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Code the Code: Surveillance Capitalism, Education, and the Critical Theory of Technology

A Dissertation

Presented to the Faculty of the  
College of Education and Social Work

West Chester University  
West Chester, Pennsylvania

In Partial Fulfillment of the Requirements for the

Degree of  
Doctor of Education

By

Robert C. Rust

May 2021

## Dedication

This dissertation is dedicated to my family. My wife, Kristen, was a tireless source of support and encouragement over the past three years, selflessly taking on additional responsibilities to ensure I had the space and time I needed to read, think, and write. In the rare moments I was afforded a break, she was always up for a good conversation, TV show, or dance party with our daughters to help ease my mind. I will be forever grateful to have had such an extraordinary partner, friend, and mother to our daughters throughout this process.

And our daughters, Victoria and Stella...The endless ways you filled me with pride and joy and laughter over the past three years helped more than I will ever be able to express in words. I pursued this degree because each time I was with you, you inspired me to be better than I was. I am most excited, at this point, at the end of this long journey, to catch up on lost time.

And to my mom, Mary Frances. Your constant and unconditional love, support, enthusiasm, and faith in me made this journey possible. Our nightly phone calls and conversations provided the comfort and reassurance I eventually came to depend on, especially during moments of uncertainty. I cannot thank you enough. Kristen, Victoria, Stella, and I are lucky to have you in our lives. And, finally, to my dad, Bob. I find myself, again, wishing for one more minute of borrowed time, with the right bottle of Old Vines Zinfandel and a toast that would capture all the conversations we were denied...I hope for this to be your tower in the sky.

## Acknowledgments

As my experience in the doctoral program comes to an end, I feel compelled to acknowledge my great fortune. I think back to Dr. David Backer suggesting at the end of the Master's program three years ago, that I continue my research on the doctoral level. That suggestion was the decisive moment that started the process that is now in its final stage, with Dr. Backer as my dissertation advisor. As my advisor, your suggestions, questions, and insights pushed me and were invaluable to my development as a writer and scholar. Added to that, I think back to Dr. Matthew Kruger-Ross introducing me to the Critical Theory of Technology, the theory that captured and held my interest and that I explore in this dissertation. I remain grateful for our conversations and the case you made in support of this dissertation. And, finally, Dr. Ashwina Mosakowski. Every time I saw you and spoke with you at Academy Park, you generously offered your time, asking how my work was coming along and if you could be of any assistance. Your sincere kindness and generosity were always appreciated more than you know.

I must also acknowledge my cohort (Cohort 3!), who became my second family over the past two and a half years. From our weekly dinners, honest conversations about our shared struggle, and moments of levity, you created a life experience I never knew I would be fortunate enough to have. I will always look back on the past few years with great appreciation for the fact that I got to share it with you. And finally, I would like to say a few words about other professors I am grateful to have had. Dr. John Elmore, our conversations and common interests made me realize I was in the right program, at the right school, with the right people. Dr. Curry Malott, you challenged my assumptions and thinking in ways I cannot describe and that I still value. And, finally, Dr. Robert Haworth. I still remember our first conversation, nearly six years ago, as I drove home from work that day. Who knew it would lead to this...? I will always be grateful.

## Abstract

This study is a theoretical examination of surveillance capitalism's influence on educational technology. While the neoliberal era saw increased teacher accountability measures result in the encouraged expansion of for-profit educational technologies competing with traditional public education, surveillance capitalism's educational technologies are distinctive. Theory has the power to reveal the existence of values embedded in the designs of these new technologies as well as the ways certain interests act through them. The researcher argues that Andrew Feenberg's Critical Theory of Technology presents a framework for critique, intervention, and transformation of these technologies, but it must first be updated with David M. Berry's (2014) *Critical Theory and the Digital*. Following this update, a new potential for critique and transformation emerges by introducing conceptual foundations (gestalt switch and choice of a past) and potentials (platform cooperativism and technography and social analytics). The author concludes by presenting new configurations of existing surveillance capitalist educational technologies as well as a concept for a curriculum intended to establish a balance of power between students and these technologies.

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## CHAPTER I: INTRODUCTION

On March 12<sup>th</sup>, 2020, two weeks after a COVID-19 scare prompted the first closing of a high school in the United States in Washington state, the faculty at my school received an email from administration titled “Urgent Take Home.” The email made clear teachers were to have all necessary logins and passwords and concluded with the line “No one should be walking out empty handed” in case circumstances arose in which adapting curriculum and resources for remote instruction became necessary. In the days leading up to March 12th, students were issued district Gmail accounts, and teachers were asked to set up Google Classroom accounts as a way to temporarily maintain instruction, using units and texts they brought home that day. Following the school closing, administrative emails revealed a district, like others across the country, adapting to unprecedented circumstances and guiding faculty in the use of unfamiliar forms of educational technology.

As schools closed indefinitely across the nation in the spring and efforts were made to ensure continuity of education, technology vendors and promoters stepped in. According to Williamson (2020), these groups became “frontline emergency response providers...offer(ing) up novel solutions and potentially gain(ing) advantage from the new pandemic markets” (para. 1). In the following weeks, teachers reached out to students with varying levels of success through email, Google Voice, Zoom, and other technologies. English teachers in my department were instructed to stop using Zoom, however, following reports of “Zoombombing” in which “Zoombombers” would crash classes, occasionally going so far as to use hate speech and display pornographic images (Bond, 2020; LaBennett, 2020). These actions, happening at Zoom meetings across the country, overshadowed another story from around the same time that

illustrated the subtler but nonetheless just as concerning potential for tech companies to exploit online teaching.

An example of this exploitation, reported by Cox (2020), started with a Facebook software development kit (SDK), installed by users to run updates. The Facebook SDK was discovered to be stealthily collecting data on the devices of Zoom users who signed into Zoom through their Facebook accounts. When some teachers logged into Zoom in this way early on to communicate with students, Facebook quietly hoovered up their device's mobile OS type and version, the device time zone, device model and carrier, screen size, processor cores, and disc space. Though only device data and not personal data was collected, the manner in which Facebook's data extraction squared with Zoom's privacy policy remained unclear.

Within a broader context that I explore in this dissertation, practices like Facebook's potential bundling of extracted device data with personal data is at the center of a new economic model. The tech industry's development of this model through ever expanding and ubiquitous methods of data extraction illustrates emerging, "behind-the-screen" engines of profit and power. In addition, this new economic model has demonstrated increasing levels of influence over the designs of educational technology.

More traditional education companies, used by myself and other teachers during the pandemic, have recognized their own potential future in the new, technology-oriented education market as well. These companies act according to a profit motive and have sought to grow by implementing new technologies that represent a break from the past. The pandemic provided nearly unlimited opportunity for experimentation, product testing, and profit for these companies. BMO Capital Markets, an investment bank, acknowledged the unprecedented potential for profits represented in the numbers of students served by online education companies

in March, 2020. The bank claimed in a report “[w]hile we are uncomfortable citing ‘winners’ in the coronavirus situation, some companies may be positioned better than others...Specifically, those that specialize in online education could see increased interest should the situation worsen” (EdTech Business, 2020, para. 2). My ELA department selected one of these companies, Pearson, for online instruction shortly after the school closing. Pearson Realize, which was being rebranded as Savvas Realize at the time, was Pearson’s digital second act. According to “my Savvas (previously Pearson) Training” (2020), the learning management system “gives ‘digital natives’ the learning experience that they’ve come to expect” (para. 1) and “[t]eachers can search by keyword or browse by standard to easily curate their student’s digital learning experience” (para. 2).

The reasoning behind this model of instruction was suggested in a 2018 interview with Pearson Inc.’s Chief Operating Officer and Chief Technology Officer, Albert Hitchcock. In the High (2018) interview, Hitchcock, whose purview also included IT and digital transformation, spoke of switching from a traditional publishing culture to the digital native culture. His proposal was a “Netflix of education” in which (generalizing Netflix’s recommendation system) machine learning algorithms would process patterns of user data along with granularized and “tagged” content to personalize learning experiences. Hitchcock expounded on the influence of the tech industry’s business model on Pearson by explaining:

Silicon Valley companies create the benchmark for the digital experience by being platform businesses. Our vision is to leverage the opportunity to transform along similar lines in terms of having a single platform globally that could deliver all our educational content and courseware. Furthermore, this would allow us to move into a more personalized experience that delivers high-quality education outcomes. (para. 13)

The use of Pearson (now Savvas) Realize revealed how the pandemic was reconfiguring traditional pedagogical practice. Corporate power and strategy and the influence of the tech industry were at the new center of the digitally-mediated teacher-student relationship.

Within a broader context that I explore in this dissertation, Facebook's potential bundling of extracted device data with personal data, Netflix's granularizing and tagging of content, and Pearson's application of these and other sorts of technologies, are all at the center of a new economic model. This economic model, surveillance capitalism, has embedded values that distribute power in unique ways that have impacts on teachers, students, and others in and around schools. This dissertation begins by examining the shifting relationship between educational technology and the economic models of neoliberalism and surveillance capitalism, with an emphasis on the latter. Just as for-profit educational technology served as an example of a challenge to public education that was sanctioned and protected by neoliberalism, it currently stands to become an indispensable, integrated, and necessary component of surveillance capitalism's growth. Following the examination of the relationship between surveillance capitalism and educational technology, I update the Critical Theory of Technology by integrating a critical theoretical critique of digital technologies. Finally, based on this updated framework, I develop potentials for intervening and transforming educational technologies that are influenced by the practices and aims of surveillance capitalism.

### **Problem Statement**

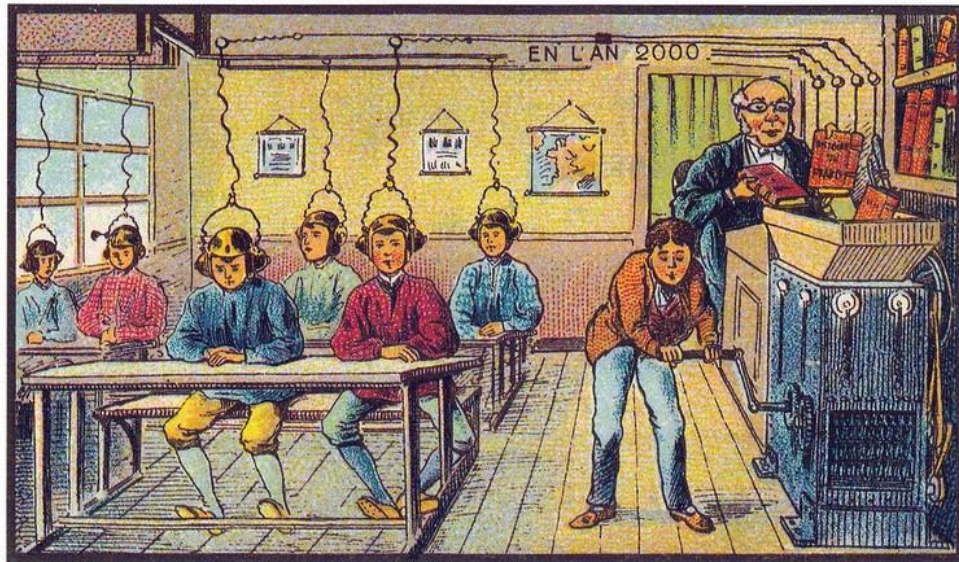
Whereas the mainstreaming of online learning has been met with critiques emphasizing the effects of neoliberal interventions and challenges to education (Abrams, 2016; Ravitch, 2014), researchers have overlooked two essential topics. The first topic is the increased extraction of personal data and the use of closely-guarded, proprietary data extraction and

algorithmic technologies, both of which are central to surveillance capitalism's aims. The second topic is the necessity of critique within a theoretical framework that values transformative social engagement and intervention in the design and use of these technologies. For this, I have selected Andrew Feenberg's Critical Theory of Technology, which emerged out of the Critical Theory tradition and during the neoliberal era and stressed these values. Learning theories must not be subject to constant reaction and adaptation to changing technologies produced by experts and software engineers working outside of education. As online learning moves from the content delivery and discussion platforms associated with neoliberalism to personalization that is associated with surveillance capitalism, it is important to examine the values and distributions of power that are embedded within these technologies.

A blind spot emerges when assuming continuity between educational technologies developed and adopted through neoliberal interventions and the newer technologies. Examples of personalized learning like AltSchool and Summit Public Schools, which have faced criticism in recent years (Adams, 2019; Kim, 2019; Straus, 2018; Wan, 2019), are not just examples of for-profit initiatives bolstered by free market ideology, but data extracting appendages of surveillance capitalism's technosystem (Feenberg, 2017). As opposed to neoliberalism's pursuit of new markets for exploitation and profit-making, surveillance capitalism pursues boundless data extraction from the raw material of human experience to effectuate a new collective order based on total predictive certainty (Zuboff, 2019). Since the same technology industry that was behind the emergence of surveillance capitalism has also developed educational technologies and championed education philanthropy efforts, an understanding of surveillance capitalist values is necessary. The Critical Theory of Technology recognizes that technologies are imbedded with a diversity of technical and social values, but it needs a "software update" to critique surveillance

capitalism’s technologies and educational technologies. Prior to examining the development of educational technology throughout the periods of neoliberalism and surveillance capitalism, it is necessary to offer a brief account of the historical development of educational technology.

### A Brief History of Educational Technology



At School

Understanding the nature of this evolution in online education calls for a brief review of the history of educational technology and online education. At the end of the 19<sup>th</sup> century, French artist Villemard conceptualized automating instructional delivery with technology by the year 2000 in the illustration “At School” (Watters, 2015, Location 108). In the illustration, displayed above, students download textbook content into their brains through crude and implausible network technology. Shortly after Villemard’s illustration in 1913, Thomas Edison predicted that “[b]ooks will soon be obsolete in schools” (Location 129) and again in 1923 that motion pictures, a technology Edison was invested in, would replace them (Location 775). Though motion pictures never replaced textbooks, Stratovision expanded the limited broadcasting range of educational TV stations in the 1940s by “broadcasting the transmission from the air, rather than the ground, via aircraft flying at 25,000 feet” (Location 843). This did not replace textbooks



and brick and mortar schools either. Following these experiments with educational technology, the leap from educational TV to computer-assisted instruction, supported by the internet, would take another half century.

According to Harasim (2000), online education emerged alongside email and was closely tied to the development of computer networking. Its origins date back to the early 1980s, a period when neoliberalism was advanced by Ronald Reagan in the United States and Margaret Thatcher in the United Kingdom. Perhaps guided by the market-oriented ethos of neoliberalism, one of the first experiments with online learning occurred in 1982 with the Western Behavioral Sciences Institute's (WBSI) Executive Education program and not in public education. Various efforts with the program served to illuminate the learning preferences that people exhibit in online environments. The faculty who had no experience teaching online suffered a period of struggles and failures as the program was developed over the following decade. The struggles and failures, according to Feenberg (1993), were associated with students who would not participate, but also foretold the impacts neoliberal and corporate values have when imposed on such learning environments. The program eventually adopted group-learning activities and interactive discussions and saw more improved and positive outcomes. This process of value-laden social interventions into and transformations of technological designs is representative of aspects of Feenberg's Critical Theory of Technology.

According to Harasim (2000) group-learning activities extended into computer conferencing within a "totally online mode" and "matched classes" (both online and face to face, or what we would call "blended" today) in a variety of subjects during the mid 1980's. These new innovations eventually produced educational outcomes that were comparable to traditional classroom instruction (Harasim, 2000). The comparisons demonstrated the potential of online

learning environments structured around prepackaged content delivery as a new market, capable of attracting investment and competing with traditional public education. As a result, for-profit online education expanded in the following decade and became a dominant new market with strong earning potential tied to aggressive recruiting and high student enrollments. The development of the prepackaged educational technologies of this new market was based on a different set of values than those of WBSI's collaboratively evolving design.

The first successful for-profit online school and model for subsequent for-profit online schools was the University of Phoenix. In 1994, the University of Phoenix and its parent corporation, the Apollo Group, went public and saw a sharp rise in market value (Maggio & Smith, 2010). Grand Canyon University, another online university, followed its 2008 IPO on Wall Street with an estimated value of \$1.2 billion (Maggio & Smith, 2010). The success of this market encouraged corporate interventions into primary and secondary education. In 2000, Ron Packard of McKinsey & Company and Goldman Sachs, along with Wall Street financier Michael Milken, Milken's brother Lowell, and Loew's Corporation cochair, Andrew Tisch, founded K12 Inc. According to Ravitch (2014), by 2007, "K12 went public and was listed on the New York Stock Exchange...(and) soon became the leader of the for-profit online school industry" (p. 182), an industry that, by 2012, served 200,000 children across the country.

### **Silicon Valley Enters the Educational Technology Market**

More recent educational technologies that have been provided at an unprecedented scale for the pandemic have advanced far beyond the early designs of the University of Phoenix, Grand Canyon University, and K12 Inc. Since figures from the tech industry like Bill Gates, Mark Zuckerberg, Reed Hastings, and others have moved into the online learning market, the content delivery designs of the early online learning platforms appear increasingly antiquated.

Adaptive learning, personalized learning, content curation, and other methods that use data extraction and algorithmic technology have replaced the prepackaged, one-size-fits-all, modular sequences that students have moved through at their own pace over the past twenty years.

Like those older technologies, the new forms come with their own political economies. Examining surveillance capitalism and the ways its embedded values influence emerging educational technologies is important in terms of control and power. Data extraction and machine learning algorithms under the influence of surveillance capitalism have been central to the dominance of Google, Facebook, and other tech companies. Their success in transforming educational technology has yet to be as clearly determined. Despite this uncertainty, personalized learning, adaptive learning, and other advances backed by the same tech company pioneers of surveillance capitalism remain viable alternatives and options for students and parents of students across the country.

### **Theory as a Method of Study**

How should we think about these developments? Early work into theoretical analysis of online learning examined the affordances of the web as well as the values that should be emphasized in online learning environments. Anderson (2004), for example, considered the various attributes of online learning environments that had the potential to serve different approaches to learning. These approaches included collaborative and individual, student centered, knowledge centered, assessment centered, and others. Another researcher, Ally (2004), considered the implications that the common learning theories behaviorism, cognitivism, and constructivism should have for the development of online learning environments. As online education became more common and further studies were conducted, learning outcomes, student perception, and student satisfaction became the focus of research.

Research into reactions to educational technology does not adequately address the technological designs of online learning environments and the values that are embedded within them. Some studies (CREDO 2015, 2019; Hess & Gunter, 2013; Ter-Stepanian, 2012) have focused on learning outcomes, for example, as well as student interactivity online to examine communication and learning outcomes as a result of knowledge construction (Kent, Laslo, & Rafaeli, 2016). Others have focused on the lived experience of teachers and students as they fail to establish effective communication (Belair, 2012; Hawkins, Graham, & Barbour, 2012; McInnerney & Roberts, 2004).

Daniels and Stupnisky (2012) went beyond common analysis of student and teacher perception and satisfaction (He & Huang, 2017; Keller & Karau, 2013; Lu & Chiou, 2010; Russell & Curtis, 2013) in online learning environments, drawing from the control-value theory of emotions. Within this framework, the researchers examined the ways student emotions predict motivation, learning strategies, cognitive resources, and ultimately their academic achievement in online environments. The researchers, like many others, did not examine the influence of neoliberalism and surveillance capitalism on the actual designs of online learning platforms. As these designs become increasingly entangled with surveillance capitalism's aims, Critical Theory and the Critical Theory of Technology are frameworks that can enable such examination.

### **Political Economy: From Neoliberalism to Surveillance Capitalism**

#### ***Neoliberalism***

During the same period that the University of Phoenix was gaining acceptance and market dominance, neoliberal economist Milton Friedman (1995) prescribed market-based solutions for alleged problems that beset public education. Friedman (1995) called for a “radical reconstruction of our educational system” (para. 9) and “a technological revolution” (para. 9) to

reform public schools or “private fiefs primarily of the administrators and union officials” (para. 6). In other words, public education would be improved through competition with the free market, a precept of neoliberalism.

As Friedman’s argument for technological innovations and market interventions was tested, however, outcomes across an array of online learning platforms failed to indicate any advantage in market-based offerings over public education’s offerings. During a period in which disconnection and poor learning outcomes (Belair, 2012; CREDO, 2015, 2019; Hawkins et al., 2012) bred skepticism around the efficacy of online education, the online education market still thrived. In a 2014 annual report, for example, K12 Inc. claimed “[f]iscal year 2014 was an exceptional year for the company. We increased revenues to \$919.6 million, a growth rate of 8.4%” (K12 Inc., 2014, p. 1). According to Ravitch (2014), K12 Inc. spent \$26.5 million in public dollars on advertising in 2010, suggesting advertising may conceal negative aspects of online education and enable the market to thrive despite poor outcomes. Friedman’s proposed market solutions risked becoming market impositions in light of the apparent failings of online education. The innovation of online content delivery platforms, however, would shift to personalized learning, adaptive learning, and other techniques associated with a new political economy: surveillance capitalism.

### ***Surveillance Capitalism***

At the time of K12 Inc.’s founding, Google was experiencing an existential crisis brought on by the dotcom crash of 2000, that would transform its status as an object of neoliberalism’s control to a pioneer of surveillance capitalism. Zuboff (2019) distinguished surveillance capitalism from neoliberalism by defining it as “a new economic order that claims human experience as free raw material for hidden commercial practices of extraction, prediction, and

sales” (The Definition) and “[a] movement that aims to impose a new collective order based on total certainty” (The Definition). When the dotcom crash forced Google to develop a viable profit-based model to maintain support from investors, the company fundamentally transformed the core design of its technology to match users with advertisers through the processing of their surplus data with algorithms and machine intelligence (Zuboff, 2019).

Behavioral surplus is a form of data that Google extracted from users of its search engine that was “available for uses beyond service improvement (and) that the young company would (use to) find its way to the ‘sustained and exponential profits’ that would be necessary for survival” (p. 75). Google thus pioneered surveillance capitalism as a result of financial pressure applied by existing capitalism and began taking steps toward new and more distant goals, separate from those associated with neoliberalism. The existence of surveillance capitalism’s aforementioned goals of a collective order based on total predictive certainty calls for an examination of emerging educational technologies and institutions that are guided by surveillance capitalism’s values.

In surveillance capitalism, the “extraction imperative” or procurement of raw material (extracted personal data) at an ever-expanding scale (Zuboff, 2019) is fundamental. This raises concern with recent developments in personalized learning. Following much controversy over privacy concerns, for example, inBloom Inc., a corporation that marketed personalized learning software and was funded by the Gates and Carnegie Foundations, announced it was shutting down in 2014. Concerns with inBloom regarded its collection of “a maximum amount of confidential and personally identifiable student and teacher data from school districts and states around the country” (Parent Coalition for Student Privacy, n.d., para. 7) which it had planned to share with software companies and third-party vendors.

Another example is Summit Basecamp, a data-driven personalized learning platform that is a joint project between Facebook and the high-performing charter-school network Summit Public Schools. According to Brown and Frankel (2016), “Basecamp’s terms of service allow Summit to share student data with any company it deems necessary. Use of the data would then be governed by that company’s privacy guidelines, which could be more permissive” (para. 25). Though Basecamp is provided to schools for free through grants from a group of foundations including the Bill and Melinda Gates Foundation, its terms of service has raised concerns. These concerns were raised after parents were no longer granted the right to consent to their children’s personal data being collected and after it was discovered “extraordinary amount(s) of personal student information is being collected and data-mined by Summit” (Strauss, 2018, para. 16).

A key figure in the development of surveillance capitalism’s aims and an enthusiast for its designs in education has been Google’s ex-CEO, Eric Schmidt. Schmidt famously claimed in 2015 that one day the internet would disappear, further elaborating that “[t]here will be so many IP addresses...so many devices, sensors, things that you are wearing, things that you are interacting with, that you won’t even sense it. It will be part of your presence all the time” (Zuboff, 2019, p. 197). This vision of the future took another step forward in early May 2020, as Schmidt met with New York governor Andrew Cuomo, at one of the governor’s COVID-19 briefings to plan for a new, post-COVID-19 reality for New York. The discussion occurred a day after a partnership was established between Cuomo and the Bill and Melinda Gates Foundation that prioritized “a smarter education system” (Klein, 2020, para. 5). At the center of this promised transformation, in which “our every move, our every word, our every relationship is trackable, traceable, and data-mineable by unprecedented collaborations between government

and tech giants” (para. 9), Schmidt enthusiastically proclaimed that the continuance of the experiment in remote learning would continue.

### **Purpose of Study**

As mentioned, the emphasis of this study is the critique and potential transformation of emerging technologies within education that are guided by and aligned with the values of surveillance capitalism. In describing one of the most important historical examples of social interventions into the value-laden designs of technology, the Minitel in France, two things become clear about Feenberg’s Critical Theory of Technology. The first is that the theory is ideal for critiquing the values embedded within technological design as well as potentials for social interventions into the designs and uses of technology. The second is that the Critical Theory of Technology can be updated in ways that pertain to surveillance capitalism’s technologies by integrating recent studies in Critical Theory and a phenomenological approach to algorithms. Through this expansion, the Critical Theory of Technology may more aptly pull surveillance capitalism and its technologies into its framework for critique. By doing so, I argue that new ways of imagining social engagement with these technologies in educational settings emerge.

### **Critical Theory as a Framework for Examining Educational Technology**

In this section, I offer a brief overview of Critical Theory as the foundational framework upon which more recent frameworks for critiquing the role of technology in society and the classroom have emerged. During the first generation of the Frankfurt School, the technological component of Horkheimer and Adorno’s (1944/2002) critique of “the culture industry” in *The Dialectic of Enlightenment* illustrated the way standardized forms act as an example of instrumental rationality. The authors claimed “[t]echnical rationality is the rationality of power” and represents “the compulsive character of a society alienated from itself” (p. 95). Prepackaged



and standardized online education platforms, as discussed, have emerged as neoliberal alternatives to public education that generate large profits, often at the expense of student engagement and learning. Marcuse critiqued instrumental rationality in a similar manner, connecting it to technology and referring to it as technological rationality. Finally, in the second generation of the Frankfurt School, Habermas transformed Critical Theory with an emphasis on the dichotomy of the life-world and system perspectives. Though technology was virtually absent from Habermas's Critical Theory, his revised Critical Theory still offered insights into possible designs and purposes for educational technology.

### **Feenberg, Berry, and Critical Theory as Applied to Technology**

Feenberg (1991, 2002, 2005, 2015, 2017) and Berry (2014) offer conceptualizations of Critical Theory and the Critical Theory of Technology that apply most directly to online education and emerging trends that are aligned with surveillance capitalism. Feenberg's (1991) Critical Theory of Technology rejected instrumental rationality but also expanded the Frankfurt School critique of technology by Horkheimer, Adorno, Marcuse, and others. It argued that the values embedded within technological designs need not be technocratic nor standardized for the exclusive benefit of the powerful. In his challenge to standardization and power, Feenberg (2005) introduced the "technical code" or "the rule under which technologies are realized in a social context with biases reflecting the unequal distribution of social power" (p. 47). When discussing models of online learning with embedded capitalist values like automation and deskilling, Feenberg (2005) revealed the technical code of such models in the way they decontextualize:

both the learner and the educational 'product' by breaking them loose from the existing world...The new world disclosed on this basis confronts the learner as technical subject

with menus, exercises, and questionnaires rather than with other human beings engaged in a shared learning process. (p. 61)

The values of online learning platforms, by contrast, can be socially relative and challenge technical codes by corresponding to the interests and values of the populations that use them, as Feenberg (2002, 2005, 2015) has suggested in his writings.

Berry (2014) situated the Frankfurt School critiques of Horkheimer, Adorno, Marcuse, and others within today's world of digital technologies and, indirectly, surveillance capitalism. These technologies have made their way into politics, economies, media, and other aspects of our modern lives and social relations. By situating Frankfurt School thought in this manner, Berry examined the ways distributions of power are realized through the implementation and use of digital technologies. By integrating Berry's work into Feenberg's Critical Theory of Technology, the examination of surveillance capitalism as both a technical code and a technosystem, two important aspects of Feenberg's theory, becomes possible. Though neither Feenberg nor Berry directly address surveillance capitalism and its influence over emerging technological designs, the Critical Theory of Technology, updated with the *Critical Theory and the Digital*, provides the necessary framework to begin that process.

### **Rationale for Study**

As previously discussed, much of the current research into online education has focused on learning outcomes, communication, and the effects of student emotion on motivation and other factors, including academic achievement. Concentrating on these aspects within prefabricated online learning environments, however, discounts the variety of potential interests and values that are embedded within the designs of those technologically-mediated environments. The values embedded within K12 Inc.'s online learning platforms, for example,

were established by the company's founders, whose backgrounds were not in education but in banking and finance (Abrams, 2016; Ravitch, 2014). As a publicly traded company, K12 Inc.'s priorities may consequently skew toward profit over pedagogy and the actual quality of the education that it provides. The notion that a focus on profit and self-interest will yield positive educational outcomes is an embedded, value-laden assumption within this perspective. The value of pedagogy may only be determined by its measurable correlation with stock valuation and, thus, ultimately limit communication, learning outcomes, and levels of satisfaction.

Similar to deregulation, commodification, and other aspects of neoliberalism, the data extraction and algorithmic technologies that operate beneath the façade of neutrality and instrumental efficiency within surveillance capitalism, exist to serve the interests of an industry and earn profit. Surveillance capitalism, however, distinguishes itself from neoliberalism in that it seeks to establish a new collective order based on complete predictive certainty. For this reason, the Critical Theory of Technology must be updated to critique the use of data extraction and algorithmic technologies within surveillance capitalism and educational technologies that center around these tools.

In an early discussion of online education, Feenberg (2002) presciently expressed what would become an essential, emerging concern with regard to surveillance capitalism's technologies. He explained, "[w]hile technocrats hail the power of the computer to render social life transparent and controllable, humanists foresee the domination of man by the machine" (p. 117). This claim was made the same year that surveillance capitalism took root, according to Zuboff (2019), with the discovery of behavioral surplus, an essential factor for generating revenue and increasingly accurate predictions over time. Throughout Feenberg's discussions of educational technology over the years, however, he has focused on early questions of online

learning. These questions regarded universities implementing automated forms of online instruction to reduce spending (2002); democratic versus technocratic models of interaction in online environments (2005); and what it means to be a radical educator in the age of the internet (Feenberg & Jandric, 2015). This focus on early questions of online learning stems from an important point that is emphasized within this dissertation, the point that Feenberg developed his theory during the neoliberal era as a reaction to the era and its technologies.

The technologies developed within surveillance capitalism are restricted to experts and engineers and guided by theoretical frameworks that support the aspirations of surveillance capitalists. Among the core values embedded within the designs of surveillance capitalism's technologies and related educational technologies is the preclusion of value-laden, social interventions that threaten to disrupt its logic and aims. This dissertation's examination of Berry's (2014) *Critical Theory and the Digital* as well as technography and social analytics as ways of updating the Critical Theory of Technology (1991) are intended to serve as a "friction" or mode of resistance and potential means for intervention into surveillance capitalism's technologies.

### **An Argument for the Possibility of Intervention**

Feenberg argued that all technologies are underdetermined to some degree and thus susceptible to social intervention and transformation. Surveillance capitalism, however, is a mutation of capitalism that prioritizes the protected secrecy of exclusive data extraction and algorithmic technologies. Vulnerabilities to intervention or hacking would directly correlate with threats to its primary, profit-generating apparatus, the manufacture of algorithmic and commoditized "prediction products". The underdetermination that exists within all technological designs, according to the Critical Theory of Technology, however, can still be applied to the

tools used in surveillance capitalism's technologies and educational technologies.

Underdetermination provides opportunities to access these technologies, often locked away in "black boxes" by surveillance capitalism's legions of software engineers, and repurpose them through social and democratic interventions to meet alternative ends. The possibility to do so exists within the updated Critical Theory of Technology.

### **The Critical Theory of Technology and Surveillance Capitalism's Technology**

Feenberg (2017) expounded on the notion of Ihde's (1990) previously mentioned technosystem, defined as "a field of technical practices aimed at control of the environment, whether natural, economic, or administrative" (p. 159). Surveillance capitalism, as a technosystem or "field of technical practices aimed at control" (p. 159), can be critiqued by the framework provided in Berry's (2014) *Critical Theory and the Digital*. It would then become possible to imagine new forms of engagement with surveillance capitalism's technologies as well as its educational technologies. Another example of a way Feenberg's work connects with Berry's work is described below.

Feenberg (2017) referenced Adorno's conclusion that "experience in advanced capitalism was so corrupted by commodification and the mass media that it could no longer provide a touchstone of alternative values" (p. 132) to demonstrate capitalism's domination of human experience. The idea of "mass media" can be adapted to the conditions of surveillance capitalism by the reconceptualization of computer code and software as a form of media. Berry (2014) claimed computer code and software:

represent an extremely rich form of media...(that) differ(s) from previous instantiations of media forms in that they are highly processual. They can also have agency delegated to

them (revealing a technical code), which they can then prescribe back onto other actors.  
(p. 123)

Within surveillance capitalism, computer code and software, in the form of algorithms, created by companies like Google and Facebook, that have established a presence in education, have the agency Berry (2014) suggested. As a result, human experience, rather than being corrupted by commoditization and mass media, as Adorno suggested, *is* commoditized through the extraction of personal data, which is encoded in media (i.e. software and algorithms). This is a field of technical practices that utilizes core technologies influenced by surveillance capitalist values that result in a form of control that is currently invulnerable to intervention.

### **Research Questions**

In this dissertation, I ask the following questions:

- 1) In what ways does surveillance capitalism inform emerging models of educational technology, and how does this problematic differ from earlier problematics?
- 2) What does the new problematic of surveillance capitalism require of the Critical Theory of Technology?

### **Rationale for Methods**

Conceptual analysis is the selected method for this study, since the study's aim is to update and expand the Critical Theory of Technology as an effective framework for the critique of emerging educational technologies. Just as importantly, I have selected conceptual analysis as a means of reestablishing the importance of theory in a field in which its significance and necessity has been challenged. According to a *Wired* magazine article by Chris Anderson (2008), companies with access to massively abundant data and applied mathematics have replaced the

need for theory, models, and conventional data in the research process. He flippantly, but aptly pointed out that:

Google conquered the advertising world with nothing more than applied mathematics. It didn't pretend to know anything about the culture and conventions of advertising – it just assumed that better data, with better analytical tools, would win the day. And Google was right. (para. 4)

He argued that correlations established with massive amounts of data can outperform causal relationships based on modeling and standard data sets and that theories of human behavior are verging on obsolescence.

These ideas reflect aspects of surveillance capitalism as well as Alex Pentland's (Olguin, Waber, Kim, Koji Ara, & Pentland, 2009; Zuboff, 2019) theoretical work that aligns with surveillance capitalist aims. As if in response to Skinner's disappointment over a lack of "instruments and methods" for the study of human behavior comparable to those available to physicists" (Zuboff, 2019, p. 419), Pentland developed the concept of "social physics". Over a period of two decades, the goal of Pentland's research was "to invent the instruments and methods that can transform all of human behavior, especially social behavior, into highly predictive math" (p. 419). This form of technical control over social behavior is antithetical to the social and democratic aspects of the Critical Theory of Technology, making the Critical Theory of Technology's presence within this field of research all the more necessary. To reestablish the importance of theory and conceptual work, this study will be a conceptual analysis of surveillance capitalism and emerging educational technologies that align with its extraction and prediction imperatives.

Conceptual analysis can identify surveillance capitalism as a recent problematic that is increasingly essential to education's professional vocabulary (Baldwin & Rose, 2009), since online education's transition to personalization and adaptive learning. Within conceptual analysis, a dispositional view situates concepts in the real world by "emphasiz[ing] the use of concepts, the behaviours or capabilities that are possible as a result of an individual having a grasp of particular concepts" (Rodgers, 1989, p. 331). A dispositional view of surveillance capitalism's influence on educational technology and the Critical Theory of Technology serves the purpose of emphasizing the use of concepts in reality (Baldwin & Rose, 2009). A dispositional view of these technologies and theories will thus make familiar that which is still new within the professional literature and illuminate future directions for research into this emerging field.

### **Significance of Study**

By examining the dialectical relationship over time between economic theories and educational technology as well as technology theory, I begin the update and expansion of the Critical Theory of Technology. By doing so, the theory develops as a framework for critiquing and reimagining the use of data extraction and algorithmic technologies in education. Online learning has modest roots in academia, embodying academia's values and pedagogical conceptions. Despite academia's early control over the value-laden designs of online learning, its expansion remained limited by uncooperative university computer centers, indifferent administrations, and business prospects left unimagined (Hamilton & Feenberg, 2005). As a result, a space was left open for its emergence as a market intervention within neoliberalism with unlimited scalability. Figures outside of academia and education soon filled that space. With the increased use of data and algorithms within more recent online learning applications, the



question of technology serving the interests of education or education serving the interests of technology remains. I broadly argue that the role of technology is to serve education rather than teachers, students, administrators and others within education serving the technologies of surveillance capitalism.

### **Contribution: A Critical Theory of Surveillance Capitalism's Educational Technologies**

Feenberg (2017) argued that functionality, defined as “a social process in which the technical mentality meets cultural or political desiderata and constraints in the design of concrete artifacts or systems” (p. 160) manifests a “residue”. The residue leads to social interventions into the development of technical achievements, since “nature and life simply cannot be reduced to functional relations” (p. 160). If universalized to all technologies, including those developed under the technical code of surveillance capitalism, surveillance capitalism's aims would no longer be as widely accepted as inevitable, but, instead, one side of a dialectical process. Part of the reason for this is because technologies, as mentioned earlier, are underdetermined.

According to Feenberg (2010), two criteria define underdetermination, “first, there is generally a surplus of workable solutions to any given problem, with social actors making the final choice among several viable options and second, the problem definition often changes in the course of the solution” (p. 10). To deny the possibility for transformation within surveillance capitalism's underdetermined technologies is resignation to critiques like Chomsky's (Scheer, 2020), which characterized the economic logic as a new, third model of a viable dystopian future, as relevant as Orwell's and Huxley's earlier models. Despite their guarded secrecy, I argue the technologies of surveillance capitalism are not fully determined, and real potential for social and value-laden interventions and transformation remains.

Expanding the concept of the algorithm beyond an efficient tool designed by software engineers is an important step in dispelling notions of instrumental rationality. Additionally, focusing on emerging sociological and cultural approaches to algorithms is also necessary to determine what they “are actually doing as part of situated practices” (Bucher, 2018, p. 29). These emerging fields of study reject the notion of technological neutrality as does the Critical Theory of Technology. They also have the potential to provide knowledge, perspective, and tools to enable students and teachers to engage transformatively with the same technologies that surveillance capitalism subsumes to achieve its own imperatives.

Social intervention, I argue, lies in acquiring the tools to breach the seemingly impenetrable barriers guarding surveillance capitalism’s technological designs. A starting point for understanding these techniques can be found in technography and social analytics. These recently developed studies can illuminate the ways software and algorithms are value-laden as well as the ways users of technology can engage transformatively with them. Examining “how interests travel across networks and how they are dialectically enacted or resisted” (Golden, 2017, p. 384), by developing an awareness of our lived experience when engaging with them is a first step. This requires a phenomenology of algorithmic technologies (Bucher, 2018). Once developed, this awareness can lead to modified forms of engagement with data extraction and algorithmic technologies that can change those technologies to better meet the personal interests of users.

### **Chapter Outline**

The first chapter of this dissertation briefly establishes the importance of Critical Theory and the Critical Theory of Technology within critiques of educational technology and surveillance capitalism. The chapter examines the history of educational technology with the

intention of identifying how interests and values often make their way into their designs and implementation. Chapter two charts the dialectical development of surveillance capitalism out of neoliberalism, identifying the values and logic of both economic models. Just as importantly, the corresponding, dialectical development of educational technologies within the two models is examined. Surveillance capitalism's educational technologies benefit from an absence of regulation that is also associated with neoliberalism. What distinguishes these technologies, however, is their necessity within the economic imperatives and aims of surveillance capitalism, the primary aim being the complete reinvention of culture and society based on the total predictive certainty of organized human life.

Chapter three begins with a history of the Frankfurt School and Critical Theory in order to define the ways early critical theorists contributed to the development of Feenberg's Critical Theory of Technology. The Critical Theory of Technology is an effective theory for critiquing technologies and educational technologies, particularly with regard to concepts like the technical code and the technosystem. It was, however, developed during the neoliberal era and needs an update in order to critique surveillance capitalism's technologies. To do so, the integration of Berry's *Critical Theory and the Digital* is necessary for reasons previously discussed.

Chapter four begins by describing a variety of resistance-oriented reactions to surveillance capitalism's technologies and educational technologies. The particular examples discussed were selected due to the fact that they do not actually promote transformative intervention as much as enable the technologies to remain and become more dominant. The purpose of the chapter, in contrast to those examples, is to establish conceptual foundations and potentials for actual intervention and transformation, in line with the Critical Theory of Technology. The conceptual frameworks of the gestalt switch and the choice of a past are then

described as the basis for transformative potentials. Those potentials are platform cooperativism, technography, and social analytics.

Finally, chapter five suggests two ways forward based on the Critical Theory of Technology and surveillance capitalism's educational technologies. It is necessary to recognize that the use of data extraction and algorithmic technologies in education is not simply going to disappear because concerns about their use have emerged. It is thus necessary to imagine new uses of these technologies based on alternative values that emerge from within education. These uses would be based on an understanding that the values embedded within the technologies are not fixed. Finally, a curriculum is proposed that would emerge from technography and social analytics and focus on the more meaningful and transformative interaction with and creation of software and algorithms.

### **Definition of Terms**

**Algorithm:** the coded instructions that a computer needs to follow to perform a given task (Bucher, 2018, p. 2)

**Behavioral surplus:** (previously “data exhaust”) behavioral data available for uses *beyond* service improvement (Zuboff, 2019, p. 75)

**Critical Theory of Technology:** Theory of technology that combines insights from philosophy of technology and constructivist technology studies. A framework for analyzing technologies and technological systems at several levels, as having distinctive features as such while also exhibiting biases derived from their place in society. (Feenberg, 2005)

**Surveillance capitalism:** A new economic model that claims human experience as free raw material for translation into behavioral data. Although some of these data are applied to product or service improvement, the rest are declared as a proprietary behavioral surplus, fed into

advanced manufacturing processes known as ‘machine intelligence,’ and fabricated into prediction products that anticipate what you will do now, soon, and later. Finally, these prediction products are traded in a new kind of marketplace for behavioral predictions that I (Zuboff) call behavioral futures markets. (Zuboff, 2019, p. 8)

**Technical Code:** the rule under which technologies are realized in a social context with biases reflecting the unequal distribution of social power (Feenberg, 2005, p. 47).

**Technosystem:** a field of technical practices aimed at control of the environment, whether natural, economic, or administrative. To that end the environment is interpreted and structured as an ensemble of sociotechnically rational functions. (Feenberg, 2017, p. 159)

### Summary

Online education has, in recent years, transitioned away from fixed sequences of modules and content delivery and toward learning analytics and personalization aided by data extraction and algorithmic technologies. This transition has coincided with the rise of surveillance capitalism, an economic logic that blocks value-laden social interventions into its technological designs. These technologies have demonstrated an ability to manipulate not only the thinking and behavior of their users, but also their values, ultimately diminishing the potential for future interventions. Recent studies, however, like *Critical Theory and the Digital*, technography, and social analytics have the potential to inform and update Andrew Feenberg’s Critical Theory of Technology. In doing so, the socially specific values and human control that are central to the theory may lead to alternative human, educational, and technological futures.

## CHAPTER II: NEOLIBERALISM AND SURVEILLANCE CAPITALISM

### Introduction

The purpose of this chapter within the dissertation’s larger argument is to demonstrate that surveillance capitalism influences not only the search engines and social network platforms commonly associated with it, but also educational technologies. Establishing the influencing power surveillance capitalism has on the designs of educational technologies justifies the critical theoretical examination of these new educational technologies in Chapter 3. To develop an understanding of surveillance capitalism, its emergence, and its influence on educational technology, it is first necessary to understand the comparative, historical development and precepts of neoliberalism. Neoliberalism and surveillance capitalism are each an example of a “problematic”, defined by Althusser (1965/2005) as “the particular unity of a theoretical formation and hence the location to be assigned to the specific difference” (p. 32). The history and aspects of both problematics as well as their evolving relationships with educational technologies are discussed in greater detail throughout the chapter. This history is told dialectically, that is, in the dynamic of changing abstraction or thesis (neoliberalism) and the dialectic or antithesis (surveillance capitalism).

From a dialectical view of the world, “*everything is changing incessantly*” (Au, 2017, p. 25) and “contains the seeds of its own termination” (p. 25). In describing the constitutive elements of dialectics, Au (2017) claimed:

[t]he law of the interpenetration of opposites, also known as the law of contradiction, the identity of opposites, or the unity and struggle of opposites, is central to dialectics.

Negation, correctly understood, is key to how it functions. We begin with the following introductory remarks about this law:

- Contradiction exists in all processes

- Development is the self-movement of things
- This self-movement is driven by contradictions internal to things
- Under certain conditions, the opposites transform into each other (p. 38)

Hegel's dialectic referred to a process in which fundamental forms of reality evolve through three stages: abstraction, dialectic, and the speculative, more commonly known as thesis, antithesis, and synthesis (Stone, 2014). The truth that emerges from this reasoning process, according to Hegel (1832/2010), is "*spirit*, which is higher than both reason bound to the understanding and understanding bound to reason" (p. 10).

Marx claimed that Hegel's dialectic suffered a "mystification" and distinguished it from his own dialectical materialism in the Postscript to *Capital: Volume I*. Marx (1873/1990) claimed that his own dialectical method:

is, in its foundations, not only different from the Hegelian, but exactly opposite to it. For Hegel, the process of thinking, which he even transforms into an independent subject, under the name of 'the Idea', is the creator of the real world, and the real world is only the external appearance of the idea. With me the reverse is true: the ideal is nothing but the material world reflected in the mind of man, and translated into forms of thought. (p. 102)

The dialectical materialism of Marx and Engels emphasized the "sensuous world" over "pure thought".

Malott and Ford (2015) further describe the difference between the dialectics of Marx and Engels and that of Hegel in explaining that "by reducing the sensuous world to pure thought, Hegel winds up reaffirming estrangement rather than transcending it, as his negation of the negation implies" (p. 20). A point of Marx and Engels's correction of Hegel's dialectic, dialectical materialism, was that "the critique of ideology or discourse...is severely limited

without a concrete mass movement aimed at transforming the real, objective conditions of people's lives" (p. 21). Despite the distinguishing aspects of thought and action that exist at the center of the two dialectics, a shared assumption of positive outcomes to the process exists. The structure of this discussion of neoliberalism and surveillance capitalism is based on a form of dialectic later developed by Theodor Adorno, in response to this traditional assumption.

Adorno's negative dialectics is a repudiation of the "positive" outcome of the dialectical processes of Hegel, Marx and Engels, and others, dating back to Plato. Negative dialectics "is a phrase that flouts tradition" (Adorno, 1966/2007, p. xix) in that it suggests achieving "something positive by means of negation" (p. xix) is not guaranteed. Negative dialectics thus "seeks to free dialectics from such affirmative traits without reducing its determinacy" (p. xix). This is to suggest that, in the context of this dissertation, the possibility of an emergent positive resulting from the dialectical examination of neoliberalism and surveillance capitalism may not exist.

### **The Origin of Neoliberalism**

Neoliberalism is a problematic or "particular unity of a theoretical formation" (Althusser, p. 32, 1965/2005) that was introduced by Friedrich Hayek and championed by Ludwig von Mises, Milton Friedman, and other scholars throughout the post-World War II world. Neoliberalism emerged from a rejection of New Deal and Great Society liberalism, British social democracy, and Keynesian economic policies (Jones, 2012). Harvey (2005) defined neoliberalism as "a theory of political economic practices that proposes that human well-being can best be advanced by liberating individual entrepreneurial freedoms and skills within an institutional framework characterized by strong private property rights, free markets, and free trade" (p. 2).



To support the transition away from Keynesianism and promote neoliberalism as a guiding ideology, Hayek capitalized on the influential power of the intelligentsia. In his 1949 article, “The Intellectuals and Socialism”, Hayek argued “that individual liberty within the framework of free markets could only be protected by an elite-driven and elite-directed strategy of opinion formation” (Jones, 2012, p. 3). Acting on this strategy, he recruited intellectuals from journalism, politics, and policy making to tout the merits of free market primacy over government regulation and interventions that defined Keynesianism (Jones, 2012).

In academics, the Chicago School of Economics emerged as a leader in neoliberal scholarship. The Chicago School of Economics, according to Palley (2005), came to emphasize “the efficiency of market competition, the role of individuals in determining economic outcomes, and distortions associated with government intervention and regulation of markets” (p. 20). By the mid-1970s, Hayek had triumphed as neoliberalism replaced Keynesianism as a dominant problematic in the United States. Hayek’s triumph was a result of a series of events that had produced an environment of uncertainty, such that faith in the prior system collapsed. According to Jones (2012):

[t]he end of the Bretton Woods international monetary system, two oil price shocks in 1973 and 1979, the Vietnam War, the Watergate break-in at the Democratic Party headquarters in Washington, D.C., at the behest of senior figures of the Nixon administration and with the president’s complicity in its cover-up...and the failure of the prices and income policies that were supposed to fight inflation...created a policy vacuum into which neoliberal ideas flowed. (p. 215)

Neoliberalism further established itself by addressing subsequent stagflation, worsening industrial relations, the breakdown of antipoverty and welfare strategies, and the collapse of economic competitiveness (Jones, 2012).

### **A Keynesian-Era Antecedent to Neoliberalism’s Eventual “Technological Revolution”**

In his article, “Teaching Machines”, Skinner (1958) suggested education had fallen behind with regard to meeting the needs of a growing population and a growing number of people interested in receiving an education. In another connection between education and private industry, Skinner (1958) claimed “[i]n any other field a demand for increased production would have led at once to the invention of labor-saving capital equipment” (p. 969). He suggested the use of consumer technologies like television, film projectors, phonographs, and tape recorders to increase efficiency and meet America’s growing need for expanded educational opportunities. His most emphasized solution was the teaching machine, an innovation of Sidney I. Pressey, a professor of psychology at Ohio State University. According to Skinner (1958):

[i]n using the device (teaching machine) the student refers to a numbered item in a multiple-choice test. He presses the button corresponding to his first choice of answer. If he is right, the device moves on to the next item; if he is wrong, the error is tallied, and he must continue to make choices until he is right. Such machines, Pressey pointed out, could not only test and score, they could teach. (p. 969)

In the 1954 promotional video, “B.F Skinner. Teaching machine and programmed learning”, Skinner claimed:

[w]ith techniques in which a whole class is forced to move forward together, the bright student wastes time, waiting for others to catch up, and the slow student, who may not be inferior in any other respect, is forced to go too fast. Not quite completing one day’s

assignment, he's even less likely to complete a second, and he gets farther and farther behind and often gives up altogether unless remedial steps are taken. A student who is learning by machine learns at a rate that is most effective for him. (Bonaiuti, 2011)

Efficiency, accompanied by aspects of behaviorism, were determining values embedded within the design of the teaching machine. Despite its function as a kind of “labor-saving capital equipment” with potential for meeting the educational needs of a growing population, its presence within education was not directly associated with any ideological precepts of Keynesianism. As a machine that students engaged with individually, the teaching machine resembled later forms of for-profit online learning that were more closely associated with and maintained by the ideology of neoliberalism. Independent as it was from the principles of Keynesianism, however, the teaching machine's longevity was tied only to its effectiveness.

In spite of Skinner's claims, the teaching machine was consistently regarded as “boring” and “impersonal” into the 1960s and was eventually abandoned by educators (Picciano, 2019). Despite similar attitudes toward for-profit models of online learning that emerged years later, in the neoliberal era, online learning would not be abandoned. One reason for this is its place within a proposed framework of ideas regarding neoliberalism and education. This chapter examines online learning not as an improvement on the teaching machine in terms of teacher and student attitudes, but as a model of learning called for by neoliberal advocate, Milton Friedman, and protected through policies that emerged during the neoliberal era. This brief history begins with educational reforms and market interventions based on neoliberalism's push for teacher accountability, standardized testing, and subsequent, technology-centered market competition in public education. These reforms and interventions were promoted as solutions to allegations of ineffective instruction in the traditional classroom.

### ***A Nation at Risk and Poor Mathematical Modeling***

Following Jimmy Carter's failed attempt at reelection in 1980, Ronald Reagan took office and proceeded to promote neoliberalism on a national and global scale, alongside British Prime Minister, Margaret Thatcher. With rising faith in the principle of market freedom, the autonomy of public institutions that were not governed by market forces was up for review. This was evident in 1983, when the Reagan administration released its scathing critique of American education, *A Nation at Risk*. *A Nation at Risk* was a neoliberal statistical study that found that SAT scores had decreased on average over a period of seventeen years. The statistical modeling used in the report, however, were later discovered to be flawed when scrutinized by researchers at Sandia National Laboratories.

According to O'Neil (2017), the statistical model that was used to show a downward trend in SAT scores, included students from poor and minority communities for the first time. When the researchers looked at the data seven years after the publication of the report, they discovered test scores for every subgroup of students in the study, including the poor and minority students, were rising. Carson, Huelskamp, and Woodall (1992) made the claim that:

[f]ollowing the declines in the 1970s by some groups, every minority subpopulation taking the SAT has shown general improvement in its average score during the 1980s while White scores have remained relatively stable.

White and Asian students continue to outperform other students; however, the performance gap is slowly closing. These data are available only in the years since 1975. Unfortunately, we could not track this trend before that time. (p. 268)

The addition of the newly included data for poor and minority students who had been underserved in financially distressed school systems had brought the overall average of all of the scores down, leading to what statisticians call a “Simpson’s Paradox”.

A Simpson’s Paradox is a statistical phenomenon that occurs “when a whole body of data displays one trend, yet when broken into subgroups, the opposite trend comes into view for each of those subgroups” (O’Neil, 2017, p. 136). The trend indicated by the whole body of data in the study suggested education was worsening in the United States, while, in fact, evidence supported by the findings of each subgroup suggested it was improving (O’Neil, 2017). *A Nation at Risk* concluded with the notion that the United States was, in a sense, under attack by failing schools and that teachers were to blame.

This interpretation of the SAT data and the sustained influence of the reported findings of *A Nation at Risk* established that neoliberalism had become a dominant problematic just as much in education as the rest of the economy. It also showed an early example of the power of manipulated data in education. The statistical modeling used in *A Nation at Risk* is an example of a technical code, defined by Feenberg (2005) as “the realization of an interest or ideology in a technically coherent solution to a problem” (p. 52). Neoliberalism was the ideology that the technical process of statistical modeling responded to. Though further discussion of the technical code occurs in Chapter 3, in relation to the Critical Theory of Technology, it is important to note here that the power of statistical modeling would go on to increase in kind and quality with the evolution and use of algorithms throughout education.

### **Black Box Algorithms and Faulty Evaluations**

The legacy of *A Nation at Risk* still impacts schools today with regard to standardized tests and the teacher accountability movement. According to O’Neil (2017), in 2009, Chancellor

of District of Columbia Public Schools (2007-2010) Michelle Rhee implemented a new evaluation system, IMPACT, that made sense “from a systems engineering perspective” (p. 4), to eliminate poor teachers. O’Neil (2017), described the process as straight forward: “Evaluate the teachers. Get rid of the worst ones, and place the best ones where they can do the most good. In the language of data scientists, this ‘optimizes’ the school system, presumably ensuring better results for the kids” (p. 4). By the end of the first year of IMPACT’s implementation, the teachers who scored in the bottom 2% were let go. The following year, another 5% were let go. The accountability and teacher evaluation movement had found a seemingly efficient tool. The tool, however, was embedded with a set of values that was more aligned with neoliberalism’s ongoing challenge to public education than with teachers. As a neoliberal technical solution, IMPACT supported the findings of *A Nation at Risk* by also using flawed statistical modeling. In the process, IMPACT became integrated with neoliberalism in ways prior educational technologies were unable to within their era’s problematic.

If the values of public school teachers were embedded within the evaluation system, the technological rationality and simple efficiency that served the opposing interests of policy makers, for-profit educational technology companies, and others would have been threatened. Transparency and transformation of the algorithm used with IMPACT might occur, reflective of the values of the teachers and the community. In the case of IMPACT, O’Neil (2017) claimed the school system was optimized from a data scientist point of view. More precisely, the use of the value-added algorithm as an efficient scoring tool for teachers was, itself, optimized through an unstated lack of valuative input from educators, administration, parents, or others. The resulting score produced by the algorithm outweighed administrator evaluations and parental

reviews of teacher performance and became the ultimate determining factor for whether a teacher was fired or not.

Sarah Wysocki, a fifth-grade teacher in Washington D.C., who had received strong reviews from her principal and the parents of her students, was surprised to find she received a “miserable” score on her IMPACT evaluation (O’Neil, 2017). The evaluation measured teacher effectiveness in math and language skills, two essential components of standardized tests. The justification for assigning such determining power to the value-added model data was, according to O’Neil (2017), to eliminate human bias. The corporate consultancy the district hired, Princeton-based Mathematica Policy Research, was aware of the problems that might arise from human bias. A principal may be a friend of the evaluated teacher, for example, or a teacher that seems like a good teacher outside of the classroom due to style or professed dedication may defy perception and be ineffective in the classroom.

The consultancy developed complex algorithms as well to account for various potential factors in students’ personal lives that could impact test scores. These complex algorithms, Sarah discovered, are hidden from stakeholders within the teaching profession in a “black box” (O’Neil, 2017) of corporate secrecy. The accuracy of the algorithm in measuring actual teacher effectiveness was also impossible to determine due to the small number of students that teachers have in their classes compared to the sample populations of millions that tech companies like Google and Facebook can use to determine the effectiveness of their algorithms. For this reason, the findings of the data provided by the value-added algorithm were more of a guess than a reliable calculation.

Despite Sarah’s inability and the inability of other fired teachers to see and understand the algorithm created by Mathematica, she eventually discovered a likely scenario that was more

unsettling. The scenario was a harbinger of an essential aspect of surveillance capitalism. The algorithm was modifying the behavior of stakeholders in the faculty of her school. The following year, she noticed 29% of her incoming fifth graders were at an advanced reading level, five times the average in the school district. Her students, however, had difficulty with reading in her class. O'Neil (2017) discussed *Washington Post* and *USA Today* stories about abnormally high levels of erasure marks on standardized tests that suggested teachers were changing test answers for a chance to receive bonuses of up to \$8,000. As a consequence, the scores of Sarah's incoming students were artificially inflated. This created a situation in which student scores at the end of their year with Sarah, though representative of effective teaching, would remain low compared to the previous year's artificially high scores. Sarah was fired as a result.

The story of Sarah's firing illustrates two points. The first is that algorithms and incentive programs that embody neoliberal values and fall short of their promise may end the careers of effective teachers. The second is that the same algorithms and incentive programs may eventually encourage unethical practices. Blind faith in algorithms as efficient and reliable tools can undermine social values that lead to more enriching educational environments. The power of the value-added algorithm was elevated at the exclusion of the social and professional interests of public school teachers, however, as is characteristic of neoliberalism. The selection of the word "power" over "efficiency" is important in this case as well, because the inefficiency of the algorithm was demonstrated as an inevitability due to the small sample of test scores that individual teachers can get from their students. Much larger sets of data like those extracted by surveillance capitalism's technologies, as I discuss later, were needed to inform the algorithm, so it might adjust or correct itself in order to provide more accurate evaluations of the teachers' actual effectiveness.



By the IMPACT evaluation eliminating of any risk of human bias in the value-added algorithm, the coders and programmers displaced any potential for meaningful human input with an algorithm that was not statistically viable or open to stakeholder understanding. Humanizing the evaluation process and eliminating the competitive salary bonuses, based on the revelations in the *Washington Post* and *USA Today* stories, may have saved the jobs of effective teachers. Rather than firing teachers based on faulty algorithmic determinations or suggesting the elimination of algorithms altogether in the process, which is unrealistic, another solution is possible.

By enabling clarity and participation in the formation of such algorithms by teachers, administrators, and community members, a more fair and democratic evaluation model may have been possible. A consistency of flawed statistical modeling in both *A Nation at Risk* and IMPACT, however, represented neoliberal technical solutions to contrived problems that resulted in ongoing, internal contradictions, i.e. skilled teachers with poor evaluations. These contradictory evaluation scores served as support for *A Nation at Risk* and contributed to education reforms that are discussed in the following section.

### **Neoliberalism, Milton Friedman, and Online Education**

Milton Friedman's (1995) call for a "radical reconstruction of our educational system" (para. 9) and "a technological revolution" (para. 9) to reform public schools or "private fiefs primarily of the administrators and union officials" (para. 6) was answered in the late 1990s. K12 Inc. was founded in 1999 by Ron J. Packard of McKinsey & Company and Goldman Sachs with a \$40 million investment from Oracle CEO Larry Ellison (Abrams, 2016). Packard started the company with "junk bond king" Michael Milken and Loews Corporation co-chair Andrew Tisch. K12 Inc. went public in 2007 on the New York Stock Exchange and soon outperformed the

competition in the for-profit online school industry (Ravitch, 2014). By 2012, K12 Inc. enrolled more than 200,000 full-time students in its virtual charter schools across the United States (Ravitch, 2014).

The resulting competition with public schools was an act of creative destruction that, according to Ravitch (2014), “proponents of the free market admire” (p. 183). It came in the form of “the online charter’s potential to disrupt traditional schooling and to destroy the influence of teachers’ unions” (p. 183), one of Friedman’s maligned adversaries. Additionally, legislation was even drafted to protect K12 Inc.’s expansion and profits in the for-profit education market by a conservative lobbying group named the American Legislative Exchange Council or ALEC.

ALEC is a conservative intervention into the functioning of government and has been a strong voice in the online education movement. ALEC, according to Ravitch (2014), is a “conservative organization of state legislators committed to privatization of public education” (p. 185) and drafts model legislation that benefits corporations that legislators are then expected to present in their home states as their own. One such piece of legislation was “ALEC’s Virtual Public Schools Act” which “authorized for-profit virtual academies and declared that they would be recognized as public schools, treated equitably, and allocated the same resources as other ‘public schools’” (p. 185). The problem with allocating equal resources to online schools or virtual academies is that:

[t]he virtual charters receive tuition payments from the state that far exceed their costs...

Because they have no school buildings, their costs are minimal. They have no custodians, no heating or cooling costs, no libraries, no gyms, no cafeterias, no social workers, no guidance counselors, no playgrounds, no after-school activities, and no transportation

costs. In addition, they are able to have a larger ‘class size,’ because one teacher can monitor forty, fifty, a hundred or more computer screens. And the teachers may or may not be certified...Even when the virtual school gets less money than the local public school, the business is profitable. (p. 183)

In contrast to the high profit business model enacted by ALEC’s Virtual Public Schools Act, graduation rates from K12 Inc. operated schools have been found to be significantly lower than public schools.

An independent study conducted by the National Education Policy Center found that “On-Time Graduation Rates” for the 2010-11 school year for K12 Inc. schools was 49.1% compared to an average public school On-Time Graduation Rate of 79.4% (Miron & Urschel, 2012, p. 34). In addition, “Only 27.7% of K12 schools met AYP targets in 2010-11. This can be compared with an estimated 52% of all public schools in the country that met AYP in the same year” (p. 37). Though Friedman’s (1995) call for private sector challenges to public schools was not vindicated by K12 Inc.’s outcomes, these outcomes were likely glossed over by the \$26.5 million spent by the company on advertising, paid for in public dollars in 2010 (Ravitch, 2014). In critiquing neoliberalism and education, Giroux (2004) warned “Under neo-liberalism, pedagogy has become thoroughly reactionary as it constructs knowledge, values, and identities through a variety of educational sites and forms of pedagogical address that have largely become the handmaiden of corporate power” (p. 497). The numbers described above suggest that in the process of education markets seizing on positive innovations of the 1980s and 1990s, pedagogy and new online educational sites served corporate power at the expense of learning outcomes.

### **The Design of K12 Inc. Courses**

K12 Inc. courses are prepackaged, online courses in which students move at their own pace from one module to the next, until they finish the course. Online instructors communicate with students, primarily through email, and there is often a mentor or learning coach that facilitates the process. This teaching and learning structure is built on the assumption that students will work independently, progressing from one learning module to the next, based on their own preference for and comfort with technology. It is liberatory in the sense that students are not limited to a single pace that is dictated by a teacher, but can move through the content at their own pace. This liberatory aspect, however, echoes identical points made by B. F. Skinner earlier, with regard to the Teaching Machine, and just as with the teaching machine, online learning has often engendered a sense of isolation, disconnection, and disengagement (Belair, 2012; CREDO, 2015; Hawkins et al., 2012). Unlike the relationship between Keynesianism and the teaching machine promoted by B. F. Skinner, however, the principle neoliberal value of market intervention as well as the call for a technological revolution by Friedman help safeguard K12 Inc. and other online providers. A model of instruction once touted by Skinner in 1954, but rejected by educators, has thus been transformed into a sustained market intervention into education.

### **Neoliberalism and Surveillance Capitalism**

A decade before Reagan took office as the President of the United States, Illich (1970) expressed optimism with regard to the use of technology, computers, and even an inchoate notion of algorithms and personalization in education. One suggestion from his book *Deschooling Society* was taped lessons used by people to learn in a way that resembled the way they learn asynchronously from YouTube, Khan Academy, and other online resources today. Another suggestion was to use computers in decentralized “learning webs”, in a manner that

presaged the use of algorithms for personalization. He spoke of computers hosting “communications networks” through which individuals could be matched with other individuals in “peer-matching networks” (pp. 92-93) based on areas of interest and desired learning. This imagined and optimistic reality assumes a particular, value-laden expression within surveillance capitalism’s technologies and educational technologies.

A persistent bafflement by and faith in mathematical models and increasingly powerful algorithms that was evident in the neoliberal era has been central to the rise of surveillance capitalism. The dotcom market of the late 1990s represented something different than traditional markets with regard to investment and return on investment. According to Zuboff (2019), Google’s searchable web pages and growing computer science capabilities attracted investors despite the absence of a model that could ensure a sensible return on investment. At the time, personal user data that was extracted with each search was used to improve Google’s machine intelligence and user experience.

Within this structure, according to Zuboff (2019), “[t]he fact that users needed Search about as much as Search needed users created a balance of power between Google and its populations. People were treated as ends in themselves, the subjects of a nonmarket, self-contained cycle” (p. 70). Data that was left over after the process was regarded as “collateral data”, “data exhaust”, and “behavioral by-products (that) were stored and operationally ignored” (p. 67). Stanford graduate student, Amit Patel, later saw potential in this data, that consisted of things like number and pattern of search terms, how a query is phrased, spelling, punctuation, dwell times, click patterns, and location. These data, according to Patel, provided a “broad sensor of human behavior” (p. 68) in what Zuboff (2019) called the “behavior value reinvestment cycle” (p. 69).

The potential that Patel observed for the use of data exhaust, however, clashed with the stated values of founders Sergey Brin and Larry Page in a paper presented at the 1998 World Wide Web Conference, in which they stated:

[w]e expect that advertising funded search engines will be inherently biased towards the advertisers and away from the needs of the consumers. This type of bias is very difficult to detect but could still have a significant effect on the market...we believe the issue of advertising causes enough mixed incentives that it is crucial to have a competitive search engine that is transparent and in the academic realm. (p. 71)

The interest in a search engine that was transparent and in the academic realm was dashed, however, with the imposition of the dotcom crash. Pressure quickly grew for Google to develop a viable profit-based model as venture capitalists threatened to withdraw their investments and support. As a result, capitalism fundamentally transformed the core design of Google's technology as behavioral data moved from its symbiotic function with users to matching ads with queries (Zuboff, 2019). Behavioral data that was "available for uses beyond service improvement constituted a surplus, and it was on the strength of this behavioral surplus that the young company would find its way to the 'sustained and exponential profits' that would be necessary for survival" (p. 75). Users "*were no longer ends in themselves but rather the means to others' ends*" (p. 88).

Google thus became the seed of the new problematic, surveillance capitalism. Traditional capitalism revealed the "seeds of its own termination" (Au, 2017, p. 25) by absorbing the search engine that had existed largely outside of its purview and negating basic aspects of capitalist logic. Zuboff (2019) defined surveillance capitalism as a new economic logic that:

claims human experience as free raw material for translation into behavioral data.

Although some of these data are applied to product or service improvement, the rest are declared as a proprietary *behavioral surplus*, fed into advanced manufacturing processes known as ‘machine intelligence,’ and fabricated into *prediction products* that anticipate what you will do now, soon, and later. Finally, these prediction products are traded in a new kind of marketplace for behavioral predictions that I call *behavioral futures markets*.

(p. 8)

Google eventually learned “ways to conduct automated auctions for ad targeting that allowed the new invention to scale quickly, accommodating hundreds of thousands of advertisers and billions (later it would be trillions) of auctions simultaneously” (p. 82). Within this new model, two economic imperatives guided the development of technologies: the extraction imperative and the prediction imperative. The extraction imperative demanded that “raw-material supplies...be procured at an ever-expanding scale” (p. 87), and the prediction imperative demanded “the fabrication of prediction products that most reliably foretell the future” (p. 198). Within Silicon Valley, the new model and its imperatives drew the attention of the tech industry as well as investors. Facebook was the first major company that designed its technology around the new model.

In 2008, Facebook’s new COO, Sheryl Sandberg, who had served as an executive at Google, recognized how “Facebook’s social graph represented an awe-inspiring source of behavioral surplus” (p. 92). Under her leadership, the extraordinary amount of information users volunteered created unprecedented opportunities within the new economic model of surveillance capitalism. As Sandberg admitted, “[w]e have better information than anyone else. We know gender, age, location, and its real data as opposed to the stuff other people infer” (p. 92).

Following the extraction and prediction imperatives, Facebook proceeded to use personal data for targeted advertising, but also allowed for third party access to users' personal data. This included leakage of personal data to third-party apps, access to personal data after accounts were deleted, and other ethically dubious practices that eventually drew the attention of the FTC, but only after earning the company robust profits. Part of the reasoning for the companies sustained profits and avoidance of regulatory consequences is discussed in the following section, with regard to surveillance capitalism's dispossession cycle.

Outside of the questionable ethics of surveillance capitalism, an essential point about it is its relationship to, protection by, and comparison to the principles of neoliberalism. Zuboff (2019) explained how a cult of the "entrepreneur" with its focus on ownership and management as well as audacity, competitive cunning, dominance, and wealth, emerged as the public corporation was shrinking from relevance. This enabled Page and Brin at Google to introduce a new structure of corporate governance with a dual-class share structure at Google's 2004 public offering that granted them immunity from market and investor pressure. Page and Brin controlled the super-class "B" voting stock that each carried ten votes, as compared to the "A" class of shares, which each carried only one vote. As a result, "Page and Brin had a 56 percent majority vote, which they used to impose a new tri-class share structure, adding a 'C' class of zero-voting-rights stock" (p. 102), which led the two to eventually control "83 percent of the super-voting-class 'B' shares, which translated into 51 percent of the voting power" (p. 102). The status of Page and Brin and the (neoliberal) audacity, competitive cunning, and dominance of their governance structure was solidified when, "[b]y 2015, 15 percent of IPOs were introduced with a dual-class structure, compared to 1 percent in 2005" (p. 102). In Facebook's 2012 IPO, there was also a two-tiered stock structure that left Zuckerberg in control of voting



rights, but a nonvoting class “C” shares proposal was later rejected due to investor pressure (Zuboff, 2019).

Surveillance capitalism also received cover and protection from the ethos of neoliberalism. In contemporary neoliberalism, market efficiency and corporate self-regulation are distorted when governments intervene with regulations (Palley, 2005). As a result, “bureaucracy must be repudiated as a form of human domination” (Zuboff, 2019, p. 107).

According to Zuboff (2019):

[b]y the time of Google’s public offering in 2004, self-regulation was fully enshrined within government and across the business community as the single most effective tool for regulation without coercion and the antidote to any inclination toward collectivism and the centralization of power. (p. 108)

In addition, legal scholars, according to Zuboff (2019), have cited a recent trend in which the First Amendment has been used in a conservative-libertarian effort to interweave free speech with property rights. This “has led to a privileging corporate action as ‘speech’ deserving of constitutional protection” and contributed to a “‘cyberlibertarianism’ ideology that (legal scholar) Frank Pasquale described as ‘free speech fundamentalism’” (p. 109) among tech leaders in Silicon Valley.

### **Neoliberal Hegemony vs. Surveillance Capitalism’s Dispossession Cycle**

Surveillance capitalism, having emerged dialectically from neoliberalism, became a dominant economic system through processes that were not possible for neoliberalism. Harvey’s (2005) description of neoliberalism’s correlation of human well-being with strong private property rights, free markets, and free trade had become hegemonic as a mode of discourse long before Google’s repurposing of data exhaust. McLaren defined hegemony as:

the maintenance of domination not by the sheer exercise of force *but primarily through consensual social practices, social forms, and social structures produced in specific sites such as the church, the state, the school, the mass media, the political system, and the family.* (Pruyn & Huerta-Charles, 2016, p. 39)

He added that ideology or “the production and representation of ideas, values, and beliefs and the manner in which they are expressed and lived out by both individuals and groups” (p. 42) is necessary for hegemony to do its work. Historically, this process for neoliberalism began when Hayek recruited intellectuals from journalism, politics, and policy making to tout the merits of free market primacy.

Whereas neoliberalism became a dominant problematic through the massive expansion of Hayek’s early appeals to figures that influence culture and policy, surveillance capitalism has taken root through its own dispossession cycle. The dispossession cycle consists of four stages: incursion, habituation, adaptation, and redirection. Zuboff (2019) defined incursion, within surveillance capitalism, as the stage in which “dispossession operations rely on their virtual capabilities to kidnap behavioral surplus from the nonmarket spaces of everyday life where it lives” (p. 138). It occurs through the embedding of surveillance technologies into undefended space such as laptops, phones, e-mails to friends, walks in the park, browsing history, and posted photos (Zuboff, 2019). The second stage of the dispossession cycle, habituation, involves people habituating “to the incursion with some combination of agreement, helplessness, and resignation” (p. 139). During lengthy FTC and FCC inquiries, court cases, and judicial reviews, for example, the techniques of surveillance capitalism become more inflexibly established in people’s lives. The third stage of the dispossession cycle, adaptation, is the creation of “superficial but tactically effective adaptations to satisfy the eventual demands of government

authorities, court rulings, and public opinion” (p. 139) when forced to alter practices by government authorities. The final stage in the dispossession cycle is redirection. During this stage, “the corporation regroups to cultivate new rhetoric, methods, and design elements that redirect contested supply operations just enough so that they appear to be compliant with social and legal demands” (p. 139). Beyond these four stages, the constantly improving personalization and free service attracts and sustains users as behavioral surplus is extracted and machine learning algorithms generate commoditized prediction products.

In addition to conditioning the public to embrace surveillance capitalism through the dispossession cycle, the logic and operations of surveillance capitalism vary in significant ways from those of neoliberalism. According to Zuboff (2019), Google’s path to converting investment into revenue came in the form of translating nonmarket interactions with users “into surplus raw material for the fabrication of products aimed at genuine market transactions with its real customers: advertisers” (p. 93). The raw material (human experience), product (behavioral surplus), and consumers in this novel market chain help set it apart from traditional, capitalist market chains, where the real customers are people. In contrast to the means of production in capitalism, surveillance capitalism also employs machine intelligence which “differs fundamentally from the industrial model, in which there is a tension between quantity and quality. Machine intelligence is the synthesis of this tension, for it reaches its full potential for quality only as it approximates totality” (p. 95).

The products manufactured in surveillance capitalism are prediction products generated from the endless stream of free raw material (human experience). They are processed with machine intelligence to estimate future behaviors, thoughts, and actions in order to reduce risk for the customer (advertisers). Ideally, for surveillance capitalists, machine intelligence will

improve in quality as it reaches a level of totality and certainty in which human free will is replaced by prediction and control (Zuboff, 2019). This fully technocratic and dystopian eventuality has its critics, though. Doctorow (2016), for example, claimed the thought of eventual displacement of free will and rational human faculties with algorithmically directed behaviors is no different than “a mind-control ray out of a 1950s comic book, wielded by mad scientists whose supercomputers guarantee them perpetual and total world domination” (para. 30).

Rather than sophisticated mind-control, Doctorow claimed surveillance capitalists use one of four strategies to affect thought and behavior. The first is segmenting, or targeting individuals based on the substance of recent actions like purchases, emails, or articles read. The second is deception. Deception may involve finding desperate or unsophisticated customers for unethical or predatory businesses or arranging people who have been deceived into following false beliefs and narratives into communities. The third strategy is domination, which most often occurs through monopolistic control over particular online actions. Google, for example, exercises a near-monopolistic dominance by accounting for 86% of all web searches, according to Doctorow (2016). This level of domination over search plays a significant role in shaping beliefs, but also in justifying the secrecy Google prioritizes for its algorithm design. The fourth and final strategy is bypassing rational faculties, which comes the closest to mind control. This includes technologies like countdown timers on purchase completion pages and the use of intermittent reinforcement schedules in games and other applications.

In the current marketplace where prediction products are sold, Zuboff (2019) explained “any actor with an interest in purchasing probabilistic information about our behavior and/or influencing future behavior can pay to play in markets where the behavioral fortunes of

individuals, groups, bodies, and things are told and sold” (p. 96). Whether Zuboff or Doctorow is proven right in the future, however, this current marketplace and its prediction products have established a new, highly influential center of economic power with designs for education transformation. The influence even extends beyond Silicon Valley to more established education companies. Pearson Inc.’s Chief Operating Officer and Chief Technology Officer, Albert Hitchcock, for example, envisioned transforming the company into the “Netflix of education” with a single, global platform capable of delivering personalized learning experiences to students (High, 2018).

### **Surveillance Capitalism and Education**

Zuboff (2019) explained that the growth of surveillance capitalism depends on the expanded use of data extraction technologies, under the extraction imperative, capable of expanding the collection of behavioral surplus. The future of this process was described by Eric Schmidt, ex-CEO of Google, as he sat next to Facebook COO Sheryl Sandberg and Marissa Mayer in 2015, at the World Economic Forum in Davos, Switzerland. In response to a question regarding his thoughts on the future of the internet, Schmidt answered:

[t]he internet will disappear. There will be so many IP addresses...so many devices, sensors, things that you are wearing, things that you are interacting with, that you won't even sense it. It will be part of your presence all the time. Imagine you walk into a room and the room is dynamic. (p. 197)

It makes sense with the necessary expansion of surveillance capitalism technologies to extract increasing amounts of behavioral surplus that the school would eventually become a site of intervention. K12 Inc. recently boasted in its online newsroom, for example, that its big data team won a “Baltimore Orioles Hackathon”. The big data team at K12 Inc. is tasked with

focusing “on analytics and adaptivity, predicting at-risk students from an engagement and academics perspective and devising differentiated paths for students depending on their proficiency within the curriculum” (K12 Inc., 2016, para. 4). The Hackathon, in which K12 Inc.’s data scientists analyzed large data sets in order to develop an actionable plan to get a batter out, was sponsored by the Baltimore Orioles and prior employer of NSA whistle blower, Edward Snowden, Booz Allen Hamilton.

In 2013, Max Ventilla, a technology entrepreneur and former executive from Google, opened the AltSchool, employing personalized learning in “micro-school communities” (Williamson, 2017). With a background in network technology and big data, but no background in education, Ventilla designed the platform of AltSchol “to support a particular cultural vision of education as being ‘personalized’ around each individual” (p. 11). Situating surveillance capitalism’s aspect of personalization in this model, Williamson (2017) wrote:

Google search results are automatically personalized to each user based on their web search history. The Facebook timeline is personalized around the friends graph it constructs about each user’s social network connections. The logic of personalization drives the ways in which social media platforms make recommendations for people to follow, consumer goods to buy, memes to share and so one. (p. 11)

Ventilla’s use of personalization in for-profit schools that compete with traditional public schools was another innovation in Friedman’s (1995) call to reform public education through a technological revolution. According to Williamson (2017) engineering and design teams at AltSchool used their “social media expertise in data dashboards, algorithmic playlisting, adaptive recommender systems and app development to the development of new personalized edtech devices and platforms” (p. 12). Williamson (2017) boasted:

[t]he datafication of education prototyped by AltSchool, and other startup school models, is not just a technical accomplishment but the product of a financial investment model for Silicon Valley startups that has been trialled in other sectors, transplanted into education, and appears to be on the cusp of being scaled-up as a competitive market solution to the problem of mainstream schooling. (p. 12)

This description engenders an enthusiasm of an imminent and surveillance capitalism-based solution to *A Nation at Risk's* narrative of failing public education and the fulfilment of Friedman's vision.

Three years after the founding of AltSchool, Facebook announced a partnership with Summit Public Schools, a network of charter schools in Silicon Valley. Like AltSchool, the Summit Public Schools partnership was focused on a student-centered learning system and a personalized learning platform. In describing the platform, Williamson (2017) echoed aspects of Skinner's 1950s promotion of the teaching machine when he said:

[b]y tracking students' engagement and progress on each of the courses, the system automatically adapts to allow students to 'work through playlists of content at their own pace and take assessments on demand' and enable teachers to 'use that data to personalize instruction and provide additional support through mentoring and coaching'. (p. 107)

One of the most important aspects of education data science and personalized learning is learning analytics. Williamson (2017) described learning analytics in a manner reminiscent of Zuboff's (2019) description of prediction products, in that it is "software...designed to enable individual students to be tracked through their digital data traces in real-time, to provide automated predictions of future progress" (p. 107).

Siemens (2013) described the use of algorithms in such platforms by saying: “[a] technique, such as prediction of learner risk for dropout, can then lead to an application, such as personalization of learning content to reflect learners’ comfort with the subject area” (p. 1386). In both AltSchool and Summit Public Schools, the use of surveillance capitalism’s core data extraction and algorithmic technologies to improve prediction is recognizable. Whereas Google was compelled through market pressure to move from a non-market, academic milieu to a commercial milieu, though, AltSchool and Summit Public Schools started as for-profit educational models. This occurred through recontextualizing surveillance capitalism’s core technologies, while preserving its practices.

### **The Current State of Surveillance Capitalism’s Education Intervention**

Ultimately, like the aforementioned neoliberal-era educational technologies, AltSchool and Summit Public Schools did not validate Friedman’s vision of for-profit, private sector, technological improvements on the alleged failures of public education. Two years after the publication of Williamson’s book in 2017, in which he touted the scalability of Ventilla’s AltSchool, Ventilla stepped down as CEO and became chairman of the renamed Altitude Learning. The rebranded company would shift its focus to selling AltSchool’s edtech product to existing school systems (Adams, 2019). In addition, AltSchool’s four remaining schools in San Francisco and New York have been assigned new leadership, including an ex-superintendent of a California school district, the first major hire, with an education and not a technology or engineering background (Wan, 2019).

Facebook-partnered Summit Public Schools have stayed open but have endured criticism and protest. According to Strauss (2018), parents in fifteen states have complained about Summit Public School’s negative impact on the way their children viewed school due to excessive screen



time and minimal interaction with teachers and classmates. More directly aligned with surveillance capitalism, however, Strauss (2018) cited a common complaint that:

[d]uring the first two years of the Summit platform, parents at public schools using the program were required to give their consent to the collection of their children’s personal data, but shortly after CZI (Chan Zuckerberg Initiative) took over technical support in March 2017, Summit announced that parents would no longer have that right. (para. 15)

The author went on to point out that, “[a]n extraordinary amount of personal student information is being collected and data-mined by Summit” (para. 16). This raises concern based on Summit Basecamp’s terms of service enabling the sharing of student data with third parties (Brown & Frankel, 2016). This also echoes prior efforts within the tech industry, like inBloom Inc. sharing the personally identifiable data of teachers and students with third party vendors (Parent Coalition for Student Privacy, n.d.) and revelations that Facebook leaked personal data to third-party apps, even after accounts had been deleted (Zuboff, 2019).

More broadly, the process of data extraction and mining is dependent on increased screen time, which is one of the most significant distinctions of surveillance capitalism and another aspect that sets it apart from neoliberalism. One of the primary means for extracting behavioral surplus from the raw material of surveillance capitalism (human experience) is maximizing the time people spend in front of computer monitors. Extraordinary amounts of extracted data are also an aspect of the totality of information awareness that is at the center of surveillance capitalism’s aims.

### **Surveillance Capitalism, Totality, and the Jinhua Xiaoshun Primary School**

To better understand the notion of totality that is imbedded within the logic of surveillance capitalism, it helps to understand the concepts of “Big Other”, “instrumentarian

power”, and “the uncontract”. Zuboff (2019) defines Big Other as “the sensate, computational, connected puppet that renders, monitors, computes, and modifies human behavior. Big Other combines these functions of knowing and doing to achieve a pervasive and unprecedented *means of behavioral modification*” (p. 376). Instrumentarian power “cultivates an unusual ‘way of knowing’ that combines the ‘formal indifference’ of the neoliberal worldview with the observational perspective of radical behaviorism” (p. 376). Together, they:

signal the transformation of the market into a project of total certainty, an undertaking that is unimaginable outside the digital milieu, but also unimaginable outside the logic of accumulation that is surveillance capitalism. The new power is the spawn of an unprecedented convergence: the surveillance and actuation capabilities of Big Other in combination with the discovery and monetization of behavioral surplus. It is only in the context of this convergence that we can imagine economic principles that instrumentalize and control human experience to systematically and predictably shape behavior toward others’ profitable ends. (p. 382)

Resistance to instrumentarian power, or friction, is elusive due to the unseen process of behavioral modification. Prediction products derived from behavioral surplus are auctioned to third parties, who bet on what people will do in the future. These bets are developed into pricing, incentive structures, and monitoring and compliance regimes in which “surplus drawn from...experience is repurposed as the means to shape and compel...experience for the sake of guaranteed outcomes” (p. 217).

The entire process occurs while the uninformed and unaware individual believes he or she is free. This represents a distinction of surveillance capitalism from neoliberalism and traditional forms of market capitalism, the loss of reciprocity. Reciprocities between capitalism

and people and societies date back to Adam Smith's descriptions of the balance between price increases and wage increases and Henry Ford's five-dollar day and emphasized mutual benefit between business, employee, and customer (Zuboff, 2019). The surveillance capitalist demand for unimpeded freedom and total control through instrumentarian power renders reciprocity obsolete and replaces it with "a totalizing collectivist vision of life in the hive, with surveillance capitalists and their data priesthood in charge of oversight and control" (p. 21).

One possible outcome of this process is the annihilation of the contract or, as Zuboff (2019) refers to it, the creation of an "uncontract". According to Zuboff (2019), "The uncontract is not a space of contractual relations but rather a unilateral execution that makes those relations unnecessary" (p. 220). The uncontract displaces the social component from the historical concept of the contract with manufactured certainty from machine intelligence, compelling engineered behaviors that advance commercial objectives and aid "surveillance capitalism's growing ambitions in the annexation of 'reality' to its kingdom of conquered human experience" (p. 220). With the potential for the ubiquitous computing of the future that Schmidt implied, the uncontract can serve as the foundation for a number of scenarios, including the "for-profit city", where schools like Summit might exist, with increased freedom and opportunity to thrive.

Dan Doctoroff, a former private equity financier, CEO of Bloomberg, and deputy mayor of New York City in the Bloomberg administration was acting CEO of Sidewalk Labs, a company under the umbrella of Alphabet, Google's holding company. According to Zuboff (2019), Doctoroff and Sidewalk Labs had plans for "recasting our central gathering place as a commercial operation in which once-public assets and functions are reborn as the cornered raw materials earmarked for a new marketplace" (p. 227). This new concept would resituate the data extraction and prediction imperatives from the incursion devices in the dispossession cycle to an

actual city infrastructure colonized by ubiquitous sensor-enabled and data extracting technologies. Within this city, the values of surveillance capitalism would permeate all aspects of life and radically expand behavioral surplus to be processed through proprietary algorithms for new prediction products. According to Zuboff (2019), “[a]lgorithms designed to maintain critical behaviors within a prescribed zone of action would manage these data flows” (p. 228) as the city’s occupants remain none-the-wiser. The public commons that was the traditional city, now populated with endless flows of experiential raw data, would be conquered by corporate power in a resounding new precedent for neoliberalism and Friedman’s aspirations. More importantly, computational truth and certainty would eventually render historical social constructs like politics obsolete in this new, for-profit city.

Efforts in China to develop 5G technology, social credit scores, biometric identification systems and other technologies serve as an example of progress in the direction of surveillance capitalism’s aims. These technologies along with those of the Jinhua Xiaoshun Primary School are incipient expressions of Eric Schmidt’s 2015 Davos prediction that the internet would disappear due to “so many devices, sensors, things that you are wearing, things that you are interacting with” (Zuboff, 2019, p. 197). The Jinhua Xiaoshun Primary School in eastern China has introduced methods of data extraction resembling those of surveillance capitalism without significant resistance from students or parents. At the start of each day, students at the school put headwear on that measures electric signals from neurons and translates that data into a score, using an algorithm.

The headwear, developed by U.S.-based startup BrainCo Inc., uses three electrodes – one on the forehead and two behind the ears – to detect brain activity and transmit that data to the teacher’s computer as well as share it with parents through an app. The software generates real-

time alerts about students' attention and focus levels and provides an analysis at the end of each class. In addition, lights appear in different colors on the front of the headwear, indicating level of attention. According to Wang, Hong, and Tai (2019), a red light indicates a student is deeply focused; a blue light indicates the student is distracted; and a white light indicates the student is offline. All lights are visible to all students at all times.



Figure 2 (Wang, et al., 2019)

The goal of the technology, according to Max Newlon, president of BrainCo's U.S. office, is to turn teachers' intuition about what students are engaged and what students are not into a measurable metric (Wang, et al., 2019). With attention represented by data directly extracted by the headwear and viewable by parents and teachers in real time, students have expressed concerns they feel regarding pressure to focus harder in class, read louder, and behave in ways that will generate better real-time, algorithmically generated scores, so as not to disappoint their parents and teachers (Wang, et al., 2019).

Additionally, the authors described how, from kindergarten through higher education, "digital cameras scan students, detecting them raising their hands or chatting behind the teacher's

back, and facial recognition robots take attendance and quiz toddlers” (para. 7). Other technologies are used as well, including Bluetooth wristbands to measure heart rates. The authors (2019) claimed:

[t]his increasingly aggressive and sometimes intrusive use of high-end technology in education is pivotal to Beijing’s goal to make the AI industry a fresh driver of economic expansion. Virtually unobstructed access to a potential sample pool of 200 million students allows Chinese scientists and researchers to amass an unrivaled database, which is indispensable to develop advanced algorithms. That provides a key advantage for China in an ongoing race with the U.S. for global dominance in the field. (para. 8)

The attitudes of the Chinese population that accepted this technology stands in stark contrast to attitudes of Americans that rejected it with AltSchool and Summit. Wang et al. (2019) quoted Gao Yuan, head of educational research at BrainCo. in China, who claimed “[p]arents in China value education highly, and because of the competitive environment, they are willing to try anything that could possibly help their children” (para. 19). These distinguishable attitudes, however, are theoretically modifiable toward various ends through the technologies of surveillance capitalism and their capacities to nudge the thoughts, emotions, and behaviors of large populations.

### **The Need for a Critical Theoretical Critique of Surveillance Capitalism’s EdTech**

Andrew Feenberg’s Critical Theory of Technology (1991) was developed during the neoliberal era, in part, as a reaction to its technologies. The theory conceptualizes technology as human-controlled as well as embedded with an assortment of values that contend with one another prior to its final determination in both form and use. Feenberg (2002, 2005, 2015) applied his theory to online education and educational technology throughout its emergence in

the neoliberal era. Surveillance capitalism's educational technologies, however, represent a clear break from prior educational technologies by following a different set of values and aims. Since these values and aims represent the interests of a new center of technological power, it is necessary to critique them with an updated Critical Theory of Technology that integrates three areas of study that will be discussed in the following chapters.

## CHAPTER III: CRITICAL THEORY AND SURVEILLANCE CAPITALISM

### Introduction

In this chapter I examine Andrew Feenberg's Critical Theory of Technology as a framework for the critique of surveillance capitalism's technologies and educational technologies. The Critical Theory of Technology is robust, but it was created during a certain period of time, in a certain problematic, neoliberalism. As a result, it has largely been applied to technologies of the neoliberal era and needs to be updated and expanded to critique surveillance capitalism's technologies. The Critical Theory of Technology sees the final, determined designs and uses of technologies as a balance of technical and social values and interests. In the past, populations have been able to intervene in the final designs and uses of technologies like the Minitel videotex system in France. Surveillance capitalism, as both a technosystem and technical code, however, is pernicious in that it establishes an imbalance of values and interests in its technological designs that bars social interventions. For this reason, starting by integrating David M. Berry's (2014) *Critical Theory and the Digital* within Feenberg's framework establishes a necessary connection to the core technologies that are appropriated by surveillance capitalism to achieve its ends. Feenberg's notion of capitalism, within which technologies are developed, does not incorporate the concept of the digital, especially as it applies to technologies that have been subsumed by surveillance capitalism. Prior to examining Feenberg, Berry, and surveillance capitalism's technologies, however, it is necessary to discuss the roots of Critical Theory. These roots date back to the early twentieth century and the Frankfurt School, a group of social thinkers and philosophers, associated with the Institute for Social Research. Though Feenberg's work and Berry's work are more contemporary and offer ways to critique more recent technologies, the



original works of Frankfurt School scholars like Horkheimer, Marcuse, and Habermas remain relevant.

### **The Frankfurt School's First Generation: Horkheimer, Adorno, and Marcuse**

The first generation of the Frankfurt School and the formation of Critical Theory dates back to 1930 with Max Horkheimer's appointment as director of the Frankfurt School.

Horkheimer prioritized moving the institute away from the limited scope of his predecessor, Carl Grunberg's historical and theoretical approach to capitalist and socialist economies and workers movements. Horkheimer, instead, broadened the range of research into:

a programme of *interdisciplinary study* in which 'philosophers, sociologists, economists, historians and psychologists must unite in a lasting working partnership...to do what all genuine researchers have always done: namely to pursue the great philosophical questions with the most refined methods. (Held, 1980/2004, p. 32)

To carry on with this interdisciplinary approach within the Marxist framework established by Grunberg, Horkheimer worked with a range of academics, including Theodor Adorno, Herbert Marcuse, and Jurgen Habermas. In characterizing the nature of the research conducted by these figures, Held (1980/2004) claimed "[c]ritical of both capitalism and Soviet socialism, their writings pointed to the possibility...of an alternative path for social development" (p. 13). The purpose of theory in their research became the establishment of a path beyond the contradictions of the existing order and a potential future state with a more developed consciousness and active political involvement (Held, 1980/2004).

Among the issues that were the focus of the Frankfurt School's research, was instrumental reason (previously known as rationalization) and its relationship to technology and domination. According to Held (1980/2004), there were two primary aspects of Max Weber's

concept of rationalization that the Frankfurt School adopted and extended within its analysis. Predating Pentland's research into technologies for transforming human social behavior into "highly predictive math" (Zuboff, 2019), the first aspect was "the growth in mathematization of 'experience and knowledge'...(and) the extension of (scientific) rationality to 'the conduct of life itself'" (p. 64). The second aspect was the notion that "the secularization of life leads to a growth of means-end rationality, whereby there is 'the methodological attainment of a definitely given and practical end by the use of an increasingly precise calculation of...means'" (p. 64). Each generation of Frankfurt School scholars situated rationalization/instrumental reason within their own version of Critical Theory.

Horkheimer and his colleagues at the Frankfurt School generally perceived technology and technological rationality, each as a form of instrumental reason, as instruments of domination (Kellner, 1998). In discussing "technical rationality", as a form of instrumental reason in *The Dialectic of Enlightenment*, for example, Horkheimer and Adorno (1944/2002) argued that standardized forms, whether in media or technology, derive from the needs of consumers and tend to be accepted with little to no resistance in a process that benefits the powerful. This process occurs with a "[t]echnical rationality (that) is the rationality of power" and represents "the compulsive character of a society alienated from itself" (p. 95). Horkheimer and Adorno (1944/2002) made clear, however, that this domination through technology was not attributable to technology, alone, however, and had more to do with technology's function within a capitalist economy.

Marcuse later updated Marx's market rationality with his notion of "technological rationality" in describing the ways social life not only depends on science and technology but also mirrors scientific and technical procedures (Feenberg, 2017). The consequence of thought

and behavior corresponding with established forms of rationality, according to Marcuse (1964/2002), is a “false consciousness” in which “the most destructive and oppressive features of the enterprise” (p. 149) are justified and absolved. Speaking more directly to instrumental reason and technology, Marcuse (1964/2002) argued:

[t]oday, domination perpetuates and extends itself not only through technology but *as* technology, and the latter provides the great legitimation of the expanding political power, which absorbs all spheres of culture.

In this universe, technology also provides the great rationalization of the unfreedom of man and demonstrates the ‘technical’ impossibility of being autonomous, of determining one’s own life. (p. 162)

The theft of autonomy through technological domination within surveillance capitalism occurs through the denial of the right to a future tense. The right or claim to a future tense, according to Zuboff (2019), is based on a human commitment to the construction of a future that is not possible without will and the keeping of promises. The rise of surveillance capitalism, according to Zuboff (2019), marks:

a moment in history when the elemental right to the future tense is endangered by a panvasive digital architecture of behavior modification owned and operated by surveillance capital, necessitated by its economic imperatives, and driven by its laws of motion, all for the sake of its guaranteed outcomes. (p. 331)

Though the denial of a future tense echoes Marcuse’s (2002) “‘technical’ impossibility of being autonomous, of determining one’s own life” (p. 162), eliminating behavioral surplus and algorithms from popular technologies is neither realistic, practical, nor a necessarily appropriate remedy. Surveillance capitalism represents a concerning new economic logic and power,

imposed on human beings and societies, but the technologies it employs are not limited to its aims.

### **The Frankfurt School's Second Generation: Habermas**

Jurgen Habermas, who served as director of the Frankfurt School following Horkheimer, redirected the institute's focus and the place of instrumental rationality while marginalizing technology. According to Held (1980/2004), Habermas sought to synthesize an understanding of Marx and Freud in order to "investigate capacities for the eradication of barriers to self-reflection and communication...(and) elaborate both a general model of individual development and a model of the development of forms of social integration" (p. 277). Habermas argued that the rationality of "systems" repressed human needs and became a stronger determining force in distorted communication than Marx's critique of production and labor (Held, 1980/2004). Such distortions occurred when there was an imbalance between the "system" and the "life-world" (Habermas, 1973/1992).

The life-world and the system exist within established boundaries that are based on what they thematize within societies. According to Habermas (1973/1992), the life-world perspective thematizes "the normative structures (values and institutions) of a society" (p. 4). The analysis of states from a life-world perspective examines "[t]heir dependency on functions of social integration" (pp. 4-5). In contrast, the system perspective thematizes "a society's steering mechanisms and the extension of the scope of contingency" (p. 5) within organized social relations. The steering of the life-world by the system occurs according to the instrumental rationality of the system. An analysis of events and states from a system perspective involves "their dependency on functions of system integration...while the goal values serve as data" (p. 5). Habermas argued:

[i]f we comprehend a social system as a life-world, then the steering aspect is screened out. If we understand a society as a system, then the fact that social reality consists in the facticity of recognized, often counterfactual, validity claims is not taken into consideration. (p. 5)

There is not so much an emphasis on the need for revolution within this framework as there is a concern for known and recognized boundaries between the life-world and the system.

Recognizing these boundaries between surveillance capitalism as a system and the lifeworld of social relations that exist outside of it is a good starting point for further examination. By doing so, new potentials, discussed in Chapter 4, emerge for alternative forms of engagement with personal data and algorithms.

### **Habermas and Online Education**

Though technology was not a part of Habermas's revised Critical Theory, his life-world and system critique has informed thinking in regard to educational technology. Nichols (1989) argued that a system of purposive-rational action, prescribed by Habermas, was possible in educational technology over thirty years ago. Purposive-rational action is a feature of the designs of educational technology that makes it possible to rationalize the life-world. Educational technology, Nichols continued, should facilitate four functions to facilitate purposive-rational or communicative action directed toward the development of a functioning life-world:

help us competently reach understanding with one another (the cultural function), fulfill appropriate societal norms (the social function), and develop our personalities (the social function), and develop our personalities (the socialization function), and in the process, learners (will) become involved with objective, practical, and emancipatory forms of knowledge. (p. 349)

Tilak and Glassman (2020) described simple content delivery to large numbers of students in distance education today as an impediment to achieving the communicative rationality that is essential to the life-world. The authors argued that “corporate-sponsored instrumental control treats consumers as passive recipients of knowledge” and restricts opportunities for free ideological exchange. Beyond this, Habermas warned that the internet has fragmented the public sphere through special interest groups that influence public opinion, monetization by forces controlling businesses, and the presence of media outlets online (Tilak & Glassman, 2020). These system-based design features of both distance learning and the internet represent the presence of particular sets of values and interests that reject the boundary and supersede the development of a life-world. The range of values that are imbedded within the designs of technology are at the center of Feenberg’s Critical Theory of Technology.

### **Feenberg and the Critical Theory of Technology**

After studying under Herbert Marcuse at the University of California, San Diego, Andrew Feenberg (1991) parted with the Frankfurt School tradition and established his own Critical Theory of Technology, claiming that within the Frankfurt School’s argument:

economic and technical implications have not been worked out far enough to carry conviction. I explore these implications in terms of the concept of ‘real possibility’ or ‘potentiality,’ to distinguish it from mere technical feasibility. I argue that the existing society contains the suppressed potentiality for a *coherent civilizational alternative* based on a system of mutually supporting transformations of social institutions, culture, and technology. (p. 12)

Despite his departure, Feenberg (2017) still acknowledged Marcuse’s prescience in recognizing “American society as a highly integrated system governed by ‘technological rationality’” (p. 41).

Marcuse established the foundation for Feenberg's Critical Theory of Technology by understanding that technological design is determined by capitalist forces that preside over its creation. In addition, he saw the potential for progressive social forces to influence the transformation of technological designs.

Feenberg (2017) was more critical of Habermas's reconsideration of Critical Theory due to its disregard for technology. In addition, Habermas's aforementioned concepts of a "system consisting of the administrations and markets" (p. 42) and a "'lifeworld' based on communicative interaction" (p. 42) were developed during the same period that a new generation of constructivist scholars emerged that attracted Feenberg's attention. These scholars rejected positivism in philosophy of science and determinism in sociology of technology. According to Feenberg (2017), "[p]ositivism and determinism hold that science and technology are value-neutral products of inquiry, exogenous influences on social life. The constructivists argue to the contrary that scientific-technical rationality is through and through marked by social influences and beliefs" (p. 43). Habermas's critique contributed little to this new area of study, particularly since it ignored technology. In addition, and based on Feenberg's more recent constructivist methods (He now refers to the theory he created as "critical constructivism"), Habermas's life-world and system can no longer be distinguished as separate spheres, and social critique is no longer confined to establishing the boundaries between them. Instead, instrumental and communicative rationality interpenetrate in all institutional settings. A theory of that mutual influence is implicit in constructivist methods. (p. 44)

Despite this critique of Habermas and his Critical Theory, Feenberg still found value in aspects of Frankfurt School Critical Theory, particularly with Marcuse.

According to Feenberg (2005) the Critical Theory of Technology “combines insights from philosophy of technology and constructivist technology studies” (p. 47) and argues “[t]echnologies have distinctive features as such while also exhibiting biases derived from their place in society” (p. 47). Additionally, the biases of technologies reveal the potential for the presence of values in their designs. This maintains the element of Marcuse’s (1964/2002) earlier argument that “technology has rendered possible the *translation of values into technical tasks* – materialization of values” (p. 236). In a capitalist system, the values materialized in technological designs benefit the capitalist class in power. The prevailing forms of technology, Marcuse argued, are thus “subject to the same form of demystifying critique that Marx applied to the market” (Feenberg, 1991, pp. 68-69). Feenberg sought to establish Marcuse’s insights as foundational while pursuing a coherent civilizational alternative that emphasized social and democratic interventions into the designs of technology. To do so, he both accepted and rejected aspects of three theories of technology: the instrumental theory of technology, the substantive theory of technology, and technological determinism.

### **The Instrumental Theory of Technology**

The instrumental theory of technology is the most widely accepted view of technology, assuming “the subject of action...can be defined independently of its means” (Feenberg, 1991, p. 65). A critique of the instrumental theory of technology as an iteration of Critical Theory’s instrumental reason or technological rationality, according to Marcuse (Held, 1980/2004), helps to demystify capitalist technologies that are value-laden. According to Feenberg (1991), the instrumental theory of technology sees technology as human controlled, as does the Critical Theory of Technology, but unlike the Critical Theory of Technology, “‘neutral’ and without valuative content of its own” (p. 5). Additionally, within instrumentalism, social values compete



against technological efficiency for optimization, without the possibility of either shared optimization or value-laden social interventions into design (Feenberg, 1991). This provides a presumption of technological neutrality within the designs and uses of technology that the values and interests of power can find expression through. The domination that, in the case of instrumentalism, imposes itself on human autonomy and culture through public assumptions of neutrality is positioned differently and less obscured in the substantive theory and determinism.

### **The Substantive Theory of Technology**

The substantive theory of technology, according to Feenberg (1991), proposes that once a society determines to use technology, technology rapidly comes to dominate that society and its culture. Additionally, technology no longer serves as a means toward desired ends but becomes an environment and a way of life. To better explain the theory, Feenberg (1991) referred to two figures whose work was done outside of the Frankfurt School, Jacques Ellul and Martin Heidegger, who argued:

technology constitutes a new type of cultural system that restructures the entire social world as an object of control. This system is characterized by an expansive dynamic which ultimately mediates every pretechnological enclave and shapes the whole of social life. (p. 7)

Ellul argued that “‘technical phenomenon’ has become the defining characteristic of all modern societies regardless of political ideology” (p. 7). Heidegger added to Ellul’s dystopian implication of the dehumanizing aspect of technology’s role in modern societies. He argued “[w]e are engaged...in the transformation of the entire world, ourselves included, into ‘standing reserves,’ raw materials to be mobilized in technical processes” (p. 7). Technology, seen through the lens of substantivism, has technologically-specific valuative content, unknown to its human

users. It is also autonomous or free from human control (Feenberg, 2003). Surveillance capitalism's aim of a collective order based on total predictive certainty that is brought forth by data extraction and algorithmic technologies is arguably an exercise in substantivism.

### **Technological Determinism**

Technological determinism, according to Feenberg (1991), is based on the premise “that technology has its own autonomous logic of development” and “cannot be integrated to a variety of social systems and cultures, but is an invariant element that, once introduced, bends the recipient social system to its imperatives” (p. 122). In doing so, “[t]echnological progress appears to follow a unilinear course, a fixed track, from less to more advanced configurations” (Feenberg, 1999, p. 177). The social system that is bent to its imperatives, however, does not become entirely controlled by them, distinguishing determinism, with regard to valuative content, from substantivism and, with regard to its assumption of technological autonomy, from the Critical Theory of Technology.

Though often a point of dispute, Karl Marx is perhaps the most prominent, historical figure associated with technological determinism. Some historians have claimed that in believing “machines make history” Marx was a determinist (Mackenzie, 1984, p. 476), though others have disagreed. Mackenzie (1984) argued that the only way for Marx to be considered a determinist is to interpret the forces of production, in his writing, as the equivalent of technology. In addition, their development would have to be taken as autonomous or independent of the relations of production. Feenberg (1991) acknowledged this ambiguity but added, in accordance with his Critical Theory of Technology, that the classification of both work relations and technologies as forces of production are also contingent on social interests.

The figure below is an illustration of the relationship between instrumentalism, substantivism, determinism, and the Critical Theory of Technology:

Technology is:	Autonomous	Humanly Controlled
Neutral (complete separation of means and ends)	Determinism (e.g. modernization theory)	Instrumentalism (liberal faith in progress)
Value-laden (means form a way of life that includes ends)	Substantivism (means and ends linked in systems)	Critical Theory (choice of alternative means-ends systems)

Figure 1 (Feenberg, 2003)

As demonstrated, the Critical Theory of Technology both shares and rejects aspects of instrumentalism, substantivism, and determinism in terms of technological autonomy, valuative content, and the assumption of technology as a destiny. According to Feenberg (1991), it “rejects the neutrality of technology” while acknowledging “values and interests of ruling classes and elites are installed in the very design of rational procedures and machines even before these are assigned a goal” (p. 14). This description also aligns with Feenberg’s concept of the technical code, described in the following section. Despite the inevitability of absolute control through technological design, however, he argued “technology is not a destiny but a scene of struggle...a social battlefield, or...a parliament of things on which civilizational alternatives are debated and decided” (p. 14), leaving space for both alternative valuative content and social control.

## The Technical Code

The conflicting interests and values in the “scene of struggle” and “social battlefield” that eventually settle and organize in the value-laden designs of technologies are associated with what Feenberg (1991) conceptualized as the “technical code”. In this section, I define the technical code and also argue that surveillance capitalism is a technical code. In the *Critical Theory of Technology*, technical codes determine the interests that specific technological designs serve. Feenberg (1991) originally described how these codes “invisibly sediment values and interests in rules and procedures, devices and artifacts that routinize the pursuit of power and advantage by a dominant hegemony” (p. 14). In surveillance capitalism, this invisible and hegemonic sedimentation of values and interests occurs through the dispossession cycle, discussed in Chapter 2. The technical code is “the rule under which technologies are realized in a social context with biases reflecting the unequal distribution of social power” (Feenberg, 2005, p. 47). In surveillance capitalism, the rule(s) under which technologies are realized are the extraction imperative and the prediction imperative. In later writings by Feenberg, however, the unequal distribution of social power was sometimes deemphasized in the definition of the technical code. Hamilton and Feenberg (2005), for example, describe the technical code as the “background of values, assumptions, definitions, and roles that guides technological design”, adding that it:

define(s) a framework of technical decision-making within which certain choices appear rational. These codes are a function of the delineation and circumscription of technological development and design by particular social groups to which the ultimate form of the technology is relative. (pp. 111-112)

Technical codes exist within all technologies throughout society, including those found in education. The scene of struggle throughout most of the history of online learning has pitted the values of neoliberalism against those of teachers and students, but the social battlefield is changing.

### **The Critical Theory of Technology and Education**

To illustrate the importance of the Critical Theory of Technology in discussions of educational technology, I will begin by citing the implications of its absence in common discourse. In an example of flawed, theory-centered assumptions regarding the role of technology, Feenberg and Hamilton (2005) discussed two sides of a debate over online learning within higher education. Both sides assumed the same technological destiny as instrumentalism and substantivism. One side of the debate saw online education “as a concatenation of tools that impose certain adaptations and structural adjustments” that, if aligned “with particular economic interests is regarded as merely incidental” (p. 105). In the argument, the instrumentalism of online education acts as a cover for a technical code that stands to benefit economic interests over alternative interests. The inference of technology as a destiny can be made as well with its acceptance of impositions (adaptations and structural adjustments) and casual disregard of incidental economic interests.

The opposing argument presented “a socio-political account of the dynamics of corporate power in the contemporary university” (p. 105). In this argument “[o]nline education is seen as a lever of neoliberal reform” in which “technology has supplied capital with a powerful means of integrating and transforming a site of social practice previously independent of markets and economic production” (p. 105). The perceived inevitability of for-profit online education in higher education in this argument illuminates both technology and neoliberalism’s domination of

a cultural “social practice” previously found on university campuses. It is a natural, if not inevitable, step for market forces to play a determining role in the sorts of technology that are used on college campuses, without discussion of the values embedded within their designs. The exclusion of aspects of the Critical Theory of Technology in both arguments results in a false dichotomy of two limiting theories. The following example of Minitel demonstrates a potential that emerges from the rejection of such limitations and subsequent impositions.

***Minitel as an Example of Social and Value-Laden Intervention***

An example of a quasi-educational technology from the early 1980s that became popular by allowing social and value-laden interventions into its design and use was Minitel, the French government’s version of videotex. Feenberg (1995) describes Minitel as:

an on-line library that stores ‘pages’ of information in the memory of a host computer accessible to users equipped with a terminal and modem. Although primarily designed for consultation of material stored on the host, some systems also give users access to each other through electronic mail, ‘chatting,’ or classified advertisements. (p. 145)

Videotex failed to gain popularity in the United States and in European countries with the exception of France, where their videotex brand, Teletel, grew into the “largest public videotex system in the world with thousands of services, millions of users, and hundreds of millions of dollars in revenue” (Feenberg, 1995, p. 146). The distribution of six million “Minitels” (free terminals for accessing videotex) by the French government resulted in six million terminals connected to a network that the French population engaged with in a manner contrary to the intended manner of the technology’s original designers. In this regard, it serves as an ideal example of a fully realized potential for social intervention and transformation.

The French government, Feenberg (2002) claimed, wanted to modernize French society by granting citizens access to the information offered by videotex. The telephone company technocrats who initially conceived of the technology placed human communication through networked Minitel systems “far down on the list of priority functionalities” (p. 119). Hackers, however, opened the network and made human communication one of its central functions. Elucidating a central tenet of his Critical Theory of Technology that would emerge later, Feenberg (2002) wrote “[t]his case is emblematic of the democratic transformation of technical networks by the human actors they enroll, innovating novel social forms” (p. 119). In addition, Feenberg (1995) claimed the reason Minitel thrived as other countries’ efforts with similar technology failed was the social interventions enabled by hackers that aroused public interest as well as three factors unique to French culture: “(1) [a] specifically French politics of modernization; (2) the bureaucracy’s voluntaristic ideology of national public service; and (3) a strong opposition to political culture” (p. 146).

The story of Minitel’s success established two informative points with regard to the presence of social values within technological design and use. The first is the role that ideology plays in determining the perception of social intervention into technological design as viable or meaningful. The second is that the intentions of technological design by industry and technology developers can be negated by these social interventions. This serves both consumers and capitalists in that research and development, in a sense, is outsourced to voluntary labor. To elaborate, if innovation was exclusively delegated to experts, technocrats, and engineers, an avenue of discovery and innovation would be blocked. Finally, Minitel’s transformation into a kind of open source communications technology demonstrates a negotiation and reciprocity

between populist values and industry that Zuboff (2019) suggests exists outside the logic of surveillance capitalism.

The example of Minitel is essential when describing the relationship between the Critical Theory of Technology and the instrumental theory of technology. In reality, according to Feenberg (1991), “subjects and means are dialectically intertwined” (p. 65). To further develop this idea, Feenberg (1991) said of the carpenter and his hammer that they:

appear accidentally related only so long as one does not consider carpentry as a vocation shaping the carpenter through a relation to the tools of the trade. Hence, the division of labor is a civilizational issue, affecting not merely workers’ productivity and working conditions but their very identity. (p. 65)

He then moved beyond the individual to explain the dialectical relationship of actor and means in terms of collective action, by claiming:

the army is not merely accidentally related to its weapons, but is structured around the activities they support. Similarly, the school does not ‘use’ its teachers or their knowledge as means to its educational goals, but is constituted qua actor by these ‘means.’ In such cases, the agent *is* its means of action viewed from another angle; they are not accidentally related. (p. 65)

According to Feenberg (2018), the values embedded within technology are socially specific as opposed to technocratic abstractions like efficiency and control. This provides opportunity for social interventions into the designs and uses of technology as was observed in the case of Minitel’s transformation from an information resource to a communication platform in France.



As the example of Minitel also suggested, technology “can frame not just one way of life but many different possible ways of life, each of which determines a different choice of designs and a different range of technological mediation” (p. 62).

The example of Minitel’s transformation, when considering the possibility of interventions and transformation of surveillance capitalism’s technologies, is an oversimplification. Surveillance capitalism’s (educational) technologies that are guided by the data extraction and prediction imperatives and machine learning algorithms limit social access to the spaces in which interventions can impart new, democratic, and value-laden transformations. The nature of black box algorithms that are used by major institutions today make interventions like the Minitel intervention implausible. In the 1980’s, modernizing French society by granting citizens access to the information offered by videotex was a priority, and communication through the network was not. Today, secrecy and the protection of proprietary algorithms is a well-established priority that makes similar interventions through hacking far less likely. Pasquale (2015) spoke of this reality when he described these algorithms as “devised by legions of engineers and guarded by a phalanx of lawyers” (p. 6).

### ***Instrumental Reason and Surveillance Capitalism***

With the capture of human experience and aim of total predictive certainty at the center of surveillance capitalism’s charge, it is necessary to see this new technical code as an addendum to neoliberalism as well as a mutation and augmentation of “the capitalist project of domination”. The dominance of instrumental reason has made the Critical Theory of Technology an essential framework for new debates and examinations of the valuative content and control that is embedded within the novel designs of surveillance capitalism’s technologies. Just as the technologies of surveillance capitalism’s extraction and prediction practices maintain an

unhackable aspect, they also revive notions associated with instrumental, determinist, and substantivist frameworks of development. This requires an updated Critical Theory of Technology that does not end with emphasizing the inevitability of social interventions, but details the necessary agency required for interventions to occur under such circumstances.

Just as the hacking of Minitel required a prerequisite knowledge base among the population, surveillance capitalism requires new knowledge be added to update the framework of the Critical Theory of Technology. With this new knowledge added, the application of the Critical Theory of Technology to surveillance capitalism's educational technology might reconfigure the balance of power within its technical code. In doing so, it would reject determinism's "fixed track" and substantivism's objectification of humans as "raw materials to be mobilized in technical processes" (Feenberg, 1991, p. 7). One possibility for this new code, if successful, could be prioritizing the social power of teachers and students at the start of, and throughout, the technological design and implementation process. To do so, issues like profit motive, access to personal data, and effects on student and teacher agency would be considered. A starting point for this is recognizing surveillance capitalism as not just a technical code that influences the designs of technology, but also as a "technosystem".

### **Surveillance Capitalism's Educational Technologies and the Technosystem**

Surveillance capitalism, as a technical code, has influenced the reconfiguration of educational technologies to serve as new means toward its conquest of human experience as free raw material. In addition to serving as a technical code representing the dominant values within an unequal distribution of social power, it also matches the description of the technosystem, an idea borrowed from Ihde (1990) and developed by Feenberg (2017). Feenberg (2017) defined the technosystem as "a field of technical practices aimed at control of the environment, whether

natural, economic, or administrative. To that end the environment is interpreted and structured as an ensemble of sociotechnically rational functions” (p. 159). The technical practices of surveillance capitalism described in Chapter 2 have clearly established aims at eventual control of all aspects of social life within all environments, including education.

The sustained power and existence of the technosystem (and surveillance capitalism as a technosystem) is challenged by the social process of functionality, according to Feenberg (2017). Functionality is defined as “a social process in which the technical mentality meets cultural or political desiderata and constraints in the design of concrete artifacts or systems” (Feenberg, 2017, p. 160). An initial abstraction, according to Feenberg (2017), within the development of technosystem technologies “leaves behind the richness and complexity of both lived experience and the human subject” (p. 160). Ultimately:

[t]he various compensatory aspects of functionalization, the infusion of the object with values and meaning, cannot completely overcome the simplifications of the original abstraction. The residue excluded by functionalization comes back to haunt technical achievements where they fail to take into consideration the most significant dimensions of their objects and contexts. And this failure is inevitable since nature and human life simply cannot be reduced to functional relations. (p. 160)

Thus, the residue produced by functionalization presents the inevitability of humanizing interventions, what Zuboff (2019) refers to as “frictions”, emerging from a Habermasian life-world but reconfiguring the interpenetration of instrumental and communicative rationalities. The aims of surveillance capitalism, within this new terrain, would stall as the possibility of total predictive certainty would be forced to yield to these frictions.

To reinforce Feenberg's constructivist interpenetration of rationalities, a shared knowledge of the technologies that surveillance capitalism exploits to achieve its ends must be integrated into the framework of Feenberg's Critical Theory of Technology. Zuboff's unprecedented examination of surveillance capitalism and its influence on technology was written in 2019. This left little time for Feenberg to offer critique in the way he had for Minitel and online education, both of which had defined means of intervention. In a short, two-page article titled "Postdigital or Predigital" published by Feenberg in 2019, the same year as Zuboff's work, he described the failures of neoliberal educational technologies and minor ways in which the roles and expectations of educational technology have since been reconsidered. He then reviewed the emergence of educational technologies in the 1980s and 1990s, without examination of current digital technologies that are associated in any way with surveillance capitalism. To initiate a critique of surveillance capitalism's technologies with the Critical Theory of Technology, it is first necessary to examine digital and code-based technologies through a critical theoretical lens. These technologies can then be extended past the limitations that Feenberg saw as problematic within Critical Theory and into the Critical Theory of Technology framework.

### **Critical Theory and the Digital**

Whereas the Critical Theory of Technology provided a foundation for social and democratic interventions into the design and use of technology, Berry's (2014) *Critical Theory and the Digital* examined the ways digital and code-based technologies are changing all aspects of social life in today's society. An examination of digital and code-based technologies is necessary, since they are at the center of surveillance capitalism's aims. In contrast to Feenberg's effective description of intervention and transformation in the early 1980s Minitel technology,

Berry (2014) applied his thinking to more recent digital technologies and their organizing role in society. The Frankfurt School's critique of capitalism's dominance of social relations, according to Berry (2014), can be compared to modern societies in which software, data, and algorithms exercise the same or greater levels of control. Berry (2014) argued:

[i]n the same way that studying the mechanical and industrial machinery of the last century can tell us about the organization of factories, geographic movements, materials, industries and processes in industrial capitalism, through the study of code we can learn a lot about the structure and processes of our post-Fordist societies understanding the way in which certain social formations are actualized through crystallization in computer code. (p. 83)

Berry (2014) established early in his study that although the digital has become an increasingly important aspect of our society, adequate means for providing a critical response to its “multifaceted surfaces” have not emerged (p. 11).

The lack of critical response has consequently bestowed upon software engineers the status of wizard, according to David Parnas, who Berry (2011) borrowed from, in claiming “technology is the black magic of our time. Engineers are seen as wizards; their knowledge of arcane rituals and obscure terminology seems to endow them with an understanding not shared by the laity” (as cited by Berry, 2014, p. 50). In a related manner, Zuboff (2019) compared the protected secrecy of machine intelligence operations that create surveillance capitalism's prediction products to a “moat that surrounds the castle and secures the action within” (p. 65). In combining Parnas and Zuboff, we are left with a complete metaphorical tableau. Silicon Valley software engineers are wizards, practicing arcane rituals in castles that are protected by moats.

The challenge in investigating the digital as well as the reason Critical Theory is in a unique position to problematize it is that the digital is “simultaneously technical and social, material and symbolic, but...also a historically located concept, as are its instantiations in concrete computational devices” (p. 50). To demystify the role of the software engineer and render digital code and algorithms accessible, Berry (2014) examined “the very structures of the digital itself, through an active critical engagement with digital code and the way in which it is structured and assembled” (p. 24). In doing so, he demonstrated “how the digital itself needs to be understood within a dialectic of potentially democratizing and totalizing technical power, that is, through notions of control and freedom” (p. 25). In other words, Berry (2014) sought to discover what Feenberg may have referred to as the valuative content of the digital as well as the distribution of social power in its code.

Just as members of the Frankfurt School concerned themselves with the way capitalism occupies and controls social life, transforming it in the process into market relations, Berry (2014) argued computational technology warrants the same concern. The presence of private or state owned or controlled technologies like computer code and algorithms that mediate social relationships have an equally transformative effect on relationships. Berry (2014) called these technologies “code-objects” and “computal objects”, and argued:

[t]hese objects contain the logic of behavior, processing, or merely act as gatekeepers and enforcers of a particular form of rationalization. Similarly, the Frankfurt School sought to map calculative rationalities that emerged in their historical juncture, particularly, instrumental rationality and a tendency towards means-end thinking. (p. 35)

Berry (2014) emphasized the point that Frankfurt School scholars did not see instrumental reason, alone, as the cause of the worst aspects of technological civilization. He argued “it is the

mode in which the process of rationalization is itself organized that accounts for the ‘irrationality of rationality’” (p. 35). This is an essential perspective from which to view the rationality of surveillance capitalism’s technologies and its potential conflict with Feenberg’s concept of functional residue. The problems that the Frankfurt School identified in instrumental rationality – eventual irrationality and domination – are no longer as easily remedied due to the obscurity conjured by the black box and black magic auras of proprietary software engineering within surveillance capitalism’s technical code.

### ***Berry and Reification***

Berry (2014) used an argument of Adorno’s that social relations are historical and produced to comment on digitally mediated social relations. Modern computational structures “that crystallize certain social forms and perpetuate and prescribe them back onto society and individuals in a multitude of ways” (p. 53) magnify the effects of the capitalist arrangement of social relations. The bridge between capitalism’s colonization of social relations and computational colonization of social relations is reification. Lukacs argued that reification involves:

a process whereby social phenomena take on the appearance of things, it is not... simply a subjective phenomena; rather it arises from the productive process which reduces social relations themselves to thing-like relations – reduces, that is, the worker and his or her products to commodities. Reification is a socially necessary illusion – both reflecting the reality of the capitalist exchange process and hindering its cognitive penetration. (Held, 1980/2004, p. 22)

Within new highly mediated, ecologies of code objects, code infrastructure, and coded spaces, according to Berry (2014), a new, automated agency emerges, capable of acting on social

relations. This leads to “a reification of the world and the re-presentation of the world as discrete objects subject to control and management” (p. 122).

### ***Berry Informs Feenberg’s Concept of Reification***

In a discussion of Lukacs’s influence on Horkheimer, Adorno, and Marcuse, Feenberg (2017) described reification as “the reduction of complex and dynamic social relations to apparently law-governed (social) things” (p. 41). Feenberg (2017) then expanded this description by citing Lukacs’s argument that “members of a reified society understand themselves as isolated individuals. As such they cannot change the laws of social life, only use them as the basis of technical manipulations” (p. 41). While Feenberg left the concept of reification largely within its context of social relations within capitalist societies, he briefly extended it into the realm of technology within the concept of the technosystem. “Lukacs’s theory,” according to Feenberg (2017) “makes explicit the technical character of the whole technosystem, including administrations and markets” (p. 149). The actual modern technologies that would be used in a technological society in which computation has the same determining influence on social relations as capitalism are not discussed by Feenberg, though.

Berry (2014) filled the space within Feenberg’s description of reification by describing “web bugs”, “beacons”, and “trackers” as “reification technologies” (p. 132). Web bugs, which are closely related to the other two technologies, are defined as “automated data collection agents that are secretly included in the web pages that we browse” and that “secrete cookies onto your computer so that they can track user behavior, and send various information about the user back to their servers” (p. 134). They are reification technologies in that they convert social relations, experience, and activities into relations between objects, which are code objects (Berry, 2014). In an indirect nod to surveillance capitalism, Berry (2014) warned that these reification



technologies are sometimes aimed at behavioral “nudges” that can range from “libertarian paternalism” to “post-human distributed aids to cognition” or even “collective notions of cognition” (p. 134). More immediately relevant though is the fact that these nudges and behavior modifiers are used to connect users to third parties (advertisers, for-profit data-mining vendors, et al.), within the framework of surveillance capitalism. As a technosystem, however, in which functionality represents the potential for intervention and transformation of digital technologies, Feenberg’s (2017) consideration of Ihde’s gestalt switch, which will be discussed in chapter 4, is a necessary foundation for a new resistance and transformation.

### **Critical Theory of Technology, Critical Theory, and Surveillance Capitalism**

An important aspect of surveillance capitalism within the context of this dissertation is the nature of the theory that informs its practice. Zuboff (2019) warned “a cadre of data scientists and ‘computational social scientists’ has leapt into this void...(with) computational theories and innovations (that) exist in dynamic interaction with the progress of surveillance capitalism” (p. 416). This selective employment of theory, accompanied by a disregard for the social consequences of surveillance capitalism, necessitates the inclusion of the Critical Theory of Technology in the literature. I argue that a Critical Theory of Technology that integrates a critical theoretical examination of the digital technologies that are employed by surveillance capitalism is an important first step. This updated Critical Theory of Technology may then be used to critique and potentially alter the effects that surveillance capitalism’s values have on technological designs, even as they present themselves in educational technology. For example, the conceptualization of “human experience as free raw material” within surveillance capitalism’s feedback loop of theory and practice may be critiqued by connecting Feenberg, Berry, and Adorno.

Feenberg (2017) referenced Adorno's conclusion that "experience in advanced capitalism was so corrupted by commodification and the mass media that it could no longer provide a touchstone of alternative values" (p. 132) to demonstrate capitalism's domination of human experience. The idea of "mass media" can be adapted to the conditions of surveillance capitalism through an examination of computer code and software as a form of media. Berry (2014) described computer code and software as "an extremely rich form of media...(that) differ from previous instantiations of media forms in that they are highly processual. They can have agency delegated to them (revealing a technical code), which they can then prescribe back onto other actors" (p. 123). Within surveillance capitalism, computer code and software, in the form of data extraction and algorithmic technologies, created by companies like Google and Facebook, that have established a presence in education, have the agency Berry (2014) suggested. As a result, human experience, rather than being corrupted by commoditization and mass media, as Adorno suggested, *is* commoditized through the extraction of personal data, which is encoded in media (i.e. software and algorithms). This reality, however, need not be reserved to critique from instrumental, determinist, or substantive frameworks. While the common practice of creating software and algorithms remains in the public domain, so does the potential for embedding alternative social values into software and algorithms.

### **Conclusion**

The perception of surveillance capitalism's aims and technologies as the primary, determining features of an inescapable, dystopian future is one more example in a long history of imagined, technology-oriented dystopias. Its substantive aspects accompanied by the optics of the Jinhua Xiaoshun Primary School in eastern China that was discussed in Chapter 2 add to the perception of inevitability and domination. Surveillance capitalism's fundamental technologies,

software and algorithms, however, remain accessible and not necessarily the exclusive and esoteric domain of “wizards” practicing “black magic” in “castles” surrounded by “moats”. Though the tech industry protects the secrecy of their specific and proprietary software and algorithms from the public, I argue that new conceptual foundations and potentials discussed in Chapter 4 reestablish possibilities for social intervention and transformation. These conceptual foundations and potentials complete the Critical Theory of Technology’s “software update” and even make engineering new software and algorithms based on alternative values possible.

## CHAPTER IV: RESISTANCE AND POTENTIALS

### Introduction

This chapter begins by surveying recent efforts to resist and push back against surveillance capitalism in both education and, more broadly, throughout society. These efforts are representative of a trend that favors external interventions that tend to avoid actual reconfigurations of surveillance capitalism's existing technologies. I claim that we can know what a reconfiguration would look like if two things happen: (1) a gestalt switch and (2) a choice of a past. In so doing, a framework is established for evaluating transformative reactions to surveillance capitalism's technologies. After describing examples of reactions to surveillance capitalism that enable its continuation, I develop a framework for thinking about alternatives along with other options consistent with that framework by examining two conceptual foundations and two potentials for transformation. The first conceptual foundation, mentioned above, is Ihde's gestalt switch, which acts as an alternative to instrumental arguments that may occur within the confines of dominant ideological frameworks ("mythologies", according to Ihde). The second conceptual foundation is the "choice of a past", developed from the work of McClintock and Moretti, that points toward a new educational technology future free from the value-laden designs of practices described thus far in this dissertation.

McClintock and Moretti looked at communications technology in education as an extension of the historical development of consciousness. Going back in history to ancient Greece, for example, McClintock and Moretti demonstrated how a notion of consciousness was developed that required communication since human beings are fundamentally consciousnesses engaging with other consciousnesses. Moretti (2021) cited "a new emergent notion", for example, that "there's a deeper reality behind appearances" (para. 1) that enables us to interpret

reality in a way that was not present in the writings of Homer. Separating this new notion from the writings of Homer reveals the ways consciousness finds expression through communication while also being shaped by it. Moretti further developed this notion by comparing Homer and Herodotus, who “show us the birth of the parameters for understanding” (para. 3). Herodotus used the word “apodeixis”, meaning “display”, communicating that “he’s going to lay out in front of you something you can see” (para. 8). In this form of communication, the rhythmic poetry and dramatic speeches found in Homer were replaced with descriptive representations of scenes. Homer and Herodotus each represented a separate, past potential for consciousness and communication as situated within a specific historical context.

McClintock (2012) also explored notions of consciousness and communication as they relate to the past during a period of his work in which he referred to himself as “the accidental technologist”. Throughout this period, he explored the possibility that “emerging information technologies might serve as historically effective tools for humanistic education” (para. 9). Humanistic education paid particular attention to “the juncture of politics and education as understood by the ancients, the civic humanists, and various European thinkers—Rousseau to the present” (para. 6). The deep, historical tradition of this study aligned with Moretti (2021), who claimed:

[o]ne of the questions you should be asking throughout this History of Communication, and I think you’re already starting to figure it out, is what are the primitive—and by “primitive” I mean basic and fundamental—what are some of the primitive ways that communication gets configured based on natural human energies, and the appropriation and exploitation of them, through cultural and political structures? (para. 16)

I have emphasized, in this dissertation, the ways in which cultural and political structures as well as communication and even consciousness are all increasingly mediated by the digital technologies of surveillance capitalism. According to Berry (2014), “in a similar fashion to the way in which corporations now seek to intervene in consciousness through computational persuasive technologies, the critical theorists identified the way organizations began encroaching upon individuals’ consciousness and unconsciousness” (p. 149). Surveillance capitalism appropriates and exploits human energies and communication as free raw material for data extraction and algorithmic processes. This new reality consequently begs the question of how communication is being configured in basic and fundamental ways.

The gestalt switch and choice of a past support two potentials for expanding the Critical Theory of Technology so it may more effectively critique surveillance capitalism’s technologies, including its educational technologies. It is necessary to take a moment to explain that the term “potential” in this chapter derives from Feenberg’s (1991) “potentiality”, which he used to distinguish his own work from that of the Frankfurt School. Feenberg (1991) used the term “potentiality” to represent “real possibility” as opposed to “feasibility”. The “real possibility”, as defined in Chapter 3 of this dissertation, was for “a *coherent civilizational alternative* based on a system of mutually supporting transformations of social institutions, culture, and technology (p. 12).” Within the chapter’s framework for evaluating transformative reactions to surveillance capitalism, a potential or “real possibility” results in reconfiguration.

The first of the two potentials described in this chapter is the business model of platform cooperativism. The second potential consists of technography and social analytics, two fields of study that enable new forms of involvement with the algorithmic process. Each of these potentials has, within it, aspects of both conceptual foundations, the gestalt switch and choice of

a past, upon which the potential is based. To demonstrate the way platform cooperativism has aspects a chosen past, for example, the Rochdale Principles of 1844 serve as the model for its service over profit business model. Additionally, technography and social analytics have aspects of a gestalt switch in terms of human involvement in the algorithmic process. As both potentials are described later in the chapter, however, it becomes evident that to exist as potentials they require aspects of not just one, but both conceptual foundations.

### **Reactions to Surveillance Capitalism's Technologies**

The rise of surveillance capitalism and its technologies, both in and outside of education, has been met with various efforts to resist and regulate its effects. As discussed in previous chapters, online learning platforms that utilize surveillance capitalism's technologies (e.g. data extraction and algorithms) and share its extraction and prediction imperatives have been met with uncertainty and suspicion, if not outright protest, like in the case of Summit Public Schools. A common oversight best understood as an example of the instrumental theory of technology, however, is the distinction between the technologies that are used and the values that guide their design and use toward specific ends. This section of the chapter begins with a review of various attempts that have been made to resist and regulate the platforms and algorithms that have been repurposed to achieve surveillance capitalism's imperatives. An argument will then be made for the possibility of actual technological transformation through the two conceptual foundations and potentials.

Critical reactions to surveillance capitalism have ranged from guarded concealment from its gaze to a proposed system of monetary compensation for the behavioral surplus freely derived from human experience. Zuboff (2019), for example, described the ways in which “a new

generation of activists, artists, and inventors feels itself called to create the art and science of hiding” (p. 489). These efforts to refine the characteristic of invisibility involve novelties like:

a ‘serendipitor app’ to disrupt any surveillance ‘that relies on subjects maintaining predictable routines’, a clothing line called ‘Glamouflage’ featuring shirts covered with representations of celebrity faces to confuse facial-recognition software, (and, in counter-distinction to the headwear worn by students at the Jinhua Xiaoshun school in China) anti-neuroimaging surveillance headgear to obstruct digital invasion of brain waves. (p. 489)

Outside of these technologies, Andrew Yang has developed the Data Dividend Project, to financially compensate people for the data they provide that is eventually commodified in the form of prediction products. The project is aimed at establishing and enforcing data property rights under laws like the California Consumer Privacy Act (CCPA) and would grant citizens “the ability to collectively bargain and advocate for your data rights and your right to be compensated for the use of YOUR data, which is YOUR property” (Data Dividend Project, n.d., para. 7). This compensation, however, has been criticized for being “so miniscule and ineffective that it would most likely reinforce existing power dynamics that allow data to be extracted and exploited in the first place” (Ongweso, 2020, para. 4).

These efforts have grown in tandem with legal arguments in both the United States and the European Union against the extraction imperative. Legal scholars in the United States have argued that the Fourth Amendment, which protects citizens against unreasonable searches and seizures, may be applied to surveillance capitalism’s imperatives, particularly with regard to the “Internet of Things” (Ferguson, 2016) but have only been able to provide frameworks for future protections against instrumentarian power. In the European Union, in 2018, the General Data



Protection Regulation (GDPR) took effect, requiring tech companies to justify their data activities within the GDPR's regulatory framework (Zuboff, 2019). Some of the regulations within the framework include notifying people when personal data is breached, a requirement to use privacy by design when building systems, and, among others, a right to erasure of data (Zuboff, 2019). The GDPR's privacy requirement by design when building systems as well as other features is a rare example of outside intervention that has potential for value-laden interventions into surveillance capitalism's technical code.

To date, the greatest outside intervention in the United States to the tech industry's dominance occurred on July 29<sup>th</sup>, 2020, when Jeff Bezos, Mark Zuckerberg, Tim Cook, and Sundar Pichai participated in a House Judiciary antitrust subcommittee hearing. The purpose of the hearing was to question the heads of Amazon, Facebook, Apple, Alphabet Inc., and its subsidiary Google with regard to monopolistic business practices. An example of the kind of concerns addressed at the hearing came from U.S. Representative Jerry Nadler approximately one hour into the hearing:

Mr. Zuckerberg...the documents you provided tell a very disturbing story. And that story is that Facebook saw Instagram as a powerful threat that could siphon business away from Facebook. And so rather than compete with it, Facebook bought it. This is exactly the type of anti-competitive acquisition that the antitrust laws were designed to prevent.  
(Rev, 01:01:33)

What was missing from the Representative's question was not the business practice itself but the nature of the business that Instagram was threatening to take from Facebook and the fact that it interfered with Facebook's economic imperatives. Thus, the greater societal impacts of surveillance capitalism's monopolies were not addressed, indicating that even with strong anti-

trust regulation, surveillance capitalism's values and technological designs were shielded by its dispossession cycle from the scope of lawmakers.

### **Reactions to Surveillance Capitalism's Technologies in Education**

In response to concerns over student data in education, in 2014 the Parent Coalition for Student Privacy was established to address the data privacy of students. Actions taken by the group since its creation have consisted of writing letters to Congress to strengthen federal rights to student privacy, writing op-eds, and informing parents of their rights to protect their children's data under federal law. According to the organization's website, the two parent advocates behind the coalition's creation prevented nine states from disclosing their personal student data to inBloom Inc., "a massive student database, with the goal of more easily sharing... information with for-profit data-mining vendors and other third parties without parent notification or consent" (para. 1). Years later, similar controversy emerged as Summit Public Schools, in its partnership with the Chan Zuckerberg Initiative, revoked the parental right to consent to children's personal data being extracted [in "extraordinary amount(s)" (Strauss, 2018)] and data-mined and shared in undisclosed ways. The Parent Coalition for Student Privacy is credited with spreading awareness and starting a larger debate surrounding the issues of school districts engaging in data sharing and the lack of privacy and security protections for students.

Moving beyond the spread of awareness and mobilization of parents to advocate for their children's protection against violations of data privacy, others have suggested direct student action with regard to their data. Glass (2018), for example, suggested that students attempt to download the personal data that has been extracted by the platforms they use. She then suggested that if they succeed, they attempt to delete that data as an exercise, using the online service Data Detox by Tactical Tech, which suggests "[e]veryday steps you can take to control your digital

privacy, security, and wellbeing in ways that feel right to you” (“Data Detox Kit”, n.d.). The site provides information with regard to ways algorithms influence information online, ways to avoid misinformation online, and an activity book for children aged 11-16 years old. The activity book contains four sections:

- Digital privacy, which focuses on reducing data traces and understanding online profiling;
  - Digital Security, with tips on creating strong and secure passwords;
  - Digital Wellbeing, which deals with the addictive nature of smartphones;
  - And finally, Misinformation, a guide for consuming and sharing information online.
- (“Data Detox X Youth”, n.d.)

We can understand these practical forms of resistance as well as others by using the two aforementioned, foundational concepts, the gestalt switch and the choice of a past. These concepts frame potentials that complete the “software update” of Feenberg’s Critical Theory of Technology, as it applies to surveillance capitalism’s educational technologies.

### **First Foundational Concept: The Gestalt Switch**

The nature of the reactions discussed in the prior section to surveillance capitalism and its technologies both in and outside of education signifies a perceivably insurmountable power differential. Artists and activists who are unable to transform the technologies and business models of Google and Facebook have developed ways to render themselves invisible from related technology-based surveillance techniques. Andrew Yang’s Data Dividend Project would enable the business models and technologies behind the new economic logic to stay the same with the exception of dolling out a relatively small fraction of their revenue to users. Meanwhile, as others have advocated for greater regulation by government into the operations of these

companies, it is also clear that the technological designs engineered by these companies under the technical code of surveillance capitalism have advanced beyond meaningful regulation. (The congressional hearings with Mark Zuckerberg in 2018 and tech industry CEOs in 2020 have demonstrated this.) Nonetheless, these reactions are representative of a collective dissatisfaction that may make the first of two foundational concepts, the gestalt switch, possible.

Gestalt is a German word used for shape or form and assumes:

[t]here are contexts in which what is happening in the whole cannot be deduced from the characteristics of the separate pieces, but conversely; what happens to a part of the whole is, in clear-cut cases, determined by the laws of the inner structure of its whole.

(Wertheimer & Riezler, 1944, p. 84)

Ihde (1990) extended the concept of gestalt into technological cultures by claiming “cultural-technological forms of life which circumscribe all our empirical human societies are also contextual in terms of holistic gestalts” (p. 18). In other words, only addressing what Wertheimer and Riezler (1944) referred to as “characteristics of the separate pieces” allows broader cultural-technological forms of life to remain intact. In contrast, McClintock illustrated the ways in which the laws of the inner structure of the whole would transform the gestalt of an educational setting. In McClintock’s (1992) example, this would occur through the replacement of a textbook (a part of the whole, as opposed to a separate piece) with a computer. He argued:

[b]ig changes in key institutions are hard to launch, but irresistible once underway. They are tough to start because they need to be many-sided. Existing arrangements are a puzzle of many interlocking pieces. One cannot, for instance, simply replace textbooks with computer programs that do the same thing, only slightly better, for all sorts of other things will have to start changing as well -- classroom layout, teacher training, curriculum

organization, the interaction of children in class, relations between home and school, possibly even the professed purposes of the school. (para. 177)

McClintock thus demonstrated how a “gestalt switch in sensibilities” (Ihde, 1990) from within the technological culture of a school may undergird the development of new and broadly transformative potentials.

Rather than dependency on external sources like politics, religion, et al., a gestalt switch is made possible because technologies that constitute the technosystem are multistable or underdetermined. According to Feenberg (2017), “[t]he technical underdetermination of artifacts leaves room for social choice between different designs that have overlapping functions but better serve one or another social interest” (p. 46). This means that these technologies have an “interpretive flexibility” (p. 46) that is overlooked in instrumentalist accounts. By emphasizing social involvement in determining ultimate technological designs, both Feenberg (2017) and Ihde (1990) imply that seeking protection from government, institutions, or figures outside of the technological sphere, including “a god”, is an improper solution. Instead, forces within the technological culture must actively work to intervene and transform the technologies that, in this case, surveillance capitalism subsumes to achieve its ends. Glass’s (2018) suggestion that students attempt to download and erase their data, for example, would do little to challenge the power of Facebook’s extraction and algorithmic technologies that are used by Summit Public Schools.

The gestalt switch is a change in one’s understanding of the relationships between parts and wholes in a particular reality. The particular and well-established reality that is dealt with here is surveillance capitalism’s educational technologies. The example of Glass’s suggestion for her students as well as other examples that are drawn from this particular reality are more

“separate pieces” than “part(s) of the whole” and would fail as potentials, for their lack of the necessary conceptual foundation. If they were to be recognized as “part(s) of the whole (or gestalt)” of surveillance capitalism’s educational technologies, however, they would be granted the conceptual foundation of the gestalt switch and, if the choice of a past was added, become potentials, moving toward transformation.

### **Second Foundational Concept: The Choice of a Past**

The foundational concept of “the choice of a past” is rooted in the work of McClintock and Moretti. The concept of the “choice of a past” emerges from the idea that “[t]he shaping of a future for education depends on the choice of a past. How far one looks forward is functionally related to how far one chooses to look back” (Chou, McClintock, Moretti, & Nix, 1993, para. 1). The thinking that culminates in the choice of a past that determines a future for education begins with McClintock and Moretti. A recent example of a choice of a past is the New York Times’ 1619 Project. The 1619 Project aimed to reconfigure the way history education occurred in schools with the goal to:

[r]eframe American history by considering what it would mean to regard 1619 as our nation’s birth year. Doing so requires us to place the consequences of slavery and the contributions of black Americans at the very center of the story we tell ourselves about who we are as a country. (Silverstein et al., 2019, pp. 4-5)

1619, the year the first ship carrying slaves arrived in the British colony of Virginia, was the past chosen to guide a potential future for history education. Surveillance capitalism, as both a technical code and a technosystem, has guided the development of technology and, more recently, educational technology in a specific direction that I argue was not fixed or inevitable. Two potential starting points for disputing the perception of inevitability with regard to these

technologies are: (1) Google's value-laden technological designs before the emergence of surveillance capitalism and (2) greater control of data by the user.

Thus, a "choice of a past" for a Critical Theory of Technology that considers surveillance capitalist technologies, is the balance of power that existed between search and user in Google's core technology prior to the dotcom crash. During this period, the technology was intended to be reserved to the academic realm and had embedded within it an entirely different set of values. Within this context, behavioral surplus would revert back to data exhaust as the neoliberal tendency to commoditize all possible forms of technology and available data would be shed. Users of Google's search during that period needed search as much as search needed users, and beyond this closed loop of steadily improved technology and experience, nothing more was necessary. I argue later in this chapter that this dynamic is possible to reproduce in the relationship between user and algorithm, based on technography and social analytics.

The poor reception of educational technologies employed by AltSchool, inBloom, and Summit Public Schools do not signal the failures of data extraction technologies and machine learning algorithms but the rejection of a specific set of governing values. One way to explore the possibility of new sets of governing values is to move away from the institutions and practices associated with surveillance capitalism and toward those that are based on an alternative economic model. In the following sections, the alternative potentials of platform cooperativism and the studies of technography and social analytics present ways to expand the Critical Theory of Technology. Technography and social analytics are based on alternative understandings of human-technology relations and may inform educational technologies so that they may be more democratic and engaging. Moretti (2021) described a point at which one's

consciousness shifts with regard to educational life in ways that require a new form of engagement. He claimed:

[a]t a certain point in time you begin to develop the capacity to not only look at the world, or learn things, but to begin to see yourself as a complicated mechanism... (with) a set of choices interacting with a set of circumstances around you. (para. 16)

According to Feenberg (2017), the notion of the technosystem represents a threat to human agency and, by extension, risks limiting one's ability to make choices in regard to interacting with a set of circumstances. Platform cooperativism, technography, and social analytics present potentials for, among other things, the maintenance of human agency in the context of surveillance capitalism's technosystem.

#### **Alternative Potentials: Platform Cooperativism, Technography, and Social Analytics**

Despite the effects of surveillance capitalism's technologies, discarding them and moving toward a different chosen past in which they did not exist is not only implausible but disregards emancipatory potentials that may emerge under alternative technical codes. With the ongoing tradition of developing educational practice and policy based on the collection and analysis of student, teacher, and school data, it is reasonable to assume that data extraction and algorithmic technologies will remain technologies that education continues to use. Additionally, the logic of surveillance capitalism's extraction and prediction imperatives virtually ensures its continued incursion into educational spaces. With computer programming and coding widely available as acquirable skills, however, potentials exist for transformative social interventions. The first potential is reconceptualizing the designs of educational technologies not on the values of neoliberalism or surveillance capitalism, but on an alternative economic model: cooperative capitalism. The second potential resides in alternative modes of involvement with the



algorithmic process, technography and social analytics. Technography and social analytics offer new perspectives from which programmers and coders, employed in cooperative settings, can work in more transformative ways with algorithmic technologies.

### **First (Large Scale) Potential: The Cooperative as a Business Model with Alternative Values**

This section describes the platform cooperative as a potential, dependent on the conceptual foundations of the gestalt switch and the choice of the past. The gestalt switch is the alternative political economy of platform cooperativism, in contrast to surveillance capitalism, and the choice of a past is the Rochdale Principles of 1844. Just as neoliberalism and surveillance capitalism influenced educational technology, platform cooperativism and cooperative capitalism are “a radical horizon” (Scholz & Schneider, 2016, Location 112) based on an alternative economic logic that proposes potentials for new, value-laden designs. Platform cooperativism emerged as a reaction to platform capitalism, which has acquired other monikers such as “the gig economy”, “the peer economy”, and “the sharing economy”. Within platform capitalism, according to Scholz (2016), there is a “rush to control demand, supply, and profit by adding a thick icing of business onto apps-based user interactions...(while) the deregulated free-market (is extended) into previously private areas of our lives” (p. 3). In contrast, two characteristics define platform cooperativism. The first is “shared governance and shared ownership of the Internet’s levers of power – its platforms and protocols” (Scholz & Sneider, 2016, Location 112), and the second is “a different kind of ecosystem – with appropriate forms of finance, law, policy, and culture – to support the development of democratic online enterprises” (Location 112).

Platform cooperativism, as a viable alternative to the surveillance capitalist model, is founded upon a gestalt switch in its conceptualization of a whole new economic logic upon

which to base the designs of data extraction and algorithmic technologies. Initial, alternative designs developed by platform cooperatives may emerge from social interventions into underdetermined surveillance capitalist technologies, for example, that make the gestalt switch possible. Feenberg (2017) claimed “[t]he modern lifeworld is an ambiguous combination of the reified technosystem and persisting elements of tradition and lived experience. It makes a difference where the emphasis is placed in evaluating the potential for resistance” (p. 120). In addition, this non-profit, cooperative model dereifies and acts as a friction against the for-profit, corporate governance structure established by Google and later adopted by Facebook and other companies throughout Silicon Valley.

In determining what forces within technological culture can lead to transformation without the assistance of legislation or other outside interventions, emphasizing the values of those engaging transformatively with technologies is necessary. An example of a cooperative with alternative values that are based on the second conceptual foundation of the chosen past is the Platform Cooperativism Consortium. The organization’s chosen past is represented by the statement on its website: “The Rochdale Principles of 1844 inspire our cooperative work today” (Platform Cooperativism Consortium, n.d., para. 1). The Rochdale Principles of 1844 stressed service over direct profit but also allowed for “a quasi-profit in that he (the cooperative member) may accumulate more savings than he would accumulate in a profit-inspired economy” (Conover, 1959, pp. 111-112). The process through which this non-profit, service principle is applied begins with a “differential between cost of a commodity sold to a patron and the price that the patron paid for it...returned to the patron after a periodic accounting for such cost” (Conover, 1959, p. 112). The differential is not classified as a profit, but as a “surplus-saving” or “savings return” or “patronage dividend,” and it is returned to the patron in proportion to the

amount of his patronage. This model demonstrates a potential for the dereification of surveillance capitalism's technosystem by the displacement of its economic imperative.

Additionally, the Platform Cooperativism Consortium recognizes predatory surveillance capitalist technologies as a threat that it seeks to work against. The cooperative's website claims:

[f]rom dating to search, extractive platforms are reaching into every corner of life, collecting data along the way to be controlled only by a tiny number of people. Internet giants collect and control innumerable data points about users, and in exchange, offer zero transparency for how this information is used, who it is sold to, and for what purpose. Despite the fortunes made by many investors and creators of extractive platforms, the users who give value to these apps through their data don't have a say about what happens on them. (Platform Cooperativism Consortium, n.d., para. 3)

Below that, a statement on the site reads "[p]latform co-ops give stakeholders a say in what happens on the platforms" (Platform Cooperativism Consortium, n.d.), implying the presence of more democratic values embedded within its practice.

Other, similar cooperatives and technological solutions exist as well that present alternatives to surveillance capitalism, while emphasizing the enjoyment experienced by members. One example is the French cooperative, Motion Twin, which designs free online video games. Their website boasts of how all six members of the nineteen-year old cooperative have no boss, have an equal say, and earn the same salary. The cooperative has designed 150 free games since its inception and emphasizes its success deriving from enjoyment rather than the profit motive. A statement on their website claimed:

[w]e make games to fulfil(1) ourselves and be happy when we go to work every morning. We love the feeling of booting up a new game for the first time. It's the same feeling we

get when we start a new project. We live and breath(e) this stuff. (Motion Twin, n.d., para. 3)

The site also contains cookies, a reifying technology, according to Berry (2014), but is open regarding their use. When selecting a game to play, the user has the option to read about the cookies that are used as well as their purpose. This aspect of the platform demonstrates another part of platform cooperativism's economic logic as a gestalt that diverges from surveillance capitalism and its economic imperatives. If a user decides to find out more about the cookies used for the Motion Twin game Twinoid, for example, they would be brought to a page with the following information:

Why does Twinoid use cookies?

Cookies are small files sent to your browser by a website. They can subsequently be re-sent by your browser to the same website that put them there on a previous visit.

Twinoid uses cookies for:

Connecting to your account: This main cookie let's us know which Twinoid account you're connected to, so that you don't have to login on every single page of the site.

Security: Some cookies are used to identify users and detect or stop any fraudulent use of our games.

Preferences: some elements of your navigational preferences can be stored thanks to cookies.

Can I deactivate these cookies?

You can, at any time, delete the cookies on your computer by accessing the settings of your browser. For more information consult the help documentation of your browser.

(Motion Twin, n.d.)

This model emphasizes user control and ownership of data as well as a relationship between user and service that is similar to Google's search prior to the dotcom crash. The reifying technologies used by Motion Twin are transparent and optional and used only to maximize the users experience on the site, while improving the technologies that provide the improved experience.

Within educational technology, the Western Cooperative for Educational Telecommunications (WCET) is "a member-driven non-profit which brings together colleges, universities, higher education organizations, and companies to collectively improve the quality and reach of technology-enhanced learning programs" (WCET, n.d., para. 1). WCET has addressed issues related to algorithms in education that are influenced by the values of the programmers that create them. In a paper published on the site, Downs (2020) argued algorithmic bias that has been shown to exist in criminal justice and healthcare can exist anywhere that data is extracted and analyzed using machines, including in higher education. She went on to suggest the following possible solutions for the development of unbiased algorithms:

1. Institutional and organizational staff who are responsible for algorithm development should be prepared to conduct tests and analysis to ensure that none of their algorithms are biased. As with any human-based system, we must be diligent and introspective about the effects of our decisions – whether they are made by human teams or by a machine that has had data fed into it.
2. Whatever algorithms are put in place, and aside from the move to create more evaluation of those algorithms, people should always remain present. While algorithms may be able to help humans do their jobs better, it should never replace humans. There is nothing that

exists that can replace thoughtful evaluation done by live humans, and we shouldn't try to find something that can.

3. Teams of developers should be diverse. A diverse team of developers can help identify the ways that different algorithms could harm different people or groups of people. This is similar to how it is recommended that accessibility departments contain people with disabilities – there should be real people representing diversity so that they can design algorithms fairly, and not have someone designing algorithms on someone else's behalf.
4. Lastly, everyone should be involved with the continued fight to create greater equity at institutions, even outside of technology departments. Data is improving as our society works toward more inclusive and equitable environments. In the meantime, we need to work to create better equity both on and offline. (para. 12)

These suggestions illustrate a conscientious way forward with regard to embedding values that align with equity in educational algorithms. More importantly, cooperative-developed technologies represent a break from those that have been developed within neoliberalism and surveillance capitalism. The gaming, learning, and other various platforms that emerge from these cooperatives that use the same extractive and algorithmic technologies that surveillance capitalism exploits may present entirely new potentials as a result of the gestalt switch they are a part of. These potentials are necessary to explore in relation to educational platforms in order to avoid existing problems of student disengagement or overlapping interests with surveillance capitalism.

### **Second (Small Scale) Potential: Technography, Social Analytics, and Involvement**

In 1950, English mathematician, cryptanalyst, and computer scientist, Alan Turing, developed an algorithm he named Turbochamp to enable computers to challenge human beings

at chess. With an interest in testing the limits of mechanical intelligence, he developed Turbochamp to simulate the chess moves a human chess player would make. Two years after the completion of the algorithm, Turing tested it on a Ferranti Mark 1 computer, but the computer was incapable of processing the complex algorithm. According to a famous anecdote, Turing would play chess with a friend on behalf of the algorithm by “flipping through the pages of his printed program and manually implementing the chess moves derived therein” (Hourly History, 2019, Location 213). As a result, each move on the chess board took roughly thirty minutes to make. Though Turing was unable to have the Ferranti Mark 1 process his algorithm and had to play the role of the computer himself, a form of cognitive engagement and involvement with algorithms was established.

Close involvement in the algorithmic process like Turing’s is antithetical to surveillance capitalism’s values, designs, and educational technologies. Seventy years after Turing’s novel application of Turbochamp, students using educational platforms with data extraction and algorithmic technologies may engage cognitively with an entirely different algorithm than Turbochamp. Machine learning algorithms are models that are derived automatically from data as opposed to being directly hand coded by human beings. Human beings code meta-algorithms or processes that machine learning algorithms evolve from, but they do not directly design the final machine learning algorithms (Kearns & Roth, 2020). Additionally, Kearns and Roth (2020) claimed “the less directly involved humans are with the final algorithm or model, the less aware they may be of the unintended ethical, moral, or other side effects of those models” (p. 6).

Involvement in the algorithmic process is thus a gestalt switch that becomes necessary for identifying ethical, moral, and other side effects of algorithms used in online platforms, including educational platforms. Together, technography and social analytics are the potential that may

reestablish, for the first time since Turing engaged with Turbochamp, an involvement approach to the algorithmic process. Technography and social analytics may also expand the capacity of the Critical Theory of Technology to more effectively critique these technologies, because once awareness of ethical, moral, and other consequences are revealed, value-laden transformations may be imagined. These transformations may emphasize the absence of negative biases, as was described by Downs (2020), or expand the educational experience for students in terms of ethical, personalized learning practices and engagement.

### ***Responding to Existing Algorithmic Technology***

If writing and implementing new, more emancipatory educational algorithms at scale is not immediately possible, studies developed to analyze the nature of interactions with existing algorithmic technologies can offer meaningful perspective. As larger and larger sets of data are extracted with educational platforms that require the robust capacities of machine learning algorithms, consideration of the effects they have on social relations in these learning environments is necessary. Algorithms, Vannini (2015) argued “are no mere props for performance but parts and parcel of hybrid assemblages endowed with diffused personhood and relational agency” (as cited in Bucher, 2018, p. 8). The personhood and relational agency of these algorithms may have values that are obscured by instrumental reason but remain embedded and active within the models none-the-less.

Bucher (2018) described algorithms as political in that they are capable of determining the ways in which the world appears to users of algorithmic technologies. She claimed “realities are never given but brought into being and actualized in and through algorithmic systems” (p. 3). Algorithmic power is thus about “*how* and *when* different aspects of algorithms and the algorithmic become available to specific actors, under what circumstance, and who or what gets



to be part of how algorithms are defined” (pp. 3-4). Corresponding with Berry’s (2014) notion that state-owned and privately-owned computer code and algorithms mediate social relationships, Bucher spoke of “programmed sociality...the notion that social formations and connections are algorithmically conditioned and governed by the sociotechnical and political-economic configurations of specific media platforms” (p. 8). This is not to mention the ethics, morals, values, biases, etc. of the programmers that author meta-algorithms that develop into machine-learning algorithms within such platforms. Surveillance capitalism’s meta-algorithms are based on the governing and value-laden configurations of its technical code just as meta-algorithms written by cooperatives that reject the tenets of surveillance capitalism would be governed by their own.

### ***Technography***

In education, self-ownership of student data and deeper understandings of the nature of student experiences with algorithms is a strong starting point for examining programmed sociality and personalization. To counter what Bucher (2018) referred to as the tendency of “[m]ythologizing the workings of machines” (p. 60), she proposed mapping the operational logics of algorithms in the same way ethnographic researchers map people’s values and beliefs in their research. She referred to this new technique as “technography” and defined it as “a way of describing and observing the workings of technology in order to examine the interplay between a diverse set of actors (both human and nonhuman)” (p. 60). The technographer’s role is to ask what algorithms are suggestive of in the same way that the ethnographer “seeks to understand culture primarily through the meanings attached to the world by people” (p. 60). Technographic inquiry, according to Bucher (2018), does not require expertise but encourages “a readiness to engage in unknown knowns, seeing the black box not as an epistemological obstacle but as a

playful challenge that can be described in some ways (but not all)” (p. 61). Technographic inquiry ultimately has the potential to answer questions like “what is the world view of an algorithm”, “how does it work”, and “who does it work for” (p. 61). Most importantly, technographic inquiry eliminates instrumental, deterministic, and substantive assumptions about these technologies and imparts awareness to the user and the agency to gaze back at the algorithm in a more involved manner.

### *Social Analytics*

According to Rao, Jongerden, Lemmens, and Ruivenkamp (2015), technical codes are “literally as well as metaphorically written (at the design level) and read (in society), and have a surreptitious, nontransparent character” (p. 460). Zuboff (2019) acknowledged that “the continuous pervasive collection of human behavioral data could succeed only when conducted outside the boundaries of human awareness, thus eliminating possible resistance” (p. 424). This is the manner in which surveillance capitalism’s technical designs demonstrate “the unequal distribution of social power” (Feenberg, 2005, p. 47) commonly associated with technical codes. Building upon the awareness of the interplay between humans and algorithms that emerges from technography, social analytics increases the agency of the human by cultivating a more equal distribution of social power within human-technology relations.

According to Bucher (2018), a social analytics is associated with the phenomenological approach to algorithms that seeks to excavate “the meaning-making capacities that emerge as people have ‘strange encounters’ with algorithms” (p. 63). A social analytics approach to technology:

more precisely, a sociological treatment of how analytics get used by a range of social actors in order to meet their social ends – aims to capture how particular actors reflect

upon, and adjust, their online presence and the actions that feed into it, through the use of ‘analytics’. (Couldry, Fotopoulou, & Dickens, 2016, p. 119)

Social analytics can provide the agency for people whose “presence and intentionality as social actors is intertwined with the operations of analytic measures and underlying computing architecture” (p. 120) to respond transformatively to those measures and architectures. The following explanation by Bucher (2018) effectively describes the most important potential of social analytics for this project:

when modes of appearance or senses of identity are at stake, actors may reflect at length on how to influence such operational logics; and, in doing so, they performatively participate in changing the algorithmic models themselves, a key reason it is important to study actors’ own experiences of the affective landscape of algorithms. (p. 63)

This reflexive practice between user and algorithm in ways that change the experience of the user along with the algorithm, itself, is a potential built on the chosen past of Google prior to the dotcom crash, when the balance of power between user and search was paramount. The potential is also undergirded by a gestalt switch in terms of user involvement in the algorithmic process that is antithetical to that of surveillance capitalism’s black box algorithms and more reminiscent of Turing and Turbochamp. Following the rise of surveillance capitalism, however, these potentials exist as a form of resistance or friction.

Additionally, a possibility emerges with both technography and social analytics for determining “who or what gets to be part of how algorithms are defined” (Bucher, 2018, pp. 3-4). Through this new and reestablished involvement with these algorithmic technologies and their underdetermined designs, social interventions into their ultimate forms and uses become possible. Once the Critical Theory of Technology integrates technography and social analytics, it

will be better able to frame social interventions and enable a new technical code to guide the development of alternatively value-laden, algorithmic technological practices. In doing so, the risk of technological designs fully determined by the industry and instrumental assumptions that facilitate surveillance capitalist aims may be better managed and reduced.

## CHAPTER V: A CRITICAL THEORY OF SURVEILLANCE CAPITALISM'S EDUCATIONAL TECHNOLOGY

### Introduction

It is important to note, as previously discussed in this dissertation, that the Critical Theory of Technology was developed during the neoliberal era and is thus a response to the era's technologies and educational technologies. This is the theory's history. The possibility remains, however, to update the theory, so that it may critique data extraction and algorithmic technologies that are fundamental to surveillance capitalism's interventions in education. This chapter begins with a direct discussion of examples of educational technologies aligned with the aims of surveillance capitalism, ways that they are currently used, and the new, reimagined ways that they can be used. These technologies, I argue, are underdetermined, meaning that room is left open "for social choice between different designs that have overlapping functions but better serve one or another social interest" (Feenberg, 2017, p. 46). The question remains, however, how the social interests necessary to determine technologies' final, stabilized forms, according to the Critical Theory of Technology, can find their way into surveillance capitalism's seemingly inaccessible and unhackable technologies. Feenberg's Critical Theory of Technology is robust, but it was also developed during the neoliberal era and is, thus, a response to that particular problematic. The theory is adequate for that moment, because that is how it is situated historically. In order to critique surveillance capitalism's educational technologies as well as develop models for social interventionist practices into their designs, the Critical Theory of Technology requires a kind of software update. I argue that the required software update kit must include Berry's (2014) *Critical Theory and the Digital*, technography, and social analytics. To aid in this critique and transformation, I suggest additions and modifications be made to school curriculums, especially as they relate to coding curriculums, based on aspects of the expanded

Critical Theory of Technology. These additions and modifications can enable students to better understand the impacts of surveillance capitalism's technical code and work toward more liberatory social interventions and interactions with its core technologies. To summarize the points made throughout the chapter, I conclude with an imagined educational scenario that captures the ideas discussed.

### **The Quantified Self and Sensor-Enabled Devices in Education**

The Quantified Self movement is the global phenomenon in which people use sensor-enabled devices like Oura Rings, Apple watches, smart bottles, meditation headbands, emotion sensors, et al. to record sleep patterns, track movement, record caloric input and output, and far more (Williamson, 2017). One of the leading theorists that Zuboff (2019) discussed in connection to surveillance capitalism was Alex Pentland, who in a 2009 study with colleagues, presented “the design, implementation, and deployment of a wearable computing platform for measuring and analyzing human behavior in organizational settings” (p. 43). Pentland and his colleagues (2009) were aware that to “improve group function, one needs to be able to monitor social communication and provide real-time intervention” (p. 44) and wanted to develop machines capable of doing so. One example was the sociometer, defined as:

[a] wearable sensor package designed to measure face-to-face interactions between people with an infrared (IR) transceiver, a microphone, and two accelerometers. It was used to learn social interactions from sensory data and model the structure and dynamics of social networks. (p. 44)

The sociometer and other wearable technologies like it align with the extraction imperative in the potential for expanding data extraction capacity.

The spirit of the research conducted by Pentland and his colleagues into wearable, data extracting technologies has made its way into education. Two examples of similar technologies either designed for or used in education will be discussed in the following section. With surveillance capitalism's imperatives applied to educational settings, new realities may emerge, including the obsolescence of standardized tests to measure the effectiveness of teachers and curriculums as well as traditional observation and evaluation practices for teachers. The devices I describe are intended to achieve traditional and established educational goals with increased efficiency and precision but are also integrated into larger systems of economic and state power. Though these technologies may be critiqued within substantive, deterministic, and instrumental frameworks, I argue they remain underdetermined and subject to social interventions and transformation.

### ***The Downside of Sensor-Enabled Devices in Education***

One example of a sensor-enabled device designed for use in education is the “galvanic skin response” bracelet, financed in 2012 by the Bill and Melinda Gates Measuring Effective Teachers project. According to Strauss (2012), a description that accompanied a grant for research into the galvanic skin response bracelet stated its purpose was to “measure engagement physiologically with Functional Magnetic Resonance Imaging and Galvanic Skin Response to determine correlations between each measure and develop a scale that differentiates degrees or levels of (student) engagement” (para. 5). Student stimulation based on data extracted from the bracelets was intended to be part of a new teacher evaluation process in the tradition of standardized test score data according to Strauss (2012).

Additionally, and more in line with surveillance capitalism, the galvanic skin response bracelet would be used in the field of neuromarketing. According to a since-deleted post by

Ohanian (n.d.) on the Bill & Melinda Gates Foundation website, neuromarketing ““relies on biometric technologies to determine a participant’s emotional and cognitive response to certain stimuli”” (as cited in Strauss, 2012, para. 8) within a market context. The potential for errors in accurately correlated data was a risk, according to Diane Ravitch, as quoted in the article, who asked how the extractive technology could distinguish between reactions to teachers and a friend who whispers something into a student’s ear (Strauss, 2012). In the end, potential problems would be similar to the inaccurate assessments of teacher effectiveness in the IMPACT evaluation process discussed by O’Neil (2017) and described in Chapter 2.

Another example of sensor-enabled devices used in education is the headwear developed by BrainCo Inc. that was used by students in the Jinhua Xiaoshun Primary School discussed in Chapter 2. The algorithmic technology used to render student focus levels into a score that is sent to a chat group for parents as well as the colored light on the front of the device that is visible to other students apply novel forms of pressure to nudge students’ behaviors. What these technologies actually do is make the students’ quantified selves more recognizable and identifiable to others than any other aspect of their “selves”. They also act upon and influence the thoughts and behaviors of students in ways that parents and students tend to assume are necessary.

The sensor-enabled headwear also shares two features with the galvanic skin response bracelets. The first is that it is prone to error. According to neuroscientist, Theodore Zanto, the technology used in the headwear is electroencephalography (EEG), more commonly used by doctors in hospitals and labs (Wang, Hong, & Tai, 2019). It is also susceptible to artifacts like the subject feeling fidgety or the device being poorly set up in the first place, meaning that the data collected and translated into focus and attention scores may be unreliable. The second



feature is that it is part of a larger system of power that employs education to achieve its aims. Whereas the galvanic skin response bracelet was a tool intended to be developed for neuromarketing as much as teacher evaluations, the data collected by BrainCo Inc.'s headwear on school children may be absorbed into China's data collection and surveillance infrastructure as the nation strives to become the world's leader in artificial intelligence (Wang, et al., 2019).

With regard to the headwear worn by the Jinhua Xiaoshun students specifically, a political dimension can be added to Ihde's claim that we have always lived in a technologically mediated world. Winner (1980) claimed there is meaning in the characteristics of technological objects and that "certain technologies (exist) as political phenomena in their own right" (p. 123). The data that is collected on students at the Jinhua Xiaoshun Primary School through various technologies including the headwear is subsequently used for vaguely labeled "government funded research projects" (Wall Street Journal, 2019). Zanto explained the nature of the political phenomena of this particular practice of data extraction in claiming that "in a classroom, if you're trying to make an assessment of an individual student, you really can't anonymize it" (Wall Street Journal, 2019). This means there may be no privacy protections for the students using the technology and having their data stored in unknown databases for unknown reasons and for unknown lengths of time.

The roots of the galvanic skin response bracelet and the headwear worn by the students at the Jinhua Xiaoshun Primary School, I argue, trace back to Pentland's efforts in which he and his colleagues sought to:

set a foundation for developing the technology and methodology that will enable social scientists to automatically measure individual and collective patterns of behavior, predict human behavior from unconscious social signals, identify social affinity among

individuals, and enhance social interactions by providing real-time feedback. (Olguin, Waber, Kim, Koji Ara, & Pentland, 2009, p. 43)

The researchers further revealed their vision and its connection to the extraction and prediction imperatives when they claimed:

[o]rganizations will become truly sensible when they start deploying hundreds or thousands of wireless environmental and wearable sensors capable of monitoring human behavior, extracting meaningful information, and providing managers with group performance metrics and employees with self-performance evaluations and recommendations. (Olguin, et al., 2009, p. 43)

One of Pentland's coauthors went on to name this field of study "people analytics", establishing an opposing distribution of social power away from the balance of power prompted by "social analytics".

### ***Personalization***

Personalization, according to Zuboff (2019), is an essential aspect of surveillance capitalism, in that it acts as "a camouflage for aggressive extraction operations that mine the intimate depths of everyday life" (p. 19). Roberts-Mahoney, Means, and Garrison (2016) found that learning analytics used in the creation of personalized learning are being used to relocate decision making regarding educational policy, teaching, and learning away from public schools and toward private corporate authorities. The authors cite the arguments of personalized learning advocates that if Google, Netflix, Amazon, Facebook, and others have changed the way we do business, work, shop, etc., why not situate their model within education, in the name of progress. This thinking was even illustrated by Pearson Inc.'s COO and CTO, Albert Hitchcock, who promoted the idea of his company's transformation into a "Netflix of education" (High, 2018).

Once these decisions are in the hands of corporate authorities though, education has been shown to align with certain economic rationalities (Roberts-Mahoney, 2016). Within the framework of these rationalities, emphasis is shifted toward “human capital development, the expansion of data-driven instruction and decision-making, and a narrow conception of learning as the acquisition of discrete skills and behavior modification detached from broader social contexts and culturally relevant forms of knowledge and inquiry” (p. 405).

The unknown storage and uses of student data extracted by Summit Public Schools and Jinhua Xiaoshun Primary School may or may not cast them as trojan horses of surveillance capitalism’s imperatives and the manufacture of human capital. More importantly for this chapter, however, a return to the suggestion of a future for education based on a chosen past (Chou, McClintock, Moretti, & Nix, 1993) presents a more meaningful way forward than any notion of discarding these technologies. Rather than abandoning the galvanic skin response bracelets or BrainCo Inc.’s headwear, transforming the way they, along with similar technologies, are used the way the French population transformed the intended purpose of the Minitel system in the 1980s is a more practical and meaningful aim. Rather than a light appearing on a student’s headwear, the algorithmically-derived score representing attention and focus could be presented to parents, students, and teachers to better customize modes of instruction to meet students’ needs. Each student could then have something like their own algorithmically-personalized IEP based on extracted data that they and their parents own, like private property. With these measures in place, data extraction and algorithmic processes could also be open and transparent, without the risk of exposure to unknown third parties. Additionally, with social analytics, redistributing power away from existing, machine-learning algorithms and distributing it among students who can engage with them with greater agency, altering the

outcomes of algorithmic processes to better meet their needs may represent a balance of power between student and (machine learning) algorithm that is reminiscent of the balance of power between user and search in Google's pre-dotcom crash era.

### **The Critical Theory of Technology's Software Update**

Having been recently published in 2019, *The Age of Surveillance Capitalism* has not been thoroughly examined in the contexts of educational technology or Critical Theory. The Critical Theory of Technology was developed during the neoliberal era and is thus a response to the neoliberal problematic, its technologies, and its educational technologies. In this dissertation, I set out to understand what is required of the Critical Theory of Technology in order to move it ahead into the new problematic, surveillance capitalism. An initial step, I argued in Chapter 3, is recognizing surveillance capitalism as both a technical code and a technosystem, as conceptualized within Feenberg's theory. Additional adjustments are also necessary. One example is the replacement of Feenberg's notion of capitalism as a reifying force, as derived from the Frankfurt School and Lukacs, with Berry's (2014) concept of the digital. The digital acts as a replacement for capitalism in its reifying potential, shaping social relations, in this case, through surveillance capitalism's educational technologies. Additionally, due to the seemingly unhackable nature of proprietary and black box data extraction and algorithmic technologies, surveillance capitalism's educational technologies are not as open to social interventions as Feenberg's example of the Minitel system from the 1980s. For this reason, technography and social analytics are also necessary for updating the Critical Theory of Technology to further expand its capacity to understand or augment its critical capacity for surveillance capitalism.

### ***Feenberg's Critique of Neoliberal Online Learning***

Feenberg (2002), an early supporter of the potential of asynchronous online learning environments, presented the choice between the metaphors of the factory and the city, which were based on opposing value systems. The city, drawing from elements of social constructivism, is a place of enhanced communication, unplanned “horizontal contacts”, and the development of capacities that would be necessary for living in an increasingly modern world. The factory, on the other hand, was a design governed by more technocratic values with emphasis on efficiency, achieved through mechanization and rigid hierarchical management. Feenberg, presaging the need for empowered and engaged teachers in online learning environments, who evolve in their roles through critical reflection, discussed the persistent role of active teachers in online learning environments. The role of the teacher, he claimed, should be woven into the design of every, emerging educational technology, indicating a way a specific value system can be imbedded within the design of online learning situations that would serve students and teachers rather than the technology itself or governing, technocratic institutions.

Feenberg (2005) later expressed concerns over a division of labor among university professors that would result from the dissolution of the faculty’s “monopoly on education” as professors would be demoted to “deprofessionalized ‘content experts’” (p. 98). He went on to express the view that online education is “reified around political-economic interests that it is claimed, unequivocally, to represent. Commodification, commercialization, and corporatization are understood as fundamental dimensions of the technology and its consequences for higher education and the university” (p. 99). Still, as late as 2015, Feenberg was primarily concerned with “[t]he dream of automating education” as “part of an industrial trajectory that has deskilled and automated manufacturing and certain types of services” (Feenberg & Jandric, 2015, p. 143). Shifting the paradigm from industrialization and neoliberalism to surveillance capitalism requires

the integration of Berry's (2014) *Critical Theory and the Digital*, technography, and social analytics.

### ***Critical Theory and the Digital***

Berry's (2014) *Critical Theory and the Digital* explored Critical Theory and the Frankfurt School and its relationship to a code-based digital world that is more in line with surveillance capitalism. Berry believed code-based technologies are an influencing force on social relations just as capitalism was, according to Marcuse, Horkheimer, Habermas, et al., but with greater potential for control. In examining the organizing role of software, data, and algorithms, he thus argued that the digital "needs to be understood within a dialectic of potentially democratizing and totalizing technical power" (p. 25). The democratizing antithesis to totalizing power must first recognize the digital as "technical and social, material and symbolic, but...also (as) a historically located concept" (p. 50). In so doing, the digital may come to be seen through the lens of alternatively value-oriented perspectives, allowing new possibilities for transformative configurations to emerge.

In echoing Feenberg's emphasis on the configurations of value-laden technologies, Berry (2014) claimed computational systems require:

a critical praxis that includes their hacking, interrupting and reconfiguration into new pathways and possibilities. Indeed, if critical theory is dedicated to a project of emancipation, then it seems clear that there will be an increasing need for critical theories of software, and critical approaches to the applications of rationalization within these systems and their inherent contradictions. (p. 171)

By establishing a value of emancipation over rationalization, Berry engaged with the process of determining or stabilizing the potential designs of surveillance capitalism's technologies. In

describing the manipulation of streams of data in ways that make the modification of behavior possible (Zuboff, 2019), he went on to claim “to facilitate the use of these streams the technologies are currently under construction and open to intervention before they become concretized into specific forms” (p. 174). This ongoing engagement with the potentiality of underdetermined technologies that are associated with data extraction and algorithmic technologies connects tenets of Feenberg’s Critical Theory of Technology to surveillance capitalism’s technologies in previously unexamined ways. The “hacking, interrupting and reconfiguration into new pathways and possibilities” of the computational systems of surveillance capitalism, I argue, require understandings of technography and social analytics, due to their peculiar and unhackable nature.

### ***Technography***

Following Berry’s (2014) *Critical Theory and the Digital*, the second concept used to expand the Critical Theory of Technology is technography. Technography enables a developed awareness of one’s lived experience when engaging with value-laden algorithmic technologies. With an awareness of the effects of algorithms on lived experience, transformative engagement subsequently becomes possible through social analytics, which is discussed in the following section. With regard to Feenberg’s Critical Theory of Technology, an initial way to develop awareness of the existence of values in algorithmic technologies also exists within technography. Feenberg (2018) claimed “[v]alues cannot enter technology without being translated into technological language” (p. 49). Bucher (2018) described the “mapping of operational logics of algorithms in terms of ‘technography’”, a kind of ethnography of algorithms (p. 60). By doing so, the technological language of algorithms may reveal values of the individuals that wrote them or the institutions they were written on behalf of. The technological language in this situation

later becomes the site of intervention and transformation through social analytics. Prior to intervening, however, it is necessary for the technographer to develop awareness by examining “what they see and what they think they see” (p. 61) in personal dealings with algorithmic technologies.

An example of this may be conceptualized by looking at Facebook’s “social contagion” experiment from the vantage point of the unwitting participants. In the company’s study titled “A 61-Million Person Experiment in Social Influence and Political Mobilization” published in the scientific journal *Nature* in 2012, social cues were proven to tune the:

real-world behavior (of users) toward a specific set of actions determined by the ‘experimenters.’ In this process of experimentation, economies of action are discovered, honed and ultimately institutionalized in software programs and their algorithms that function automatically, continuously, ubiquitously, and pervasively to achieve economies of action. (Zuboff, 2019, p. 299)

Facebook users were unwittingly used in a controlled, randomized study in which three groups each received different notifications in their news feed. The first group received a message at the top of their news feed encouraging them to vote, with information on polling places, a button reading “I Voted”, a counter showing how many Facebook users voted, as well as up to six profile pictures of the users’ Facebook friends that already pressed the “I Voted” button. The second group received the same information but without pictures of friends. A third control group did not receive any special message (Zuboff, 2019). According to Zuboff (2019):

[t]he results showed that users who received the social message were about 2 percent more likely to click on the ‘I Voted’ button than did those who received the information alone and 0.26 percent more likely to click on polling place information. (p. 298)



Facebook users, throughout the experiment, remained unaware that Facebook's algorithms were influencing them through a variety of methods that affected their thoughts, feelings, and behavior.

If the millions of users involved in the experiment engaged with Facebook during this time with any degree of knowledge about technography, an awareness may have emerged of their lived experience and its correlation with the algorithms that were tuning their behavior. In doing so, they may have decided to vote and engage socially with friends and acquaintances with regard to their vote, outside the influence of Facebook's influencing algorithms. Their vote may have been based on their own values and interests rather than the social pressures associated with social networks. Just as the technographer becomes aware of the "world views of algorithms" (Bucher, 2018, p. 61) and their effects on lived experience, the next step, social analytics, presents a model for engaging directly and transformatively with these technologies that is in line with a developing critical theoretical critique of surveillance capitalism's technologies.

### ***Social Analytics***

Social analytics emerged from a broader phenomenological approach to algorithms, which considers not how algorithms may govern and structure patterns of behavior but how they "are perceived and made sense of by the actors in a given situation" (p. 62). Bucher (2018) described social analytics as "the phenomenological study of how social actors use 'analytics' to reflect upon and adjust their online presence" (p. 63). The two most important potential outcomes of social analytics are increased agency for actors engaging with algorithms and active engagement with algorithms with the intention of intervening and changing them. Recalling the claim made by Williamson (2017) as well as the work of Pentland and his colleagues (2009),

social analytics also explores the ways actors engage with increasing levels of quantification (Bucher, 2018). According to Bucher (2018):

when modes of appearance or senses of identity are at stake (from modes of algorithmic control), actors may reflect at length on how to influence such operational logics; and, in doing so, they performatively participate in changing the algorithmic models themselves, a key reason it is important to study actors' own experiences of the affective landscape of algorithms. (p. 63)

This gestalt switch in perspective redistributes power from the institutions in control of the extraction and algorithmic technologies to the actors engaging with the technologies. At the same time, it encourages interventions and a greater balance of power that is more aligned with the chosen past of the pre-dotcom crash Google model and Feenberg's Critical Theory of Technology. With a developed sense of the character of Jinhua Xiaoshun Primary School's algorithmic technologies, students there may develop the agency to cope with anxiety associated with the threat of shaming themselves and their parents with poor focus and attention scores. Beyond this, a potential might emerge to actively resist the technologies of the school. Feenberg (2017) remarked:

[i]n technosystem struggles rational principles in their original lifeworldly form are reapplied to the technosystem through judgments based on experience, often informed by counterexpertise. The design process is reactivated through interventions based on the operations as they appear in the lifeworld. (p. 169)

In this case, the rational principles of the lifeworld can be distinguished from those of the technosystem, e.g. surveillance capitalism's educational technology, through a developed awareness that emerges from knowledge of technography. Rational principles derived from

lifeworldly models of instruction that are not based on engendering anxiety or the dehumanizing impact of imposing hegemonic technological values may eventually lead to a reactivated design process. A restored or heightened agency among students in Summit Public Schools and Jinhua Xiaoshun Primary School in eastern China may also prove valuable in understanding the effects of personalization algorithms.

### **The Updated Framework**

As a technosystem, or “field of technical practices aimed at control of the environment, whether natural, economic, or administrative” (Feenberg, 2017, p. 159), surveillance capitalism establishes itself through the dispossession cycle. The four stages of the dispossession cycle, described in Chapter 2 (incursion, habituation, adaptation, and redirection) enable a form of hegemony that sustains the expansion of the extraction and prediction imperatives’ aims. Zuboff (2019) claimed that these four stages, taken together “constitute a ‘theory of change’ that describes and predicts dispossession as a political and cultural operation supported by an elaborate range of administrative, technical, and material capabilities” (p. 138). Complimenting Zuboff’s “cultural operation” in the work of the dispossession cycle, Feenberg (1999) emphasized the importance of culture, when describing hegemony, by adding hegemony was “that aspect of the distribution of social power which has the force of culture behind it” (p. 86). I argue that a gestalt switch emerging from within the technological culture of surveillance capitalism’s educational technologies is made possible with the expanded Critical Theory of Technology. The expanded framework of the new Critical Theory of Technology, through the adoption of technography and social analytics, for example, may act against the “force of culture” that sustains hegemony as well as the dispossession cycle, itself.

The expanded Critical Theory of Technology begins by integrating a critical theoretical examination of the technologies that are essential to surveillance capitalism, i.e. software, data, and algorithms by specifically accounting for the peculiar features of these digital technologies. It then moves away from instrumental, deterministic, and substantive critiques of these technologies by including a technographic examination of the effects of algorithms on the lived experience of those who interact with them, knowingly or unknowingly. Through this increased awareness, a sense of the “worldview” of the algorithms that students engage with may be accompanied by a sense that they are capable of influencing thoughts, emotions, and behaviors in ways that are influenced by the values embedded within those worldviews. Finally, by doing so, transformative engagements with algorithms, based on the balance of power made possible with social analytics, may become possible. The expanded theory would then move toward democratizing the designs of the totalizing technical power of these technologies under a new technical code. Throughout the rest of this chapter, I provide an example of a proposed educational practice based on a new and democratizing technical code derived from the expanded Critical Theory of Technology. With the new, expanded framework established, it subsequently becomes necessary to further discuss the conceptual foundations and potentials described in Chapter 4.

### **Integrating the Updated Framework in New Coding Curriculum**

In December, 2019, while campaigning for president, Joe Biden made a stop at a coal mining town in Derry New Hampshire and acknowledged the difficult circumstances faced by coal miners. His solution: learn to code. Misstating the modern tasks performed by coal miners, he told a crowd “[a]nybody who can go down 3,000 feet in a mine can sure as hell learn to program as well...Anybody who can throw coal into a furnace can learn how to program, for

God’s sake!” (Jones, 2019). The theme of his speech was reminiscent of the Obama-era Computer Science For All Initiative, which sought to “give all students across the country the chance to learn computer science (CS) in school” (Office of the Press Secretary, 2016, para. 1). In addition, the Office of the Press Secretary for the White House (2016) claimed “[o]ur economy is rapidly shifting, and educators and business leaders are increasingly recognizing that CS is a ‘new basic’ skill necessary for economic opportunity and social mobility” (para. 2). One of the organizations leading the development of computer science and coding curriculums is Code.org.

### ***Code.org***

Code.org is a non-profit organization and website that promotes computer science and coding education programs for educators. According to its home page, it receives support from several corporations, foundations, and individuals, including Microsoft, Facebook, Google, Amazon, the Bill and Melinda Gates Foundation, the Chan Zuckerberg Initiative, Bill Gates, and Jeff Bezos. The reasons it suggests for teaching Computer Science (CS) Principles and coding are that “[s]tudents who study CS perform better in other subjects, excel at problem-solving, and are 17% more likely to attend college” (code.org, 2021a, para. 1). Similarly, according to a blog that is published by Learning Resources, five reasons why learning code is important are: “1) Coding is another language; 2) Coding fosters creativity; 3) Coding helps children with Math skills; 4) Coding improves writing academic performance; and 5) Coding helps children become confident problem solvers” (Learning Resources, 2018).

Beyond the short- and long-term benefits of learning computer science and code, Code.org also supports social issues like gender equality. In its video “Change the World – Hour of Code”, several well-known women promote coding as a source of empowerment and agency

for women. Facebook COO Sheryl Sandberg, for example, said, in the video “I think for a long time the world thought that some things were for boys and some things were for girls. Everyone understands now, boys and girls can have equal opportunity” (code.org, 2021b). Actress and entrepreneur Jessica Alba, who was also featured, said “[y]ou all live in a time where expressing yourself, learning about different people, making a business and a real difference in your communities is all totally possible. With computers, it’s right at your fingertips” (code.org, 2021b). Finally, Pakistani activist for female education and Nobel Prize laureate, Malala Yousafzai said “[e]very girl deserves to take part in creating the technology that will change our world and change who runs it” (code.org, 2021b).

With the financial support code.org receives and the presence of Facebook COO Sheryl Sandberg, who initially recognized and prioritized Facebook’s surveillance capitalist potential, it is reasonable to surmise that code.org’s advocacy exists within an unchallenged surveillance capitalist status quo. One woman interviewed in the video, however, offered a segue that reengages with the purpose of this chapter. A woman simply referred to as “Alice”, whose description reads “leads code.org engineering” claimed “[y]ou know, it’s one thing to use software, it’s a totally different thing to get to change how the software you use actually works” (code.org, 2021b). It is the aim of the expanded Critical Theory of Technology as well as the gestalt switch, choice of a past, and integration of platform cooperativism to “change how the software...actually works”.

### ***Where Demand and the Slow Introduction of Coding Curriculums Provide Opportunity***

The demand for computer science and coding expertise in the United States remains high from one year to the next. In 2019, tech job postings increased 32% from 2018, and during one

three-month period, employers had 918,000 unfilled IT jobs (Loten, 2015). Parents of school-aged children recognize potential in these numbers. According to Smith (2016):

more than nine of 10 parents surveyed say they want computer science taught at their child's school. However, by some estimates, just one quarter of all the K-12 schools in the United States offer high-quality computer science with programming and coding and 22 states still do not allow it to count towards high school graduation, even as other advanced economies are making it available for all students. (para. 4)

This demand combined with the fact that coding curriculums have not been introduced into a majority of schools in the United States represents a potential for expanding these curriculums prior to and during their roll out. Current curriculums utilize programs and topics like ScratchJr, Game Design Fundamentals, Computational Thinking and Problem Solving, and Code.org Computer Science Principles (The Commonwealth of Massachusetts Executive Office of Education, 2015) to teach basic coding skills.

Beyond the skills that are taught through such programs and topics, I argue that the addition of units developed from Berry's (2014) *Critical Theory and the Digital*, technography, and social analytics would provide new awareness and opportunities for students beyond the aims of surveillance capitalism. A unit based on Berry's reconceptualization of Critical Theory around digital technologies can illustrate the ways data extraction and algorithmic technologies influence social relations. Following this unit, the development of a unit based on technography would expand awareness of algorithmic "world views" and their observable influence on emotions, thoughts, and behaviors. The aim of this unit would be to increase awareness that these technologies are not neutral, but value-laden, and that these values are perceivable in the way lived experience is affected through engagement with them. Once that awareness is established,

students will discard any notion of neutrality or instrumental rationality and move on to engaging transformatively with algorithms through a subsequent unit based on social analytics. Upon the completion of these units, students would be invited to begin work on a coding curriculum with greater agency and understanding of the social impacts of their work as well as developing new interventions into the technology from within the technological culture of surveillance capitalism's gestalt.

### **The Gestalt Switch and Educational Platform Cooperatives**

Curriculums for coding are taught through a variety of methods, and the benefits, as stated by code.org and Learning Resources are all oriented toward achieving a variety of forms of success within the current economic model. The current economic model, however, as championed by Google, Facebook, Microsoft and others is developing goals including the “uncontract” which:

[d]esocializes the contract, manufacturing certainty through the substitution of automated procedures for promises, dialogue, shared meaning, problem solving, dispute resolution, and trust...(and) bypasses...social work in favor of compulsion, and it does so for the sake of more-lucrative prediction products that approximate observation and therefore guarantee outcomes. (Zuboff, 2019, p. 220)

In this capitalist endgame, what is at stake, according to Zuboff (2019), is “the human expectation of sovereignty over one’s own life and authorship of one’s own experience” (p. 521). A first step toward reclaiming authorship of own’s own experience is replacing the logic of surveillance capitalism with platform cooperativism, based on the conceptual foundation of the gestalt switch.



The current gestalt of surveillance capitalism and its educational technologies in the Summit Public Schools and the Jinhua Xiaoshun Primary School in China constitute a dehumanizing parts/whole configuration. A gestalt switch, I argue, begins with the potential of an alternative economic logic, platform cooperativism. Just as schools have partnered with surveillance capitalist-adjacent figures and foundations as well as used data extraction and algorithmic technologies, they can also partner with as well as be conceptualized from the ground up by platform cooperatives. By doing so, the data privacy protections that were weakened, if not eliminated altogether by the aforementioned schools, could not only be restored, but reconfigured in a manner that would grant full ownership to parents of students and the students themselves. Not only this, but transparency regarding the use of algorithms can also be prioritized, since the profit motive that requires their secrecy within surveillance capitalism would not exist.

A public school program or charter school that partners with a platform cooperative may then implement a new curriculum to accompany traditional coding curriculums like those promoted by code.org. The new curriculums would draw from technography and social analytics to grant students greater agency when authoring code and engaging with algorithmic technologies. The teacher in the class might assign a project in which students create a blog documenting the specific thoughts and feelings they experience during and after spending time on Facebook, Instagram, or other social media platforms as well as how they experienced persuasion, social pressure, elation, etc. They may then compare those feelings and thoughts to the ones they have while engaging with people without the presence of technological mediation. Students may also document the specific search results they get from Google or YouTube compared to a teacher, friend, or family member with different interests and values. Projects like

these and others inspired by technography would be aimed at challenging instrumental assumptions about such technologies as well as developing an awareness in students of the ways power is configured and expressed in surveillance capitalism.

### **Prerequisites for Enrolling in a Coding Class: Technography and Social Analytics**

According to Boyd (2016) Paulo Freire believed “learning was a social and democratic event where authoritarianism and control of the learning process are minimized” (p. 179). Kahn and Kellner (2007) explained how Freire used slide projectors toward the emancipatory end of teaching literacy to peasants. Though Freire had no power to intervene in the design of the slide projector, he reconfigured its use just as the French population did with Minitel. Freire:

enlisted the well-known artist Francisco Brenand to create ‘codified pictures’ (Freire, 1973, p. 47) that were designed to help peasants semantically visualize the ‘culture making capacities of people and their communicative capacities’ (Bee, 1981, p. 41).

Composed of 10 situations that intended to reveal how peasant life is cultural (and not natural) and thus human (and not animal) [10], Freire’s film slides were displayed on the walls of peasants’ homes, whereupon dialogues were conducted that analyzed the slides’ various pictorial elements. (pp. 435-436)

Freire used an existing technology to challenge the cultural elements that are the force that sustains hegemony. Similarly, coding technologies within the hegemonic technological culture of surveillance capitalism can be reconfigured toward more humanizing and emancipatory ends.

Providing students with a curriculum that develops awareness of the nature of the relationship they have with the value-laden algorithmic technologies of surveillance capitalism can progress toward social analytics. A curriculum based on social analytics, informed by the choice of a past,

of some of the ways data extraction and algorithmic technologies existed before surveillance capitalism can promote a greater balance of power between student and technology.

In such a curriculum, projects would be based on a foundational understanding of technography and ability to develop a notion of the worldview of algorithms. Students would be required to develop a knowledge of analytics in order to better reflect upon and adjust their online presence to meet their social needs (Couldry, Fotopoulou, & Dickens, 2016). Without the behavioral surplus, prediction products, and advertising infrastructure of surveillance capitalism, a more humanizing sense of social needs may also be given an opportunity to develop within students. The value-laden design of the engagements that students have with algorithms in this curriculum could thus be based on the balance of power between user and search in Google's pre-dotcom crash model. With a developed knowledge of the influencing power and values embedded within algorithms as well as their potential harms, students would then be eligible to enroll in coding classes where they would be granted the technology and space to develop transformative, social interventions into the technology.

### **Coding the Code**

To clarify the prerequisite requirement of technography and social analytics instruction before enrolling in a coding class in this new program, I choose the example of assigning a persuasive essay. An English teacher might go about assigning a persuasive essay to students in a class by providing a template for the five-paragraph essay and explaining the purpose and structure. The teacher might then instruct the students in the class to select a topic and begin writing. On the other hand, students might receive instruction on a variety of democratizing efforts like the Women's Suffrage Parade in 1913, the March on Washington for Jobs and Freedom in 1963, the Stonewall Riots in 1969, and, more recently, the March for Our Lives in

2018. Following this instruction, they would then be told to select a topic and begin writing. In this hypothetical situation, the selected topic students choose to write about would most likely be different from one approach to the next.

If, prior to teaching students the technical aspects of coding, curriculums based on technography and social analytics were implemented, the knowledge gained by students may alter their perspective on the meaning of coding. Students may even develop working relationships with members of platform cooperatives that partner with schools. Deeper reflection of the ways the codes they eventually learn to author may embody values and interests and possibly, eventually, affect the lived experiences of those who engage with them may inspire novel and innovative approaches and reconfigurations. These approaches and reconfigurations might create new, computational spaces where the dispossession cycle and technological domination, control, and exploitation are not imbedded in either design or practice.

Students and teachers can either work through or cocreate a curriculum in which a new technical code for the algorithms and algorithmic technologies is developed based on the social meaning that the technology has acquired throughout the prerequisite courses. Students can then code the code that they author with their own, acquired values and awareness. Students enrolled in the coding classes can conceptualize and even author educational algorithms based on preferred styles of learning, preferred time spent in front of a monitor, nature of personalized instruction, as well as a host of other aspects that eventually became problematic in the designs of Summit Public Schools and arguably with the Jinhua Xiaoshun Primary School.

**Conclusion: Friction Instruction (An Imagined Scenario)**

Zuboff (2019) defined “friction” as the resistance to surveillance capitalism. The following is an imagined scenario that imagines what developing a value-laden friction might look like in the context of surveillance capitalist schooling.

In a classroom, in the year 2030, a curated reading list was provided to students based on specific sets of data points extracted and then processed by personalized learning algorithms. The data points were based on electroencephalography (EEG) readings collected by headwear, the tracking of click-through rates on different online assignments and projects, biometric data on various physical movements collected by cameras and infrared cameras, and other monitoring technologies. The boy sitting next to a girl in the class, looked at the girl’s list and shook his head sympathetically. The first book on the girl’s list was *To Kill a Mockingbird*, with a page count of 260. The first book on the boy’s list was *Old Man and the Sea*, with a page count of 73. The numbers were disappointing to the girl. She didn’t like long books, or at least the idea of them, a data point so common among her and her peers that it was scrubbed from the personalization process. The algorithm had instead filtered for predesignated areas of interest and targeted personality traits.

The girl’s disappointment and growing frustration reduced her algorithmically produced focus and attention scores, which subsequently reduced the classroom teacher’s evaluation score, which was calculated and recalculated continuously and tracked on a daily, weekly, and monthly basis. She realized this and felt pangs of remorse, which further lowered the teacher’s evaluation score, which was calculated based on extracted data measuring student stimulation levels. She finally gave in to a slowly-shifting daydream about the flawlessly ordered and efficient operation of the school, causing her algorithmically determined attention score to plummet and a ‘circuit breaker’ to be activated, as a kind of fail-safe, in her teacher’s collapsing evaluation score. She

thought of how data from ubiquitous sensor-enabled devices automated the orderly flow of student traffic to ensure the timely movement from one class to the next. This was achieved by algorithms that determined which students came within close proximity or direct contact with each other.

As a result of implementing the technology package the school purchased from a company owned by a prominent Silicon Valley software engineer and entrepreneur, fights never broke out, students were never late to class or capable of skipping class, and teachers' employment and merit pay were all ostensibly subject to a variety of algorithmically determined, job performance scores. Every student in the girl's class was well-aware of these operations. The girl, still daydreaming to ameliorate the boredom and disappointment of her book selection, felt a little more frustrated and a little more depressed each day. She thought of the stories that her parents and aunts and uncles would tell about attending school when they were her age and how, even though there were occasional fights and students that skipped school, there was a randomness and unpredictability in those stories that she desired.

At the same time, her teacher noticed the girl's attention and focus score and the way it was affecting his evaluation. This was good, he thought. She must be daydreaming. The teacher had petitioned administration and the school board to purchase the sensor-enabled technologies and personalization technologies to make a point that was inspired by a professor he had recently taken a course with at the local university. The professor subscribed to and used the Critical Theory of Technology with the additions of technography and social analytics to critique various settings that employed digital surveillance technologies to manipulate and engineer individual and collective patterns of behavior. Based on the ideas the teacher learned, he decided to design a collaborative, action research project that reconfigured a part of the school into an environment

largely governed by the technologies of surveillance capitalism to ensure similar, predictive outcomes and more efficient and precise systems of measurement. Those aspects were promised in the marketing literature that came with the technology package. The action research project designed by the teacher, however, aimed to make students more aware of the effects of the technologies.

“Okay,” he exclaimed, as the girl awoke from her daydream and sat upright, attempting to focus, to make up for her emotional depth charges to her teacher’s ongoing evaluation. “For what time is left, please open your blog and, based on the established categories of specific thoughts, emotions, and interest level, describe what you experienced when you saw the personalized projects that were assigned. Add to this the personalized work schedule and books that were assigned. In addition, include the same categorical reflections on how each personalized requirement compared to those that were assigned to other students in the class. When you finish these blog entries, that will be anonymously shared with the class, please describe any other thoughts you may have had. Like if you found yourself daydreaming, what were you daydreaming about and at approximately what time and during what part of the class? Finally, begin work on an idea you have for how you would establish a different process for the algorithmic management of some aspect of the class or the school. Base it on your lived experience today.”

His final request generated mild interest in the girl.

“Oh, and by the way,” he continued, “I have direct messaged my evaluation score to each of you as well as a grid that will show the changes that directly correspond to your individual thoughts and behaviors at specific times, as you encountered them today. I have also included a personalized graph of all of the data points collected on you today.”

The girl stared at her monitor and the blank blog page for a minute and finally typed the words “Allow for daydreaming freedom from order.” A part of her that had been reflecting on the stories told to her by her family and daydreaming remained outside the efficiently and algorithmically controlled space of the school’s surveillance infrastructure. This part of her pushed back increasingly and involuntarily against the algorithmic governance of the school’s dehumanizing order and predictability. She had assumed that the students like her, who negatively impacted teacher evaluation scores, due to things like daydreaming, would be redirected, disciplined, or managed in some other way. The truth was that her teacher had come to pay special attention to her. Her daydreaming and occasional frustration were a new form of behavioral surplus within the teacher’s action research project, a behavioral surplus that could be used in coding more humanizing and engaging algorithmic technologies one day. Students like her were the students that would be prioritized for enrollment in the following year’s coding class.

Upon starting her work in the subsequent coding class, that part of her would serve as the guiding value for the codes she would begin writing. In the meantime, the girl stared at her monitor, still unenthused about documenting the different ways she felt that day. She looked at the boy sitting next to her, who was assigned the Hemingway book and the girl next to him and wondered with brief fascination what every student in the class was writing. What if each blog post could be an alternative, interest-based foundation for a new educational design that might still use the same technologies, but toward ends that were more life-world-oriented and less system-oriented.

She suddenly sat up straight. The words on her monitor that had blurred were suddenly sharp and clear, not just in their appearance, but in a kind of purpose she had not realized before.



“Why,” she began to wonder, “document dissatisfaction, when it is possible to code for greater satisfaction?” At that moment, the suggestion window with *To Kill a Mockingbird* appeared again with another suggestion, the newly published autobiography of Greta Thunberg (Thunberg, 2029), reflecting on her years of intervening in a variety of ways within the system that had generated the undesired outcome of a climate crisis. The girl noticed something peculiar, however. The book was not suggested through the personalization algorithm, but directly by her teacher. The student’s behavioral surplus, captured by the classroom technology but *also* by her teacher’s own observation and interest, based on a variety of personal and technologically mediated experiences with her, was processed, and the suggestion was the outcome. Scout was an astutely selected protagonist that would appeal to her, based on the character’s individual attempts to address systemic problems, and the themes of *To Kill a Mockingbird* would also appeal to her. She had shared with her teacher, the year before, however, the deep appreciation she had for the stories and histories told by people she had spoken with or might still be granted the opportunity to speak with one day. Attached to the autobiography suggestion was an alert that Thunberg was speaking on her life and experience in a few weeks at the local university her teacher recently attended. There was also a note accompanied by an image, an aerial view of the school and surrounding community and a message that read “[a]s a part of the whole, you can engage with and transform the whole as much as any other individual or group. Let your daydreams lead.”

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