tools, and other platforms, were needed at this time. As a result, all middle school teachers— from those who had no experience to those who had some— adopted GC as a primary communication tool. This opened up the possibility that educational and pedagogical practices would be increasingly defined by the platform’s protocols.

The pandemic itself ushered in fears and concerns about the quality of education. These fears and concerns spawned an “achievement gap” or “learning loss” discourse (Dorn et al., 2021; Turner, 2022), which views remote instruction during the pandemic as causing students to fall behind the expected yearly learning standards and a gap to widen between students. These discourses were driven by a “doomster” view of technology, whereby technology is viewed as a distraction and remote instruction inferior to in-person learning (Bigum & Kenway, 2005). Mrs. Turner and Mr. Salinger reinforced the notion that there were indeed gaps forming in their students. For example, Mrs. Turner remarked that “in a classroom, you have medium, highs, lows, well. Now you’re going to have medium, medium mediums, medium lows, mediu-, you know, like, there’s going to be different variants of *gaps*.” (my emphasis). In other words, teachers felt that there would be new classifications of student levels and a widening gap between student performance.

The achievement gap discourse pushed teaching time toward academic and standard-based goals. For example, Mrs. Turner (as well as the principal Mrs. E) was concerned about the toll of the pandemic on the social emotional state of students. Yet, she found that other teachers (and perhaps herself) were driven to focus on academics at this time and to achieve the learning standards:

The need for social emotional instruction and time has never been so great. You know, I think that that’s, that’s something that we’re going to have to endure, and we’re going to have to really have tolerance...where a lot of teachers, because it’s just one subject,

---

<sup>23</sup> The school did move to hybrid instruction in the late spring and experimented with hybrid instruction on Wednesdays throughout the late winter in 2020.

they're very mind-driven to “Okay, I got to get these, got to get this, I got to get these standards in...”

Notably, Mrs. Turner felt that her “dream” to implement project-based learning would be pushed back further due to such achievement gaps:

I would love for [PBL] to be something that we continue to strive for. But with holes and gaps and things in instruction, it's really tough to see it there, as well as project-based learning really has an emphasis on student agency where they're able to create their own assignment, create their own project.

The future of instruction seemed fated to a focus on standards and academics to address these gaps. According to Mrs. Turner, the gaps themselves precluded students from being able to pursue engaging and agentive forms of learning rather than task and assignment-based activities.

Finally, it is important to mention that at St. Jacobs', academics were a high priority for parents, teachers and students. This was notable in conversations with Mrs. E, the principal, as well as outsiders who saw St. Jacobs' as more “middle class” and high achieving. The context of remote learning and the school culture reinforced Google Classroom and its task-based interface as the hub of learning activity. This in turn led to the corporate imprinting of GC on academic relationships and practices.

### **Users Making Platforms Act**

In this section, I will show how the context of teaching and learning shapes what parts of the infrastructure come to matter. Most notably, there was a complete lack of API presence due to the nature of teaching (in a pandemic) and the fragmentation of pedagogy primarily resided between teachers, students and platform, rather than teachers, parents, administrators and shadow laborers as claimed by Perrotta and colleagues. I will end this section on a special implementation of GC, which researchers could not have accounted for without empirical research: the playful use of GC by students beyond school.

### ***No APIs Here: Actual Uses, Improvisation and Denial***

One of the most apparent findings that contrasted with Perrotta and colleagues' technographic account of GC was a lack of integration of Google-compatible apps through the API infrastructure. In fact, we could argue that the use of external applications was an “idealized” form of GC use at St. Jacobs, of which even teachers like Mrs. Turner, who was considered by the IT team as independent and “adept at doing a lot of different things on technology,” did not take advantage. In fact, according to the IT coordinators who oversaw the administrative account and worked with teachers, only about half of the teachers on campus used any external integration with Google Classroom. From our interview, Mrs. Serrano explained how teachers modified GC or added new applications to their classroom practice:

I think now the teachers that are using Google Classroom will kind of see if they are introduced to a program, the program will usually have on their site or on their homepage somewhere like "works with Google Classroom" if it integrates with or has like a syncing feature or something like that. So, they know to look for that now. But as far as teachers that are actively looking for that, I would say maybe, maybe half, but most of them are getting that information from us or from the principal, or from other trainings that they- that they attend for- for teaching and teaching digitally.

About half of the teachers looked for integrations, though perhaps less than half used them. The reality was that St. Jacobs' teachers had to learn over time that such external applications existed

(and hence to look for an indication that the app “works with Google Classroom”) and that most teachers only considered integrations when informed about them by administration and staff trainings. The API infrastructure was not a major infrastructural feature of the Google Classroom experience.

Numerous other actants did not support the API infrastructure, essentially disappearing it from pedagogic participation in GC. First and foremost were teacher capabilities and time and the reality of the classroom needs. As Mrs. Turner explained in an interview, being a teacher during a pandemic could be described as “all-immersing.” She shared that in her own Catholic school upbringing the nuns modeled to her that teaching was an all-immersing occupation as they would eat, sleep, and live together. For her, her life as a teacher prior to the pandemic was all-immersing where it “consumed a very good portion of my life. 75% of my life.” But once the pandemic hit, this changed drastically and required much more time. She explained at length the added labor required during the pandemic:

You were recreating your model. You were recreating every day you did something new and different. **And you not only had to spend your time on Zoom, you also have to spend at least five to six, sometimes ten hours a day, just getting ready for that next day.** Because you weren't just creating your- your lessons, you were learning how to recreate your lessons, and then you were like, okay, you know, like you, you'd have to do research in between your classes. And you had to really, like, focus on what you thought would be the best way to do things.

The reality of teacher time during the pandemic is that it was very sparse— most of the teachers were learning how to recreate their courses for an online experience and to teach remotely. Teachers did not have excess time to constantly expand or explore their GCs. In fact, Mrs. Turner noted that it was not until late spring that she learned key built-in features of GC such as putting “all of my grades in a draft” or sending assignments to only a few students.

Teachers were making-do with the platform to meet the needs of their classrooms and pedagogical objectives in ways that intervened with the data extraction efforts of the GC API. With a range of teacher technology capabilities, which the IT coordinators admitted that some teachers even struggled with copy and paste, and a lack of time to fully explore the GC infrastructure, pedagogic participation in relation to the GC API could be defined as “sub-standard,” if we were to use Perrotta and colleagues’ framing. But as I critiqued previously, these practices were anything but sub-standard— they were how teachers actually used the platform. These actual practices show that the GC infrastructure is context-dependent, which should give us some pause to solely rely on decontextualized accounts of platforms to guide our understanding of EP impacts. A look at context helps us to paint a broader picture of how GC was made to act on pedagogic participation.

Another reason why external, plug-in applications were not widely used was due to the strong pull of other dominant platforms (e.g., Zoom, GoGuardian) and the Google Suite itself, which minimized the need for add-ons and plug-ins. Cross-platform tensions and alignments were common themes in Mrs. Turner’s class and they presented opportunities for teacher improvisation and denial, which shaped pedagogic participation. Zoom and GoGuardian often supported the use of GC in live sessions. Zoom’s sharing feature allowed and perhaps guided Mrs. Turner’s widespread use of weekly Google Slides, which she shared during each class and used to walk students through key learning objectives. GoGuardian, the web-browser monitoring application, gave Mrs. Turner a modicum of surveillance to ensure students were not cheating on

Google Quizzes (or Star Tests). The cross-platform use was at times defined by improvisation. When technology issues or malfunctions occurred, the platforms helped to support each other. The most common example was that on occasion students had trouble connecting to live Zoom sessions. As a result, the GC daily announcement became a makeshift means for students to alert their peers and instructors that they were locked out.

In addition, when platforms did not function together—namely PowerSchool, the school wide information system, and GC—there were opportunities for denial. In one field note, I observed how the art teacher Mrs. Santana denied the grading functionality of Google Classroom for that of PowerSchool:

She explained to the students that she gives them grades and comments in PowerSchool. She explained to the students that she doesn't enter in the grades on Google Classroom because it is "double work." Several students asked how to log in to PowerSchool and weren't sure what their password was.

Here we learn that Mrs. Santana *denied* the grading functionality of GC (even if it would have been more convenient for students) because it created "double work." PowerSchool and Google Classroom did not integrate, meaning that grades entered on GC would not automatically appear in PowerSchool. They would have to be re-entered manually. Consequently, students were introduced to a practice of checking their grades specific to Mrs. Santana's pedagogical approach, and they were expected to navigate the two platforms to understand their grades. Without a robust use of the API infrastructure on GC, teachers pushed back and improvised with how they used schoolwide platforms, including GC. In addition, GC and its interface did not act in isolation from other platforms, showing that studying a platform in isolation from other platforms (let alone other actants) reduces the richness of what platforms actually do.

### ***Fragmented Pedagogy: The Students-Teachers-Platform Triad***

Critical scholars of technology in education argue that teachers' control of their pedagogical practice is further slipping away as monitoring and surveillance of teachers intensifies via technology (Selwyn et al., 2018) and as EPs continue to structure pedagogic participation. Perrotta and colleagues for example argue that pedagogic participation via GC is split between four primary actors: teachers, parents, technology administrators and data shadow laborers. In my findings, the most powerful pedagogical participants were teachers, the GC platform and students, with parents and administrators playing a less substantial or influential role. In terms of shadow laborers, their presence was not felt (at least on the GC platform) though we can remain fairly certain that they reaped the data benefits of Mrs. Turner's 6th grade class, which perhaps will be a sliver of the mass data Google feeds back to the platform design.

While the role of data administrator is built into the platform and parents can reasonably be expected to play a pedagogical role, my research on Mrs. Turner's 6th grade class showed how pedagogical roles are carved out by local expectations and actors in addition to platform protocols. In the 6th grade, and admittedly the larger St. Jacobs' middle school context, the driving force in terms of *who* participated with the platform had to do with a dominant discourse of "student independence," or the need for students to be responsible for their own learning. Students in the middle school were expected to become responsible for their own learning over the course of the year (and middle school grades). Student independence was part of Mrs. Turner's teaching philosophy, but also evidenced in how other teachers spoke of Google Classroom and the expectations they placed on students. Mrs. Turner carried several teaching philosophies, which in my time in her class manifested throughout the year. These philosophies

were teaching 1) gratitude and wellness, 2) becoming self-learners, 3) improving executive functioning skills, and 4) developing a love for reading. The second and third skills defined expectations of student independence. Mrs. Turner explained about these skills:

I also like to make them self-learners. So I want them to understand that they have control of everything that they're learning, and that they have to be active participants in their journey of education....I'm really making them aware of their learning and how they're learning and what's coming inside. And then the focus on executive functioning skills has always been a very passionate piece to me that I think doesn't get enough attention. Particularly when you get higher into your academics, your- your focus is learn, learn, learn, learn. Get all this information in. But there isn't a lot of direction on how to do that, or different types of test skill taking, and just organization in general, like how are you going to work- map out your time, and you know, all of that.

Student independence was defined by students being “active participants in their journey of education” and by being deliberate about allocating and “mapping” their time toward academics. The capacity to actively participate in their own education manifested time and again in the expectations teachers had about how students navigated different platforms. They were expected to read and re-read instructions and assignment feedback in Google Classroom to achieve academic independence.

Over the course of the academic year, teachers became less tolerant of student questions about assignments and grades. Whereas in the first trimester, I saw teachers more readily explain assignments and respond to questions surrounding the assignments, by January teachers often referred students to materials or feedback already posted in GC. The art teacher, Ms. Santana, Mr. Salinger, the tech team and Mrs. Turner all referred to the importance of students actively reading their GCs to answer their own questions.

For example, Mr. Salinger said in an interview that students have an added benefit of having their assignments and due dates easily accessible. It reminded him of his own experience with a teacher who did not honor a grade dispute because the professor's phone number was on the board. He narrated:

I had a teacher once who I tried to argue an essay grade and I said I- I didn't understand it. And he said, “Why don't you call me? My phone number's on the board?” He was really- he was.. He's one of my favorite teachers. Really gruff, straightforward guy. And I have, I always remembered that because he got me. **And so I tell the students that story. “You've got my email address, you've got the assignments on Google Classroom, the assignments on the board, you've got study hall. Don't come in and say you didn't know that assignment was due.” And that's- that is basically how I use Google Classroom. It's just another way of communicating.**

GC might have given students a “benefit” to view their assignments at any time or place (as opposed to a classroom whiteboard), but it also added an onus on students to pull together resources available on the platform so as to direct their own learning. Mrs. Turner, for example, carefully detailed her assignment instructions and used announcements and feedback on GC. Students were expected to work with these instructions and forms of communication to guide their own learning; the assignment descriptions and grade comments acted in Mrs. Turner's place.

A salient example from Mrs. Turner's classroom is when she reviewed assignments. She would often spend time reviewing assignments as a class and then expected students to return to

the assignment for any follow up questions. For example, on December 3<sup>rd</sup>, students completed an activity to write a paragraph about a special person in their life. I wrote that:

Mrs. Turner told the students to brainstorm in their notebook and that they “will see that an assignment is pushed through.” She explains the assignment and has three students read it out loud. She had them read the assignment after she shared her screen and reminded them to read through the instructions, saying “today I had a question about something but the answer to the question was embedded in your instructions.” She continued by explaining they need to go to their instructions and “read them again when you have a question.” She explained this was a “big routine” and a “responsible routine.”

After developing these routines with GC, the students were referred back to the platform time and again for questions in the spring trimesters. As she told a student who asked about how many sentences a paragraph should be, she said “I want to make sure you revisit that google assignment because it is kinda spelled out..take a look at those directions.”

This was not only a practice of Mrs. Turner, but the art teacher (who visited on Thursdays), Ms. Santana. Ms. Santana almost primarily relied on imparting her pedagogical practices in video lectures and PDFs that explained the assignment. When she visited class, her teaching routine would be to have students share their artwork from a previous activity, to then watch the next art lesson Ms. Santana had pre-recorded, and to review the assignment instructions. Students watched the video and read the assignment quietly and independently during these 30-minute sessions and would ask questions if they had any. During one exemplary session, Ms. Santana refused questions dealing with instructions. I observed in a field note:

Ms. Santana reminded the students to “be following all of the directions for full points” and to “remember to be submitting every part of the assignment... so if there is a practice sketch, I need to see it in your Google Classroom.” This class Ms. Santana spent the time checking on whether students had submitted everything and if they had completed the assignment correctly. Students asked in class for Ms. Santana to check their assignment by messaging her in the chat and unmuting themselves.

Wyatt asked for clarification— I believe after logging into PowerSchool and looking at his comments— saying “what do you mean by missing” and asking if “the work you gave back to us, if we didn’t do that correctly, are we supposed to turn it back in or are we supposed to submit our sketches that we did before?” After Ms. Santana got clarification that he was asking about the shoe contouring assignment, she looked and sighed and then said to “go back to the directions and look at what the directions are asking.”

Student questions were re-directed toward “student independence” over their grades: Wyatt was expected to piece together the assignment instructions available in GC and the grades posted in PowerSchool. Students played an important role in pedagogic participation, which was enabled by specific and differing expectations established by teachers about how students were expected to participate on GC (in conjunction with other platforms at times). Expectations around student independence were intensified by the teacher communications stored throughout the GC interface.

Surprisingly, parents and GC administrators played minimal roles within the teacher-student-platform dynamic. Many teachers complained that GC’s main downfall, especially as compared to the K-5 platform Class Dojo, was its lack of an easy way to grant parents access to the platform. The tech team for example explained that “Google classroom is really for- for

students and parents can get information from it, but they can't really get- they can't get to the assignments.” Mr. Salinger explained more specifically that “it's very hard for parents to keep tabs. They have to tell their child to ‘sign in and show me’ rather than having a portal to look at what's on there,” which led him to believe that Google had not “thought far enough ahead, and they're gonna have to do some huge restructuring to be able to change it.” Especially when compared to another platform, Class Dojo, an application for younger students and which allows for more advanced parent involvement, teachers and the technology team highlighted how the GC infrastructure did not accommodate parent involvement.

Parents had difficulty with GC, and the teachers and the technology team did not expect parents to be involved with the GC platform. Mrs. Turner believed there were “grades of parents” who were more or less competent and comfortable navigating GC:

I think that because they don't use Google Classroom all the time, it's way overwhelming to them. And they don't know how to find the information they're looking for. The to-do list. If you go to the to-do list, it's like miles long. So, it's really difficult. If you just pan and select one class at a time, it makes it a little bit less of a situation. But I think that there's different degrees of comfortability.

Parents were overwhelmed and had different degrees of comfortability using the platform and understanding how to help their children. As a result, parents queried teachers about student grades. They first, according to Mrs. Turner, would go to PowerSchool, where the grades were listed, and then instead of going to Google Classroom to understand more about the grade, they would turn to the teachers. The truth was that parents were, according to Mrs. Turner:

Still relying on teachers to let them know when things are not being done. Even though that's the beauty of Google Classroom, where it gives the parents that knowledge. And so, I think we can get there. **I think we can get to that ideal.** It's going to take a system, it's going to take a whole school telling and training the parents how they should be working and how that should be going.

The hope in fact was that parents could eventually learn the protocols necessary to navigate GC and become pedagogic participants, as envisioned by Google. Mrs. Turner frames this as an “ideal” situation, showing that parent involvement may be a suggested use of Google Classroom but not an actual use. In actuality, parents struggled to become pedagogic participants, even at a time when such help was gravely needed.

Consequently, students as independent learners were expected to take on an intermediary role between the platform, teachers and parents. In a class prior to the end of the first trimester, Mrs. Turner instructed the students how they could become advocates for their own grades, perhaps in their parent's place:

I want you all to be aware of your grade- why it is the way it is. First step, go to Google Classroom, look at PowerSchool, look at assignments. Assignments that have a grade in it. Go back to Google Classroom and check it. I will leave comments.. Those are feedback pieces you want to look at.. really start to own those grades 6th grade and be an advocate for yourself. Your parents are awesome supporters and have been fabulous during this time away.. You want to make sure you are practicing an advocacy for yourself.. “Why do I have a C? Why do I have this? What is going on?” Get into the habit of asking me so you can get into the habit of telling your parents so you can show your parents you know what is going on.

Students were encouraged to own their grade by interpreting teacher feedback across school platforms, and to communicate this with parents to show them they “know what is going on.” As

a result of parents' inability or unwillingness to use GC as a resource, students were required to become even greater self-advocates or independent learners by developing the capacity to read the platform to their parents.

Finally, in terms of the school administrators, they played a minimal role in the pedagogic fragmentation of teaching at St. Jacobs. The school administrators were less involved because they intentionally enabled most features of the platform, both for students and teachers. Mrs. Serrano, the technology staff member, explained that “as far as the admin of the Google Classroom itself, the teachers themselves can set their settings, what they want to have for each of the classrooms and so we left it at that.” While the technology team did not actively guide pedagogy via GC, they did in fact play a substantial role in pedagogic participation as campus technology gurus. Their approach to technology aid at the school was to work directly with teachers and their curriculum, so as to make teacher-specific suggestions around technology uses and implementation. This was not only specific to GC, but other applications or technology uses. In other words, the tech coordinators guided platform protocols from outside of the platform itself. They did not manipulate the platform’s protocols to intervene in teachers' use of GC and instead consulted and guided teachers to use technology according to the teachers’ own objectives.

### ***Playing Pretend: Friendships and Role Play on Google Classroom***

A final, unexpected use of GC was how students used the platform toward their own aims beyond school. In a few interviews, when prompting students about their thoughts on Google Classroom, three students mentioned that in addition to GC being a useful tool for school, it was also a tool for fun. I was quite intrigued by this and pressed further. These three students revealed to me that they had created their own Google Classrooms as a way to connect with cousins and friends. In subsequent interviews, I learned that these GCs were a place for “playing pretend” and tampering with school expectations around GC; the way students used these platforms borrowed from school practices, but they also transgressed and subverted the norms and protocols of the platform to the students’ enjoyment and frivolity. Below, I reveal the purpose and function of these “pretend” GCs by exploring one student’s account in detail and intertwining the descriptions and rationalizations of all three students who created GCs.

Two of the students, Delila and Selena, created Google Classrooms with each other and a few friends in 6th grade, while the other student Sheila participated in one GC with her cousins and another with Sonia (also in the study) and friends across the Catholic school network. Selena and Delila created additional Gmail accounts, which they called “business accounts,” to launch their own GCs. These business accounts were used for other platforms such as YouTube and Instagram. The alternative Gmail accounts were a necessity as the St Jacobs' Gmail accounts were limited, barring students from emailing or chatting with others outside of St. Jacobs.

Each of the students gravitated towards GC as a way to connect with their peers. For example, when asked whether or not she would recommend other student to create a GC, Delila said:

I think if they just want to play, just want to have all their friends in a Google Classroom, just kind of assign them fake- not fake, but fun work and quizzes **to get to know them better they could definitely try it out with their friends** because it is really fun and that’s all.

According to Delila, GC is a great way to “get to know” friends better and to “play” and have fun. Like Delila and Selena, Sheila and study participant Sonia created a GC to remain in contact



with friends from within the Catholic school network, but beyond St. Jacobs. They thought, “why not just make a Google Classroom” as a way to “have new friends.” Sheila further explained that they “usually just texted on [Google Classroom]” and posted quizzes “just for fun.” The posts were meant to be fun and lighthearted, and many of the GC features students used were for “texting” or chatting with friends. Ultimately, the GCs died out as the students found other ways to communicate with each other. As Selena said, the students now “usually just connect on WhatsApp or Twitch” or by calling each other. By mid-spring the students did not “really need to use it [GC] anymore.” Both the creation and demise of the student GCs revolved around the desire to make, maintain and deepen friendships, and GC, for a time, acted as a communication, rather than educational, platform.

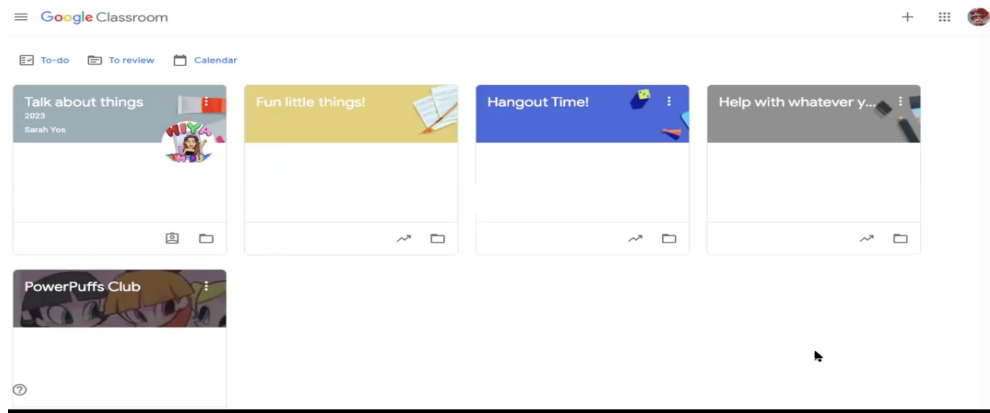
In addition to communicating with friends, the GCs satisfied a need for play and imagination. Selena explained that her and Delila, who were longtime friends, had often role played as teachers as they grew up together. GC became a stage for them to take on and play these roles. Selena explained their impetus for creating the classroom was because “we do a lot of like- like role plays since we were little...we usually like play teachers and like try to be like teachers together.” Such was the case too for Sheila and Sonia, as according to Sheila they posted as the “principal and the vice principal” to “make fake announcements and fake news about what was going on in the school.”

GC, in fulfilling students desires for communication and play, had different uses than those in class. In the classroom, the GCs were used for academic objectives, which led to the isolation of students from one another as they completed and uploaded individualized assignments. The student GCs on the other hand were communal spaces. Students primarily used the GCs to chat, favoring the chat features on the stream as opposed to the more isolated encounters on coursework. In addition, the students often managed the GCs in tandem with friends — Selena and Delila or Sonia and Sheila co-ran the classes — and announcements encouraged each other to take (BuzzFeed) quizzes or view social media posts so as to start a conversation.

In addition to being communal spaces, they were also a place to break academic rules for “fun” or to be “funny.” This was achieved through various means: creating multiple GCs, posting fun assignments sporadically, failing to complete assignments, grading nonsensically, abandoning GCs as the chat waned or failed to catch on, adopting playful tones in their roles as school officials or teachers, ignoring standard punctuation and grammar, and introducing non-academic sources for assignments and in the chats. Delila, for example, walked me through five GCs that she created — some she made with Selena and others she made on her own (depicted in Figure 4.8). In her walkthrough, Delila showed each GC in turn, navigating the stream, coursework, person, and grading tabs.

## Figure 4.8

### *The Five Student GCs Delila Managed*

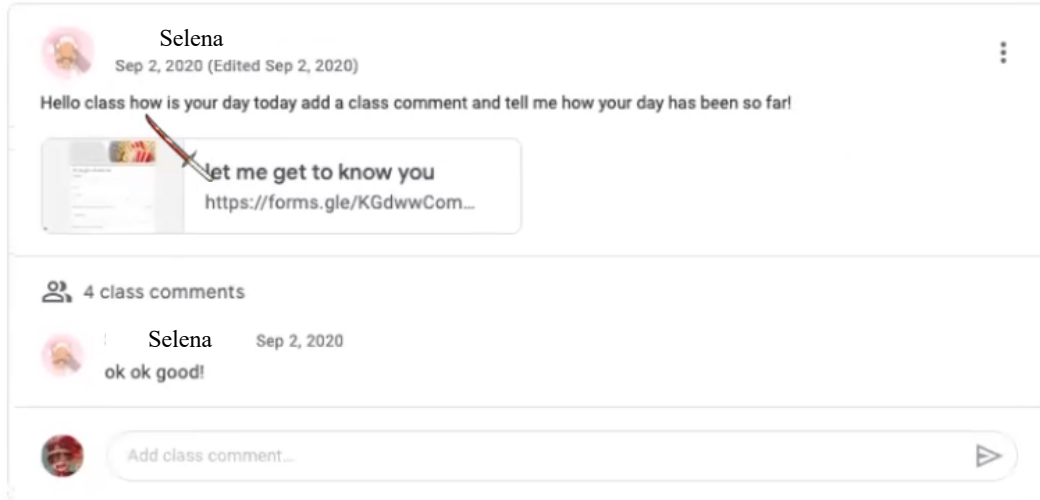


I learned that of the five, two of the GCs — “Hangout Time!” and “Fun little things!” — were abandoned shortly after being made. “Hangout Time!” had one post (which said “hi”) on the stream by an invited friend and the “Fun little things!” classroom had no activity at all. Neither of these GCs had coursework. The GCs “Help with whatever you need” and “PowerPuffs Club” contained some student interaction, but they paled in comparison to the “Talk about things” GC. The “Help with whatever you need” GC had two assignments and invited four other 6th grade classmates (two of whom did not accept the invite) and the Powerpuff GC included Delila, Selena, and a third close friend. It contained an assignment titled “Which Powerpuff are you?” where each student had to take a quiz to find out which Powerpuff Girl they were. Delila graded a submission from Selena, giving Selena’s submission, which was a photo that looked like it was from an online quiz, 181 out of 191 points. While these latter two GCs were active in September, most of the student participation took place on the “Talk about things” GC.

In the “Talk about things” GC, there were many announcements, three assignments, and four active classmates in addition to Delila and Selena. The students primarily used the stream to chat and share links as opposed to using the coursework tab. The first activity was posted by Selena and contained a link to a quiz. The google quiz had a popcorn banner and in all lower-case letters it was titled “let me get to know you.”

## Figure 4.9

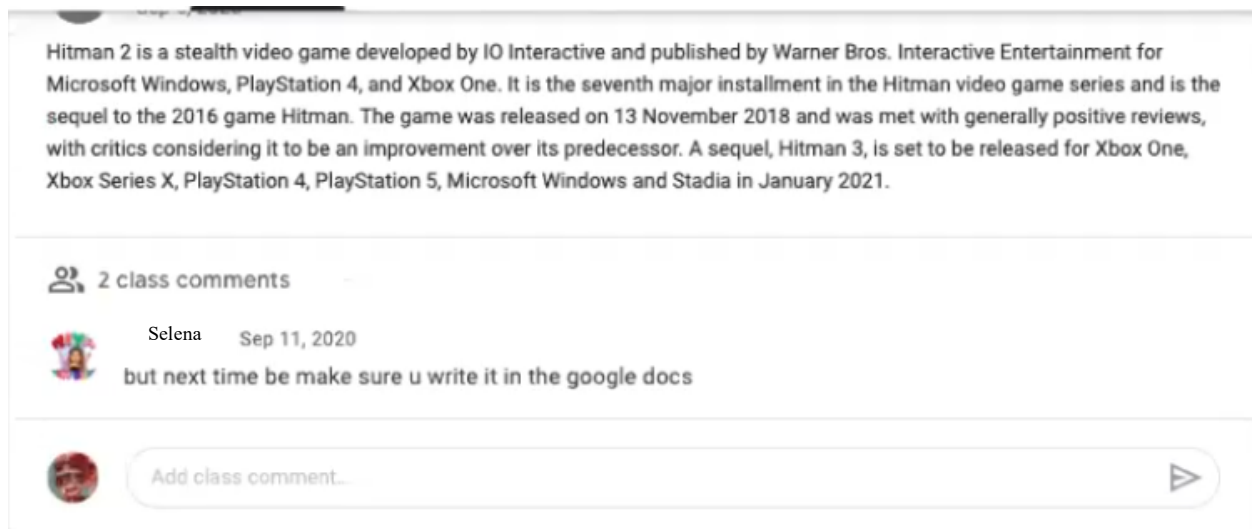
### *Selena Posts an Announcement with a “Get to Know You” Quiz*



One student also posted his assignment response to the stream, which Ms. Selena playfully reprimanded, encouraging him to “make sure u write it in the google docs” next time.

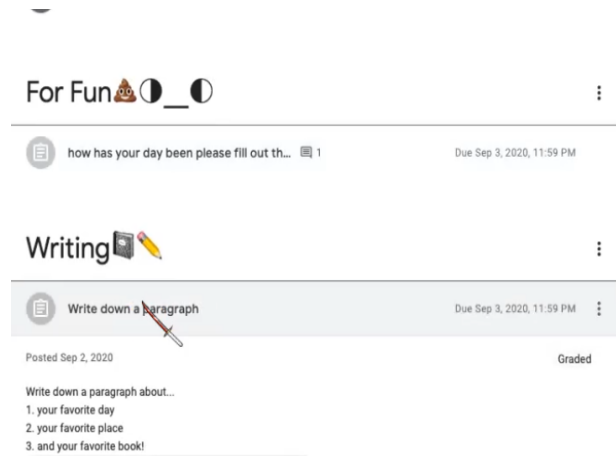
**Figure 4.10**

*An Invited Student Responds to the Assignment on the Stream*



**Figure 4.11**

*Student Created Assignments*



While most of the activity took place on the stream, Delila and Selena posted three assignments. One was a discussion asking if the students were on another GC made by Ms. Alba (i.e., Delila), a “for fun” quiz (with an emoji poo and face in the header) that asks students to share about their day, and a writing assignment with a notebook and pencil emoji, which asked students to write about their favorite day, place and book. Interestingly, this latter assignment closely mirrored Mrs. Turner’s weekly “Writing Wednesday” activity. When I prompted Delila to explain if the assignment was different from Mrs. Turner’s class, she said that “it was pretty much the same, but [Selena] told us to write about three different topics.” She then clicked

on the paragraph she submitted and it showed that she did not finish it. She laughed and said “I don't think I filled it in.” The students took inspiration from school, but they did not feel pressured to complete the assignments.

Similar to Delila and Selena’s classes, Sheila shared that in a GC with her cousins, they prompted each other to respond to popular TikTok videos and write two sentences about “what would you do if like that was you.” One such video was of a Mexican girl who ran over a cat with her toy car. Sheila went on to explain, through fits of laughter, that she made the assignment because it was on her TikTok “For You” page, and she edited the meme to depict her cousin as the cat and herself as the person driving the car. Posting the TikTok in GC inspired creativity and exchange as well as laughter in the students. Also, unlike in the instances of GC I observed in Mrs. Turner’s class, Sheila and her cousins brought in non-academic sources.

The students were clear to demarcate the bounds between school GCs and their own. Delila explained that their own GCs were “different because our assignments are very funny and umm they are definitely not like school work related or not educational” and because the assignments were funny, random and “didn't have deadlines.” In addition, the grading for assignments differed from school as it was “wacky” and “crazy” according to Delila. Submitted assignments did not always receive a grade or they received playful grades from very low (5/100) to scores in the trillions. Though there was a clear distinction between academic and pretend GCs, Delila did express that while she was “okay with how they do it” in school, she wished that teachers in school would “put a random assignment that was like for fun that would not be graded because that would be very cool and funny.”

These instances of pretend, student-made GCs show just how contingent platforms are on their uses: the students re-appropriated GC beyond educational purposes. Certainly, students deployed many of the same infrastructural tools and protocols that were used in the classroom, but to very different ends. These GCs did not mimic the corporate imprinting of narrow, assignment-based forms as seen at St. Jacobs and the students instead prioritized using GC features to spur conversation, make friends, and have fun. Though the infrastructure of Google Classroom doesn't change, how it is activated and how it manifests does.

## Discussion

Google Classroom was a *centralized* and *centralizing* educational platform in St. Jacobs' middle school classrooms. Through in-depth analysis of field notes, interviews, Mrs. Turner's Google Classroom, and student-made GCs, I found that EPs are brought to life through a lively, situated network that is made of more than APIs or pedagogical actors like parents, administrators, and data workers. In fact, in practice, some of these infrastructural elements were not actants at all. Instead, I found that the user interface, the pandemic context and constraints, discourses about technology and the pandemic, teacher beliefs, GC routines / practices, and students and teachers actual uses were the primary actants that worked with GC infrastructure to impact education.

In the first section, my investigations and analysis of pedagogic participation with Google Classroom confirmed some of the claims about GC as outlined by the EP literature and Perrotta and colleague's article: namely, that EPs are increasingly central to defining educational practices. In this case, GC promoted an intensification of traditional academic forms, namely assignment completion, in part due to its simplified user interface composed of a stream, coursework, and grades. I also showed that other contextual factors — the pandemic, teaching modality and school culture — in conjunction with the platform's protocols contributed to GC's centrality in pedagogic participation and the exacerbation of traditional academic forms.

While these earlier points coincide with Perrotta and colleagues' claim about the corporate imprinting of GC on educational practice, my empirically-based findings diverged in important ways from there. The reality of teaching during a pandemic was that using GC was often defined by teachers "making-do" with the platform rather than following the uses suggested by GC owners and designers. For example, teachers, due to a lack of time and experience, did not use extensions enabled by the API infrastructure, and parents and administrators played a minimal role in pedagogic participation. Instead of using the GC API infrastructure, teachers deployed other platforms readily available to them and encouraged by administrators and the technology coordinators. These platforms primarily worked together and even inspired improvisational uses. When they clashed, as was the case with PowerSchool and GC, they forced teachers to decide on their own protocols, which led Ms. Santana to deny the GC grading functionality. Rather than fragmenting pedagogy between administrators, parents, teachers and data laborers, pedagogic participation primarily took place through a teacher-student-platform triad. Students in fact were expected to develop into independent learners by navigating school platforms and the content therein and to be advocates for their own learning in lieu of their parents. As independent learners, they had to develop new academic literacies that required them to navigate GC and other platforms, unearth instructions and teacher communications so as to answer their own questions. Essentially, teachers embedded much of their teaching in the platform and students were given greater responsibility for their own learning as a result.

Finally, this chapter revealed how students used GC for fun. In doing so, the students deployed but also transgressed the platform protocols. Since students were motivated by making and maintaining friendships as well as playing pretend on the platform, they often disregarded formally assigning homework via coursework and they played with the grading tools. Instead, most of their participation was on the stream, where they were able to chat amongst themselves and share social media posts and quizzes. These students put the platform to their own uses, breaking with school and GC norms.

## Chapter 5: Navigating Algorithmic Identities

It's intriguing because there's something galling, almost comically presumptuous about such categorizations. Who would have thought class status could be algorithmically understood? How can something as precise as citizenship be allocated without displaying one's passport? And how audacious is it to suggest that something even less precise, like ethnicity, could be authoritatively assigned without someone having the decency to ask?

—John Cheney-Lippold, *We Are Data*, p. 3

This chapter shares findings on how youth participants engaged with platforms in everyday life in out of school contexts. A central question of the dissertation project is: How do platforms and their algorithms act on youth, and how do youth work with and against them? I discovered that processes of identity construction were an important way that students and algorithms interacted with and on each other. Specifically, the platform-calculated algorithmic identity and students' digital literacy practices to manifest their identities were a site of contestation and interaction.

As the headnote alludes, the “algorithmic identity” (Cheney-Lippold, 2011, 2017) is a calculation wrought from data “aggregated to form a unified subject” and statically-produced data categories based on other users’ behaviors. Rather than relying on government institutions and texts, like a passport, or social forms of identification, like skin hue, identification and social categories like citizenship, class, or ethnicity are moved “into an entirely digital, and thus measurable plane” (Cheney-Lippold, 2011, p. 165). The chapter observes how youth identity construction took place through digital literacy practices that reflected personal and historical senses of self, a hyper-individualized algorithmic identity, and statistically calculated identity categories, particularly of race and age.

The chapter is one of the first in literacy studies to explore how students interacted with an actual and perceived algorithmic identity. Through findings from interviews, after school club activities and student platform walkthroughs, I explore in this chapter the ways that the algorithmic identity shaped students’ identities or was challenged by students and other actants. In the first section, I explore how the algorithmic identity most powerfully shaped youth identity construction was through the trust placed in personalization algorithms and their desire for these algorithms to accurately reflect their interests. In the following section, I show through four cases how the extent to which the algorithmic identity shaped youth identity construction depended on students’ digital literacy practices: how students constructed themselves through digital tools either reinforced or undermined algorithmic personalization procedures. I examine in these cases how race was a salient algorithmic category that conflicted with and shaped identity construction online.

### **Identity Construction with and Against the Algorithmic Identity**

One of the most powerful ways that platforms and algorithms acted on students was through personalization algorithms. The videos, games, images and other content that were personalized and pushed to the youth in their social media feeds or under “Recommended For You” banners attracted much of the participants’ attention and participation on these sites. Some youth participants often *only* viewed content recommended to them (as opposed to searching for content), while for others their initial activity on a given platform was to scan through their recommendations. The youth participants in my study valued the accuracy of their

recommendations, many wishing for even greater algorithmic accuracy, even if they were perturbed by the collection of their data.

Through individualized walkthroughs of students' favorite platform(s) and afterschool club activities investigating YouTube and Google, I learned that the personalization algorithm was highly specific and individualized to each student and that it did not just reflect but in fact co-constituted their identities. This aligns with arguments within the literature as to how platforms influence identity construction: they hyper-individualize users (Lake, 2017) such that each student inhabited their own filtered "bubble" of content. What ultimately lent platforms their power to construct participants' identities was the *epistemic trust* (Kant, 2020) students placed in these algorithmic calculations of the self. Students expected to see themselves reflected in their content recommendations. In the following findings section, I show how students in the afterschool club I ran used one of four tactics to negotiate their identity in relation to the algorithmic identity reflected in their YouTube video recommendations

### ***Platform Power Co-Constituting Identity***

In this section, I focus on findings from the Critical Media Creators club (CMC), the 11-week after school program I led with sixth graders and undergraduate students. Two primary goals of CMC were to 1) develop a practice where students reflected critically on social media platforms and 2) to gain insight into how algorithms functioned on the platform through collective and comparative analyses of a shared platform. In CMC, we critically investigated the algorithmic processes of YouTube and Google, platforms with which all participants were familiar. Before each live session, students completed responses to a prompt on the website Padlet, a site where they uploaded responses to a shared virtual bulletin board and viewed each other's submissions.

Two of these Padlet activities that involved investigating YouTube were quite revealing as to how the algorithmic identity shaped youth identities. These activities were the "My YouTube Homepage" activity and "Me and My Data." The "My YouTube Homepage" Padlet activity tasked the youth participants to investigate the top eight videos that appeared on their YouTube homepage. On YouTube, the user first enters on the homepage, which greets them with a panel of eight algorithmically-generated videos organized into two rows of four. The top eight videos show a "broad array of videos that viewers are most likely to watch when they visit YouTube" (Creator Insider, 2021, 6:06-6:11). These eight videos are recommended based on performance, or "how the video engaged and satisfied similar viewers," and personalization, or "the viewer's watch history, and how often a viewer watches a channel or topic" (Chen, 2022). At the top of the homepage there are suggested topic tags that users can click on to find specific video content, and on the left-hand side, there is a panel where users can navigate to their channel subscriptions, a YouTube-wide trending page, and more. According to the YouTube designers, the homepage recommendations (i.e., the first 8 videos) is the most prominent place where users discover and watch content (Creator Insider, 2021). The Padlet prompted the participants to take a screenshot of their YouTube homepage and explore their recommendations by answering a series of questions. See the prompt in Figure 5.1.

### **Figure 5.1**

*My YouTube Homepage Padlet Prompt*

## **My Youtube Homepage**

Screen shot or screen record your YouTube homepage: In your description, respond to the following questions: 1. What content do you see on your first page? Why are these the videos on your home page? 2. If you have YouTube on your phone, how does it compare? 3. Who else might watch or view this content?

The activity asked participants to think about why these specific videos would be recommended to them, if or how the hardware may affect their content (e.g., phone versus laptop), and to think about who else might watch such content. Together, the questions encouraged students to consider both the personalization and performance features of the YouTube homepage algorithm with the first two questions focusing on personalization and the third performance.

The second Padlet activity discussed below was called “Me and My Data.” This activity aimed to develop students' data literacy. It specifically prompted them to draw an image of their “data identity” based on their Google ad personalization categories or their YouTube watch history. See the prompt in Figure 5.2.

**Figure 5.2**

*The Me and My Data Padlet Prompt*

## **Me and My Data**

Based on the data in your Google Ads Personalization or your Youtube Watch history (see links below!), draw an image of your "data identity", or what you think Google or Youtube think you look like based on this data. The image may look exactly like you, it may have some of your features, or may not look like you at all!

The learning objective was for students to identify the data categories that matched or conflicted with their own sense of self and to theorize why they were categorized in such a way. Additionally, by drawing an image of their data identity, I hoped to inspire a discussion about the categories' similarities and differences with students' own sense of self.

Through interviews and the Padlet activities, I found that youth participants' identities were constituted with and through algorithmic recommendations. In interviews with the youth participants, I discovered that they desired to be better calculated by their personalization algorithms. When asked about his thoughts on the YouTube algorithm or social media algorithms more generally, Sean for example was “okay” with algorithms as long as they were “accurate”. He explained “when it's not accurate, I don't like it. Cuz like, when it pushes out questionable things to me and then even though I don't watch it, it keeps doing that. I don't like it.” Sean, whose hacker literacy practices will be discussed at length below, disliked algorithmic inaccuracy. Accuracy for Sean was an alignment with what he wanted to watch and content that was not “questionable.” For Sean, questionable content seemed to refer to sexually-suggestive YouTube recommendations, which I discuss in more depth below.

For other students, they desired accuracy in their algorithmic personalization for convenience and enjoyment, even if they were concerned about data tracking. Kevin, who consumed gaming, music and skateboarding content, explained in his interview as he looked over his YouTube recommendations:



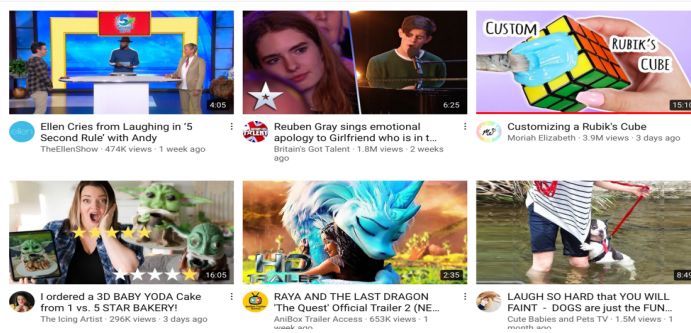
It's kind of nice to just be able to log on to YouTube and then see stuff that you basic- because basically most of the stuff on my homepage I would watch. As he continued to explain, he looked through his recommendations and commented on his recommendations “I'd watch most of this.” For Kevin, it is “kind of nice” to see “stuff” he would watch. Here, nice can be understood as convenient and enjoyable. For Eloise, she explained that “it does bother me a little bit because they are tracking my information, but then it doesn't because it helps me find new videos that I think are- that can be fun to watch.” The tradeoff between more tracking and enhanced accuracy was one that Eloise struggled with, but that she seemed to absolve because of the ability to find new and fun videos. These students' views were commonly held amongst the study participants. They framed algorithmic personalization as “nice”, “helpful”, “fun” and “accurate” even while acknowledging, as Eloisa did, that it comes at the cost of more tracking.

The Padlet activities show another layer in which students not only desired accuracy in algorithmic personalization, but *expected* such accuracy. In the “My YouTube Homepage” activity in particular, participants’ descriptions of their top eight YouTube videos uncovered an underlying trust in the algorithmic identity and algorithmic processes that generated their recommendations. This trust was revealed through how they negotiated their sense of self in relation to YouTube recommendations and what it revealed about their algorithmic identity. Participants negotiated their identity with their YouTube algorithmic identity by indicating the extent to which their interests corresponded with the top eight videos on their homepage.

This negotiation occurred in one of four ways: through acceptance, selection, addition, or dis-identification with their personalized recommendations. These last three correspondences—selective, additive or dis-identification— I discuss below as acts of identity *struggle* (Kant, 2020) with the algorithmic identity. The first negotiation tactic, acceptance, was characterized by accepting *all* of the videos on their homepage as reflective of themselves. In fact, it could be argued that acceptance lacked identity negotiation. This can be seen in Natasha’s case, who will be discussed below as participating in digital literacy practices that entrenched herself in her algorithmic identity. Natasha in the Padlet activity shared the following screenshot and repetitively listed that she liked or loved particular activities that corresponded to the videos. Specifically, with her suggestions, depicted in Figure 5.3, she wrote “I like cake decorating.I also like arts and crafts.I like when people sing.I love funny videos.I love movie clips.”

**Figure 5.3**

*Natasha’s YouTube Homepage Screenshot*

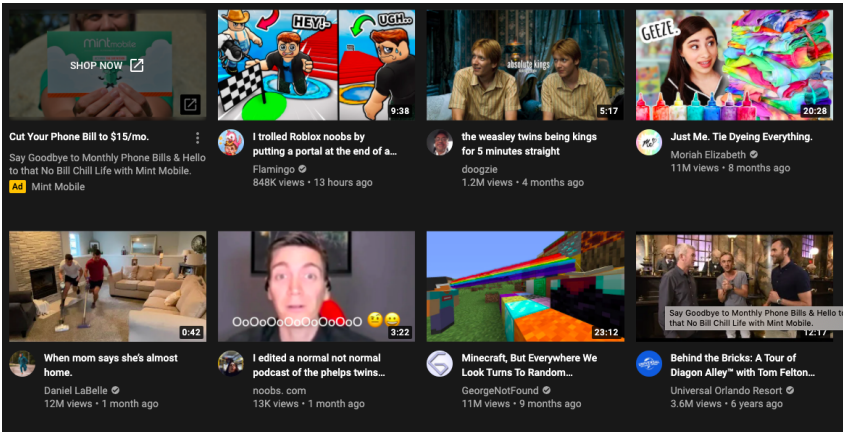


The videos show a woman building a Baby Yoda cake (i.e., cake decorating), someone painting a Rubik Cube (i.e., arts and crafts), a contestant on Britain’s Got Talent singing to a loved one (i.e., when people sing), Ellen DeGenres show and a dog who faints (i.e., I love funny videos), and a trailer from *Raya and the Last Dragon* (i.e., movie clips). Natasha identifies her interests and preferences as a means to explain the appearance of these videos on her homepage. She accepts each video, and by extension, the YouTube algorithmic identity calculated for her.

The most common identity negotiation tactic with the YouTube homepage algorithm was selective. Six of eleven responses used selective identification which was characterized by students’ identifying their interests and preferences with some videos, but not all of the videos on their homepage. This was achieved by students either highlighting specific content in their screenshot or selectively screenshotting specific video content to share on the Padlet. Delila, who will be discussed below as undermining algorithmic identification processes through her digital literacy practices, shared a screenshot of her top eight videos as depicted in Figure 5.4, but only described four of the videos in her recommendations. She wrote “my home page looks like this because I like to watch gaming, and art and I really like Harry Potter, especially Fred and George.”

**Figure 5.4**

*Delila’s YouTube Homepage Screenshot*

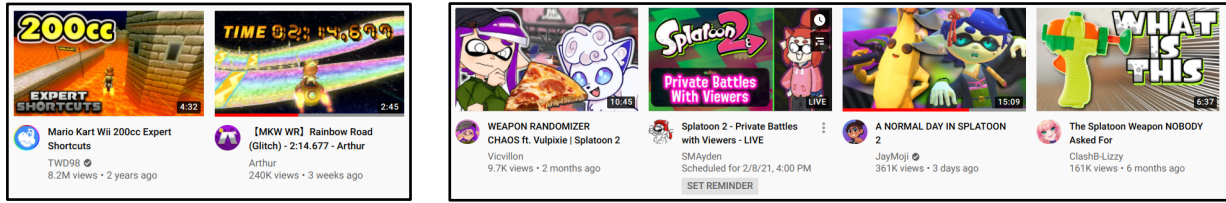


The videos on her homepage included an advertisement for Mint Mobile (not mentioned), Roblox and Minecraft videos, two videos on Harry Potter, a crafting video on dying “everything,” a comedic video on two brothers cleaning before their mom comes home (not mentioned) and a video sharing about the Phelps twins (not mentioned). Delila selects specific algorithmic recommendations to share about herself as a gamer, artist, and Harry Potter fan.

Sean also negotiated with his algorithmic identity through selection. He specifically shared a screen shot of specific videos on his home page (depicted in Figure 5.5) rather than just depicting the top eight videos. The screen shot shows videos that mirrored his interest in two particular games: Mario Kart and Splatoon. He wrote of the six videos: “My homepage is like this because I watch mario kart and splatoon and those are the games I want to get good at.”

**Figure 5.5**

*Sean's Youtube Homepage Screenshot*



These videos show creators either playing Mario Kart racing tracks or users playing Splatoon 2. While Sean certainly did often have Splatoon and Mario Kart recommended to him, his “Me and My Data” response shows that there were many other categories of videos, real or imagined, on his page that were according to him “mostly correct,” including skateboarding, Gordon Ramsey, Bob the Builder, and various advertisements. Additionally, in a walkthrough of his YouTube page during our first interview, he often had content that he said he would not watch and, as mentioned above, even that was “inappropriate.” By selecting specific content— through highlighting only some of the content through the description (Delila) or by screenshotting specific videos (Sean)— the students carved out their identity from their algorithmic identity, in effect co-constituting their identity with the algorithm.

Another way that students framed their identity in relation to their YouTube Homepage was by adding video interests not on their homepage, which I refer to as an *additive* negotiation tactic. Eloisa for example screen-shot two videos on her recommendations— an animal crossing and Disney video— but mentioned that she also watches “videos about drawing, competitions, gamers, and many other things.” Eloisa wanted to expand how others saw her by adding other categories of videos that were not present in that momentary calculation of her algorithmic identity. Her “Me and My Data” Padlet response included some of these categories as well as others such as baking and impressions as depicted in Figure 5.6.

**Figure 5.6**

*Eloisa's Data Identity*



Eloisa spoke of herself in terms of these video types, and in her data map she depicted herself as composed of these data categories. Additive negotiation operates differently than selective in that it pulls on other facets of the algorithmic identity that are latent and not manifested in the recommendation feed. Somewhat similarly to the acceptance tactic, it shows a trust in the data categories extracted about the user and seeks alignment with the algorithmic identity.

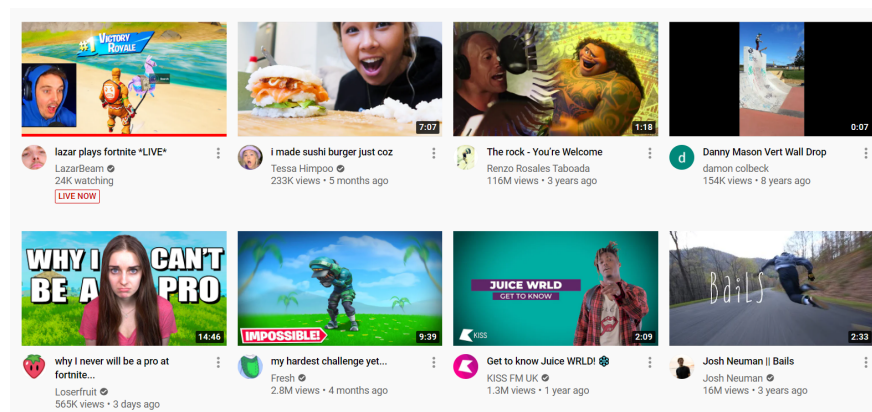
The final way that students described their homepage was to dis-identify with YouTube video recommendations. While at first this may seem to be the only negotiation tactic that would belie aligning with the algorithmic identity, a closer look at Kevin’s response reveals an underlying desire and trust that the algorithmic identity reflects the self. Kevin, who considered

himself a gamer, or someone who plays games, wrote in his response “I have gaming, skateboarding, and Juice Wrld videos on my home page because that's what I mostly watch/listen to. I have no idea why The Rock came up...I don't know who else would watch this, probably other gamers.”

The videos on his screenshot (depicted in Figure 5.7) show skateboarding videos (2 of the videos), users playing or commenting on the popular fighter game Fortnite (3 of the videos), an interview with the popular rapper Juice Wrld, a vlogger who “made a sushi burger just coz” and a video of Dwayne Johnson the Rock singing “You’re Welcome” from the Disney movie *Moana*. The three categories he listed as indicative of his video recommendations— gaming, skateboarding, and Juice Wrld— seemed to Kevin appropriate for his “gamer” identity and tastes. Whereas he did not acknowledge the food vlogging video, he distanced himself from a video of “The Rock” singing. Kevin constructed his identity in relation to the algorithmic identity by taking a baffled stance (Buchholz & Hall, 2005), claiming he “has no idea” why “The Rock” video appeared in his recommendations<sup>24</sup>. Kevin’s dis-identification serves to position him more closely to other categories suggested about him through disavowal. Such a stance does not fundamentally question algorithmic identification processes, and instead leans into the facets of the algorithmic identity Kevin is willing to accept.

**Figure 5.7**

*Kevin’s Youtube Homepage Screenshot*



Each of these tactics reveal students’ trust in their recommendations to reflect themselves. Each of their tactics is a negotiation with the algorithmically-curated content. By negotiating with this content, they acknowledge that the recommendations reflect their image, and as shown earlier, many students desired greater accuracy, or alignment with the self. Yet, what we can see from these different tactics the students deployed is that the recommendations do not just reflect them, but in fact create the categories by which they construct their own identities. Each student identifies themselves with the videos and the categories which they presume the video falls under (e.g., gamer, arts, Harry Potter fan). The algorithmic identity

<sup>24</sup> He likely received the recommendation because he watches Disney movies and music regularly. His confusion serves to exempt him from understanding what such a video might say about his online habits and other facets of his algorithmic identity that he doesn’t claim



wrought by the YouTube personalization algorithm shaped student identity through the epistemic trust and desire they placed in its outputs.

The following sections present four student cases to show more closely how students negotiated their algorithmic identity. In the first case, I show how Natasha, who exhibited acceptance of the algorithmic identity in the YouTube Padlet activity, reinforced algorithmic identification through her digital literacy practices on Pinterest. Her practice of curating Pins and her creation of media for CMC aligned herself more closely with algorithmic identity, especially in terms of race. The following two cases on Delila and Sean show literacy practices that undermined algorithmic identification. The last case focuses on Kevin whose interaction with his algorithmic identity reveals a broader phenomenon whereby the algorithmic identity can reflect back troubling or private aspects of the self that one wishes to hide or reject; in addition, his case will foreshadow how dis-identification can lead to the development of critical algorithmic literacies, which will be explored more fully in the following chapter.

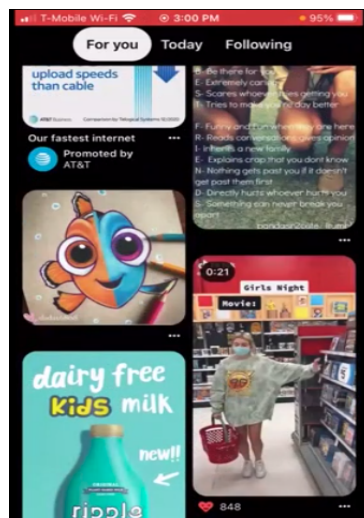
## Algorithmic Identities in Action

### *Curating the Algorithmic Self: Natasha's Case*

Natasha readily identified with the content on her platform, an act akin to identifying with the algorithmic identity. In the YouTube Homepage activity, she listed off the activities she liked to do (e.g., cake decorating, listening to people sing) that corresponded to each of the videos in her screenshot. In our interview walkthrough of her Pinterest page, she similarly identified with the personalized media content that her Pinterest “For You” page suggested to her. Pinterest is a video and image platform that allows users to curate “pins,” or the images and videos, into folders, which are called boards. The Pinterest algorithm suggests pins on a “For You” page that suggests and filters pins based off of which pins the user has interacted with and which they user has not, among many other algorithmic processes including thematic analysis of images, quality of the linked website within the image, and performance amongst other pinners (Zaratti, 2021). In a similar manner, Natasha identified with the personalized content by continuously scrolling down her “For You” page and calling out images and GIFs to explain what she likes to do and how she uses the pins. In my field note about the walkthrough, I captured Natasha's explanation accordingly:

### Figure 5.8

*Natasha's Pinterest Recommendations*



She clicked on a post that said “Disney movie marathon” with Disney letters colored according to the rainbow. She said she uses Pinterest for ideas for “lettering book.. And I like to do lots of coloring and writing” and that she uses it to learn new ways to write and new types of cursive. She then scrolled down and clicked on an image with the alphabet drawn as Disney characters. As she continued to scroll through the “For You” page, she mentioned things she likes to do, each of which coordinated with some of the pictures. For example, she explained she liked to draw, which coordinated with an image of Nemo, and to “search up fun stuff like it says here on girls movie night,” which the text “girls movie night was edited over a GIF” in her recommendations. She scrolled more rapidly and pins that arose included: the show Friends, ads, nail art, an image of girls sitting on the floor. She called out each one of these and then clicked on one that said “doggie language.” She said while laughing that it “is to learn how to talk dog because I want to teach my dog languages.”

As with the “My YouTube Homepage” activity, Natasha *expected* and *accepted* the “For You” Pinterest algorithm’s accuracy. As she scrolled through, she identified with the content and actively looked for connections that could explain why it was in her “For You” feed. This expectation led Natasha to read these pins into her own self story: she created a backstory or explanation for why these pins appeared and related to herself. With the “dog language” pin, for example, she explained that it is there “because she wants to teach my [her] dog languages.” Natasha interpretation of her pins fused her algorithmic identity with her own in a way that reflected a practice of “algorithmic conspiratoriality”, or a practice whereby users “find personal, often revelatory connections to content algorithmically recommended to them” (Cotter et al., 2022, p. 3). The algorithm and Natasha *reciprocally anticipated* each other. Combined with Natasha’s sense making of her recommendations, she formed a feedback loop with the Pinterest algorithm that shaped her sense of self.

The reciprocal anticipation between Natasha and her algorithmically-produced Pinterest identity was reinforced by Natasha’s use of Pinterest. On the one hand, Natasha regularly curated Pinterest content. She explained that she looks at Pinterest daily and did not save pins to her boards everyday but just looked “at the things that I like.” Looking and saving may be valued differently by the Pinterest algorithm, but both provide feedback about Natasha’s interests. Given her daily practice, through which she curated more than 2400 pins across tens of boards, the personalization algorithm had a stream of data that allowed for a dynamic calculation and recalculation of Natasha’s identity and interests.

In addition to regular use, she also developed a practice of using the For You page to find new content. As she explained:

I look for the “For You” first because, there it mostly already shows all the things that I want. Umm so I go through there first, because it mostly shows there the more things I like, and it knows me more what I like.

Natasha habitually used the suggested pins on her “For You” page to find content rather than searching for content by entering in her own search terms. Natasha trusted in the algorithm and Pinterest’s “For You” page specifically to “shows all the things” she wanted. She even claimed that it “knows” her and what she liked. Natasha valued and trusted the Pinterest algorithm’s reflections of self, which resulted in her developing a habitual, cyclical practice to source pins from the “For You” page, and in so doing reinforced her alignment with its identity calculations.

Finally, Natasha used these boards as inspiration for her life offline. Her boards, which she created and used to categorize curated pins, included titles such as baby shower cookies,

bedroom decor, crafts for kids, Halloween events and many more. The boards corresponded to events in her life and activities she did with friends, family and alone. Her practice was to use boards for inspiration and action in her life beyond the screen. Natasha's identity and practices offline were thus similarly shaped by her algorithmic identity.

In my observation of Natasha in CMC, her practices and trust around YouTube and Pinterest influenced her creation of media in CMC and resulted in her accepting the racializing forces of the personalization algorithm. In Natasha's walkthroughs, I did not notice any clear racial representations, but, as with all students, I queried her as to whether she saw people of her race or ethnicity in her suggested media content. In response, she said it showed "people of my race." She explained further that she had seen images of "Mexican or Hispanics" with spicy candy and holding chips:

It does, um, mostly because I like spicy candy and spicy chips. And supposedly Mexicans or Hispanics are the ones that eat them the most or something. Iunno, supposedly we like the spice more. So when I searched that up for like another little project or something I'm gonna make it shows me my race also holding a .. like a chip.

I inquired further whether she felt it was stereotyping people of her ethnicity and she said she did not "care about it that much" because "lots of my race do like spicy chips" including her family and that "all the people I know of my race, they all like... spicy things." It is not clear whether this is the *only* representation of "Mexican or Hispanics" Natasha saw on social media, but Natasha *perceived* people of her ethnicity as depicted in stereotypical ways.

Natasha's perception of racialized content in her suggested content in fact later appeared in how she and her group members depicted Mexican people in their CMC video. In CMC, the students worked together in groups during the last five weeks to create a video about algorithms. Natasha was in a group of students that all bonded over a shared Latin identity, which became a source of inspiration for their video. As Juan, their undergraduate group collaborator, wrote in his field note: "We all basically grew up with the same cultural background so agreeing on how the ending of the video would be made was a fairly easy process." Along with agreeing to the video ending, which featured a fight between the narrator— a robot algorithm in disguise— and a Mega Abuela, who saved the participants with her nunchuck chanclas, the group added other "cultural elements."

Their group, called Las Comadres, created a comedic video that featured a disagreement between three generations— a Boomer, Millennial and Gen Zer— about their respective (and stereotypical) views about algorithms. In the planning for the video, the undergraduate collaborator Juan often attempted to motivate students with laughter and popular cultural references such as the recent movie release *Godzilla vs Kong*. For example, Juan's field note demonstrated the gaiety and frivolity they each brought to their video creation:

Vanessa spoke and brought her idea of how the Mega Abuela should have some weapon in order to combat the giant algorithm robot. At first Sheila had suggested a sword or some other sharp object and Natasha brought up the idea of using a chancla also known as a sandal in Spanish. All the girls agreed on the concept and I would later put my input of how they should be nunchucks to spice it up a bit.

Throughout their video, Mexican cultural references— spicy Mexican food and disciplining practices of Latina moms with chanclas— created points of laughter and inspiration.

The Mexican memes Natasha mentioned in our interview were mirrored in their CMC group video. In a key scene where the characters from different generations adjourned their

fighting to take a food break the participants ate pan dulce and jalapeños<sup>25</sup>.

### Figure 5.9

#### *Las Comadres Jalapeño Scene*



This scene recalls Natasha’s perception of Mexican content on her social media feeds.

During her final interview, I asked Natasha to explain the *Las Comadres* video. Natasha shared that the video was about different generations and that they included “things from like what our culture— our traditions that we do.” As she described the “cultural elements”, she echoed her earlier statement about the kinds of Mexican content she saw on her “For You” page:

Well, so basically, like everyone from my culture, like I know, eats like spicy foods, but they put like the amount like a bunch- like a bunch a bunch. Like if you have jalapeños, they be eating all of them. That's how much they like the spice. If in my house if we make a food it has to be with something spicy. Or else it doesn't have flavor or nothing.

When I inquired further what these cultural elements added to the video, she said that the cultural elements served to make the video “funny,” especially with the fighting *Mega Abuelita*. The media that Natasha, as well as her group members, viewed and recalled on her feed was mirrored in her own creative endeavors and sense of “Mexican-ness”. On the one hand, this example shows how suggested content can also become the material or inspiration for later creative endeavors. Additionally, it informed Natasha’s sense of Mexican identity as she read the suggested content into her own family. On the other hand, the creation of a culturally-relevant video is important to acknowledge as a form of agency. Latin social media users who create Latin media, like these participants, use platforms as one of the few spaces where they can continually preserve and assert *Latinidad* (i.e., Latin identity). As critical race and media scholar Villa-Nicolas (2019, p. 3) notes though, using platforms to shape *Latinidad* and Latinx digital memory makes it such that “*Latinidad* is being shaped alongside and deeply intertwined with the culture of Silicone Valley.” In Natasha’s case, user agency and, to a greater extent, algorithmic power were intertwined in her digital literacy practices and construction of her identity.

Up to this point, I have shown how participants were powerfully acted on by algorithms and how they negotiated their identities with the algorithmic identity provided to them on their YouTube recommendation page. The following sections explore how two students’ online identity construction worked to undermine, rather than support, the algorithmic processes online. Specifically, I will feature Sean’s hacker identity and Delila’s cross-platform collaging.

---

<sup>25</sup> The jalapeno jar in fact became a weapon soon after this short reprieve as the Boomer and Millennial resumed their disagreement.



### ***The Hacker's Dilemma: Sean's Case***

Sean, an Asian Pacific Islander male student, was an intelligent and witty participant. He performed well in school and often spawned the envy of other students after claiming he didn't study despite achieving top scores. He also enjoyed making others laugh; with a serious demeanor, he mentioned many times to Mrs. Turner and his classmates that he had enjoyed watching *Bob the Builder*, a popular toddler TV show, over the weekend.

These character traits coincided with his "hacker" identity, rooted in a "hacker" literacy practice of resisting, reconfiguring, and/or reformulating "sociotechnical digital spaces and tools" (Santo, 2011, p. 2). Sean was an avid video gamer who played the Nintendo games Mario Kart, a racing game, and Splatoon, a first-person shooter game with octopi and squid that shoot ink. In our platform walkthrough, Sean shared the website "chadsoft.co.uk," a website where users shared custom tracks for the racing video game Mario Kart and taught each other to "exploit" the Nintendo Wii console. Three times a week, Sean logged on to Chadsoft to download new or modified race tracks. He collaborated with other "hackers" through Google Docs to collaboratively document how he "hacked" his Wii or other consoles and would review and share "documentation" on how he and others hacked Mario Kart race tracks:

**Sean:** Um, well, with Google Docs you can share. So, I sent it [my documentation] to a few of the people in- who play Mario Kart. Um, it's not people I know in person, but just people who were a reliable source, just so that they could check my work. See if it is all correct.

**Interviewer:** Oh, cool. So, they're actually kind of like mentors, almost like, they would look over it and be like, "Yeah, that's great."

**Sean:** Um, the relation that we had was mutual. So, they would also send me stuff. And it's, it's like comparing notes.

Sean collaborated with other Mario Kart hackers to compare notes and provide mutual aid. He saw his exploitation of the Wii system as a serious endeavor, labeling his notes "documentation" and something that required reliable sources to check its correctness. He took such endeavors so seriously that he explained in our first Padlet activity, which asked students to share a social media post they enjoyed, that he "studied the current world record" to achieve a world record and that he was second place on the "Yoshi Falls" track. In Mario Kart and other gaming communities, setting a world record means that the gamer has the fastest time completing a race track. To be a record holder requires commitment and expertise beyond casually playing a game.

After showing Dylan (the undergraduate student who helped me with interviews) and me the Chadsoft website during the walkthrough, Sean showed us his YouTube account. As he scrolled through videos, there were several that he said he would not watch and one that was somewhat sexually suggestive that he called questionable. Sean explained that he prefers for the algorithm to be "accurate" and that he did not like when it pushed "out questionable things to me and then even though I don't watch it, it keeps doing that." As explained above, he desired for the YouTube algorithm to be *more* accurate and provide him more precise, and therefore less "questionable" content.

We learned through the interview that Sean manipulated the algorithm by engaging or disengaging with content. Sean explained that he tried to avoid inappropriate content by not clicking on it and that he also had orchestrated his viewing to generate specific content for a "prank." He recounted a time where he filled his brother's YouTube homepage with FlexTape

ads<sup>26</sup> to prank his brother. He explained that he “sent a screenshot of my YouTube feed to my older brother while he’s away, and I filled my entire feed with Flex Tape ads by watching all of the Flex Tape ads at two times speed.” We encouraged him to tell us more about how he manipulated the algorithm and how he learned to do this. He shared with us that he watched a YouTube video that explained how the algorithm worked. From this video he devised several tactics that he deployed to inundate his homepage. Specifically, he shared that: “I watched it two times speed. I had two instances of YouTube watching it. And on one of the instances, every time it reached halfway through, I would skip.” He also shared that the “algorithm still works even if it probably knows you didn’t take it all in.”

As a technology hacker, Sean was drawn to understanding how technology works and manipulating it toward his own ends. His original impetus to learn about the algorithm was to understand how his brother’s video received over 2000 views when most of his brother’s videos were watched by only 30 viewers. From a YouTube video, Sean learned that there were tactics to engineer the algorithm— watching the video at two times its normal speed, watching until the video was at least halfway through, watching videos on two open tabs, and doing this over a “three hours over the course of two days.” All of this he implemented to create a “funny screenshot.”

Sean embraced a hacker identity. In everyday activities with technology, he exploited systems such as the Wii console or YouTube homepage. In the club, we asked participants to brainstorm an idea or question they would like to focus on for their club video. Sean wrote:

I would like to answer the question "How do these algorithms work?" I would most likely present my data with a video because no one wants to read my reports (I know I don't). I think it's fascinating to learn how something works, and then break it. **It's what I do.** [my emphasis]

Sean saw himself as a “breaker” or hacker. He stated simply, “it’s what I do.” While he and his group ultimately created a video about browser cookies rather than how to “break” the algorithm, he mentioned in our final interview that if he were to do a second video “it would be along the same lines of me manipulating the YouTube algorithm to do- to get everything to be Flex Tape, but perhaps for another website.”

Sean’s hacker identity and practice provided him a source of agency in relation to platform power. His inclination to learn about and exploit technological systems guided him to use the algorithm against itself. The Flex Seal prank may have been in jest, but it shows the capacity for youth to counter total algorithmic power in everyday, casual exchanges with platforms.

While exploiting technical systems empowered Sean, it also created algorithmic consequences. Sean at times struggled to identify with his recommendations and even advertisements on his YouTube. He expressed, for example a discontentedness with “inappropriate” content on his platform. Through the “Me and My Data” activity, Sean discovered that he was categorized as a white, middle-aged man. Though we cannot know exactly how we come to be categorized in particular ways, this did not prevent Sean, a self-identified Asian pacific islander, from guessing why he was racialized and aged in a particular way. In our first interview, he guessed that the algorithm “may get American<sup>27</sup> middle-aged man from Mario Kart 64” and his music preferences because “Mario Kart 64 is more active with like

---

<sup>26</sup> Flex Tape is marketed as a powerful, waterproof adhesive tape, and the founder of Flex Tape is part of a popular meme that shows him slapping Flex Tape on a leaking water tank (Know Your Meme, 2022)

<sup>27</sup> Here he conflates Whiteness with Americanness.

guys in their 40s to 60s.” This categorization conflicted with his actual race and age, though he was not surprised to be so categorized based on his online activities.

Later on, Sean revealed that his classification as white was reflected in his YouTube suggestions. In his second interview, we discussed the advertisements that appeared on his “Me and my Data” Padlet. He mentioned that YouTube / Google may have thought he was older because he received Geico ads, but that recently he checked and saw that it listed him as thirteen again. I asked:

**Jessica:** Did you notice anything else when you checked it again?

**Sean:** Um, yep. It stated my race to like white so it's been doing a lot of white businesses yeah.

**Jessica:** Okay. Any suspicions how that came about?

**Sean:** No.

**Jessica:** And what was it before? What did it have for your race? Or did it have anything?

**Sean:** It- it was undefined. But there was a day when I was looking at national anthems and the only one I looked at was the Soviet anthem. And I don't know how it thought it was- I was white so.

**Jessica:** Okay, so maybe it traces back to that moment or something.

**Sean:** Yeah.

Here, he mentions another possible source of being classified as white. This time it is not an affiliation with his online interests, but that he had recently looked at the Soviet anthem (which, like Americanness, he associated with whiteness in this instance). In this conversation, he claimed that the white classification led to advertisements from “white businesses.” Unlike with his earlier statement, Sean indicated that the classification had an impact on his suggestions. Though Sean only began to connect his classification of whiteness or age to his suggested videos, the algorithmically-calculated race and age for Sean likely affected his suggested content. Sean was at once both white and not white. He was not “miscategorized” as white from the standpoint of the algorithm, as Cheney-Lippold (2017, p. 9-10) explains: “Google’s misrecognition of my gender and age isn’t an error. It’s a reconfiguration, a freshly minted algorithmic truth that cares little about being authentic but cares a lot about being an effective metric or classification.” Sean at once belongs and does not belong to a “white” user base. His interests and online activities coincide with white users, as defined by Google at that moment. This could have been due to his Mario Kart viewing, his search for the Soviet anthem, his hacking practices, and / or some other patterns in his data altogether.

Whatever the cause, the important point here is how hyper-individualization impacts racial categorization. Race as a data category is in constant flux; it is defined by its users’ behaviors and how the algorithm interprets and clusters this data into categories of similar users; the category is uprooted from the skin and one’s culture and history. Users themselves can move in and out of racial categories as they move in and out of communities or as the communities’ online actions change the parameters of categories themselves (and leave users behind); in Sean’s case, he was either “uncategorized” or “white,” and his suggested content never fully captured his interests. This case brings forth several questions: Which users are more likely to occupy a liminal racial space? How does liminality impact user experience? What is the power afforded users in liminal spaces? Importantly here though, there is no “liminal” space within data. There is always a place to categorize users, even if the category is “uncategorized”. Instead, liminality is a concept that emerges as we investigate users’ mis-categorizations and mis-alignments with the algorithm.

While Sean experienced greater agency in relation to the platform, Sean also experienced adverse and imprecise personalized content recommendations. Though we cannot be certain, it is possible that such activities generated the “questionable” YouTube recommendations that so frustrated Sean. Playfully exploiting the algorithm may have compromised Sean’s viewing experience. We can see in Sean’s experience that counter-algorithmic practices can both be empowering and disempowering. This points to a paradox about our relationship with algorithms that was expressed by many students: we desire the platform to know us so as to create a seamless user experience, even if this feels invasive and concerning. By working against platform power, we work against some of our interests in the platform.

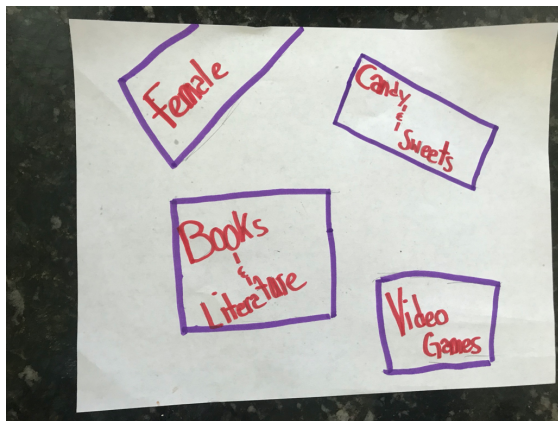
### ***Cross-Platform Collaging: Delila’s Case***

In this section, I show in detail how another student’s symbolic creativity and acts of identity construction on platforms undermined algorithmic processes. This case serves as an important example of how identity construction on and through platforms can be agentive and disrupt platform power. I focus here on the case of Delila, an avid digital collage maker and Roblox gamer.

Delila deftly moved across several platforms in her everyday activities to “take away the boredom” and manifest a digital self. Specifically, she made collages on the graphic design website Canva, played games with friends and alone on the popular social media gaming website Roblox, and regularly watched YouTube videos related to gaming. While she enjoyed these platforms individually, she also interwove her collage-making across these websites in a way that undermined algorithmic processes on these platforms, which I refer to as a *cross-platform literacy practice*. Her cross-platform literacy practices disrupted the power of any single platform, and this disruption arose through the coming together of social and technical actants that pushed and pulled Delila to create collages across these platforms.

**Figure 5.10**

*Delila’s Data Identity*



In our interviews and my observations of Delila in class, I learned that she saw herself as a reader, a baker, an artist, a collage-maker and a gamer on Roblox. These identities were at times mirrored in her YouTube feed and her suggested Roblox games. In her “My Data & Me” activity depicted in Figure 5.10, she depicted in four boxes data categories that matched her sense of self: books & literature, female, candy & sweet, and video games, and in the description, she wrote that the data was “sorta right,” but that it “thought” she was 24-35 and that she liked sports even though she didn’t “watch sports.” A common theme for many students in the “Me and My Data” activity was an over-prediction of age.

In a walkthrough of her Roblox account, she explained the games at the top of the page under the “continue playing” section. She focused on “Teafull Library,” a game that is an interactive library where “you can interact with the books” and Roblox users “can write books.” She found Teafull Library to be fun because she enjoyed reading the recipes in the cooking section. Her interest in books, baking and gaming all combined in this gaming experience. These activities revealed to me the ways that the interface reflected Delila's identity; it showed the

power of platforms to track, predict, and reinforce students' interests through the user interface (e.g., Teafull Library was under a "continue playing" section) and its algorithm, which suggests games Roblox users might be interested to play.

Through our walkthrough, I soon learned that Delila had a penchant for creative collage making on Canva in addition to being a Roblox gamer. On Canva, Delila crafted collages for friends, family and herself. One of her collages celebrated the arrival of her friend's baby cousin, another depicted her favorite characters from Harry Potter and an anime show, while still others were crafted to serve as Desktop and phone backgrounds for friends.

One collage in particular became the focus of our attention as Delila showed me her creations. She referred to the collage, depicted in Figure 5.11, as "art for Roblox."

**Figure 5.11**

*Delila's Roblox Favorite Game Art*



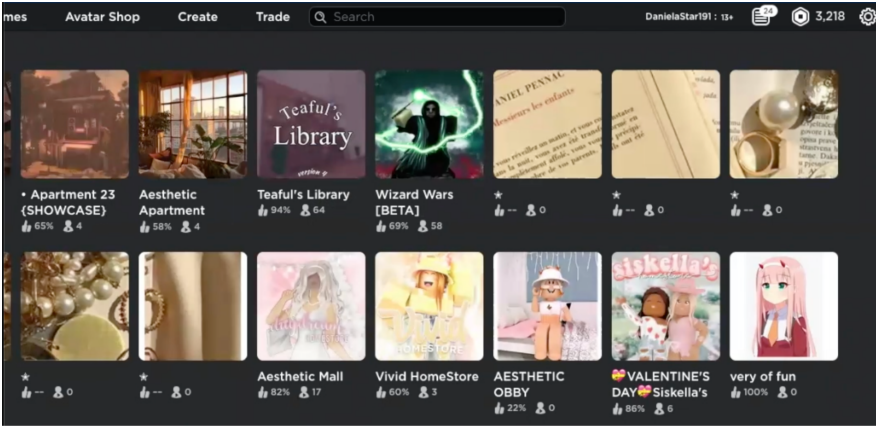
Delila was quite proud of the many collages she had made, but she was most proud of her "Roblox collage." Delila, who described many of her collages, in particular those that she created for herself, as "vintage", "pretty", "classic", and "aesthetic," explained that she created a collage for Roblox because she saw one on her Roblox friends' favorite games page. She explained that she found a YouTube video explaining how to cut the image into squares and display it on her Roblox favorites page. In fact, the Roblox art was her initial foray into collage-making, and that the Roblox community, which is dispersed across Roblox and YouTube, introduced Delila to collaging on Canva.

The Roblox Art collage shows the interweaving of three platforms: Roblox, YouTube, and Canva. In addition, there are many actants that converged to create Delila's Roblox collage: the broader Roblox community, who created these collages for their Roblox "favorite games" page, Delila's artistic interests and "vintage" aesthetic, a specific Roblox friend and the Roblox platform that emphasizes friendships (e.g., giving users the ability to view a friend's favorite games), YouTube tutorials, and Delila's history on Roblox.

Her collage making and gaming were intertwined, and her navigation across Roblox, Canva, and YouTube disrupted the tracking and power of any single platform, in particular on Roblox. In her walkthrough, Delila navigated to the page that showed her favorite Roblox games. On this page, games are represented by a square icon and the most recently favorited games are placed first. As new games are favorited, the game moves further to the right and eventually moves down a row once eight games have been favorited. In order to keep her collage together, Delila shared that "I try my best not to favorite other games."

**Figure 5.12**

*Delila's Collage in her Roblox Favorite Games Page*



As shown in Figure 5.12, the collage split into six tiles with three tiles on the top right row and four on the bottom right (a view of the 4th tile is partially obscured due to how Delila navigated the Roblox favorite games). She had favorited five games since she created the Roblox art piece, causing the collage to spill onto the second row. Of utmost importance here is her admission that she tried her “best not to favorite other games.” Favorite games are one form of data tracking on Roblox that personalizes game recommendations and operates to keep users on the website longer. Delila’s inclination to express herself to Roblox friends as “classy” and “aesthetic” countered the platform's protocols. Delila refrained from using the favoriting option so as to express her identity and as a result this overrode the data collection and creation of an “accurate” Roblox algorithmic identity.

As Delila undermined the Roblox data collection procedures through her repurposing of the Roblox favorite games, Roblox had less power to predict and control Delila’s participation on the site. Coincidentally, I learned that Delila’s game choices were influenced by technical and social actants beyond just the algorithmic recommendations. As she scrolled through her Roblox account she explained that she finds games by watching YouTube gamers, playing with her sister and friends, and she “kind of just scroll[s] through the most engaging or...the game section.” She admitted that Roblox put “a lot of games that may interest you” based on what she had played and her interests, but she primarily scrolled through her recommendations and chose amongst the recommendations. Her game choices were not dictated (though they were influenced) by the Roblox personalization algorithm. Delila pointed out several actants that influenced which games she played, including her friends, her sister, and the YouTube gaming community. In addition, her inclination to search amongst recommended games and not select the first few recommendations may have been due to the ways she subtly undermined the algorithm's calculation of her interests and self.

Delila’s cross-platform literacy practices provided her greater agency in the face of platform power. By repurposing her Roblox favorite games page through collage making inspired by the YouTube Roblox gaming community, she constructed an identity as a gaming artist that undermined the platform’s tracking and algorithmic processes. Her gaming practices on Roblox were not determined by the algorithm, but instead reflected a complex network of social and technical actants across platforms.



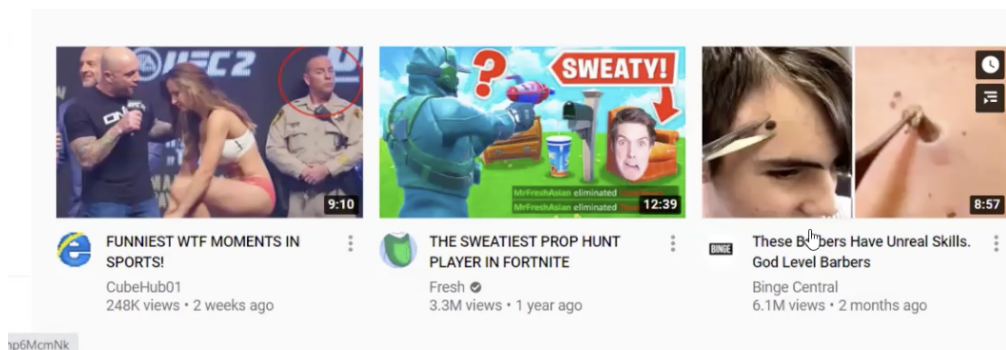
### ***Possibility in “Random Crap”: Kevin’s Case***

The last student case I will present is Kevin who was the only student in the “My YouTube Homepage” activity to dis-identify with his YouTube suggestions. Dis-identification was practiced more broadly amongst the participants, which I observed in interviews and club sessions; for example, Sean labeled some of his content as “inappropriate” and mentioned that he avoided “questionable” content. Kevin routinely negotiated his algorithmic identity by claiming and dis-identifying from algorithmic suggestions. Kevin’s case is instructive as it reveals an insidious nature of the algorithmic identity; by hyper-individualizing and invoking trust in its accurate reading of ourselves, it can feel as if the algorithmic identity “uncovers” desirable and undesirable, private facets of the self with which users must reconcile.

Unlike the TikTok users in Cotter et al.’s (2022) study who conspire with the algorithm to uncover latent parts of their identity from their algorithmic suggestions, an alternative orientation is to hide and reject facets of the algorithmic identity. This occurred during the walkthrough of Kevin’s YouTube page where he showed me and Dylan many of his recommended videos. At one point, Kevin came to a row of videos that showed a video of a woman at an Ultimate Fighting event who seemed to be undressing while a cop tried to look away, a video of someone playing the fighting game Fortnite, and another video showing what appears to be a blackhead being removed from a person’s head. During this moment, Kevin questioned and dis-identified from the suggested content. As I wrote in my field note:

**Figure 5.13**

*Kevin’s YouTube Suggestions During the Interview Walkthrough*



He explains that most of the time he sees videos on gaming. He then looks to the third video on the bottom that shows something being pulled from a man's head. He says “I don't know why this is there. I have never seen anything like that.” He then hovers over the first video on the bottom row (i.e., “FUNNIEST WTF MOMENTS IN SPORTS!”), which then starts to play. As he is about to say he doesn't know why it is there, he then says “I guess actually I watch sports.”

Like with “The Rock” video in his “My YouTube Homepage” response, Kevin took a baffled stance. He claimed to not know why the videos were suggested and even that he had not seen anything like it, which positioned these suggestions as aberrant and even possibly the algorithm as faulty. These statements sought to distinguish himself from what the content might say about

his interests, his regular viewing habits, and ultimately about himself. With the Ultimate Fighting sports video, Kevin realized that the algorithm likely recommended the first video, “FUNNIEST WTF MOMENTS IN SPORTS!”, due to his interest in sports. This instance shows a struggle with the algorithm's positioning of the student: on the one hand, Kevin at first wanted to distance himself from the selected video<sup>28</sup>, yet upon closer analysis, whether observing the title that says “SPORTS!” or the UFC2 background banner, Kevin suspected that the content coincided with his interest in sports. The content that filters into the YouTube homepage tries to calculate who the viewer is and what their interests are. Kevin felt compelled to reckon with this algorithmic-positioning and, in distancing himself from the content, he disengaged from understanding why it appeared in his recommendations.

Another instance where Kevin dis-identified with the self-image reflected back to him through his content was in relation to the homogeneity of race and gender in his subscriptions and recommended videos. In our first club session, I shared results from a pre-club survey that included questions about whether most of the content participants saw matched their gender and race. More than half of the student participants said most of the influencers they saw on social media matched their gender (6 match, 5 don't match) and less than half said most of the influencers they saw on social media matched their race or ethnicity (3 match, 7 don't match). When asked to elaborate in interviews and the club session, I learned that the students disavowed seeking out content based on race or gender of the creators, and instead they discussed the content in terms of its applicability to their interests. Kevin, in the first club session, shared openly about how his content was filled with white and most often male skateboarders. He mentioned that skateboarders are “from all sorts of different races, genders,” but as he looked at the skateboarders he subscribed to he realized that he “mostly watch[es] males” and that they are primarily white. In the following excerpt, he scrolled through his subscriptions and learned that “it's somewhat true” that he mostly subscribed to white, male skateboard YouTubers:

One of them lives in Texas, but I think... but they're all the rest of them are all in the UK. These— all five of these live in the UK. So, I sort of, like it's somewhat true, because, like they are kind of, but I also I just don't specifically watch them because of that. I watch them because of the content they create, not really what they look like or where they're from.

Kevin, who watched primarily skateboarding and gamers and who entered in the survey that most of the social media influencers he sees did *not* match his race or ethnicity but “somewhat” did his gender, explained that despite the similarities of race and gender to his own, he watched the creators “because of the content they create, not really what they look like or where they're from.” His response, which appeared in other student discussions about race on their platforms, was consistent with a “color-blind” approach. A color-blind approach is “a mode of feigning an oblivion to race,” which Kevin may have done here so as to not implicate himself in unknowing race and gender-based selection practices (Leonardo & Porter, 2010, p. 150). By *feigning oblivion to race*, this stance remained consistent with the baffled stance Kevin takes to unsavory video recommendations.

Several youth participants like Kevin insisted that they did not *choose* content based on the gender and race of the creators. Yet, as we know from Bourdieu, gender and race are culturally constructed and imposed categories that align with our habitus, or the “set of dispositions, which incline agents to act and react in certain ways” and that “are inculcated,

---

<sup>28</sup> While it is not entirely clear why he attempted to dis-identify from the video, it was perhaps due to the sexually suggestive video thumbnail.



structured, durable, generative and transposable” (Thompson, 1991, p. 12). The habitus explains how individuals have specific ways of acting and being in the world that correspond to behaviors and tastes characteristic of certain social categories and that seem natural to the individual, a *sens pratique*. Skateboarding and gaming are stereotypical activities for young white men, and Kevin’s tastes may have arisen in no small part due to his socialized gender and racial identity. In other words, from a sociological perspective, social norms around gender and race likely informed Kevin’s interest in these topics, and so Kevin did not need to “choose” content that matched his gender and race, as these tastes were invisibly “inculcated” in his YouTube practices.

Platforms are not interested in our culturally-defined habitus. They “dividuate” us into various data categories based on our online habits and act on us based on “constellations of data” (Kant, 2020, p. 50). This ever-shifting constellation of data markers becomes what I call an “algorithmic habitus.” The algorithmic habitus makes our content suggestions seem common sense and gives us the feeling that they *reflect* our interests, rather than continuously co-construct them. The algorithmic habitus seeks precision and shifts with and for the individual overtime; it can bring together unlikely tastes and discard categories that do not impact user participation. For Kevin, despite believing that his content was not raced or gendered, his gaming and skateboarding content reflected a white, male sensibility; this particular content may be recommended to him, again not because he “chose” the content, but because it was chosen for him as his online practices were clustered with other “male” and “white” viewing patterns. The algorithmic habitus constructs a profile about the participants to anticipate their interests, which, as we know with Sean, may or may not overlap with a cultural habitus, but which derives from algorithmically-defined racial and gender categories.

For Kevin, dis-identification from the private or undesirable facets of the algorithmic identity, including its calculation of his race and gender preferences, at first began with a *disengagement* from understanding the underlying algorithmic processes. Kevin feigned ignorance and took a baffled stance that initially ceased conversation and investigation into why these recommendations appeared. Despite Kevin’s impulse to dis-engage from understanding his algorithmic suggestions, in our club, Kevin’s dis-identification led to critical possibilities for thinking about the platform mechanics including how the platform hyper-individualized users through particular data categories. For example, Kevin moved beyond having “no idea why The Rock came up” to theorizing about why the algorithm recommended it to him, which the undergraduate collaborator Kathleen encouraged him to explore.

**Kathleen:** Well umm was there anything that you guys were surprised to see on your homepages? Like I know for me personally there is this.. oh wait, go ahead, Kevin. You can—

**Kevin:** Sorry, for me some random thing about the Rock Johnson singing *You’re Welcome* came up and I don’t know why. It was just a really highly viewed video. But I have not watched anything any type like nothing similar to that.

*[a few moments later]*

**Kathleen:** “I guess you were kind of like “I have no idea why the Rock” was on my YouTube channel, but do you have any like theories as to why?”

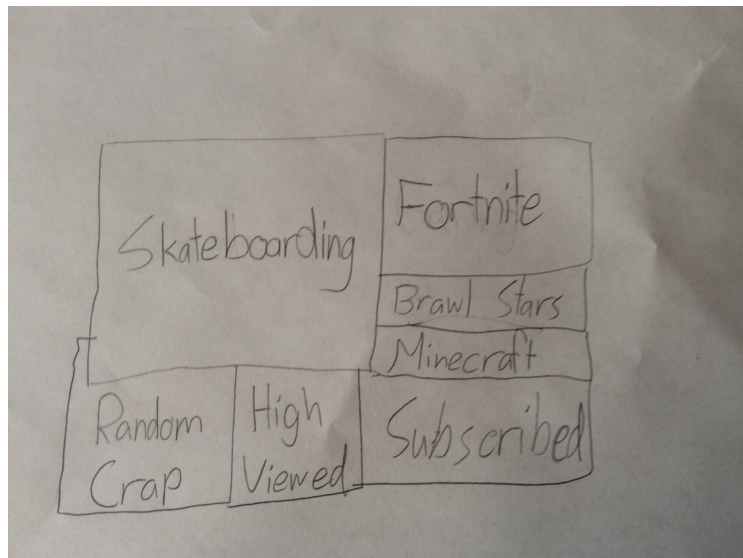
**Kevin:** For me I just get a lot of sometimes- I just get a random highly viewed video that has nothing to do with anything I watch. Just random video that has a lot of views or the person who made it has a lot of subscribers so it just pops up trying to see if how they are trying to see... if I would be interested in something else that is highly viewed.

By returning to the youth participants' initial observations about their YouTube recommendations, the club re-engaged them with understanding algorithmic protocols. Kevin identified that the video was “highly viewed” and the channel may have had “a lot of subscribers,” which were considerations about the *performance* element of the YouTube Homepage algorithm. This moved beyond the trend in participant responses to explain their feed based on personalization protocols of the algorithm. In addition, Kevin alluded to the algorithmic motives behind this process by saying “they are trying to see” if he would be interested in the “highly viewed” video. During the club session, many students moved beyond accepting or selecting specific content they identified with to questioning or dis-identifying with videos and theorizing why certain results arose.

After this club exchange, Kevin negotiated his identity in new ways in relation to the algorithm. In the “Me and My Data” Padlet response, he created boxes that showed interests he claimed— skateboarding and gaming (i.e., Fortnite, Brawl Stars, and Minecraft)— and he added three boxes to capture the videos he dis-identified with: “Random Crap,” “high viewed” and “subscribed.”

### Figure 5.14

*Kevin's Data Identity*



These latter three boxes loosen the algorithmic identity's grip on Kevin's own identity construction. Using the same language and findings from the club session with Kathleen, he acknowledged that specific algorithmic protocols shape his recommendations and, in so doing, he called attention to the constructed nature of the algorithmic identity. In my last interview with Kevin, his recognition of the algorithmic identity and its protocols developed even further. He explained why “The Rock” might have appeared due to having watched similar video genres like musicals or that there were platform processes that tried to capture his and “other people's” interest. He explained of “The Rock” video:

Probably a lot of people are watching that or, like, the Rock is very popular. So, there's a lot of reasons. So, it could be like, I've been watching, like musicals, or just like listening to music then ever just trying to find other music interests. So, it's like kind of the same

subject a different genre. Just like trying to figure out other things they like. Or it could be just like, it's, it has a high view..ya it does have 116 million views. So, like, a lot of people have watched it. So, it's probably just looking at things that are high viewed and they're kind of putting this out there to see if other people would view it as well.

Developing an awareness of the algorithmic protocols de-personalized the algorithmic identity. By citing the popularity of the Rock, the high view count of the video, his browsing habits and the YouTube's desire to "put the video out there" for other people brought Kevin toward a more empowered relation to his algorithmic identity. Rather than struggling with his recommendations in terms of what it might reveal about himself, Kevin more or less located the algorithmic identity as a statistical phenomenon based on users' practices more generally. This gives credence to the power of critical digital literacies and their capacity to offer participants some agency in relation to algorithmic power. The following chapter discusses findings from the club on how students' views about algorithms were shaped through club sessions and the impact this had on their digital practices.

## **Discussion**

This chapter discussed how digital literacy practices and identity construction online were shaped by the algorithmic identity. The participants' featured in this chapter show some counterevidence to Cheney-Lippold's (2011, p. 178) claim that "we are effectively losing control in defining who we are online" and the categories that define us. Rather, the overarching point is that digital literacy practices and our beliefs about the algorithmic identity matter in terms of how much algorithms control identity construction online. Participants' trust in the algorithmic processes underlying their platforms and the common view that their suggestions were a reflection of themselves granted algorithms more control over the identity construction process. Natasha for instance accepted and interpreted her suggested Pins and YouTube videos as relevant to her interests and her self. Her digital literacy practices of curating Pins primarily through her "For You" page and her trust in the recommendations created a cycle whereby her identity was iteratively more closely aligned with the algorithmic identity. Additionally, whether students selected, added, or dis-identified with their YouTube homepage recommendations, they desired for the algorithm to accurately anticipate their interests and they sought to identify a reflection of themselves in their recommendations. In this process, the YouTube algorithm helped to co-construct student identities, and it did so most powerfully through the personalization algorithms on the YouTube homepage.

If we only looked at these participant cases, we might agree with Cheney-Lippold's proclamation. However, in the cases of Sean, Delila and Kevin, we see that there are ways, unknowing and knowing, that we can disrupt algorithmic processes. Sean was a technology "hacker" who exploited gaming consoles and algorithmic processes to create a funny Flex Seal screenshot for his brother. The hacker identity Sean manifested in his relation with technology enabled him to manipulate and control the YouTube algorithm toward his own ends. Delila on the other hand unknowingly disrupted algorithmic protocols on the gaming website Roblox as she created collages through engaging communities across platforms. Delila re-appropriated the Roblox favorite game page—a place where the algorithm collects data on users to more accurately recommend them content—to share a classy, vintage identity with her Roblox friends. Through the CMC, Kevin's initial dis-identification with videos led to a deeper understanding about the statistical calculation of user identities and the platform motives, which made him less susceptible to seeing the algorithmic identity, in its favorable and unfavorable

calculations of the user, as different than his own. In each of these instances, students' everyday digital literacy acts disrupted or reframed the algorithm in ways that presented them with greater agency to define the self and distance themselves from their algorithmic identity.

Finally, across the cases, race appeared to be a salient category in terms of how students engaged with or were shaped by the algorithmic identity. For Natasha, Sean and Kevin, the algorithmic identities' calculations of their race shaped their recommendations. In Natasha's case, her perception of how Mexicans were depicted in her recommended content eventually influenced her own manifestation of Mexican-ness in her club video. Sean, whose actions to manipulate the algorithm and for whom his algorithmic race did not match his own self-identified race, experienced a paradoxical disempowerment in relation to the often "questionable" and "inappropriate" content on his feed. Finally, the lack of comfortability and color-blind approach Kevin displayed as he realized the whiteness of his content foreclosed an investigation into how users are shaped by algorithms' racializing practices. Each of these cases show the importance of exploring race and algorithms, among other identity categories. Additionally, each of these instances were ripe opportunities for uncovering the troubling ways that algorithms work to calculate and group the user according to race and to challenge the racialization that influenced their sense and manifestation of self.

## Chapter 6: Shaping Algorithmic Imaginaries in CMC

In this chapter, I show how students' understanding of platforms and algorithms developed over the course of the Critical Media Creators club and the extent to which they developed critical digital literacy practices around platforms and algorithms, which was a primary aim of the club. I use a range of evidence to make the chapter argument, including interviews with youth participants and undergraduate students, multimodal analyses from student platform walkthroughs and the final videos they made in the club, teaching materials—including slides and videos presented in class, and transcripts from large and small group discussions.

Using student interviews and screenshots from their walkthroughs, I begin by showing how prior to CMC students had “folk theories” as to how algorithms and the platforms that they used work. These theories were influenced by a range of discourses and actants, from family to social media influencers to the platform user interfaces themselves. Whether or not students were familiar with the concept of an algorithm, they innately understood that the platforms they used filtered and curated content and they had theories as to how this happened. These theories are part of the “algorithmic imaginaries” that guided students' participation on platforms.

By analyzing the discursive framing of algorithms in teaching materials, videos shown in club sessions, videos produced by the students and transcripts between students and instructors, I show how students developed a socio-technical understanding and language about algorithms through CMC, which granted them the capacity to jointly analyze and investigate platforms, but also paradoxically made algorithms and platforms *less* personal and more individualistic. Specifically, I show how there were three prominent discourses that shaped students' views and understandings about algorithms: a 1) socio-technical discourse, 2) moralizing discourse, and 3) an investigation discourse. These discourses worked with and against each other, and they shaped students' CDL practices and understandings of algorithms. The findings from this chapter informs the dissertation's concluding chapter by showing how educators might engage youth in critical conversations about platforms and algorithms and how we can develop students' critical digital literacies.

### Algorithmic Folk Theories

Before the club, students took a survey that asked if they had “ever heard of the term ‘social media algorithm?’” The majority of students (8 out of 11) remarked that they had not (n=5) or were unsure (n=3). From this initial survey, I learned that many students were new to the idea of a social media algorithm. In the first interview, some of the students revealed that they had some familiarity with the concept (specifically, Oscar and Kevin) through family and the creators they followed, but for the majority the club was their initial foray into learning about algorithms. For all students, the club activities and conversations amongst club members and instructors molded their views and definitions of social media algorithms.

The survey asked a follow up question about whether students had heard of social media algorithms: “From your view, what is a social media algorithm?” Only two of the students (who both said they had heard of the term) provided a definition, while a third student (who said she had heard of the term) said she still was not sure. The two students were Sean, the student with hacker literacy practices discussed in Chapter 5, and Veronica, a student who had developed a sticker business and drew and posted Japanese-influenced artwork. Sean wrote that algorithms are “the method to make your media known” and Veronica wrote that a “social media algorithm is how social media platforms gather information about you depending on what you have

searched or look at. From the information it collects, it puts together things that you may like also known as your for you page.” These two definitions reveal two differing discourses around algorithms that appeared in the club. In Sean’s case, an algorithm is something a creator manipulates to spread their media. In Veronica’s case, an algorithm operates on the user, collecting their data and curating media content specific to them. It was this latter definition that the club primarily focused on and fostered, which I refer to and explain below as a “socio-technical discourse” about algorithms.

Before the club began to spread a socio-technical discourse, the students themselves harbored “folk theories” as to how the algorithms work and what they are. DeVito, Gergle & Birnholtz (2017) coined the term algorithmic folk theories in their studies on users’ behaviors and reactions to algorithmic changes. They explain that folk theories are “intuitive, informal theories that individuals develop to explain the outcomes, effects, or consequences of technological systems, which guide reactions to and behavior towards said systems” (p. 3165). In other words, algorithmic folk theories are users’ reasoning about how the platforms they use operate, based on a combination of knowledge and assumptions. These folk theories shape the users’ algorithmic imaginaries and thereby how they interact with the platform and algorithms.

The study participants’ folk theories were composed of a variety of discourses and actants in the students’ lives, which were not only generated by their engagement with platforms and technical systems, but also through their engagement with participatory cultures online, family and friends, digital citizenship discourses, and eventually our club. In this way, the paper not only contributes to understanding how algorithmic imaginaries and practices evolve through CDL curricula, but also contributes a more complex understanding as to how algorithmic folk theories form. In the following section, I discuss the two types of folk theories about algorithms and students had prior to joining the club: creator-centric and platform-centric.

### *Creator-Centric Theories*

The first two students that I focus on here are Oscar and Veronica. Oscar and Veronica both had folk theories about algorithms that manifested from a media “creator’s” perspective; they were concerned less with how algorithms manipulated users and more how creators and algorithms interacted to spread a creator’s art or content. These folk theories were both developed from their own online actions and relations, which itself was inspired by actants beyond the screen.

Oscar was a white male student who was creative, assertive in his views and quick-witted. In our walkthrough together, he showed two websites that he often used: Scratch and Roblox. Scratch is a kid-friendly, MIT-founded coding program that introduces students to coding through “block-based” codes that students can use to create animations, games, and stories, which Scratch calls projects. The website also has a social component where users can interact with each other’s projects (through commenting, liking, favoriting and more), and projects are featured on the homepage of the website. During the interview, Oscar showed me and the undergraduate student Dylan his many projects, including a game where users could earn money, a maze, and his most viewed project (683 views), which was a story about the evolution of a frog. Through this conversation, we learned that Oscar’s father introduced him to Scratch as a kindergartener and that his father was a programmer who Oscar claimed had written a book on programming.

As we carried on the conversation, Oscar expressed frustration with the “featured projects” on Scratch. These projects are placed by Scratch on its homepage for others to view,

and the featured projects typically come from a group of creators called a Studio. Oscar felt that there were few ways for smaller creators who were not part of Studios to share their projects to a wider audience. He continued to say that “Scratch really doesn’t make much of an effort to, you know, get stuff out there. It doesn’t really have a good algorithm or doesn’t have a recommended page.” Implicit in this explanation of the Scratch algorithm, which he at one point questioned if Scratch had an algorithm, is a belief that “good algorithms” recommend small creator content.

Oscar expanded on his view about what makes a good algorithm. He explained that he had never come across a “perfect algorithm” and that a good algorithm is one that has “an unbiased view of creators and projects.” He continued to say:

It's important, you know. Just because a creator did something that you don't agree with does not mean that, you know, you should not look at their art. And I think that's something that algorithms, you know, need to be working on. Like, let's say there's, there's a really small creator, but he makes something that you might be interested to. If an algorithm recommends that to you, that's good. That's good. That's, that's a good algorithm. Um, but an algorithm that will only share big projects in order to get that creator or things when it's not really, you know, relevant to you and your interests. I would call that a bad algorithm. Basically, a biased algorithm would be a bad one.

From this excerpt, we can see a few important values and discourses about algorithms emerging. First, implicit in this conversation is that there can be a “good algorithm.” Counter to discourses about algorithms that see them as harming society and irreparable (e.g., the documentary *The Social Dilemma*), I found that the majority of students, as evidenced here by Oscar, esteemed algorithms when they “worked.” For Oscar, an algorithm worked when it was *unbiased*. Second, his view of an unbiased algorithm is defined in relation to his role as a small media creator and “artist.” For Oscar, algorithms should be content-focused rather than focused on the creators’ following. This would effectively connect content from all creators, small and large, with an interested audience rather than only share content from creators who already have a large following. A third value operates within his explanation, namely that biased algorithms *ensor* content. As he says, “because a creator did something that you don't agree with does not mean that...you should not look at their art.” While he focuses here on how users choose to not look at projects they don’t agree with, he then frames it as something algorithms “need to be working on.” In other words, a good and unbiased algorithm, according to Oscar, should not censor content regardless of the opinions shared.

The latter value connects to discourses on content censorship broadly and perhaps even within far-right communities. Oscar framed censorship more specifically as something he heard creators discuss on YouTube: “I have heard about them talking about like the YouTube one. It's based more on trends and less on actual content and sometimes YouTube will block creators that they don't like the opinions of. I have heard of that.” Censorship is a concern within the YouTube creator community since YouTube de-monetizes content it deems “inappropriate,” which most often includes depictions or mentions of violence, sex, death, or other explicit language or material (Kaur, 2019; Wright, 2017). Oscar’s algorithmic imagination is shaped by the censorship discourse he had “heard” discussed by YouTube creators. Perhaps concerningly though, Oscar connects censorship specifically to the censorship of opinions YouTube doesn't like. Currently, this particular discursive framing of censorship often circles in far-right communities that position the banning of far-right leaders and removal of misinformation as infringement on first amendment rights (Dwoskin & Shaban, 2017).

Finally, we asked Oscar to rank algorithms between three websites he had discussed — Scratch, YouTube and Roblox. He chose to rank them according to complexity and fairness. In terms of complexity, he ranked YouTube first, since it is “most cohesive,” Roblox and then Scratch. In terms of fairness, he found all of them to be equal, in that he believed that all of them were biased toward big creators to some extent (in terms of Roblox he criticized the “up and coming” category as featuring games with large followings). Oscar went on to share how conflicted he felt about Scratch in terms of fairness:

I love Scratch. And I really want it to, you know, do better in that regard. But it's, it's just not very good for sharing yourself. You'd have you know, you just have better luck sharing somewhere else.

Oscar’s algorithmic imaginary not only depicted algorithms on the website he used as unfair, but it shaped his potential future practice in creating media. A central value for Oscar was the ability for him, as a small creator, to spread his content to other interested users, regardless of the opinions held. Oscar was quite disappointed in the Scratch algorithm, or lack thereof, and its featured projects such that he considered not creating on the website.

Oscar’s algorithmic imaginary weighed algorithms against his own creator-centric views based on his assumptions about the platforms. His folk theory about how fair and complex the algorithms were on Scratch, YouTube and Roblox derived from more than just observations he had on these websites. There was an amalgam of discourses that shaped his algorithmic imaginary and his practices around creating projects and sharing them. Specifically, he was influenced by his father, who shared with Oscar a passion for creating through coding, and he was influenced by the creator community who were concerned about censorship of unsavory opinions. These two discourses shaped his interpretation of the technical functioning of these websites and ultimately his values around what makes for a “good algorithm.”

Veronica, an artist and content creator herself, toed the line between a creator-centric discourse and a sociotechnical discourse about algorithms. As mentioned earlier, these two discourses are opposed to each other in how they view the function of algorithms: in the former, creators use algorithms to spread their content and in the latter algorithms harvest user data and curate content for them. These competing perspectives on algorithms arose from her short-lived, yet nonetheless impressive small sticker business, which she promoted on Instagram, and from her curation of Japanese-style anime art on Instagram and Pinterest.

Veronica was an artist and avid fan of anime art. When she showed her Instagram during her walkthrough, she revealed several posts of her art, many of which were sticker designs she created. She shared that for a short time she had a sticker business, which she ran through Instagram, but that over time she stopped the business because “I was pressuring myself to make more designs for the stickers when art should really just be for fun.” While she explained that she created the business to pay for something she wanted so her parents would not have to, her inspiration to create a small business was certainly due to precedent set in her own family: her grandmother owned a cake business and her parents a t-shirt business.



**Figure 6.1**

*Veronica's Sticker Art*



She shared that she had learned about algorithms through other artists as she was running her sticker business. Specifically, she ran across an artist discussing the Instagram algorithm, who shared that Instagram reels would make content appear on other users' feeds:

**Veronica:** One of the artists I really like said that they were trying to get their artwork out there. And they were going- they're trying to do so according to the algorithm. And they said that you're supposed to post at least two reels a week. So, then you're- you would be more out there.

**Jessica:** Oh, got it. And so that kind of caught your attention. For what reason I guess?

**Veronica:** Because at the time, I was still trying to advertise my business. And I thought, if I produce reels, then I'll get more orders. But then I stopped.

Veronica's theory about the algorithm on Instagram was based on her own travails as a creator and small business owner, like her family, and the artist community on Instagram. The theories about the Instagram algorithm and how to use the system to spread content shaped her own understanding of algorithms. Her family and interests led her to interact with a specific theory of the Instagram algorithm, which shaped her own.

As an avid consumer of art and drawings from other creators, which served to provide inspiration for her own work, she also espoused views of the algorithm that were more sociotechnical. When I asked Veronica to explain what an algorithm was, she shared a technical definition that considered social and economic factors:

I think a social media algorithm is like, almost like a code that produces everything we use on a daily. So, when we scroll through Instagram, the algorithm generates what we follow. What we like. And then from there, it advertises things that we are most likely to buy. And then it's leads us to other places, and so on and so forth. And then we kind of just go into a rabbit hole.

This definition is in line with the socio-technical definition highlighted in CMC (see more below). In it, she identifies an algorithm as a "code" that "produces" and "generates" content (technical) that the user engages with. This content is something the user "uses on the daily" and is personalized around "what we follow. What we like" (social). Interestingly, Veronica contextualized this response in terms of her own experience on Instagram by saying "when we scroll through Instagram," it produced what she interacted with "on the daily." She went on to say that it created advertisements and a "rabbit hole" that captures the attention of the user (economic).

Despite the explicit mention of some of the harmful effects of algorithms (i.e., we go into

a rabbit hole), Veronica did not find algorithms troublesome. I asked about her views of algorithms and she described algorithms as normal and the user as agentive:

**Jessica:** And what would you say your views are about algorithms?

**Veronica:** Um, I mean, it's very interesting. umm [chuckle] It's, Well, I'm not really sure. Because, I mean, the algorithm kind of just gives us what we are supposedly enjoying and then I mean, if we do enjoy them, we enjoy them. And then we just scroll if we don't. And I think that's why we spend so much time on social media apps, because the algorithm is giving us stuff they think we might like, but then we might end up not liking it, or liking it even more, or finding out something.. new.

**Jessica:** So, I guess, um, is that a mostly positive thing? Or mostly negative?

**Veronica:** Well, I've, to me, I think it's eh.. positive, negative, somewhere in between. It's just normal, I guess.

As will be discussed below in the moralizing discourse section, students felt conflicted about the implications of algorithms even if they identified potentially troubling features of algorithms. Veronica's own view of algorithms here focused on the agency of the user and the mundaneness of algorithmic processes. Her algorithmic folk theory was at once technical but also flavored with her own experience as a user of these programs and assumptions about the power of the user to choose their own path through algorithmic curation.

This platform definition was intertwined with her creator-centric view of algorithms via her own artistic process. Veronica habitually used Instagram and Pinterest to source content for her own creations. Toward the end of the interview, she explained that the algorithm has a big impact on her and that through "looking at others and learning about new, different techniques in art styles... the algorithm helps me unlock new levels of drawing." Veronica felt an appreciation for the algorithm and its impact on her. Rather than stymieing her creative process by giving her the same content, she felt that it exposed her to new content and helped her to improve as a drawer. Her own self-conception as an artist and her art practice was interlaced with her competing perspectives on what an algorithm is and does.

### ***Platform-Centric Theories***

In the preceding two cases, both of the students were quite familiar with the concept of an "algorithm." The creator-centric lens that contributed to their algorithmic imaginaries were born of other creators' opinions and knowledge about algorithms, and these lenses were shaped by other actants in the students' lives. In Oscar's case, he was also familiar with technical concepts through his own background in coding and his father's profession. For Veronica, she was influenced by the family penchant for small businesses and her love of anime art and drawing. The majority of other students were new to the concept of algorithms, technically or otherwise. Nonetheless, they all intuitively had a sense of how algorithms functioned, and their algorithmic imaginary was shaped by the platforms themselves, making these folk theories platform-centric.

One platform and its algorithm that shaped student folk theories was Roblox. Selena and Delila were avid players of Roblox, and both of them formed similar theories as to how the algorithm worked on Roblox based on features gleaned from the platform. Both of the students focused on how Roblox, a gaming website that features individual and multiplayer games, suggested games based on a user's friendships. Selena, who had multiple social media accounts and who livestreamed some of her Roblox gaming on Twitch (a website where gamers can live stream themselves playing a game), shared that the social media algorithm "connects more people together and like, usually like, puts them into a genre." Selena's theory about algorithms was that they are meant to connect users and put them in genres. Selena's own experience of

Roblox was playing multiplayer games and connecting with other gamers such that her own definition of an algorithm focused on the connections made between users. She also used the concept of “genre.” Roblox uses genres to classify games as multiplayer, general, horror, or otherwise. Selena’s folk theory stayed closely aligned with her experiences on Roblox and she adopted terminology from Roblox to make sense of its algorithm and algorithms generally.

Selena continued to make sense of algorithms by contextualizing algorithms in her own experience. More specifically, she continued on to explain a sequence of events that one might go through as a result of the algorithm connecting people together and putting them in a genre:

It “makes them like, say, let's, let's go into Twitch... you invite that person from that genre that you saw on TikTok. And you make a group chat with other people. And then you guys kind of connect and then you decide to have a call, or like, decide to go meet up, but obviously, safety first, you don't want to do that.

Selena related to the algorithm not as an abstract technical phenomenon, but made sense of it through her own experiences with the Roblox algorithm and the kinds of behaviors and exchanges it inspired. While Selena’s algorithmic imaginary is rudimentary or basic (see DeVito, 2021), she does not lack an algorithmic imaginary altogether. Her algorithmic imaginary was shaped by the platform features and language (e.g., genre, interconnection between platforms like Twitch) and her experience using the platform.

Delila spoke more technically about algorithms than Selena, but she also contextualized her algorithmic imaginary in terms of the platform. As an aside in her explanation of how she found games on Roblox, Delila began to theorize how it recommends games to her. She explained that “they just like put a lot of games that may interest you” based on tracking “what you like, what you've played before” and “what you're mainly interested in right now.” I asked her to explain further what Roblox tracked and how it suggested recommended games. Delila explained that they “track what you are playing” and they “like sometimes they just give me things that my friends are playing.” Delila was focused on the game recommendation system and identified algorithmic processes that were shared across other platforms and specific to her experience of Roblox as a community platform. Both Delila and Selena understood and contextualized algorithms through their experience of Roblox, making their algorithmic folk theories platform-specific.

Most other students, such as Sheila and Sonia, who were avid TikTok users, and Natasha, who was a Pinterest user, understood the algorithm through the lens of the platforms they used. These three students in particular were new to the idea of an algorithm, and I explained the algorithm in an abstract way during the interview since they were unfamiliar with the idea. Regardless if students had knowledge about algorithms or not, they each understood their feeds such as the TikTok “For You” page or the Pinterest homepage were curated toward their interests. In addition, they each had accurate, but not comprehensive ideas as to technical procedures that helped shape their recommendations. Sheila for example pointed to the initial survey that TikTok users filled out about their interests. Sonia thought the content she saw was based on who she followed and how she interacted with their content (especially through likes). For Natasha, she identified a number of procedures that shaped her suggested pins: the boards she curated, accounts she followed, and an initial questionnaire that surveyed her interests.

From these accounts by various students, I learned that students had folk theories about algorithms, regardless of their familiarity with the concept, from either a creator-centric or platform-specific lens. Veronica was one of the few students who defined algorithms in a socio-technical manner, which is the discourse fostered in the club. The students’ folk theories were

not just based on observations and interpretations of platforms, but they were composed of particular perspectives wrought by social connections (family and friends) and the activities that the participants did on the websites (creating media or consuming media).

It is unsurprising that students had folk theories as this phenomenon is well-established in the literature. Where my study adds to this existing body of literature is to point toward the complexity of how these folk theories initially formed, and, as I will show in the following section, how these folk theories can continue to evolve through educational programs. In the next section, I reveal how three discourses about algorithms arose in the club.

### **Educational Discourses Shape Folk Theories**

In the following section, I analyze defining discursive moments during the Critical Media Creator’s club. The club recruited eleven regular student participants and three undergraduate collaborators. The club was split into two segments: an investigation segment and a creation segment. The first five sessions together, we investigated how the YouTube algorithm functioned and how we interacted with it. During the last portion of the club, the students created a video in groups exploring a topic related to algorithms.

Through the analysis of key moments, I will show how three discourses about algorithms arose through various activities and practices in the first five weeks of the club. These discourses are a techno-centric discourse on algorithms, which is influenced by scholarly and popular conversations that define algorithms as technical processes that adapt to user’s interests for the profit of the company. In concert with the “techno-centric” discourse, the club itself originated an “investigation” discourse and practice, which positioned algorithms as knowable through intentional collective and individual manipulation of platforms. Finally, after the fourth session on tracking and data, the moralizing discourse arose, which positioned algorithms as possibly nefarious actors through their link to data tracking, and in relation to which students felt inclined to identify algorithms as good and / or bad. These three discourses were pivotal in shaping how students later viewed and discussed algorithms in their video projects and in their final interviews, which will be the focus of the following and last findings section.

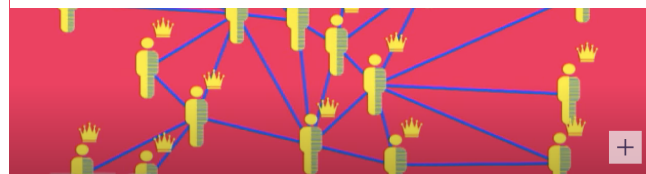
### ***Technically Speaking***

The primary definition that our club operated from was inspired by socio-technical literature on platforms. This perspective acknowledges a complexity to algorithms as having social, technical, and economic components (Seaver, 2017; van Dijk, 2013). The students were introduced to this discourse on algorithms in an initial 30-minute meeting held before the first club session. During this meeting, I reviewed results from a pre-club survey and I asked them to share about what they had entered.

As I began sharing the survey results, I showed that most students had not heard of the term “social media algorithm” and that we would be discussing and learning about it in the club. I used a video produced by Deutsche Welle News in 2018 that operationalized a socio-technical definition of algorithms. Through its imagery and audio, the video presents a

**Figure 6.2**

*Screenshot from a Deutsche Welle News Video  
Defining Algorithms*

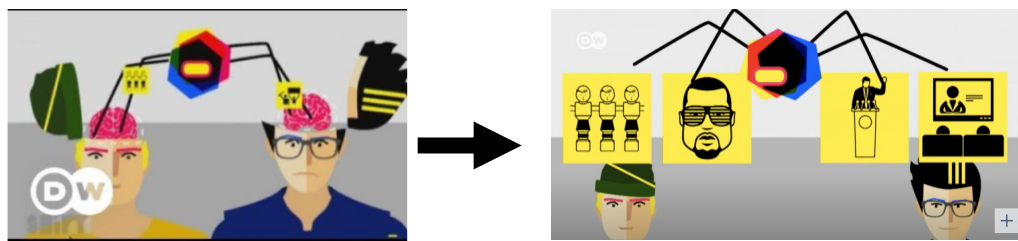


vision of algorithms as technical phenomena. The video features Facebook to illustrate its broader points about how social media algorithms work and it presents simple and technical imagery, using clip art, the same set of vibrant colors— yellow, blue, reddish-pink, and black— and images like a social network, amorphous people, cash symbols, the silhouette of a Facebook posts, and the Facebook like button and hearts, which mirror the narrator’s points (see Figure 6.2 for an example of the imagery). In addition, the audio features a sonorous drum and “sci-fi” or futuristic sounds like clicks, buzzing, bubbles popping, and glitches. Through these features, the video depicts algorithms as neutral and a-political technical operators underlying social media platforms.

Yet, the algorithm’s depiction draws some suspicion. It is depicted as a spider-like robot with rotating hexagonal forms each in the thematic vibrant colors of blue, red, yellow and black, and it has four black cords (or spider arms) that draw things into and off of the screen. At one point the video depicts two characters’ brains being “picked at” by the spider-like algorithm’s robotic arms; from the people’s brains come yellow squares with clipart images of people, a soccer ball and other icons, and after eating or computing these squares (i.e., data points), the spider-robot grabs four, larger yellow squares that feature a picture of Rapper Kanye West, Foosball men, a person orating at a podium, and two people watching a screen (see Figure 6.3).

**Figure 6.3**

*The Spider-Like Algorithm in the Deutsche Welle News Video*



The two stills in this instance depict two different affective states. As the white men’s brains are picked, they have a concerned or disconcerted face— this reveals a lack of comfortability around the data collection process. But, once they are presented with their suggestions, the two men seem to have a smug grin on their face, seemingly content with their recommendations. The two affective states depicted within the men foreshadow students’ immediate response after the video and they foreshadow an enduring relationship students navigated in relation to algorithms. More specifically, immediately after the video, I asked students how they felt about the video. As I wrote in my field note, Veronica, Oscar, Delila and Nayeli reacted ambivalently to the video:

Veronica started first saying that she finds it disturbing but also amazing at the same time. Oscar shared that he thought it was a “necessary evil.” That it had showed him some great media that he would never have come across but that it is unfortunate it collects information on them, and Delila said it made her feel comfortable and uncomfortable due to the data that was collected. Nayeli also said she was uncomfortable that others could view her name and address potentially.

The students felt ambivalent about algorithms after this presentation. They thought it was disturbing but amazing, a “necessary evil,” and it made them comfortable and uncomfortable. On the one hand, they found data tracking “uncomfortable” or “unfortunate,” yet the students, like Oscar, admitted that they had experienced the benefits of algorithmic recommendations such as coming across new content. Like the cartoon men in the Deutsche Welle News video, the students too were disturbed but indebted to algorithms— despite its invasiveness, it was “necessary,” “amazing” and “comfortable” according to the participants.

In addition to the imagery and audio, the explanation itself ushered in a socio-technical discourse by reinforcing the technical processes of recommendation algorithms and the profit motives behind them. The beginning of the video focuses on the technical processes that underlie algorithms as seen from the user’s perspective. The narrator explains:

Users will only see content that is relevant to them. That's what social network's promise.  
[pause] So what determines which content is relevant? Social media algorithms that work with user data.

In the first four lines, algorithms are connected to relevance and data. These are technical processes— algorithms connect with information to act on it in the form of producing “relevant” (to the user) recommendations. Algorithms are also figured as active, even personified, in that they “work with user data” to “determine” the relevancy of content for a user. The video goes on to explain that some of the most important data are what a user likes— topics, videos, texts and posts within a social network. The video continues:

Algorithms use these data to select posts for an individual's feed. Conflicting opinions and too many details are withheld from the user.

Again, the algorithm is framed as active in that it “selects” content for a user’s feed while withholding other content. In this line, the video changes to a more ominous tone and continues to do so by explaining data collection and its purpose. The video says:

According to experts an algorithm needs around 300 likes to really know a user.  
Algorithms can also glean private details users haven't shared on the network like whether their parents are divorced. [pause] User data benefit something else too. Targeted advertising which is a profitable business for social networks. [pause] They add paid posts to the feed selected according to user preferences.

Here again, algorithms can “know” a user, even “private details” about them like a parent’s marital status. This data is then used toward targeted advertising and paid posts, or the profit motive underlying algorithms. The technical and the economic are joined in this latter portion of the video where the technical functioning of algorithms is united with its economic interest. The video ends to say that users can change how their feed sorts posts, but that these saved settings revert to an algorithmic default after they leave the webpage, positioning the user as relatively helpless.

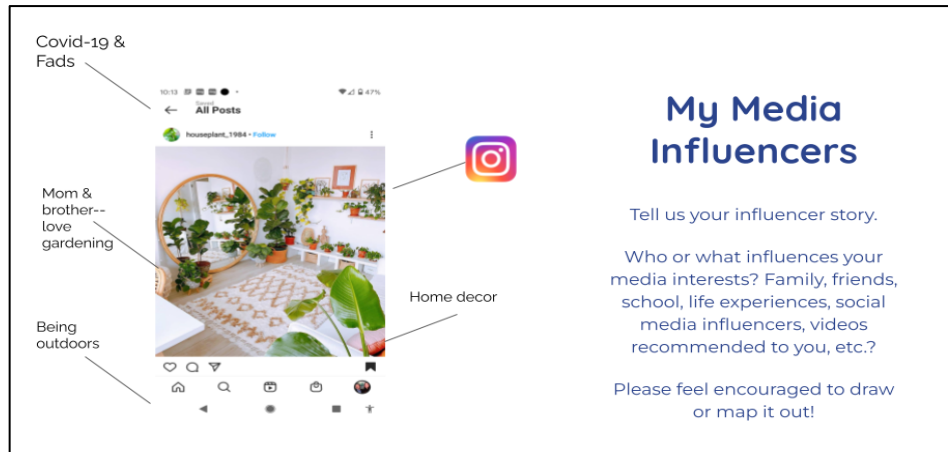
The tone of the video, at once powerful yet ominous (e.g., “glean private details users haven't shared”), flavored the students' responses to waffle between praising the algorithm and acknowledging its more insidious nature. Kevin even mentioned that he had heard of algorithms (after previously mentioning he had not in the survey) because he had watched *The Social Dilemma*, a documentary about algorithms detailing through a socio-technical discourse how algorithms work and work on users’ data.

The same theme of algorithmic power, technical processes, and economic interests were underlined in the club through examples I provided and more generally in our investigation focus in the first five weeks. I invited students to think about how the media they were interested in

was influenced by algorithms in concert with other factors. For example, I shared with them a recommended Instagram post on my feed that was a picture of a light-infused room with green plants. I annotated the image as depicted in Figure 6.4 to show various influences, including family, societal pressures (pandemic), personal interests (being outdoors), and the Instagram algorithm.

**Figure 6.4**

*Instructor’s Sociotechnically Annotated Instagram Post*



In my explanation about Instagram, I said: “Instagram definitely helps to fuel my interest because I always get recommended posts that have plants on them. So, I think it keeps- it keeps it going.” In my explanation, I underlined that algorithms are connected to recommendations that “keep” my interest in plants “going.” Algorithmic power was underlined as stoking an interest in this topic through re-surfacing similar content<sup>29</sup>.

Another moment I highlight here before turning to specific class activities where the other two discourses arose is in the introduction to our first investigation session on YouTube. Before we analyzed our YouTube homepages, I quizzed the students on YouTube facts, some of which featured business information. The slide showed the first video uploaded to YouTube and we discussed why it had hundreds of millions of views, to which Sean chatted “that man has the YouTube algorithm down,” and we discussed how the video differed from videos they watch today. From there I asked the students about who owned YouTube (Google) and how much money Google makes and how it makes it. Two of the bullet points included “Google acquired YouTube for \$1.65 billion in November 2006” and “YT makes up ~10% of Google’s ad revenue (\$15B last year!).” We discussed what ad revenue was and connected this to how ads popped up during videos; specifically, I said “those little annoying ads that we’ll see before the video, during the video, or when we search for something, that is actually a huge area of their profit.” Within this, I helped to shape a socio-technical discourse about algorithms in the club, which did not explicitly make a value statement about algorithms, but implicitly underlined what I had perceived to be ominous features of algorithms— data tracking, profit motives, algorithmic

<sup>29</sup> Interestingly, when students did this activity, all of the students identified a person— whether family or a social media influencer — and in one case Covid as influencing their media interest. None saw the platform as responsible for their media interests.



power and content curation to keep viewers interested. By the end of the club, students’ identified data tracking as “creepy,” but as I will show in the final section on student definition and views, students primarily developed a neutral, technical perspective toward algorithms.

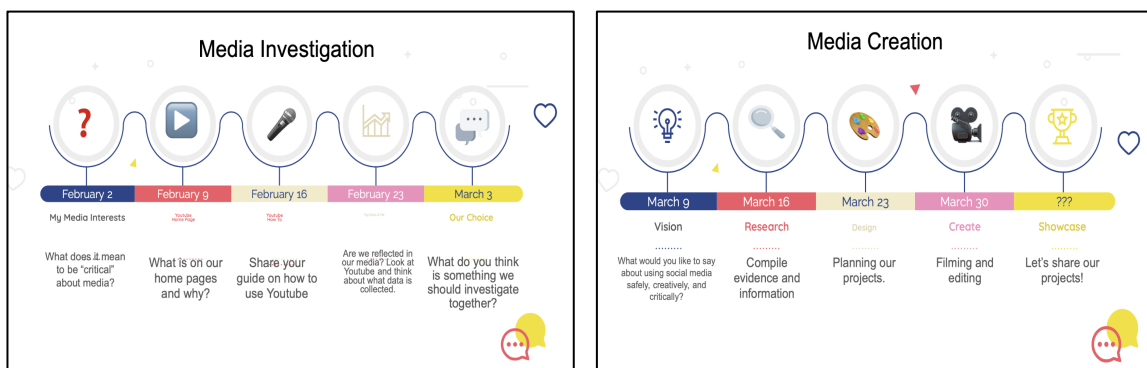
### *Investigating YouTube*

Investigation was an intentional curricular component of CMC to develop students’ critical digital literacies (CDLs). The goal of investigation was to foster agentic practices around algorithms such as asking questions (i.e., critical reflection), experimenting with platforms, and collaboratively querying them. This practice became connected to a discourse of its own that students called on toward the end of the club and beyond.

The investigation discourse was embedded in a timeline graphic I made, shown in Figure 6.5. I showed the students how their time would be spent across the two club components— investigation and creation. The investigation weeks centered different ways to investigate social media algorithms, and the middle three weeks were specifically or at least in part focused on YouTube. These middle weeks were pivotal to shaping the investigation that students later did on their own and they included investigating different aspects of YouTube: homepage recommendations (week 2), how the students navigated these recommendations (week 3), and how they were understood by YouTube or Google through their data (week 4). The fifth week gave students the choice to suggest an activity, specifically what they wanted us to investigate as a group, which they decided to watch and share YouTube videos and learn more about each other. The following set of weeks on media creation followed a familiar multimodal storytelling arc that I had deployed in other Bay Area programs, which included conceptualizing, researching, planning, filming and editing, and sharing media projects.

**Figure 6.5**

*CMC Timeline*



During the first week of the program, I explained to the students, while showing the Media Investigation slide in Figure 6.5, that we would use the “first couple of weeks.. to look at YouTube” (a platform they all used). I then began to ground the ethos around investigation:

So that'll [YouTube] be something that we use to kind of look a little bit closer about, you know, what are the videos that come to the top of our recommendations? And how does that compare to others in the class? And why might that be? How is it related to the



things that I like, and the things that I'm interested in? We'll really use this next five weeks to do a series of- ask a series of questions about YouTube more specifically. The investigation discourse positioned students as collaborative questioners of social media. They were tasked with “looking a little bit closer” at the YouTube platform. A focus of the investigation weeks and discourse was that it was something we did as a *collective*. Students were tasked with the Padlets to not only look at their platform critically and ask questions about how it works (“what are the videos that come to the top” and “why”), but to be able to compare and share with their peers. This practice was modeled after the crowd-sourcing methodology recommended by Sandvig et al. (2014) as one method to un-blackbox algorithms. In addition, the investigation discourse was often one that related to platforms and algorithms in terms of questions. This was reinforced by the questions asked in the timeline, in my presentation of the timeline, and in that the five weeks was meant to “ask a series of questions about YouTube more specifically.”

In the following examples, I focus specifically on the YouTube homepage activity where students were first introduced to investigating the YouTube platform with an undergraduate collaborator. I instructed students to share a “little backstory” about their Padlet post by talking about their homepage videos (i.e., their recommended videos captured in their screenshot). After each participant shared about why they were in the top six and reflected their “interests,” I explained that they would then investigate:

The second thing that we'll do is we're going to investigate. So, the idea will be to compare your home pages with each other...what can we kind of find out by comparing the videos that are on there?

Again, investigation was referred to as the comparison portion of the group activity. Through comparing their homepages and “the videos that are on there,” I implored students to think about why their recommendations appeared as they did.

In the student groups, we practiced asking questions about our recommendations. One student group with Kevin, Nayeli, and Delila was led by myself and an undergraduate student collaborator Kathleen (who did not participate in the program past the second week due to a course conflict). We collectively looked at the trending page and the order of the videos on the page. Before we began, I asked the students “what’s your theory? Do you think they [your trending pages] will mostly be the same?” In effect, I suggested how they might collectively and comparatively question their trending pages. Nayeli started off by sharing her screen and explaining that she had a YouTuber called Dude Perfect as the first video on her trending page<sup>30</sup>. We all noted that we had the same video on our trending page, but we realized that we had a different order:

**Nayeli:** I got two Dude Perfect ones too.

**Jessica:** Who's Dude Perfect?

**Kevin:** A YouTube channel does trick shots and stuff.

**Jessica:** Okay, I got them as well. So, 1.8 million- 18 million views. So, my top one is not even on your list. I have “I Bought a New House” David Dobrik.

---

<sup>30</sup> The trending page is a webpage on YouTube that “captures what’s happening on YouTube and in the world.” According to Google, these videos are not personalized though they are based on the user’s country and they are updated every 15 minutes. Videos appear on the trending page are determined by “the rate of growth in views and where the views are from, among other things” (YouTube Creators, 2017). While YouTube makes trending seem like a fair and equally applied policy, a YouTube researcher have found that the trending page is biased toward traditional media sources like TV networks over YouTube creators (Alexander, 2019).

**Kathleen:** I got that same one, Jessica.

**Kevin:** Oh, that's mine too. It must have been because hers uploaded faster.

**Jessica:** Yeah, that's an interesting theory. So maybe time of— time of loading. If we had all loaded at the same time that might have umm... Delila, what is— is yours similar?

**Delila:** Umm it's similar, but like the videos are in like a different order.

**Jessica:** Different order. Okay. Yes, so that's a really interesting theory- theory, Kevin. And that might be something that we can put on— like, part of what we're trying to investigate is just like, how does this like ranking and ordering come up? And I think figuring out you know, like, why, why our trending page might be different, but also really similar. So maybe the time that it loads— maybe the algorithm is just that quick. It's constantly updating what's trending.

In this exchange, we noticed that our trending page had a different ordering to the videos even though we identified that we had many of the same videos. Kevin proposed a theory about upload speed. Interestingly, Google claims that the trending is only updated every 15 minutes, and it does not mention that there would be a difference between users. While Kevin's theory may have been incorrect according to Google / YouTube's official explanation of the trending page function, there is not an explanation for why we received a different ranking of videos. Our collaborative practice and theorizing actually surfaced a contradiction between our own experience and the publicly available information produced by YouTube / Google.

We continued to investigate the YouTube trending page and we came across another inconsistency between our pages around gender. Nayeli noticed that she had video games and music trending on her page. I noticed a series of five icons on the top of the page that allowed users to curtail their results to either music, gaming, news, movies, or fashion and beauty. I asked Kevin if he had the “fashion and beauty” icon and we learned that he did not:

**Jessica:** I wonder if those categories are different. Not to single you out Kevin, but do you have fashion and beauty on your- your uh filters?

**Kevin:** No.

**Jessica:** Okay, I was wondering if it was gendered potentially. So, meaning that like if the algorithm identifies you as female, it might use that as one of your categories. Do, Nayeli and Delila, do either of you watch like fashion and beauty on occasion?  
[They shake their heads no]

**Jessica:** Okay, so it could be like very generalized like to like, “oh, women will like the fashion and beauty category.”

In this exchange we learned that Kevin did not have a fashion and beauty icon as a filter on his trending page. We began to theorize that the gender of the user may influence which icons appear at the top, even though both of the female students reported not watching that content. We asked Kevin if he had another category and I showed him the five icons at the top of my Trending page. He revealed that he did not have a fifth category, but Kevin said he would update his Google. After updating Google, it added the fifth “beauty and fashion” category:

**Kevin:** Real fast, I updated Google and now the fashion and beauty shows up in the filter.

**Jessica:** Oh, it does?

**Kevin:** Yeah.

**Jessica:** What do you mean you updated it?

**Kevin:** Uh it gave me an option in the top right corner.

**Jessica:** Oh, interesting. Okay, so maybe the gender thing isn't... isn't what is going on.

**Kevin:** Ya, it could just be a be generic every sec- every section for everyone.

This series of exchanges shows the power, but also the uncertainty around investigation as a collaborative practice and discourse. We began to ask if gender might affect the icons on the Trending page, and at first, we had evidence to validate this theory. But Kevin was notified that he could update “his Google”—perhaps meaning his Chrome browser—and the icon appeared, providing counter evidence of a gendered Trending algorithm. Investigation is not a conclusive practice, but one that allowed inconsistencies to arise and necessitated constant questioning and exploration. Ultimately, the students were developing an ethos around asking questions of their pages and each other's to theorize how or why the algorithm shaped their own feeds.

Similar practices were happening in another group during the same session, where they noticed a trend in the homepage recommendations. In this group, led by undergraduate collaborators Dylan and Juan, and engaged in by participants Oscar, Eloise, and Selena, each student took turns sharing what videos were on their homepage and Dylan shared about his own. Dylan noticed a trend across their descriptions; namely, that the top videos were often not channels they were subscribed to. After Selena presented her videos, Dylan asked her about whether she was subscribed to them:

**Dylan:** So how much of this content that you're seeing here is people that you are totally subscribed to and you watch regularly?

**Selena:** Uh well. The one..[looking through] Well, the one- I'm not really subscribed to any of these- those people. Well, I am subscribed to Larray. That's the only person I'm subscribed to.

**Dylan:** Okay, cool. All right. So that was a really interesting one. And we can tell that again, like we have total differences or like all three so far we've seen things that are very like they pertain to us. We would want to watch them, but like most of the time we're not subscribed to any of these creators. So that's the YouTube algorithm showing you stuff that, you know, you're gonna like.

Selena identified that only one of the recommendations was from a channel she was subscribed to. Dylan summarized, saying that the three who shared (Oscar, Selena and himself) had many videos that were not subscribed to but that “pertained to them.” He then connected this to an explanation of the algorithm as “showing you stuff that, you know, you’re gonna like.” The investigation practice circled back to the socio-technical discourse as a way to explain their observations. In this way, the investigation discourse bolstered the socio-technical discourse.

After this, Eloise shared her videos next and took up this theory in her own explanation. She explained that of the two videos on her Padlet screenshot— an Animal Crossing game video and a Disney movie video— “I am both fans of Disney and Animal Crossing, so I think that's probably why they showed it to me. And I haven't seen those channels, but I have watched like I said some Animal Crossing videos that are probably very similar to the one that are shown there.” Eloise confirmed the group’s theory that homepage recommendations are not necessarily something someone subscribed to but they are related to videos they had watched.

Before the group switched to writing down their findings to share with the larger group, Juan synthesized their small group investigation:

You know, everybody's first six videos or their first feed on YouTube is very unique in their own taste...It just shows that the YouTube algorithm kind of sees you click on one video, and then it goes, “Okay, let me find some more videos that are related. So, we can pop that up in your feed, maybe we'll catch your eye.”

Through looking at their homepages together, this student group realized that many of their homepage recommendations were not from their subscribed channels, yet were specific to their

“own taste.” They recognized the hyper-individualization of the personalization algorithm. This cohered with YouTube’s design to give a “diverse” and “broad” array of videos that, as Juan said, may “catch their eye.”

Upon returning to the main group, Dylan shared their findings that the algorithm is accurate, but does not pull videos from the user’s subscriptions. He explained:

The majority are things that you're not subscribed to and you probably haven't seen before. But at the same time like you can instantly describe like, what it is, why it's there and everything, which just kind of shows how good the algorithm is at predicting what you want to see. It's kind of cool.

Here, Dylan describes algorithms as technical phenomena and evaluates them as “good” (for being accurate) and “cool.” These evaluations of algorithms were something the students and collaborators engaged in as well, especially after the week on “Me and My Data.” The investigation discourse was influential as students turned toward their group projects during the last five weeks.

### ***Moralizing Algorithms***

The introduction of the week on data set a new tone around algorithms as something potentially dangerous due to data collection. This discourse, which I call the moralizing discourse, was one that positioned students as evaluators of algorithms as either good or bad, and this evaluation of algorithms carried on into their video projects and assessments of algorithms after the club.

The moralizing discourse appeared most prominently during the “Me and My Data” week. During this week, I presented an informational video on data tracking and asked the students a series of questions about data. The video itself explained the extent to which data tracking occurred and its purpose, but it did so in an ominous way that students later reported as “scary.” The video called “Hot on Your Trail” (Reveal, 2013) depicts a 20- to 30-year-old woman called Liz who is planning a trip to Hawaii. The first minute of the video shows Liz planning a surprise trip to Hawaii, and as she does so the narrator says she “can’t keep the trip a secret” because “Google knows” she is planning a trip and has personally identifying information like her email address, contact list and internet address. As Liz goes about researching the trip, a green, gaseous bubble pops out to represent the data tracked about her. Around a minute in, the video music turns more ominous as the music switches from elevator music to a heavier bass and a number of shadowy human figures representing the federal government and advertising firms appear to be watching her data. The video continues to show how police scanners, location services, purchases, and store cameras track Liz as she unknowingly goes about her day, and as she walks throughout the mall, she “leaks” location data in the form of red circles. The video also shows how social media sites like Facebook know about her trip and begin to advertise diet shakes to her (see Figure 6.6). The final scene features calculation sounds from a computer as a digitized image of Liz starts to assemble, which the shadow figures watch. The narrator explains how the firms have a “pretty good idea of who she is” and that they develop a picture of her which “she has little control of who sees it.” The video then turns it on the watcher and says “neither do you.”

### **Figure 6.6**

*Video Character Posts About a Bikini on Facebook and Sees Diet Ads*



After this video, the students were asked a series of “this or that” questions, a game I borrowed from Mrs. Turner. In this or that, students are asked to agree with one of two statements by saying “this” or “that.” These statements were “my data is spot on *or* not very accurate,” “I am worried about data collected about me *or* Data collected about me doesn’t bother me,” and “We should do something about our data (e.g., privacy, change our habits) *or* Let the data collection commence.” See Figure 6.7 for an image of the slides.

**Figure 6.7**

*This or That Data Slides*



One of these slides depicted data collection as associated with a maniacal purpose as a cartoon character GIF is presented as laughing at “letting data collection commence.” In the this or that framing of the questions, which was done in an effort to drive student participation, students may have inadvertently been driven into a binary way of relating to algorithms and data collection through the binary response options.

In the groups, the students shared their “Me and My Data” assets. During this time, some students like Sheila reported feeling “creeped out” and that she was “gonna be more careful.” Other students felt indifferent to the threat posed by data collection. Specifically, Oscar and Sean reported to undergraduate collaborator Michelle that data collection did not bother them:

**Michelle:** Data being collected about you? Does it worry you or does it bother you?

**Oscar:** I don't really care. I don't really find it bad. I don't really find it good. I think the video was exaggerating with some parts. Specifically, in the way that it seems it's been a serious thing, which in most cases, it's not. The- I think that the data collected on you really doesn't matter that much. It doesn't- it's not going to affect me. And as long as I don't get any big personal information, I really just don't care.

**Michelle:** So not a big bother for you. Okay, what about you, Sean?

**Sean:** It doesn't bother me much umm the data that they collect from me. The video made it feel like you're being watched.

**Michelle:** The video was a little scary.

**Sean:** Like scouring and trying to, like, get to me. Um, that'd be kind of rare.

In this exchange, we see that Michelle re-voiced the “this or that” question for further discussion. The students positioned themselves as indifferent to data collection because according to Oscar “it doesn’t matter that much” and wouldn’t affect him. Oscar later repeated this thought by saying he “didn’t have anything to hide.” Both students questioned the video and its presentation of tracking, where Oscar found it exaggerated and Sean said that it felt like he was being watched or scoured. The students, in response to the eerie affect inspired by the video, turned away from the overwhelmingness of data tracking and claimed indifference. This indifference remained in their views on algorithms post-club and for many, like Oscar and Sean, led to viewing algorithms and data tracking neutrally.

Another element that added to the “moralizing” discourse was that the club borrowed from digital citizenship curricula that emphasizes online safety. The school used the CommonSense Organization “Digital Citizenship” curricula to teach students about social media. To encourage participation in the program, the digital citizenship discourse, which tends to emphasize personal responsibility and safety (Krutka & Carpenter, 2017), influenced the club: I pitched my research to parents by sharing research questions about critical digital literacy by framing it through the digital citizenship discourse. Specifically, I shared that one of my questions was “how can youth safely and critically navigate online spaces?” In an effort to link algorithms to having effects on users, I asked students to think of them in terms of safety as represented during an activity during the third session. The students were to watch YouTube videos together and after doing so work through a series of questions. This specifically asked if “YT content can be dangerous or inappropriate” and what was “the safest way to navigate YT and find content?” The safety discourse, as borrowed from the digital citizenship discourse, was one that positioned social media platforms as potentially dangerous, and our learning objective during the week was to see how navigating a social media website might avoid or be informed by platform algorithms.

### **Students Take Up Discourses**

These three discourses— a socio-technical discourse, investigation discourse, and a moralizing discourse— about algorithms influenced the way students later re-voiced algorithms and it shaped their algorithmic imaginaries. This section reviews how students represented or talked about algorithms in their group videos and final interviews, respectively. The first section focuses on how students defined algorithms, the second on how they evaluated them, and the last on the practices they reported developing or maintaining on social media after the club.

### ***Student Definitions***

Students' folk theories about algorithms either shifted wholly or partially toward socio-technical accounts of algorithms. This is most notable in the final survey of the course where students were asked to describe what a social media algorithm was "in their own words." Many of the students defined an algorithm in general terms, divorcing it from specific platforms, and they also focused on the technical features of algorithms rather than how users, like creators, might manipulate them.

Four of the students focused on defining algorithms in terms of data collection and the personalization of media content. For example, Delila, who prior to the club explained Roblox recommendation system in terms of friendships on the platform, defined social media algorithms more generally as "a database with the data of millions of people, and the algorithm collects your data to keep recommending things it would think you like." Like Delila, Eloise, Oscar and Kevin also emphasized data tracking with them respectively saying it is "something websites use to gather bits of information about you," a "program that gathers information" and "something that is made track multiple different things." Eloise, like Delila, focused on how the algorithm collected data in service of the user: Eloise focused on how it made the user's "experience on the browser better" and allowed "the website to show more relevant posts." Kevin and Oscar on the other hand attributed ulterior intentions to data tracking, with Kevin noting that "the algorithm draws you back in with things you would enjoy" and Oscar that the data is used for advertising purposes. Sean, unlike the other four, solely emphasized the profit-motive of algorithms in his definition without citing specific technical features like data or code. He wrote that "a social media algorithm is a method of keeping the user invested in your website so that they will eventually buy something from one of the ads." Each of these five definitions uses technical language— they are understood broadly (as opposed to in terms of a specific platform) and in terms of their connection to data collection and / or their purpose (i.e., advertising, drawing in the user or personalizing content).

While these students developed a technical algorithmic imaginary, the four other students who completed the survey showed that they were still in the process of ideological becoming (Bakhtin, 1981) as they worked toward a socio-technical understanding. The students voiced technical definitions but with less clarity and ownership over the discourse. Selena for example, wrote that an "algorithm that tells you what the media sees and can see also how they imagine you looking like biased on the things you like to watch." Despite the definition being unclear, Selena connects the algorithm to facets of activities in the club— specifically algorithms piecing together how the user looks (from the "Me and My Data" week)— and she cites algorithms as trying to understand or visualize the user to produce personalized results (i.e., "things you like to watch"). Natasha repeated verbatim a definition posed by her group during their video production sessions, namely that algorithms are "the structure of apps and websites." Nayeli, who had not heard of algorithms prior to the club, said it "is sorting thur posts in a users post." These students focus on a technical description of algorithms without control over the discourse. Finally, Sheila wrote that the "algorithm is something bases on your software that can sometimes track you down." Like the others, this definition cites tracking and software, a technical process and language, yet this definition works more toward a personally meaningful discourse. Specifically, and as will be explored more fully in the next section, she understood algorithms and data collection more specifically as potentially dangerous and malicious.

### *Student Views on Algorithms*

Before the club began, many of the students viewed algorithms as “clever,” “cool,” and / or helpful, and some students expressed discontent with how algorithms worked (e.g., Oscar thought algorithms were biased toward large creators) or simply were indifferent to them (e.g., Sonia didn’t “really care” about them). By the final interviews, some of these ways of evaluating algorithms remained such as finding them useful or having an ambivalence about algorithms, but more prominently students described them as “scary,” “creepy,” or “weird” and many students discussed them in relation to being good or bad.

In the case of students finding algorithms scary, creepy or weird, they often attributed this to data tracking. In fact, this creepy affect was often cited as a result of the “Hot on Your Trail” video about data tracking. Delila, for example, in the final interview explained that the video was “scary” but “informative,” and she thought about data tracking more generally that she “kind of felt better, but it's still a bit scary because it was a lot of data that was being collected.” Students' views towards algorithms shifted slightly to focus more specifically on data tracking and, as I discuss below, toward whether algorithms were good or bad.

The students who discussed algorithms and data collection in terms of being good or bad reflected this in their video projects, which they created in the second half of the club. One of these video projects was from a student group called the “Super Happy Fun Fun CMC” group who made an informational video about cookies, including the history of cookies and the pros and cons of enabling cookies on web browsers. The other group called “Las Comadres” created a humorous video that featured a fight between different generations about algorithms and a final battle between an evil “algorithmic robot” and mega abuela.

The “Super Happy Fun Fun CMC” group focused on presenting a neutral presentation of cookies and data collection so that the audience could decide whether to enable or disable them. The video was a 2 minute and 20 second voice over narration of images arranged in a PowerPoint, which began by asking the audience if they ever had to accept cookies before and wondered “if they are bad for you or your computer.” The video is broken up into three sections: the introduction, “what is a cookie?”, and the downsides of cookies. Each of the four students in the group— Oscar, Nayeli, Sean and Kevin— narrated their own section and sourced their own images, giving each voice over a distinctive style, such as Sean’s section, which, for nearly every word, had a symbolic representation of the word, and such as Kevin’s section, which was replete with Sesame Street Cookie Monster memes (see Figure 6.8). The video ended by saying “although they may be helpful, they have their downsides as well,” and listed features such as storing sensitive information, limiting privacy and giving less competitive pricing. The video itself was concise and presented factual information about cookies.

During the weeks designing the video, the group decided to take a more “positive” approach and the undergraduate collaborator assigned to their group, Dylan, counched their video design process in the investigation discourse. During the second week that groups met, Dylan asked the students if they wanted to focus on the dangers of the internet or focus on the positive side:

**Figure 6.8**

*Meme Used in Student Video*





**Dylan:** Do you- would you guys want to make it something that's kind of like, a like a public service announcement that's kind of like, you know, showing people like the dangers of the internet and the algorithm, or something that's like really positive and talks about how like ads can be personalized. What do you guys think?

**Oscar:** I'd go for positive because these are younger kids and they might not like or listen to a negative one.

At this point, the students had decided that their ideal audience would be students around their age or slightly younger. The proposition by Dylan shows the influence of a binary, moralizing discourse, where they could either show the dangers of the internet or its positive side. Oscar, selecting within this binary, felt the audience would better receive a positive spin.

Dylan explained to me that they had begun to narrow their project down to focus on cookies and that they had arrived there through investigating them. That week, their Padlet project was to do research on their topic. Dylan explained that they investigated cookies by clicking rather than doing "plain old research":

I know one thing that we kind of all decided was a good idea was to kind of investigate rather than just going and doing plain old research. We figured we could learn a lot by clicking on the like why cookies or am I tracked or those things that are specific to websites. But ya, from- to me at least, from the Padlet it seemed like, we kind of wanted to focus on why things are targeted, and why we get cookies and such, you know, rather than like the effects of cookies or the effects of targeted ads.

Here, Dylan frames their project in terms of investigating websites. By investigating the websites and how cookies work on them, they were able to answer "why" questions rather than focus on the effects of cookies or targeted advertising. This positioned their project as a neutral, informational video rather than providing an evaluation on cookies.

In the final interviews when I had students reflect back on the video project, I learned that the students wished to present a neutral, unbiased view of cookies so that the audience could decide what they would do. Oscar shared that their message was to say "cookies aren't as scary as you think. They're really just kind of there working in the background doing minor things that can make a difference, but most often don't." In this way, the goal was to minimize the significance of cookies in the user experience. He explained that their message was meant to give an unbiased view of algorithms and data collection:

In addition, I think we wanted to- we didn't want a biased approach. [unintelligible] we wanted to, like lay out the pros and cons of having- having an algorithm and storing data. So, I think, on that regard, I think we did okay on that. There are definitely a lot more, I think, cons than pros, that we had laid down but the pros were kind of big.

Oscar saw their video as explaining the pros and cons. This is rooted in the good / bad dichotomy in that they chose to present both a positive and negative feature of cookies in a way that seems fair to both sides.

Sean more concisely explained that their video was "pretty unbiased" specifically because "I feel like from the information we give they could already catch on to like read what they are going to do with their cookies before you just automatically give consent." In other words, a take away from the video that the audience might have had is that they should read over the cookie descriptions before giving consent right away. Similar to Oscar, the information presented gives an awareness about cookies and the decision point users have in relation to them.

Finally, Kevin explained that they presented the pros and cons of cookies so the audience could decide what to do when presented with the option to allow or disable cookies:

I think it was more like they both work. But then you can kind of choose which side you want to focus more on. Like, if you don't want to, you want to minimize the use of cookies as much as possible because the cons there's like a greater portion, now you think, or if you think, well, then the pros make it like run faster, then might as well just like use them because it's easier.

Kevin explains that ultimately it is up to the audience to decide whether the pros outweigh the cons, but their purpose in the video is to present the information. He frames the audience as having a choice between opposing “sides.” These students felt the need to engage in the moralizing discourse that arose around algorithms and data tracking.

Las Comadres on the other hand took a negative stance towards algorithms, which they playfully captured in their video. The video was about different generations — a Boomer, Millennial and Gen-Zer— meeting to talk about their views on algorithms. In a somewhat contrived conversation about algorithms, the Boomer is nostalgic about a time before social media and he (Juan) gets into a fight with the Millennial who speaks technically about algorithms saying its “the structure of most apps and software” while the Gen-Z character says it “helps apps function but these things are bad news.” After a short fisticuff, they agree on a technical definition of the algorithm until the boomer insults technology and algorithms and calls them dumb. After fighting for a second time, a “Mega Abuela” comes in to fight an algorithm robot (played by Sheila) and the video ends.

In the final interview with Natasha and Sheila, I learned that the algorithm represented a “bad character.” Natasha explained that the fight symbolized that algorithms could be bad:

Well, the robot was like the narrator in disguise and the robot came out and then the mega abuelita came and started fighting and the mega abuelita won. So basically, what we were telling was that the algorithms and data are really bad sometimes. And sometimes they can be good, but mostly they're bad.

The fight scene itself was generated from the frivolity of the group’s design process and the idea arose during a conversation around the then recently released *Godzilla vs. Kong* movie. The students discussed cultural references about abuelas protecting their family, especially with chanclas (sandals). Natasha revealed in the follow up interview that in the fight, the mega abuela is good and the robot algorithm was bad, and the fight represented that “algorithms and data are really bad sometimes.” The moralizing discourse is centered in the video and Natasha’s algorithmic imaginary. While Natasha concedes that algorithms can be “good,” she claims they are “mostly bad.” In a follow up question, I asked Natasha to explain a little bit more about the message. She shared that the video on data made her aware that algorithms were bad. A somewhat foreboding video about data tracking and the extent to which it happens served as a genesis to the good / bad dichotomy in this group and their video positioned algorithms as bad because of data tracking.

Like Natasha, Sheila similarly claimed the fight scene showed a fight between a good and bad “guy,” where the algorithm “was the bad guy, and Abuelita was the good guy.” Sheila explained further that their message to the audience was “to be concerned” about algorithms and urge caution because “it could strike out of nowhere and take you by surprise.” Sheila personified algorithms as an entity that could “strike out of nowhere.” This depicts algorithms as not just bad, but nefarious actors that, in a close parallel to their video, could harm the user by surprise. While this explanation shows a confusion as to what algorithms are and how they work, her descriptions of social media since the club focused on a more technical recounting of data tracking. She explained that she learned that social media sites “throw guesses on your age and

they try, try to access a lot of your personal things.” The good / bad dichotomy perhaps misled students to see algorithms as acting in ways that they don’t, such as acting by “surprise” when they are calculated and rhythmic. The algorithm became a “bad guy” with intent to harm users.

Eloise, who missed a few sessions designing the video and found her group’s video “confusing,” was privy to the moralizing message they conveyed about algorithms. While she felt the message “could have been more direct” and that “it got lost in all the fight scene,” she wished that if she were to do a second video that she could communicate that the internet is “not gonna kill you.” She envisioned doing a video on data to dispel myths about what they collect:

**Eloise:** I’d do it on data and what they collect about you. That it’s they don’t collect all bad things and it’s not used- its not used or sold-

**Jessica:** It’s not used and then what did you say, sorry?

**Eloise:** It’s not used and it’s not sold. They don’t- they mostly collect it so they can show you different things that are more relevant. They’re not trying to steal your information. Identity theft.

While Eloise wanted to distance herself from a negative tone about algorithms and data collection in an envisioned future project, she perhaps extended too far the other direction. She wanted to show the user that their data is “not used and sold” and just used for showing “relevant things.” Here, there is a disconnect between the economic interests in data collection and how it works with algorithms. For Eloise, algorithmic personalization is a benefit to the user and what data collection is really about. It is not about “stealing information” or “identity theft,” which Eloise saw as some of the more dangerous possibilities. Though Eloise had not connected data collection, profit, and algorithmic personalization together quite yet, she nonetheless refracted her understanding through the moralizing discourse to make sense of what she saw as the “good” and “bad” of algorithms.

The moralizing discourse about algorithms was one in which many students felt they should take a stance. Many of the students grappled with data collection and its connection to algorithms and their own personal information. Two of the three student groups designed their video to communicate an evaluative message about data collection and algorithms— one group positioned themselves as neutral information purveyors and the other as emphasizing the negative sides of algorithms through a humorous battle between a mega abuela and algorithm robot. The moralizing discourse shaped how students understood algorithms beyond the club.

### ***The Third Eye & Other CDL Practices***

As a result of the club, most of the students reported developing an awareness about platforms and algorithms, what undergraduate collaborator Juan referred to as “the third eye.” Juan claimed that the third eye is metaphorically located in the back of the head and “watches his back” and looks “around making sure everything is okay.” In relation to algorithms, Juan explained that the third eye is a cautionary warning system: “My third eye is like, wait, you better be careful, because that, you know, algorithms are recording your data... So, you better watch out.”

The focus on caution and awareness reverberated throughout the final interviews with students. Specifically, I asked the students if their use of social media had changed since the club and what their takeaways were. Most students reported little to no change, but they underlined that they had become more aware. Eloise and Sheila were two students who said that they became more aware through the club. Eloise described her takeaways from the club as being “more aware in how it all works,” specifically in data collection and “how the websites are used”

and she was adamant that the “internet isn’t scary.” Despite advocating for others to not be afraid of the internet, she still argued that “it doesn’t mean you should be careless and not pay attention. Always pay attention and be careful not to give personal information.” For Eloise, paying attention, and in particular, not giving out personal information was essential to her online practices. The emphasis on awareness was echoed by Sheila, who also urged users to “be careful.” In reference to social media, she said she used to see “it as a plain old app” and “didn’t really care about it”:

But once I joined the club and you know we went through everything. That’s where I was like, okay, now I just got to be more aware of this. And be careful. Yeah. Be careful, like, what I do and what I answer.

Sheila, who above saw algorithms as “bad,” thought awareness was an important takeaway from the club. Awareness for her was about being “careful” about what she “does” and “answers.” For Sheila, she most often cited algorithms on her platforms as working through surveys after videos and introductory quizzes about user interests and preferences. Like Eloise, she intimated the importance of not revealing or giving too much personal data through these questionnaires.

Some of the students felt they had sufficient awareness of algorithms prior to the club, but they still insisted that awareness of algorithms was a key takeaway. Most notably Kevin and Oscar felt they continued to have awareness, which they defined as self-consciousness and caution, respectively, of their platforms. Kevin shared that his family taught him to be “very self-conscious when accepting things” by for example looking into something before proceeding and asking questions about it. In reference to his group’s video on cookies, he mentioned that one practice of his that changed was that he now knew when he should or should not accept cookies, “like, when it would be helpful, and when it would be bad.” Oscar reported that his practices using social media had not changed as he “had tried to like, you know, stay cautious beforehand.” In fact, he claimed that “if anything, it just strengthened my caution.” Following this, his advice to others using social media was to “be cautious,” especially in terms of data collection. He explained that users should have “common sense” about whether or not there is something the user should worry about. More specifically, he referred to using social media as a double-edged sword where “on the one hand, it’ll help you. On the other hand, it could hurt you if you’re not careful. But overall, I think data is probably, you know, for the better.” Like the majority of students, Oscar felt that the biggest concern in relation to social media platforms was data collection, which could be remedied by being “careful.”

By being careful and aware or developing a third eye, the majority of students reported a sense of security in relation to algorithms, data collection and platforms. Awareness was a key ingredient in this sense of security, but there were other ways that students reassured themselves that they were “safe” in relation to data collection and algorithmic influence. Eloise, for example, felt that “ultimately, I decide what I watch, and how I use social media.” For her, she had a strong sense of agency in relation to algorithmic personalization, leading her to say that the club did not influence her practice using social media much. Sean felt that data collection and cookies “can’t really exploit me with what I do on the internet.” Despite data collection being “kind of scary,” he was safe from its effects because he did not do anything online that could harm him and later, he said that if they were to use data “against you they have a big risk in doing that. Lawsuits and stuff.” The legal system ultimately would protect him if his data was used inappropriately. Finally, Natasha felt that by sharing her social media account with her mother she was immune to any dangers online. Specifically, she said that it made her feel safe because an adult “can take care of the situation if it goes out of hand.” Students reported not changing

their use of social media other than having greater awareness of how the platform works, in particular data collection.

While most students reported awareness as a key change or continued practice in their use of social media, some students revealed ways in which they obfuscated algorithmic protocols since being in the club. These practices, which I refer to as critical digital literacy practices, included account switching, experimenting, selective participation, and tailoring the message. Delila explained that she used spare accounts with little personal data on them when using untrusted websites. As she explained, when she signed up for a “random website” she had “made like a spare account like that doesn't have a lot of my data on it so I can use it when I want to sign up for websites that I'm not so sure of.” In cases where she felt like she was on a “safe website” she would “definitely use like my main personal account.” This practice of account switching presents different algorithmic identities to the platform and provides the user ways to disrupt data collection processes. Sheila experimented with her cousin to see what effect skipping questionnaires after YouTube advertisements would have. She remembered that she and her cousin “tried it out once and it affected like our whole recommendation.” Sheila, who was new to algorithms, took up the investigation discourse in her own life. Sean and Eloise both mentioned ignoring undesirable or uninteresting content recommendations so as not to generate more of that content on their feed. Sean explained that if he sees “something that I wouldn't want in my feed. I just scroll past it” and Eloise, for irrelevant videos, that she'll “just skip them or not watch them at all.”

Despite the creator-centric folk theories espoused by Oscar and Veronica prior to the club, Delila was the only student to also mention how she would tailor her message so that the algorithm would promote her content to her desired audience: She mentioned that “I would keep in mind if I'm creating media, about how the algorithm works and like how I would want to base it off who- like what audience I would want to show it to. So, to make sure I would like, make sure what to say, like, the audience could see it.” Though not a social media content creator at the time, Delila envisioned shifting her language to use the algorithm to her benefit. While the majority of students reported having greater awareness about algorithms and data collection through the club, some also revealed a shift in practices to obfuscate or confuse the algorithm and data collection procedures.

## **Discussion**

This chapter showed that students had folk theories about algorithms prior to joining the club. For two students, they were familiar with algorithms based on the explanations of creators they followed on YouTube or Instagram. These two students, who were aspiring creators themselves, defined algorithms in terms of a creator-centric discourse, which focused on how algorithms are tools to spread one's content. For the majority of participants, algorithms were a new concept. These participants nonetheless were aware that their platforms were shaped to reflect their own interests through actions they took on the platform. Their theories were platform-centric in that they made sense of algorithms through features of platforms they used such as Roblox's protocol to prioritize friend relations in video game recommendations.

Over the course of CMC, there were three discourses that shaped students' folk theories about algorithms. These discourses were a technical discourse, which described algorithms as technical objects owned and used by social media companies to produce profits through advertising. In the final survey, the majority of students presented a techno-centric algorithmic imaginary, though there were some who struggled to make a technical definition in their own

words; this seemed to indicate that these students were still in the process of internalizing a sociotechnical algorithmic imaginary.

The investigation discourse, which was endemic to the club, led students to develop new ways of relating to platforms and algorithms. Student groups understood themselves as doing investigatory research by clicking and experimenting with the platform to see how it responded. While most of the key insights in the club were found by collective investigation, several students began to implement critical practices in their own individual everyday use of technology. These critical practices included selectively engaging with content on their recommendations, experimenting with their platform, and opening multiple accounts to present different algorithmic identities to websites. These practices of playing with the platform were a sign of the club's success in entreating students to more critically engage with social media platforms.

Over the course of the club, students were also introduced to a moralizing discourse, particularly through the introduction of a week on data collection that positioned data collection as foreboding. This week motivated many participants to grapple with evaluating algorithms as either good or bad, and this question was a key driver for how two student groups designed their video message. In some cases, this discourse led students astray from understanding what algorithms are, as they were either focused on how an algorithm could be bad and “strike out of nowhere” or that they weren't that “bad” because they were mostly focused on curating relevant content for the user.

Whereas the development of critical literacy practices showed a success of the club, the “third eye” that students also developed showed a limitation of the club. The algorithmic imaginaries that students started the club with shifted to take on more technical language that made algorithms less personally meaningful. As students re-voiced these discourses, they felt that algorithms were something they could work around by being “cautious” or having “awareness.” Rather than algorithms being something that they could exploit as creators or as being intimately intertwined with the features of platforms they used, algorithms became data collection machinery that could be good or bad for the user. Students found a sense of agency in relation to algorithmic power through awareness; rather than referring to the critical digital literacy practices developed in the club as a means of agency in relation to platforms, the majority of students felt that they needed “a third eye” to ensure their safety on platforms.

## **Chapter 7: Conclusion**

Our society is intertwined with algorithms and platforms. The only way to interact with algorithmic and platform power is not to try to work outside of them, but work through them. In fact, this is not a matter of choice, but necessity. A world before or outside of the algorithmic calculation of ourselves, our language, and our humanity no longer exists. Some may lament our digital reality, while others, like myself, seek ways to chart a course through our AI present and future, one that leads to human (and perhaps machine) flourishing. The course though is not simple and presents quandaries and dilemmas along the way.

My study of youth and teachers being shaped by and themselves shaping platforms and algorithms provides some guidance on this matter. The study revealed the lively presence of human agency in the face of the seemingly overwhelming power of algorithms and platforms to control our lives. Youth participants crafted and enacted identities and digital literacies through disrupting or hacking technology and by developing a sociotechnical discourse. Teachers “made-do” with Google Classroom in ways that subverted, transgressed or denied the technically-embedded Google business model that aims to shape classroom learning. The actor-networks in which participants, platforms and algorithms were embedded provided opportunities for humans to enact agency or see out their own intentions. At the same time though, all participants were shaped by these technologies to some extent.

In the following section, I summarize the key findings from the dissertation’s three empirical chapters. The recapitulation will serve to refresh the reader before I re-introduce and discuss my findings in relation to the project’s guiding research questions. I will then discuss the study’s contributions to scholarship in relation to the first question of the study and suggestions for practice in relation to the second question. I conclude the dissertation by exploring its implications for current conversations around artificial intelligence in education and society.

### **Summary of Findings**

The first data chapter explored the engagement of teachers and students with the popular and widespread educational platform Google Classroom (GC). My chapter showed through empirical evidence how GC shaped classroom teaching and learning, but also how school members and other actants shaped the use of GC. GC — in concert with the school culture and Mrs. Turner’s pedagogical approach, which both centered academic achievement — most profoundly shaped the classroom by orienting teaching and learning toward narrow academic goals. Specifically, much of the instruction and student-teacher relationship was focused on scoring and assessing individualized assignments, which was promoted by the categories of participation on the platform.

At the same time, teachers and students improvised, subverted, denied or transgressed the uses imagined and designed for in the GC platform as documented by Perrotta and colleagues (2021). In an effort to “make-do” with their time, resources and knowledge, teachers inventively navigated GC in ways that at times privileged the designs of other platforms like PowerSchool or avoided using GC features like app plug-ins (a main part of GC’s business model). The most essential relationship upholding GC practices was that of the teacher-student-platform triad wherein students were expected to become independent learners and to advocate for themselves through regularly interacting with the platform. These empirical accounts led to a fascinating discovery: students used GC as a tool for “playing school” with friends. These playful uses privileged community, non-academic resources and activities, and fun, up-turning many of the designed and actual uses of GC in schools.

Chapter 5 and Chapter 6 explored how youth use non-educational platforms in their everyday lives. These two chapters focused more specifically on how algorithms shaped student identity and digital literacy, and on how a program designed to develop sociotechnical critical digital literacies shaped student interactions with platform algorithms. Chapter 5 showed that literacy practices and our beliefs about our algorithmic identity affect algorithmic power to construct our identities online. Students who trusted and viewed their suggestions as a reflection of themselves more readily accepted their algorithmic identities than those who struggled with the algorithmic identity presented to them through their suggested content. I explored this phenomenon through four case studies, which showed how students knowingly or unknowingly disrupted algorithmic processes by, in Delila’s case, navigating across platforms to design a collage or, in Sean’s case, intentionally hacking the algorithm as a prank. Special attention was given to how algorithms racialized students, reinforcing stereotypical views of Latinidad and disempowering students by providing irrelevant and even “inappropriate” content suggestions.

Chapter 6 more specifically explored an afterschool critical media program in relation to students’ algorithmic imaginaries. Consistent with the literature on algorithmic folk theories (see DeVito, 2021), the youth participants maintained thoughts, beliefs and knowledge about how platforms and their algorithms work, whether or not they knew what an algorithm was. These folk theories were shaped by a myriad set of actants — family and peer relationships as well as the students’ interests, aims and knowledge about platforms. The folk theories informed their algorithmic imaginaries. The club provided students with a discourse to discuss and represent algorithms, which had benefits and drawbacks. On the one hand, students developed a language to co-investigate platforms and their algorithms, while on the other hand algorithms became less personal and therefore more open to an “awareness” or a “third eye” discourse, which, ironically, led students to view algorithms as less consequential in their lives.

### **Contributions to Scholarship**

My study contributes to scholarship in critical studies of platforms in education and critical algorithm studies. I return to the first question proposed in my dissertation project to explore how my study contributes to these literatures. My first research question was:

*How do platforms and algorithms shape the digital literacy practices, identities, and views of young adults and their teachers across informal and formal educational settings? What forms of agency do these participants enact in the face of algorithmic power?*

One of the key findings from this dissertation is that algorithmic and platform power are *not* absolute. The interaction between user, platform and algorithm is complicated. Youth used platforms in ways that confused, subverted or directed algorithmic operations toward their own goals and which at times contradicted the platform business model. This was particularly notable in the creative endeavors of students like Delila and Sean. Delila, for example, created a collage by navigating across platforms — YouTube (her inspiration for the collage), Canva (the app used to make the collage), and Roblox (where she displayed her collage). By embedding her collage in her “favorite games” to frame herself as having a “classy aesthetic,” she disabled a key mechanism for Roblox to collect and recommend games. Following de Certeau (1988), we might call this a “cross-platform tactic” in the face of algorithmic and platform power: Delila wove her own pathway across platforms to craft a personally meaningful identity, which disrupted the algorithm’s ability to ensnare Delila on the Roblox platform through game recommendations.



The study contributes to recent research on algorithmic agency within critical algorithm studies by showing how algorithmic agency can also manifest a paradoxical form of *disempowerment*. Sean, a hacker who turned the YouTube algorithm against itself to prank his brother, struggled to find his interests reflected in his YouTube recommendations and he disdained the many “inappropriate” video suggestions. The algorithm struggled to define Sean’s racial identity in a way satisfactory to him — over the course of the study he was “undefined” and “white,” the latter likely due to his interests in Mario Kart, which reflected a middle-age, white male taste. While youth showed that there is a capacity of the user to disrupt algorithmic processes by using it against itself or through cross-platform tactics, this also interfered with the ability to use the platform for entertainment.

Beyond user agency, the effects of platforms and algorithms were mediated by a host of actants, a finding that echoes the post-humanist definitions of algorithms as algorithmic systems (see Seaver, 2017). In terms of my study, how a platform or an algorithm shaped teaching, identity, or literacy was contingent on the broader actor-network. For example, in Chapter 4 on Google Classroom, student independence was one of the ways that GC shaped educational practices. But GC did not operate alone; instead, the school culture, Mrs. Turner’s teaching philosophy, and pandemic constraints made it such that teachers relied more heavily on the platform to communicate with students and to use particular features of the platform (e.g., assignments assigned to individual students). The actor-network in which GC was embedded reinforced and channeled how the platform shaped classroom learning. Additionally, in Chapters 5 and 6, we observed how integral family and peer relationships were to how students used social media platforms. At times this is what lent students a modicum of agency (Holland & Skinner, 1996) in relation to algorithmic power and in other cases the actor-network contributed to students’ further entanglement with algorithmic recommendation systems like Veronica whose sticker business, inspired by a familial entrepreneurial spirit, drove her to iteratively return to Instagram and Pinterest to gain inspiration from artists.

In focusing on youth, the study also contributes important empirical evidence to critical algorithm studies. In my search of the literature, I did not find many papers examining how youth respond to algorithmic systems (see Pangrazio, 2016 as the only other study empirically examining this age group). The preteen users in my study were embedded in actor-networks unique to youth experiences; specifically, their algorithmic imaginaries were based around family practices with technology, peer relationships on and offline, school discourses (especially in the use of GC, but also in how students interpreted algorithms and data collection in relation to a safety discourse) and their own youthful interests.

Studying this age group showed new and underemphasized components of algorithmic and platform governance. A concerning trend across the youth participants is that they all reported being classified as older than they were and receiving advertisements for dating apps, car insurance, and other adult content. The majority of students had a combination of youth-centered content (e.g., Disney channels, games for younger kids), while also being exposed to political discourses or, in the case of Sean and Kevin in particular, sexually suggestive content. This latter insight provides some evidence that platforms can or may intentionally overestimate ages, perhaps to expose youth to more profitable advertisements and content.

Another finding that cuts across these literatures is the importance of empirical research in making claims about how algorithms and platforms shape users and, in particular, classroom practices. Much of the literature in critical algorithm studies and critical scholarship on educational platforms has focused on theoretical pronouncements, analyses of platforms’

technical features and company guidelines or how macro-actors like businesses and school districts use platforms. My study shows that how these technologies actually shape users and classrooms is specific to the context in which they are embedded.

I contend with the directions suggested for research in the critical studies of educational platforms as outlined by Decuyper and colleagues in the special issue of *Critical Studies of Education*. The studies in that special issue focus on analyzing platforms from the infrastructure level or through a macro-lens to make claims about how EPs influence education. The uses of GC I documented, which showed that teachers made-do with the platform in ways that subverted, transgressed or denied features of the platform, show how essential it is for researchers to understand platforms as they are situated in actual contexts and as they are actually used. Thus, I believe the direction of critical research on EPs should focus analytic efforts on empirically-based accounts to answer questions about how EPs shape education.

Finally, I observed a disconnect between how the literature and popular discourse on algorithms emphasize the harrowing and insidious features of algorithms and platforms and how all of the participants in my study — teachers, youth, undergraduate students — maintained a positive outlook on platforms and their recommendation systems even if they were critical of data tracking processes. GC, for example, was celebrated as the hub of teacher and student activity. Additionally, students desired their personalization algorithms to be more accurate, and many youth participants felt the need to stake a claim about the pros and cons of algorithms in their group videos so that their audiences could decide how they felt about these technologies. These technologies, in all of their insidious nature, also bring entertainment and convenience to the user. The positive and admiring views of algorithms should help us to see the importance of continuing scholarship on the agonistic (Crawford, 2016) or even “conspiratorial” (Cotter et al., 2022) relations users develop with algorithms as much as we should highlight the antagonistic and hacker-like relationships.

Despite the positive views of school participants about GC and of the youth about algorithms, the literature rightfully should remain critical or skeptical of platforms and their impact in education and on youth. As a critical discourse analyst, I have struggled with participants’ positive evaluations of algorithms and platforms and the way that algorithmic power shapes these perspectives. A critical platform gaze helps scholars to remain abreast of the ways platforms may conflict with public education and personal values, but it should not supplant those views. A pathway forward might be to balance critical accounts with users’ views of platforms so as not to lose contact with the empirical uses and values ascribed to them (e.g., Williamson, 2017 on Class Dojo).

### **Recommendations for Practice**

The second question that guided my dissertation project is connected to recommendations for practice. I asked:

*What effect can an after school digital storytelling program designed to develop critical digital literacies have on students’ capacity to engage with algorithmic processes agentively?*

My findings in relation to this question stem from Chapter 5 and primarily Chapter 6. The after school digital storytelling program I designed and offered was developed around sociotechnical versions of critical digital literacy. Sociotechnical CDL considers how power operates in the technical and economic dimensions of a platform (i.e., its algorithm and business model) in addition to its discursive dimensions (i.e., the content and interactions on the platform) as

typically outlined in definitions of critical (digital) literacy. This program as a result focused on having students engage with platforms through crowdsourcing methods (Sandvig et al., 2014) to investigate and compare how social media platforms work and what patterns this might reveal about the algorithm and its read of their algorithmic identity.

Chapter 6 shows that students' opinions and practices around algorithms and platforms in their lives form from discourses in the family and amongst peers and through their knowledge of and ambitions with the platform. In each of the cases, the students defined and evaluated algorithms and their effects based on how algorithms were relevant to their own goals with the platform. Oscar for example ranked algorithms on YouTube, Roblox and Scratch (the latter of which does not have an algorithm) in terms of how they catered to and uplifted small creators. Veronica saw algorithms as a means to shape her art through curating relevant content on Instagram and Pinterest.

The critical media program provided students with a discourse about algorithms that derived from scholarship on how to open the algorithmic black-box. The discourse enabled students to develop an external, if not distant, relationship to algorithms and the platforms they used. Students unearthed patterns in YouTube's algorithm (e.g., Kevin's group debated whether trending results were gendered) and began to understand how they were uniquely tracked and profiled. This capacity for critical and collaborative reflection was a primary goal of the program, and shows how sociotechnical versions of CDL programs might be implemented to great effect.

At the same time, an unforeseen outcome of the program was the effects that such a discourse might have on how students understood the implications of algorithms and platforms in their own lives. CMC developed a "third eye" in students, or a wariness and alertness toward the data collection practices on websites. Students enacted this third eye by experimenting with security settings, creating false accounts, and disengaging from content they no longer wished to be recommended. The third eye at once was a way students reframed technology as having ambitions other than their own while at the same time it made the effects of such technologies seem distant or not personally meaningful or significant. Students who developed this third eye felt that whatever was tracked about themselves could not harm them. Whereas students at the beginning of the club had very elaborate accounts of how algorithms tied into their own uses of platforms, toward the end of the study the inner workings of algorithms and platforms became autonomous and universalized and therefore less concerning.

These results reveal important implications about how to design such programs moving forward and how to orient toward critical digital literacy in theory and practice. The research on CDL rarely derives from implementations of such definitions with students or youth (or anyone for that matter). To date, the conversation has been abstract and has stemmed from earlier research on critical literacy education (formed without the digital in mind) and from digital literacy scholarship, which did not attend to power as a central theme. As a result, the literature is prescriptive, which my study shows can lead to a "disarmament" in the face of algorithmic power.

My findings show, like their predecessors in digital literacy studies, that definitions of critical digital literacy and implementations in practice should derive from observing CDL in practice. Chapter 5 and Chapter 6, which viewed how students navigate platforms critically, is therefore an important corrective to such literacy programs and definitions. From this, I ask what can we learn about critical digital literacies from the creator-centric platform views of Oscar and

Veronica? Or from the hacker practices of Sean and the cross-platform tactics of Delila? Or from Kevin's dis-identification with his platform recommendations?

One important implication for practice is to begin such CDL programs connecting to youth's existing algorithmic imaginaries. As my study shows, whether or not youth can define an algorithm, they are already forming ideas about how such platforms work and how recommendations are generated. If I had, for example, begun the club by understanding how Oscar and Veronica understood algorithms as interfering with or stimulating their digital creations, I might have instead focused on having them explore how the algorithm does this and, especially in Oscar's case, how he might design a platform to surface the content of small creators. Through a more personally meaningful investigation of algorithms, a teacher could begin to connect this more intimate or internally persuasive discourse about algorithms (Bakhtin, 1981) to the sociotechnical discourse that affords users a means of critiquing these technical systems.

In addition, we might take particular dispositions and practices from Sean, Delila and Kevin as lessons in designing such programs. In Sean and Delila's case, they disrupted algorithmic calculations of the self through their digital literacy practices to create across and hack platforms. These two literacies — cross-platform and hacker — are two competencies that a CDL program would do well to instill in their students. As for Kevin, perhaps as a result of a healthy dose of skepticism about social media in his family, he developed an identity outside of social media that conflicted with algorithmic calculations of the self. He was able to question and dis-identify with this calculation as his sense of self differed from suggested content.

As for definitions of CDL, this study brings together the two branches of CDL. The two branches are the discursive and the sociotechnical where the former is typically concerned with the "the interplay of users, devices, and content" and the latter on "concerns about technical infrastructures and socio-economic relations" (Nichols & Stornaiuolo, 2019, p. 14). My study showed the importance of tying together students' algorithmic imaginaries (which has to do with the interplay of "users, devices and content") with critical investigations into technology in its infrastructure and socio-economic relations. Admittedly, many who fall into the sociotechnical branch of CDL do not disavow the power of discursive analyses of platform content and interactions; but what I am offering here is not the same. Rather, it is a particular orientation to tying these two branches of CDL together. Instead, I see CDL as sharpening youth's existing critical competencies created through their interactions with technology. This means folding sociotechnical orientations to CDL into youth's budding and even nascent critical digital literacy practices, rather than providing them an entirely new set of competencies defined and reified outside of themselves. We might call this a grounded CDL; such a CDL will not look the same for everyone, but it will draw from a similar toolkit to sharpen and advance how youth are shaped by platform and algorithmic power currently.

### **Directions for Future Research**

The intent of my dissertation was to break new ground in several fields by conducting empirical research on how youth are shaped by algorithms and platforms in and beyond school. The study uncovered that human agency is intertwined with algorithmic power and processes through the actor-networks that humans and machines are embedded. While algorithms are at once powerful because they dynamically calculate and make decisions based on the users' actions, this is also their weakness.

A key component of my study was the implementation and evaluation of a critical media club where students could develop CDLs to understand and counter algorithmic and platform power. In the previous section, I outlined lessons learned based on program outcomes. A future line of research might be to iterate on the club model, centering it around activities and forms of investigation that derive from a grounded CDL and the orientations and practices of students like Sean, Delila, Kevin, Veronica and Oscar. How might a CDL program centered on developing students' algorithmic imaginaries enable them to tap into agentive uses of platforms and algorithms? Would students continue to develop a "third eye" as a learning outcome?

One limitation of the study was my ability to observe youth using platforms in their daily lives. While this was my original intention, due to the pandemic, I did not directly observe youth participants' social worlds and platform uses beyond the club and school day. Pre-pandemic, I envisioned recording laptops in the afterschool space to see more "natural" uses of the platform and to follow particular students and their friend groups. During the pandemic, my access to students and their screens was heavily delimited to the Zoom software. Another contributing factor to this limitation was the difficulty I had distinguishing myself between my role as a teacher's assistant and as a confidential researcher. I believe my many ignored or rejected proposals to observe students play Roblox or watch them use GC for fun beyond school were in part due to my relation to teaching authorities and how school blended into daily life.

Future researchers could conduct a more expansive digital ethnography to observe youth using algorithms and platforms in daily life. Through such an embedded position, a researcher could, for example, observe students interacting with algorithms across time. Algorithms are calculating, captological devices that slowly ensnare their users, but that must also adapt to users' changing or even conflicting interests (Kant, 2020; Seaver, 2017). Future research might explore how and if users break from their algorithmic recommendation systems or how algorithms shape users' worldviews and identities over time.

The landscape of AI is currently being transformed. ChatGPT-4 is now available to the public and there is a race at Microsoft, Google and other companies to embed this new technological agent in technological systems (like search engines or word processors) more broadly. Views about these innovations in AI run along similar lines — the boosters, doomsters and critics (Bigum & Kenway, 2005). On the extreme ends, AI is now a thought partner and collaborator (boosters) or it damages language and learning (doomsters). The critic helps to forge a middle ground between these two poles. While it is beneficial to approach such technologies with an openness and experimental mindset, it is also important to understand how it is shaping us at the same time, and if we are comfortable with where it is leading us.

For those who see ChatGPT as a thought partner, we should be wary about how it delimits and channels thought. My study shows how algorithms and platforms influence classroom practice and youth identity, digital literacies, discourse and views about technology through a network of human and non-human agents. While human agents certainly disrupt, transgress and subvert technical processes, they are also simultaneously shaped by these processes. It would be wise to remain alert to how generative AI like ChatGPT, despite our most intentional, thoughtful and agentive uses of it, channels and shapes the possibility for thought and expression. While we are cyborgs — composites of AI calculations and human capacities — as Haraway (1985) envisioned, we do not have to submit to or remain naive to the ways our cyborg forms are being engineered by technologists and capitalist logics. Rather than reject our increasingly statistical forms of human life or simply accept and make-do with how our

humanity is being programmed, those committed to ethical forms of AI need to diagnose current technical trajectories and engineer a better future so our youth can flourish.

## References

- Aguilera, E. (2017). More than bits and bytes: Digital literacies on, behind, and beyond the screen. *Literacy Today*, 35(3), 12–13.
- Alaimo, S., & Hekman, S. (2008). Introduction: Emerging models of materiality in feminist theory. In S. Alaimo & S. Hekman (Eds.), *Material feminisms* (pp. 1-19). Bloomington: Indiana University Press.
- Alexander, J. (2019, May 29). YouTube’s Trending section puts creators at a huge disadvantage over big brands. *The Verge*. <https://www.theverge.com/2019/5/29/18642833/youtube-trending-coffee-break-pewdiepie-late-night-sports-highlights>
- Aljanahi, M. H. (2019). “You could say I’m a hardcore fan of Dragon Ball Z”: Affinity spaces, multiliteracies, and the negotiation of identity. *Literacy Research and Instruction*, 58(1), 31–48.
- Anderson, J. (2018). Archiving, ordering, and searching: search engines, algorithms, databases, and deep mediatization. *Media, Culture, & Society*, 40(8), 1135-1150.
- Ananny, M. (Apr 2011). “The Curious Connection Between Apps for Gay Men and Sex Offenders.” *The Atlantic*.
- Ananny, M., & Crawford, K. (2016). Seeing without knowing: Limitations of the transparency ideal and its application to algorithmic accountability. *New Media & Society*, 20(3),
- Austin, J.L. (1962). *How to do things with words*. Oxford: Oxford University Press.
- Ávila, J., & Pandya, J. Z., (Eds.). (2012). *Critical digital literacies as social praxis: Intersections and challenges*. New York, NY: Peter Lang.
- Bakhtin, M.M. (1981). *The dialogic imagination* [Trans. M. Holoquist]. Austin: University of Texas Press.
- Benjamin, R. (2019). *Race after technology: Abolitionist tools for the new Jim Code*. Polity.
- Bennett, J. (2010). *Vibrant Matter: A Political Ecology of Things*. N.C.: Duke University Press.
- Bernal, D.D. (2002). Critical race theory, Latino critical theory, and critical raced-gendered epistemologies: Recognizing students of color as holders and creators of knowledge. *Qualitative Inquiry*, 8(1), 105-126.
- Bhandari, A. & Bimo, S. (2022). Why’s everyone on TikTok now? The algorithmized self and the future of self-making on social media. *Social Media and Society*, 8(1), 1-11.
- Bigum & Kenway (2005). New information technologies and the ambiguous future of schooling- some possible scenarios. In A. Hargreaves (ed.), *Extending educational change: International handbook of educational change* (pp. 95-115). Dordrecht: Springer.
- Black, R.W. (2009). English-language learners, fan communities, and 21st-century skills. *Journal of Adolescent & Adult Literacy*, 52(8), 688-697.
- Bogdan, R.C., & Biklen, S.K. (2007). *Qualitative research for Education: An introduction to theory and methods* (5th ed.). Boston: Allyn & Bacon.
- boyd, danah. (2007) “Why Youth (Heart) Social Network Sites: The Role of Networked Publics in Teenage Social Life.” MacArthur Foundation Series on Digital Learning – Youth, Identity, and Digital Media Volume (ed. David Buckingham). Cambridge, MA: MIT Press.
- boyd, D. (2014). *It’s complicated: The social lives of networked teens*. London: Yale University Press.
- Brandt, D., & Clinton, K. (2002). Limits of the local: Expanding perspectives on literacy as a social practice. *Journal of Literacy Research*, 34(3), 337–356.

- Bucher, T. (2017). The algorithmic imaginary: Exploring the ordinary affects of Facebook algorithms. *Information, Communication, & Society*, 20(1), 30-44.
- Bucher, T. (2018). *If...then: Algorithmic power and politics*. New York: Oxford University Press.
- Bulfin, S., & North, S. (2007). Negotiating digital literacy practices across school and home: Case studies of young people in Australia. *Language and Education*, 21(3), 247–263.
- Burrell, J. (2016). How the machine ‘thinks:’ Understanding opacity in machine learning algorithms. *Big Data & Society*, January-June 2016, 1-12.
- Butler, J. (1997). *Excitable speech: A politics of the performative*. New York: Routledge.
- Chen, J. (Feb. 2022). How the YouTube algorithm works in 2022. *SproutSocial*.  
<https://sproutsocial.com/insights/youtube-algorithm/>
- Cheney-Lippold, J. (2011). A New Algorithmic Identity Soft Biopolitics and the Modulation of Control. *Theory, Culture & Society*, 28(6), 164–181.
- Cheney-Lippold, J. (2017). *We are data: Algorithms and the making of our digital selves*. New York University Press.
- Citron, D.K., & Pasquale, F.A. (2014). The scored society: Due process for automated predictions.” *Washington Law Review* 89.  
[http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2376209](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2376209)
- California Department of Education. (2013). *California common core state standards: English language arts & literacy in history / social studies, science, and technical subjects*.  
<https://www.cde.ca.gov/be/st/ss/documents/finaelaccsstandards.pdf>
- Coole, D., & Frost, S. (2010). Introducing the new materialisms. In D. Coole & S. Frost (Eds.), *New materialisms: Ontology, agency, and politics* (pp. 1-46). Duke University Press.
- Cotter, K. (2019). Playing the visibility game: How digital influencers and algorithms negotiate influence on Instagram. *New Media & Society*, 21(4), 895–913.  
<https://doi.org/10.1177/1461444818815684>
- Cotter, K., DeCook, J.R., Kanthawala, S., & Foyle, K. (2022). In FYP we trust: The divine force of algorithmic conspiratoriality. *International Journal of Communication*, 16, 1-23.
- Crawford, K. (2016). Can an Algorithm be Agonistic? Ten Scenes from Life in Calculated Publics. *Science, Technology & Human Values*, 41(1), 77-92.
- Creator Insider (2021, April). Behind the algorithms: How search and discovery work on YouTube. <https://www.youtube.com/watch?v=9Fn79qJa2Fc&t=49s>
- Crooks, R. (2019). Cat-and-mouse games: Dataveillance and performativity in urban schools. *Journal of Critical Library and Information Studies*, 2(1), 1-25.
- Darvin, R. (2017). Language, ideology, and critical digital literacy. In S. Thorne & S. May (Eds.), *Language, education and technology*. Encyclopedia of language and education (3rd ed., pp. 17–30). Springer.
- de Certeau, M. (1988). *The practice of everyday life*. Berkeley: University of California Press.
- de Freitas, E. (2012). The classroom as rhizome: New strategies for diagramming knotted interactions. *Qualitative Inquiry*, 18(7), 557-570.
- De Roock, R.S. (2020). On the material consequences of (digital) literacy: Digital writing with, for and against racial capitalism. *Theory into Practice*.
- Decuyper, M. (2020). Visual network analysis: A qualitative method for researching sociomaterial practice. *Qualitative Research*, 20(1), 73-90.
- Decuyper, M., Grimaldi, E., & Landri, P. (2021). Critical studies of digital education platforms. *Critical Studies in Education*, 62(1), 1-16.
- Decuyper, M., & Simons, M. (2014). An Atlas of Academic practice in digital times. *Open*



- Review of Educational Research* 1 (1): 116–143
- Decuyper, M. & Simons, M. (2016) Relational thinking in education: topology, sociomaterial approaches and figures. *Pedagogy, Culture & Society* 24(3): 371–386.
- Delanda, M. (2006). *A New Philosophy of Society: Assemblage Theory and Social Complexity*. London: Continuum.
- Deutsche Welle News. (2018, April 23). *Hidden code: Algorithms in social networks* [Video]. YouTube. <https://www.youtube.com/watch?v=OuU3UfRM2pE>
- DeVito, M.A. (2021). Adaptive folk theorization as a path to algorithmic literacy on changing platforms. In *Proceedings of the ACM on Human-Computer Interaction*, 5(CSCW2), 1–38.
- DeVito, M.A., Gergle, D., & Birnholtz, J. (2017) “Algorithms ruin everything“: #RIPTwitter, folk theories, and resistance to algorithmic change in social media. *CHI 2017, may*, 3163–3174.
- Diakopoulos, N. (2014). Algorithmic accountability reporting: On the investigation of black boxes. A Tow/Knight Brief. New York: Columbia Journalism School, Tow Center for Digital Journalism.
- Diakopoulos, N. (2015). Algorithmic accountability. *Digital Journalism*, 3(3), 98–415.
- DiAngelo, R. (2018). *White fragility: Why it’s so hard for white people to talk about racism*. Boston: Beacon Press.
- Dixon-Román, E., Nichols, P., & Nyame-Mensah, A. (2019). The racializing forces of/in AI educational technology. *Learning, Media & Technology*. DOI:10.1080/17439884.2020.1667825
- Dooly, M. & Ron Darvin. (2022). Intercultural communicative competence in the digital age: Critical digital literacy and inquiry-based pedagogy. *Language and Intercultural Communication*, 1–13. <https://doi.org/10.1080/14708477.2022.2063304>
- Dorn, E., Hancock, B., Sarakatsannis, J., & Viruleg, E. (2021, December). COVID-19 and education: An emerging K-shaped recovery. *McKinsey & Company*. <https://www.mckinsey.com/industries/education/our-insights/covid-19-and-education-an-emerging-k-shaped-recovery>
- Dwoskin, E. & Shaban, H. (2017, August 24). Tech conservatives call for the regulation of Internet firms. *Albuquerque Journal*. <https://www.abqjournal.com/1053252/tech-conservatives-call-for-the-regulation-of-internet-firms.html>
- Ehret, C. & Hollett, T. (2014). Embodied Composition in real virtualities. Adolescents’ literacy practices and felt experiences moving with digital, mobile devices in school. *Research in the Teaching of English*, 48(4), p. 428–452.
- Fabos, B. (2008). The Price of Information: Critical Literacy, Education and Today’s Internet. In D.J. Leu, J. Coiro, M. Knobel & C. Lankshear (Eds.). *Handbook of Research on New Literacies*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Fairclough, N. (2001). *Language and power* (2nd ed.). Harlow: Pearson Education.
- Ferrari, F., & Graham, M. (2021). Fissures in algorithmic power: Platforms, code, and contestation. *Cultural Studies*, 35, 814–832. <https://doi.org/10.1080/09502386.2021.1895250>
- Foucault, M. (1979). *Discipline and punish: The birth of the prison*. London: Allen Lane.
- Foucault, M. (1990). *The history of sexuality. Volume 1: An introduction*. New York: Vintage Books Edition.
- Foucault, M. (1994). *The order of things: An archaeology of the human sciences*. New York:

- Vintage Books Edition.
- Foucault, M. (1995). *Discipline and punish: The birth of the prison*. New York: Vintage Books Edition.
- Freebody, P. & Luke, A. (1990) Literacies programs: Debates and demands in cultural context. *Prospect: An Australian Journal of TESOL*, 5(3), 716.
- Fyfield M., Henderson M., Phillips M. (2021). Navigating four billion videos: Teacher search strategies and the YouTube algorithm. *Learning, Media and Technology*, 46(1), 47-59.
- Garcia, A., & de Roock, R. S. (2021). Civic dimensions of critical digital literacies: Towards an abolitionist lens. *Pedagogies: An International Journal*, 16(2), 187-201.
- Garcia, P., Cecilia Henríquez Fernández, Fernandez, C. H., & Okonkwo, H. (2020). Leveraging Technology: How Black Girls Enact Critical Digital Literacies for Social Change. *Learning, Media and Technology*, 45(4), 345–362.  
<https://doi.org/10.1080/17439884.2020.1773851>
- Gee, J. (2007). *What video games have to teach us about learning and literacy* (2nd ed.). MacMillan.
- Gee, J. P. (2010). A Situated-Sociocultural Approach to Literacy and Technology. In E. A. Baker (Ed.), *The New Literacies. Multiple Perspectives on Research and Practice* (pp. 165-193). New York: The Guilford Press.
- Gillespie, T. (2014). The relevance of algorithms. In *Media Technologies*, T. Gillespie, P. Boczkowski, & K. Foot (Eds.), 167-93. Cambridge, MA: The MIT Press.
- Glesne, C. (2016). *Qualitative researchers: An introduction* (5th ed.). Boston: Pearson.
- Golden, N.A. (2017). Critical digital literacies across scales and beneath the screen. *Educational Media International*, 54(4), 373-387.
- Golinkoff, R.M., Wilson, J. (2023, February). ChatGPT is a wake-up call to revamp how we teach writing. *The Philadelphia Inquirer*.  
<https://www.inquirer.com/opinion/commentary/chatgpt-ban-ai-education-writing-critical-thinking-20230202.html>
- Gourlay, L., Lancelos, D.M., & Oliver, M. (2015). Sociomaterial texts, spaces and devices: Questioning ‘digital dualism’ in library and study practices. *Higher Education Quarterly*, 69(3), 263-278.
- Grimaldi, E. & Ball, S.J. (2021). Paradoxes of freedom: An archaeological analysis of educational online platform interfaces. *Critical Studies in Education*, 62(1), 114-129.
- Gupta, A.H. (2019, November 15). Are algorithms sexist? *The New York Times*. Retrieved from <https://www.nytimes.com/2019/11/15/us/apple-card-goldman-sachs.html?searchResultPosition=4>.
- Haraway, D. J. (1985). Manifesto for cyborgs: science, technology, and Socialist feminism in the 1980s. *Socialist Review*, 80, 65–108.
- Hartong, S. (2021). The power of relation-making: Insights into the production and operation of digital school performance platforms in the US. *Critical Studies in Education*, 62(1), 34-49.
- Hayworth, G. (2023, January). ChatGPT: Implications for Business. *Medium*.  
<https://medium.com/@gfhayworth/chatgpt-implications-for-business-b7a619e8944>
- Hinrichsen, J. & Coombs, A. (2013). The five resources of critical digital literacy: A framework for curriculum integration. *Research in Learning Technology*, 21, 1-16.
- Hodges, C., Moore, S., Lockee, B, Trust, T., & Bond, A. (2020, March). The difference between emergency remote teaching and online teaching. *EDUCAUSE Review*.

- <https://er.educause.edu/articles/2020/3/the-difference-between-emergency-remote-teaching-and-online-learning>
- Hoff, M., Mok, A., & Zinkula, J. (2023, February). 4 white-collar jobs most at risk of getting replaced by AI like ChatGPT. *Business Insider*.  
<https://www.businessinsider.com/chatgpt-white-collar-jobs-at-risk-artificial-intelligence-ai-2023-2>
- Holland, D. & Skinner, D. (1996). The co-development of identity, agency and lived worlds. In J. Tudge, M. Shanahan, & J. Valsiner (Eds.), *Comparisons in human development: Understanding time and context* (pp. 193-221). Cambridge: Cambridge University Press.
- Hull, G. A., & Katz, M. L. (2006). Crafting an agentive self: Case studies of digital storytelling. *Research in the Teaching of English*, 43-81. Hull & Nelson, 2005;
- Hull, G.A., Kenney, N.L., Marple, S., & Forsman-Schneider, A. (2006). Many versions of masculine: An exploration of boys' identity formation through digital storytelling in an after school program. *The Robert Bowne Foundation*, 6, 1-42.
- Hull, G.A., & Nelson, M. (2005). Locating the semiotic power of multimodality. *Written Communication*, 22(2), 224-261.
- Hull, G. A., & Stornaiuolo, A. (2014). Cosmopolitan literacies, social networks, and 'proper distance': Striving to understand in a global world. *Curriculum Inquiry*, 44(1), 15-44.
- Ito, M., Arum, R., Conley, D., Gutiérrez, K., Kirshner, B., Livingstone, S., Michalchik, V., Penuel, W., Pepler, K., Pinkard, N., Rhodes, J., Tekinbas, K.S., Schor, J., Sefton-Green, J., & Watkins, S.C. (2019). *The connected learning research network: Reflections on a decade of engaged scholarship*. Irvine, CA: Connected Learning Alliance.
- Janks, H. (2000). Domination, Access, Diversity and Design: A Synthesis for Critical Literacy Education. *Educational Review*, 52(2), 175–186. <https://doi.org/10.1080/713664035>
- Jaworski, A., & Coupland, N. (2014). Introduction: Perspectives on discourse analysis. In A. Jaworski & N. Coupland (Eds.), *The discourse reader* (3rd ed.) (pp. 1-36). New York: Routledge.
- Jenkins, H. (2006). *Convergence culture: Where old and new media collide*. New York: New York University Press.
- Jones, R. (2016). Surveillance. In A. Georgakopoulou & T. Spilloti (Eds.), *The Routledge handbook of language and digital communication* (pp. 408-411). London: Routledge.
- Jones, R. (2021). The text is reading you: Teaching language in the age of the algorithm. *Linguistics and Education*, 62, 1-7.
- Jones, R., Chik, A., & Hafner, C. (2015). *Discourse and digital practices: Doing discourse analysis in the digital age*. London: Routledge.
- Kant, T. (2020). *Making it personal: Algorithmic personalization, identity and everyday life*. Oxford: Oxford University Press.
- Kaplan, F. (2014). Linguistic capitalism and algorithmic mediation. *Representations*, 127(1), 57-63.
- Kapsch, P. H. (2022). Exploring user agency and small acts of algorithm engagement in everyday media use. *Media International Australia*, 183(1), 16–29.  
<https://doi.org/10.1177/1329878x211067803>
- Karakayali, N., Kostem, B., & Galip, I. (2018). Recommendation systems as technologies of the self: Algorithmic control and the formation of music taste: *Theory, Culture & Society*, 35(2), 3–24. <https://doi.org/10.1177/0263276417722391>

- Kaur, K. (2019). The politics of YouTube's AI. *Towards Data Science*.  
<https://towardsdatascience.com/the-politics-of-youtubes-ai-289148c14e38>
- Kell, C. (2011). Inequalities and crossings: Literacy and the spaces-in-between. *International Journal of Educational Development*, 31, 606-613. doi:10.1016/j.ijedudev.2011.02.006
- Kelly, M. (2023, February). Biden rallies against Big Tech in State of the Union Address. *The Verge*. <https://www.theverge.com/2023/2/7/23590396/state-of-the-union-sotu-biden-tech-tiktok-privacy-antitrust>
- Knight, J., Dooly, M., & Barbera, E. (2020). Getting smart: Towards critical digital literacy pedagogies. *Social Semiotics*, 1-24. <https://doi.org/10.1080/10350330.2020.1836815>
- Knobel, M., & Lankshear, C. (2004). Planning pedagogy for i-mode: From flogging to blogging via wi-fi. *English in Australia*, 139, 78-102.
- Knobel, M., & Lankshear, C. (2008). The art and craft of endless hybridization. *Journal of Adolescent & Adult Literacy*, 52(1), 22-33.
- Know Your Meme. (2022). *Flex Tape*. <https://knowyourmeme.com/memes/flex-tape>
- Kotliar, D. M. (2020). The return of the social: Algorithmic identity in an age of symbolic demise. *New Media & Society*, 22(7), 1152-1167.
- Kress, G. (2003). *Literacy in the New Media Age*. London: Routledge.
- Krutka, D.G., & Carpenter, J.P. (2017). Digital citizenship in the curriculum. *Educational Leadership*, 75(3), 50-55.
- Lake, R.W. (2017). Big Data, urban governance, and the ontological politics of hyperindividualism. *Big Data & Society*, January-June, 1-10.
- Lam, W.S.E. (2000). Second language literacy and the design of the self: A case study of a teenager writing on the internet. *TESOL Quarterly*, 34(3), 457-483.
- Lam, W.S.E. (2009). Multiliteracies on instant messaging in negotiating local, translocal, and transnational Affiliations: A case of an adolescent immigrant. *Reading Research Quarterly*, 44(4), 377-397.
- Lange, J. (2021). Platform stabilization: An autoethnographic exploration of the multiple relations and role of data behind the interface of online tutoring software. *Critical Studies in Education*, 62(1), 82-96.
- Langlois, G. (2013). Participatory culture and the new governance of communication: The paradox of participatory media. *Television & New Media*, 14(2), 91-105.
- Latour, B. (2005). *Reassembling the social: An introduction to Actor Network Theory*. Oxford: Oxford University Press.
- Law, J. (2009). Actor network theory and material semiotics. Unpublished manuscript. Retrieved from <http://www.heterogeneities.net/publications/Law2007ANTandMaterialSemiotics.pdf>
- Leander, K., & Boldt, G. (2013). Rereading "a pedagogy of multiliteracies": Bodies, texts, and emergence. *Journal of Literacy Research*, 45(1), 22-46.
- Leander, K., & Buriss, S.K. (2020). Critical literacy for a posthuman world: When people read, and become, with machines. *British Journal of Educational Technology*, 51(1), 1-15.
- Leander, K., & McKim, K.K. (2010). Tracing the everyday 'sitings' of adolescents on the internet: A strategic adaptation of ethnography across online and offline spaces. *Education Communication and Information*, 2, 211-240.
- Leonardo, Z., & Porter, R.K. (2010). Pedagogy of fear: Toward a Fanonian theory of 'safety' in race dialogue. *Race, Ethnicity and Education*. 13(2), 139-157.

- Lewis, C., & Fabos, B. (2005). Instant messaging, literacies, and social identities. *Reading Research Quarterly*, 40(4), 470–501.
- Lewison, M., Flint, A. S., & Sluys, K. V. (2002). Taking on critical literacy: The journey of newcomers and novices. *Language Arts*, 79(5), 382–392.
- Light, B., Burgess, J., & Duguay, S. (2018). The walkthrough method: An approach to the study of apps. *New Media & Society*, 20(3), 881-900.
- Lincoln, Y.S. (1995). Merging criteria for quality in qualitative and interpretive research. *Qualitative Inquiry*, 1(3), 275-289.
- Lonas, L. (2023, January). What is ChatGPT? AI technology sends schools scrambling to preserve learning. *The Hill*. <https://thehill.com/policy/technology/3816348-what-is-chatgpt-ai-technology-sends-schools-scrambling-to-preserve-learning/>
- Long, P. & Siemens, G. (2011). Penetrating the fog: Analytics in learning and education. *EDUCAUSE Review*, September/October 2011, 31-40.
- Low, D.E., & Rapp, S.M. (2021). Youth identities and affinities on the move: Using a transliteracies framework to critique digital dichotomies. *Pedagogies: An International Journal*, 16(2), 111-124.
- Luke, A., & Freebody, P. (1999). Further notes on the four resources model. *Reading Online*.
- Luke, A. (2018). Regrounding critical literacy. In D. Alvermann, N. Unrau, M. Sailros & R. Ruddell (Eds.), *Theoretical models and processes of literacy* (7th ed.) (pp. 1-25). New York: Routledge.
- Lutkevitch, B. (2020) What is language modeling? *TechTarget*. <https://www.techtarget.com/searchenterpriseai/definition/language-modeling>
- Mager, A. (2012). Algorithmic ideology: How capitalist society shapes search engines. *Information, Communication & Society*, 15(5), 769-787.
- McKracken, H. (2023, January). If ChatGPT doesn't get a better grasp of facts, nothing else matters. *FastCompany*. <https://www.fastcompany.com/90833017/openai-chatgpt-accuracy-gpt-4>
- McNicol, S. (2016). Respond to concerns about online radicalization in UK schools through a radicalization critical digital literacy approach. *Computers in Schools*, 33, 227-238.
- Miles, M.B., Huberman, A.M., & Saldaña, J. (2014). *Qualitative data analysis: A methods sourcebook* (3rd ed.). London: SAGE.
- Mills, K.A. (2010). A review of the “Digital Turn” in literacy studies. *Review of Educational Research*, 80(2), 246-271.
- Moll, L.C., Amanti, C., Neff, D., & Gonzalez, N. (1992). Funds of knowledge for teaching: Using a qualitative approach to connect homes and classrooms. *Theory into Practice*, xxxi(2), 132-141.
- Moshckovakis, Y.N. (2001). What is an algorithm? In B. Engquist & W. Schmid (eds.), *Mathematics unlimited – 2001 and beyond* (pp. 919-936). Berlin: Springer.
- Ng, A. (2023, February). Biden calls for ban of online ads targeting children. *POLITICO*. <https://www.politico.com/news/2023/02/07/biden-calls-for-ban-of-online-ads-targeting-children-00081731>
- Nichols, T.P., & Campano, G. (2017). Post-humanism and literacy studies. *Language Arts*, 94(4), 245-251.
- Nichols, T.P., & LeBlanc, R.J. (2021). Media education and the limits of “literacy”: Ecological orientations to performative platforms. *Curriculum Inquiry*, 51(4), 389-412.
- Nichols, T.P., & Stornaiuolo, A. (2019). Assembling “digital literacies”: Contingent pasts,



- possible futures. *Media and Communication*, 7(2), 14-24.
- Nichols, T.P., Smith, A., Bulfin, S., & Stornaiuolo, A. (2010). Critical literacy, digital platforms, and datafication. In Pandya, J.Z., R.A. Mora, J. Alford, N.A. Golden, & R.S. de Roock, (Eds.), *The Handbook of Critical Literacies* (pp. 345-353). London: Routledge.
- Nickerson RS and Landauer TK (1997) Human-computer interaction: background and issues. In: Helander MG, Landauer TK and Prabhu PV (eds) *Handbook of Human-Computer Interaction* (2nd ed.) (pp. 3–32). Amsterdam: North-Holland.
- Nixon, H. & Hateley, E. (2013). Books, toys and tablets: Playing and learning in the age of digital media. In K. Hall, T. Cremin, B. Comber, & L.C. Moll (Eds.), *International handbook of research on children's literacy, learning, and culture* (pp. 28-41). Oxford: Wiley-Blackwell.
- Noble, S.U. (2018). *Algorithms of oppression: How search engines reinforce racism*. New York: New York University Press.
- Nordquist, B. (2017). *Literacy and mobility: Expanding literacies in education*. London: Routledge.
- Office of Science and Technology Policy (Oct 2022). Blueprint for an AOI bill of rights: Making automated systems work for the American people. <https://www.whitehouse.gov/wp-content/uploads/2022/10/Blueprint-for-an-AI-Bill-of-Rights.pdf>
- Orlowski, J. (Director). (2020). *The social dilemma* [Film]. Sundance.
- Pahl, K.H., & Roswell, J. (2011). Artifactual critical literacy: A new perspective for literacy education. *Berkeley Review of Education*, 2(2), 129-151.
- Pangrazio, L. (2016). Reconceptualising critical digital literacy. *Discourse* 37(2), 163-174.
- Pangrazio, L. (2019). Technologically situated: The tacit rules of platform participation. *Journal of Youth Studies*, 22(10), 1308-1326.
- Pangrazio, L., & Selwyn, N. (2019). 'Personal data literacies': A critical literacies approach to enhancing understandings of personal digital data: *New Media & Society*, 21(2), 419–437. <https://doi.org/10.1177/1461444818799523>
- Pariser, E. (2013). *The filter bubble: How the new personalized web is changing what we read and how we think*. London: Penguin Press.
- Pasquale, F. (2015). *The black box society: The secret algorithms that control money and information*. Cambridge: Harvard University Press.
- Perrotta, C., Gulson, K.N., Williamson, B., & Witzemberger, K. (2021). Automation, APIs and the distributed labour of platform pedagogies in Google Classroom. *Critical Studies in Education*, 62(1), 97-113.
- Peters, M., & Lankshear, C. (1996). Critical literacy and digital texts. *Educational Theory*, 46(1), 51-70
- Pink, S., Horst, H., Postill, J., Hjorth, L., Lewis, T., & Tacchi, J. (2016). *Digital ethnography: Principles and practice*. Los Angeles: Sage.
- Plantin, J-C., Lagoze, C., Edwards, P.N., & Sandvig, C. (2018). Infrastructure studies meet platform studies in the age of Google and Facebook. *New Media & Society*, 20(1), 293-310.
- Polizzi, G. (2020) Information literacy in the digital age: why critical digital literacy matters for democracy. In: Goldstein, Stéphane, (ed.) *Informed societies: why information literacy matters for citizenship, participation and democracy* (pp. 1-23). London: Facet Publishing.
- Pöttsch, H. (2019). Critical Digital Literacy: Technology in Education Beyond Issues of User

- Competence and Labour-Market Qualifications. *TripleC: Communication, Capitalism & Critique. Open Access Journal for a Global Sustainable Information Society*, 17(2), 221–240.
- Ramizo Jr, G. (2021). Platform playbook: A typology of consumer strategies against algorithmic control in digital platforms. *Information, Communication & Society*, 25(13), 1849-1865.
- Reichert, R., & Richterich, A. (2015). Introduction: Digital materialism. *Digital Culture and Society*, 1(1), 5-17.
- Reveal. (2013, September 30). *Hot on your trail: Privacy, your data, and who has access to it* [Video]. YouTube. <https://www.youtube.com/watch?v=bqWuioPHhz0>
- Roose, K. (2023, January). Don't Ban ChatGPT in Schools. Teach with it. *The New York Times*. <https://www.nytimes.com/2023/01/12/technology/chatgpt-schools-teachers.html>
- Sandvig, C., Hamilton, K., Karahalios, K., & Langbort, C. (2014). Auditing algorithms: Research methods for detecting discrimination on internet platforms. *Data and Discrimination: Converting Critical Concerns into Productive Inquiry*, 64th Annual Meeting of the International Communication Association. Seattle, WA.
- Santo, R. (2011). Hacker literacies: Synthesizing critical and participatory media. *International Journal of Learning and Media*, 3(3), 1–5.
- Schwandt, T. A. (2003). Three epistemological stances for qualitative inquiry: Interpretivism, hermeneutics, and social constructionism. In: N. K. Denzin, & Y. S. Lincoln (Eds.), *The landscape of qualitative research* (2nd ed.) (pp. 292-331). Thousand Oaks, CA: Sage.
- Scott, J. (2017) *Social network analysis* (4th ed.). London: SAGE.
- Seaver, N. (2017) Algorithms as culture: some tactics for the ethnography of algorithmic systems. *Big Data & Society*, 4(2). <https://doi.org/10.1177/2053951717738104>
- Seaver, N. (2019a) Captivating algorithms: recommender systems as traps. *Journal of Material Culture*, 24(4), 421–436.
- Seaver, N. (2019b) Knowing algorithms. In J. Vertesi & D. Ribes (Eds.), *digitalSTS: A field guide for Science & Technology Studies* (pp. 412–422). Princeton: Princeton University Press.
- Selwyn, N., Nemorin, S., Bulfin, S., & Johnson, N.F. (2016). Toward a digital sociology of school. Kn Daniels, J., Gregory, K. and McMillan Cottom, T. (Eds). *Digital sociologies* (pp.143-158) Bristol: Policy.
- Selwyn, N., Nemorin, S., Bulfin, S., & Johnson, N.F. (2018). *Everyday schooling in the digital age: High school, high tech?* (1st ed.). London: Routledge.
- Singer, N. (2017, May 13). How Google took over the classroom. *New York Times*. <https://www.nytimes.com/2017/05/13/technology/google-education-chromebooks-schools.html>
- Sobko, S., Unadkat, D., Adams, J., & Hull, G.A. (2020). Learning through collaboration: A networked approach to online pedagogy. *E-Learning and Digital Media*, 17(1), 36-55.
- Solorzano, D.G., & Yosso, T.J. (2001). Critical race and LatCrit theory and method: Counter-storytelling. *International Journal of Qualitative Studies in Education*, 14(4), 471-495.
- Sørensen, E. (2009). *The Materiality of Learning*. Cambridge: Cambridge University Press.
- Stewart, K., & Gachago, D. (2016). Being human today: A digital storytelling pedagogy for transcontinental border crossing. *British Journal of Educational Technology*, 47(3), p. 528-542.
- Stornaiuolo, A. (2020). Authoring data stories in a media makerspace: Adolescents developing

- critical data literacies. *Journal of the Learning Sciences*, 29(1), 81–103.
- Stornaiuolo, A., & Hall, M. (2014). Tracing resonance: Qualitative research in a networked world. In G.B. Gudmundsdottir, & K.B. Vasbø, *Methodological challenges when exploring digital learning spaces in education* (pp. 29-43). Senses Publisher.
- Street, B. (2003). What’s “new” in the new literacy studies? Critical approaches to literacy in theory and practice. *Current Issues in Comparative Education*, 5(2), 77–91.
- Striphas, T. (2015). Algorithmic culture. *European Journal of Cultural Studies*, 18(4-5), 395-412.
- Talib, S. (2018). Social media pedagogy: Applying an interdisciplinary approach to teach multimodal critical digital literacy: E-Learning and Digital Media, 15(2), 55–66.
- Thomas, E. E., & Stornaiuolo, A. (2016). Restorying the self: Bending toward textual justice. *Harvard Educational Review*, 86(3), 313–338.
- Thompson, J.B. (1991). Editor’s introduction. In P. Bourdieu, *Language and Symbolic Power* (pp. 1-31). Cambridge: Harvard University Press.
- Truong-White, H., & McLean, L. (2015). Digital storytelling for transformative global citizenship education. *Canadian Journal of Education*, 38(2), 1–28.
- Tseng, Y.-S. (2022). Algorithmic empowerment: A comparative ethnography of two open-source algorithmic platforms – Decide Madrid and v Taiwan. *Big Data & Society*, 9(2), 1-14.
- Tuana, N. (2008). Viscous porosity. In S. Alaimo & S. Hekman (Eds.), *Material feminisms* (pp. 188-213). Bloomington: Indiana University Press.
- Turnbull, D., Chugh, R., & Luck, J. (2021). Transitioning to E-learning during the COVID-19 pandemic: How have Higher Education institutions responded to the challenge? *Educ Inf Technol (Dordr)*, 26(5), 6401-6419
- Turner, C. (2022, June). 6 things we’ve learned about how the pandemic disrupted learning. *NPR*.  
<https://www.npr.org/2022/06/22/1105970186/pandemic-learning-loss-findings>
- Van den Boomen, M., Lammes, S., Lehmann, A.-S., Raessens, J., & Schäfer, M.T. (2009). *Digital materials: Tracing new media in everyday life and technology*. Amsterdam: Amsterdam University Press.
- Van Dijck, J. (2013). *The culture of connectivity: A critical history of social media*. Oxford: Oxford University Press.
- Van Dijk, J., Poell, T., & de Waal, M. (2017). *The platform society: Public values in a connective world*. New York: New York University Press.
- Vasquez, V. M., Janks, H., & Comber, B. (2019). Critical Literacy as a Way of Being and Doing. *Language Arts*, 96(5), 300.
- Velkova, J., & Kaun, A. (2019). Algorithmic resistance: Media practices and the politics of repair. *Information, Communication & Society*, 24(4), 523–540.
- Villa-Nicolas, M. (2019). Latinx digital memory: Identity making in real time. *Social Media + Society*, October-December, 1-11.
- Whorf, B. L. (1956). *Language, thought, and reality*. Cambridge, MA: MIT Press.
- Williamson, B. (2017). Decoding ClassDojo: psycho-policy, social-emotional learning and persuasive educational technologies. *Learning, Media and Technology*, 42(4), 440-453.
- Williamson, B. (2021). Making markets through digital platforms: Pearson, edu-business, and the (e)valuation of higher education. *Critical Studies in Education*, 62(1), 50-66.
- Williamson, B., & Hogan, A. (2020). *Commercialisation and privatisation in/of education in the context of Covid-19*. Education International.



- [https://issuu.com/educationinternational/docs/2020\\_eiresearch\\_gr\\_commercialisation\\_privatisation](https://issuu.com/educationinternational/docs/2020_eiresearch_gr_commercialisation_privatisation)
- Willson, M. (2017). Algorithms (and the) everyday. *Information, Communication & Society*, 20(1), 137–150.
- Wohlwend, K. E., & Lewis, C. (2013). Critical Literacy, Critical Engagement, and Digital Technology. In *Handbook of Research on Teaching the English Language Arts*. Routledge.
- Wright, J. (2017, April). An update on restricted mode. YouTube Official Blog. <https://blog.youtube/news-and-events/an-update-on-restricted-mode/>
- Yi, Y. (2008). Relay writing in an adolescent online community. *Journal of Adolescent & Adult Literacy*, 51(8), 670–680.
- YouTube Creators. (2017, September 1). *How YouTube's trending tab works* [Video]. YouTube. <https://www.youtube.com/watch?v=GZmGmkOJ9ME>
- Yu, Z., Treré, E., & Bonini, T. (2022). *The emergence of algorithmic solidarity: Unveiling mutual aid practices and resistance among Chinese delivery workers*. <https://doi.org/10.1177/1329878x221074793>
- Zaratti, G. (2021, April 20). How Pinterest uses machine learning to provide tailored recommendations to million of users worldwide. *Digital Initiative*. <https://d3.harvard.edu/platform-digit/submission/how-pinterest-uses-machine-learning-to-provide-tailored-recommendations-to-million-of-users-worldwide/>

## Appendices

### Appendix A

#### Semi-Structured Teacher Interview Protocol

##### **Background:**

1. How did you become a teacher?
2. What is your teaching philosophy? Or your teaching beliefs and practices?
3. What are your views about technology in education? Have they changed over the pandemic?
4. Do you feel in your role as an [subject] teacher that you have an obligation to educate students about technology?

##### **Pandemic:**

1. What does it mean to be a teacher in a pandemic? How do you think the pandemic has affected your teaching if at all?
2. From your view at this point, what do you think the challenges and successes are / will be moving into hybrid learning? And back to face to face?
3. What changes, if any, do you think will endure after schools return to in person learning?

##### **Technology:**

1. How do you use technology in your daily life? How do you use it for teaching?
2. Prior to the pandemic, what had been your experience with teaching with technology? Were your views about technology in education different than they are today?
3. What challenges have you experienced in the transition to online teaching? What successes have you experienced?

##### **Google Classroom:**

1. What was your introduction to using GC?
2. If you were to describe GC to another teacher, what is it?
3. What does your role as a teacher using GC involve? Do you feel your role as a teacher remains the same as before or has it shifted with the introduction of GC?
4. What role do parents play / do you hope they will play with GC and / or other apps?
5. How about school administrators and other teachers? What factors influence how you use GC?
6. (Other teachers) How do you use Google classroom? (Do you do any add ons?)
7. What, if any, are the limitations to GC? The advantages?
8. Do you think you will continue to use GC after we return to in person learning? If so, will you use it in the same ways beyond remote learning?
9. Do you have any concerns related to data or privacy with any of the applications you use?

##### **Last question:**

1. What do you think teaching will look like over the next 5 years?



## Appendix B

### Semi-Structured Student Interview Protocol: Pre-Club

1. **Warm up:** (5 min) Thank you so much for being here. Planning to record this so I can review and learn more about social media and learning in the lives of preteens! Let me know if you would like me to stop video or voice recording at any point.
  1. How long have you been at St. Jacobs? What are your favorite subjects in school?
  2. What are some of your hobbies and interests?
2. **Technology Use:** As I mentioned, I am trying to learn more about how youth like yourself use social media, the internet, and technology day to day. The next couple questions are about how you use technology.
  1. What influencers, channels or content do you follow on social media? How did you get into these topics?
  2. Have you ever posted to a social media site? Do you have any interest in doing so? What would you post?
  3. Do you use technology with friends? From your understanding, do they use YouTube and technology in similar ways as you do?
  4. How does your family typically use technology? What do your parents do for work? What about your siblings?
3. **Google Classroom:**
  1. What are your thoughts about online learning during this time? Do you like it or not? Why or why not?
  2. Is this the first year that you are using Google Classroom? How would you describe what google classroom is?
  3. Do you feel like you can connect with your teachers the same way as before online learning?
4. **Go along:** I would love to see more about [the platform you wanted to show me].
  1. Who do you follow on the website? How did you come across them?
  2. How do you typically find content to watch on the website?
  3. (What does [the platform] take in consideration to give you that [content]?)
  4. Are you seeing content or memes that are related to your ethnicity?
  5. What actions do you think are tracked by [the platform]? How, if at all, do you use this website knowing that your actions online will shape what you see / watch?
  6. What do you think a social media algorithm does? How do you think it works on the website you showed us?
  7. Have you ever heard creators talk about the algorithm? What do they say?
  8. What are your views about these algorithms?

## Appendix C

### Student Interview Protocol: Post- Club

#### **Club Video Project**

First section is about the video your group made. It is okay if you played a greater or smaller role in producing it-- I am just curious about your understanding of the project you did as a group.

1. What was your CMC video about?
2. How did your group choose this topic? Who was your ideal audience for the video?
3. What message did it communicate? What did you all want to say about algorithms?
4. How did you help to design your group's video?
5. Do you feel like your video captured everything you wanted to say or do? Is there anything else you would have wanted to say or show about algorithms?

#### **Club and Social-Media:**

In this section, I will ask you questions about how you use the internet and social media, and what you might have taken away from our club.

1. What did you learn about social media and / or the internet since joining our club?
2. Have your views about social media and / or the internet changed since joining the club? How, if at all, did the activities we did in Club influence your own use of social media?
3. What have you learned, if anything, about how the social media websites you use work?
4. You may remember we had a week where we looked at your YT homepage to understand what videos came on the first page. Let's take a look: [link provided]
  1. Why do you think those videos were on your home page?
  2. How has your homepage changed since then if at all? Why do you think this is?
  3. What do you think you might have learned from this activity if anything?
5. You may remember that we had a week on data. Let's take a look at your Padlet: [link provided]
  1. How do you find this data?
  2. What did you notice that seemed off? What seemed accurate? Why do you think these were your results?
6. What, if anything, did you learn about algorithms in this club? Thinking about your own social media practices, how do you think algorithms affect what you read or see on the website?
7. What are your views about algorithms? Would you describe them as dangerous or harmless?
8. What do you think are the two or three most important things kids can do to be safe and have fun on social media?

## Appendix D

### Undergraduate Collaborator Interview Protocol

#### **Background:**

1. What is your background with teaching?
2. What is your experience with online learning and teaching?
3. What are your views on technology in education?
4. How do you typically use social media? What influence do you think algorithms have on your own social media browsing? Feel free to look through any apps you use regularly.

#### **Teaching experience / experience with student:**

1. What have you learned about teaching and working with youth through your field work? What did you learn from Ed140?
2. What did you notice about how the youth you worked with used technology? How does this compare with your own practices?
3. What was the video your group made? What was its message? What role did you play in helping them make this video?
4. What do you think the students learned in the CMC? What do you think they learned about social media and algorithms?
5. What impact do you think you have had on the students that you worked with? What were some things, if anything, that you learned from your students?
6. Thinking about E140 and our club, what do you think a critical media creator is? Would you say you or the students you worked with were “critical media creators”?

#### **Platforms / Algorithm learning:**

1. What was your experience with or knowledge about “algorithms” before the club? What did you learn, if anything, during the club?
2. What are your views about algorithms?
3. How do you think young adults in our program can best be safe and have fun while using social media, considering the influence of algorithms? What about for adults your age?
4. How do you think we can best prepare students to use social media platforms today? What critical digital literacies do students need?

## Appendix E

### Student Survey Pre-Club

Q1 Please write your full name here:

---

Q2 How do you identify your race or ethnicity?

- Black
- Hispanic
- White
- Asian / Pacific Islander
- Other
- I'd prefer not to say

Q3 How do you identify your gender?

- Female
- Male
- Another Gender
- I'd prefer not to say

Q4 What language do you use most often at home?

- English
- Spanish
- Another language
- I'd prefer not to say

Q5 Which devices do you primarily use for online activities for entertainment or fun such as for browsing social media or connecting with friends?

- School Chromebook
- Shared family computer
- A personal computer (not my Chromebook)
- Smartphone
- iPad
- Other

Q6 I use the following sources to stay connected with friends:

- Email
- Google classroom
- Zoom
- Texts
- Social media
- Messenger apps
- Other



Q7 I use the following sources to stay connected with school:

- Email
- Google classroom
- Zoom
- Texts
- Social media
- Messenger apps
- Other

Q8 Which of the following popular websites do you use?

- YouTube
- Instagram
- TikTok
- Roblox
- Discord
- Pinterest
- Twitter
- Other

Q9 If you selected other, please add the website name(s) here:

---

Q10 What influencers, channels or content do you follow on social media?

---

Q11 Have you ever posted content to a social media website?

Yes

No

Q12 In at two sentences, describe a typical day of how you use technology in the morning, afternoon, and evening. Make sure to include your use of technology for school and for personal use.

Q13 For the following questions, indicate how true these statements are about the content you see on social media.

	False	Somewhat False	Somewhat True	True
The social media sites I use show me posts from all of the accounts that I follow.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The content I am recommended on social media sites is the same content that everyone else is recommended.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Most of the influencers I see on social media match my race or ethnicity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Most of the influencers I see on social media match my gender	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am worried about what information social media companies collect about me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The information collected about me on social media changes what posts I see online	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The advertisements I see on websites are related to something me or a family member using my computer have viewed online	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q14 Have you ever heard of the term "social media algorithm"?

- Yes
- No
- Unsure

Q15 From your view, what is a social media algorithm?

## Appendix F

### Student Survey Post-Club

Q1 For the following questions, indicate how true these statements are about your views on social media.

	False	Somewhat False	Somewhat True	True
I am worried about what information social media companies collect about me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The content I am recommended on a social media site is the same content that everyone else is recommended.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The posts that I see on social media are related to my preferences.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The information collected about me on social media changes what posts I see online	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The advertisements I see on websites reflect something I have recently viewed online.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q2 What information do you think Youtube uses to suggest which videos you should watch?

---

Q3 For the following questions, indicate how true these statements are about the content you see on Google and social media.

	False	Somewhat False	Somewhat True	True
I always find the information that I search for on Google on the first page of results.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I always find the information that I search for on Google within the first 5 links.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I believe google search results are unbiased.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have never come across fake news on Google.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q4 What is something you learned in our club that you will do when using or creating social media?

---

---

Q5 How would you define what a critical media creator is?

---

Q6 Do you believe you are a critical media creator?

Yes

No

Unsure

Q7 Why or why not?

---

Q8 Do you feel like you better understand what a social media algorithm is?

Yes

No

Unsure

Q10 In your own words, how would you describe what a social media algorithm is?

---