Policies and People: A Review of Neoliberalism and Educational Technologies in P-12 Education Research

Bradley Robinson[1]

University of Georgia

Abstract

Neoliberal discourses have come to exert a powerful influence on contemporary education policies and practices across the globe, often in the form of such market-based reform measures as standardized assessment regimes, charter schools, and voucher programs. There is concern among some scholars that such neoliberal reforms rely heavily on information and communications technologies for their propagation and maintenance under the guise of educational technologies, or ed-tech. The purpose of this literature review is to examine educational research on the role that information and communications technologies have played in the neoliberalization of education across the globe. In particular, I describe how researchers have made the concept of neoliberalism intelligible by deploying it as a phenomenon for inquiry in relation to educational technologies. I argue that future inquiry must substantiate the broad claims about the effects of neoliberalized educational technologies by engaging more directly with those most affected: teachers and students.

Keywords: neoliberalism, educational technology, technology, P-12 education

[1] Correspondence concerning this article should be addressed to Bradley Robinson, College of Education, University of Georgia, Athens, GA 30602. E-mail: brad.robinson@uga.edu

Accountability regimes, value-added measures, school choice, vouchers—it is difficult to ignore the evidence of market-based rationalities in global discourses around education. Scholars have argued that the appearance of such rationalities within education policy, curricula, and assessment underscores the expansion of neoliberal ideologies and discourses across almost all spheres of life, including the family (e.g., Shannon, 2016), religion (e.g., Atia, 2012), and leisure (e.g., Rose & Spencer, 2016). Harvey (2005) observed that this expansion has been fuelled, in part, by the ability of *information and communications technologies* (ICT) to "accumulate, store, transfer, analyse, and use massive databases to guide decisions in the global marketplace" (p. 3), adding that such capacities form a primary mechanism by which neoliberal forces "bring all human action into the domain of the market" (p. 3), including education. The broad purpose of this literature review is to analyze research focused on the role that ICT has played—and continues to play—in the neoliberalization of preschool through secondary (P-12) education. In particular, I examine how education researchers operationalize the concept of neoliberalism when they situate it in various relations (e.g., economic) to the proliferation of educational technologies (ed-tech).

Neoliberalism

Given its susceptibility to terminological slippage, it is important to ground one's use of the term neoliberal(ism), particularly when evaluating how others have deployed the term. As Ganti (2014) suggested, "because neoliberal is primarily a label of critique, using it too broadly can foreclose certain avenues of inquiry and analysis, leading to an absence of contingency in our representations of social, political, and economic life" (p. 99). In other words, when the concept of neoliberalism drifts into a state of free-floating, pejorative signification, there is a risk that lack of analytical precision might obscure the very discourses and material circumstances that warrant challenge. Indeed, as Brenner, Peck, and Theodore (2010) argued, the word "has become something of a rascal concept—promiscuously pervasive, yet inconsistently defined, empirically imprecise and frequently contested" (p. 184). Neoliberalism can thus function as an empty signifier of sorts (Barthes, 1972), not representing any one thing but rather evoking constellating webs of meanings and associations that evade fixed precision. Such a lack of precision could consequently lead one to see neoliberalism everywhere, and thus nowhere.

In an attempt to reckon with neoliberalism's terminological evasiveness, here I situate my use of the concept in Larner's (2000) framework, which articulates three broad analytical categories: (a) "neoliberalism as policy" (p. 6), (b) "neoliberalism as ideology" (p. 9), and (c) "neoliberalism as governmentality" (p. 12). As a set of policy aims, Larner explained, neoliberalism promotes the expansion of the free market into all spheres of life, along with the withdrawal of centralized government planning and welfare statism. Conceived of as an ideology, however, neoliberalism transcends mere policy objectives to reflect a hegemonic worldview by which the wealthy ruling class asserts and preserves its elite status. This ideology is hegemonic to the extent that it is internalized by individuals who must heroically bootstrap their way to material security as opposed to criticizing the systemic inequities that prefigured their need to bootstrap in the first place.

Larner's (2000) notion of neoliberalism as governmentality draws on Foucault's (1982; 2008) notion of governmentality to account for the discursive power of economic rationalities to produce subjects who govern themselves

according to the market logics of competition, entrepreneurship, and audit. "To govern," according to Foucault (1982), "is to structure the possible field of action of others" (p. 790). Neoliberal governance, then, reflects processes of discipline and control "the rational measure of which must be juridically pegged to an economy understood as a process of production and exchange" (Foucault, 2008, p. 296). Governmentality—a merging of the words *govern* and *mentality*—calls attention to how processes of neoliberal governance produce and integrate subjects into an economic grid of intelligibility. Foucault (2008) called this form of subjectivity *homo œconomicus,* or "the abstract, ideal, purely economic point that inhabits the dense, full, and complex reality of civil society" (p. 296).

While Larner's (2000) framework on neoliberalism is useful, it is important to keep in mind that neoliberal policy, ideology, and governmentality remain entangled in a complex web of relations, causes, and effects. Consequently, neoliberalism can be difficult to locate, hence its empirical and terminological imprecision. For example, one cannot simply point to examples of standardized testing within schools and attribute them to neoliberalism, as such testing regimes existed in schools long before the emergence of neoliberal policies in the 1970s (e.g., the Scholastic Aptitude Test). In their review of research on education and neoliberalism, Schmeichel, Sharma, and Pittard (2017) argued that a given phenomenon should only be attributed to neoliberalism:

> if it is shown to be nested in an overall audit regime in education that is governed by an economic grid of intelligibility or when educational problems are reduced to the economic problem of finding the most efficient way to allocate scarce resources to reach a desired end. (p. 12)

Additionally, Brenner and Theodore (2002) described a notion of *actually existing neoliberalism*, which (a) calls attention to the harmful effects of neoliberal policies on people and the environment and (b) emphasizes how neoliberal discourse (e.g., individual accountability for economic well-being) often "misrepresents the real effects of such policies upon the macroinstitutional structures and evolutionary trajectories of capitalism" (p. 353). The concept of misrepresentation here is key, as it emphasizes a set of conditions whereby policymakers call upon market forces to address social inequalities while in fact perpetuating—perhaps even exacerbating—them. At the core of this literature review, then, is an effort to understand how scholars have positioned educational technologies as such a mechanism of misrepresentation by which neoliberal policies, ideology, and governmentality interface with educational processes.

Educational Technology

The proliferation of information and communication technologies has created a globally digital and digitally global information society across almost every dimension of human life, education included. In the first half of 2019, investor funding in the U.S. educational technology industry alone set a new record at $962 million (Wan & Milward, 2019). The promise of educational technologies is perhaps best encapsulated by what Watters (2015) has called the *Silicon Valley narrative*, which stipulates that (a) education is broken and (b) technology can fix it through disruption and innovation, both of which require funding from some combination of taxpayers and investors. The Silicon Valley narrative, however, has itself been disrupted by research showing that—even when accounting for demographic and socioeconomic factors—students who use computers regularly at school perform

considerably worse than those who do not (Organization for Economic Co-operation and Development, 2015). Of course, computer hardware is but one facet of educational technology as it exists today—others include state- and system-level auditing platforms, web-based instruction and assessment platforms, and socioemotional learning platforms (e.g., ClassDojo)—but given the immense investment in computers across P-12 education, these research findings should, at the very least, prompt caution and critique.

Although important, whether and how educational technologies writ large support equitable educational outcomes is outside the scope of this review, which is focused on how scholars have examined the entanglement of the for-profit educational technology industry with the not-for-profit project of public schooling around the world. Given that educational technology companies exist in a hyper-competitive market in which billions of dollars in public funding are available, it is worth examining whether and how the values that drive such companies come to bear both upon the technologies they create, as well as the users of those technologies, not to mention the aims of progressive, equitable education.

Purpose

For this literature review, I aim to offer an account of how scholars have deployed the concept of neoliberalism in relation to educational technologies, focusing on the degree to which they show how technologies are embedded within a network of auditing and efficiency practices governed by market logics. The research questions I ask are: (a) What does neoliberalism mean for researchers investigating in relation to technology and education, and (b) how have they attempted to demonstrate the influence of actually existing neoliberalism on P-12 education policy and practice? Answering these questions will help delineate a clearer problem space for further inquiry around neoliberalism and ed-tech.

Method

For this integrative review, I examined and synthesized a representative body of literature focused on neoliberalism, P-12 schooling, and ed-tech in an effort to produce new knowledge and perspectives (Torraco, 2005). Although I included research from around the world, the review is limited to articles published in English. The project began in late 2018 and continued through May of 2019, and the included articles reflect search results up to May 2019. Because neoliberalism is a concept that traverses disciplines (Gershon, 2011)—and because, as aforementioned, it is often deployed with a lack of rigor and clear operationalization—the first stage of this review involved selecting initial research databases and establishing search criteria. Given my focus on P-12 education research, I limited my search to the Education Resources Information Center and Education Research Complete via EBSCO, two central repositories of education-focused research. I searched these databases using the following search terms: *neoliberal*, *technology*, and *education,* and I included a search operator that allowed terminological variants (e.g., neoliberalism, educational, educational technologies, etc.). I first limited my search criteria to keyword matches, but after obtaining few results, I expanded to subject matches, which returned 59 results.

I then reviewed the keywords and abstracts for each result, removing articles that did not prominently feature neoliberalism, education, and technology as core phenomena of inquiry. I excluded articles that used the word *neoliberalism* in a

general way—indeed, such uses of the word tend to support the legitimacy of Ganti's (2014) critique—but I included those that employed the term as an analytic tool or examined it as a focal phenomenon under investigation. Of primary interest in this review was research that situates neoliberalism as a potentially useful heuristic for understanding how market logics come to bear on educational technologies. Finally, since my emphasis was on P-12 education, I removed results that focused exclusively on higher education; however, I kept those that considered education in a broader sense that spanned both P-12 and higher education.

After removing articles specific to higher education and those that mentioned neoliberal(ism) in passing, I identified 21 articles that met inclusion criteria. This relatively small sample prompted me to expand my search to two other databases: PsycINFO (two duplicate results) and SOCindex (one duplicate result). Although there is a considerable body of research around neoliberalism and P-12 education in general (see Schmeichel et al., 2017), scholarly attention to the specific role ICT played—and continue to play—in the neoliberalization of education continues to emerge.

I analyzed the included articles through a recursive process, and Larner's (2000) framework functioned as my guiding analytic tool. During the first round of reading, I coded articles for their discussion of neoliberal policy, neoliberal ideology, and neoliberal governmentality, which allowed me to develop an initial understanding of how authors operationalized the concept of neoliberalism in relation to educational technologies. As I discuss more fully in the next section, authors working with Foucault often use the word *technology* to mean something other than ICT, so during the second round of reading, I used the general code *technology* to indicate how authors deployed the concept. This analytic process suggested that types of educational technology—as well as the meaning of the word technology itself—are closely related to how authors discuss neoliberalism.

Findings and Discussion

In the sections that follow, I discuss how authors of the included articles have attempted to examine actually existing neoliberalism within the context of P-12 educational technologies. Again, just as there is ambiguity in what constitutes neoliberalism, there is also ambiguity in what constitutes educational technologies. I therefore begin with a conceptual discussion of how this literature has defined educational technologies in relation to neoliberalism, which grounds my subsequent analysis of how authors have connected neoliberalized ed-tech, policy, and people.

Neoliberalism and Educational Technologies

As aforementioned, Larner's (2000) description of neoliberalism as governmentality is heavily indebted to Foucault's (1979) analysis of biopolitics and neoliberalism. Authors of included articles consistently drew on Foucauldian concepts, and because Foucault maintained his own idiosyncratic conception of technology (Behrent, 2013), the word took on different shades of meaning across the reviewed literature. In many cases, authors used the word technology to refer to ICT, and such references to technology generally cohered around three dimensions of ed-tech: auditing technologies (e.g., Andreasson & Dovemark, 2013; Perelman, 2014; Thomas & Yang, 2013), assessment technologies (e.g., Au, 2016; Saltman, 2016; Torrance, 2017), and instructional technologies (e.g., Jagodzinski, 2015; Jocson, 2016; Moltó Egea, 2014; Thomas & Nayan, 2011; Valdivia, 2017).

Auditing technology refers to the software systems that track school and teacher performance using data based on student attendance, discipline referrals, grading practices, and test scores. For example, Pearson's PowerSchool 21 platform is an auditing technology "serving more than 32 million students, 66 million parents, and 100 million users in over 70 countries around the world" (PowerSchool 21, 2018, para. 1). In addition to tracking attendance, scheduling, and behavior, auditing technologies like PowerSchool 21 are often connected to assessment technologies, which are the devices, networks, and software systems used to administer and evaluate standardized assessments of learning across content areas in P-12 education. Auditing and assessment technologies are themselves entangled with instructional technologies, which are the digital tools and platforms teachers and students use in the context of classroom instruction. In addition to electronic devices, such as mobile phones, tablets, and laptops, instructional technologies include the services and platforms accessed using those devices (e.g., Google's suite of productivity apps, ClassDojo, Kahoot).

Although technology via ICT features prominently across the reviewed literature, authors often deployed the word technology in a more abstract, Foucauldian sense to describe the discursive and non-discursive tools, practices, and behaviors that produce particular kinds of subjects with particular ways of being. Torrance (2017), for example, argued that standardized assessments writ large function as a Foucauldian technology for the responsibilization of individuals as self-interested actors in a free-market economy. Such assessments, in Torrance's view, elide the structural inequities that produce inequitable educational outcomes in the first place and do so through the accountability discourses that come to bear on individual teachers and students.

In a case study of the assessment data display practices of an elementary school, Waitoller and Kozleski (2015) showed how such displays are a technology of performativity that reduces students' and teachers' experiences of teaching and learning in ways that reinforce rather than subvert the kinds of inequities inclusive education is meant to address. Unlike Torrance (2017), Waitoller and Kozleski made no mention of Foucault despite a rather Foucauldian analysis of the data displays as performative technologies. Moreover, Waitoller and Kozleski operationalized neoliberalism within the context of New Capitalism and education. New Capitalism, they explain, "arises from the ideologies of neoliberalism based on privatization, a reliance on 'free' markets, deregulation, the reemergence of the dominance of private investment in controlling labor, and the transnational transfer of goods and services" (p. 3). In this formulation, neoliberalism is an ideological orientation that produces New Capitalist policies—not neoliberal governmentality, as in the case of Torrance (2017)—that ultimately discipline educators to view themselves and their students in terms of corporate-style efficiencies and data benchmarks.

In a study of head teachers' responses to an assessment-based merit pay regime in Catalonia, Spain, Collet-Sabé (2017) deployed Foucault's conceptions of both technology and neoliberalism to examine how teachers viewed their roles as educators changing in response to economic motives. Examining data collected through interviews with primary school teachers, Collet-Sabé argued that teachers were being governed to make instructional choices according to market-logics and that such logics likewise came to bear on their relations with colleagues, students, and students' families. Drawing on Foucault, Collet-Sabé attributed such policies to "a rationality animated by the desire to govern at a distance and to produce an

entrepreneurial identity in correspondence" (p. 142). What is striking about Collet-Sabé's study is the degree to which his participants sensed how the nature of the job was evolving from one focused on relationships and community to one focused on students as data points.

Backer and Lewis (2015) offered a critique similar to that of Torrance (2017) and Collet-Sabé (2017); however, they attempted to rehabilitate what they called the "ontology of testing" (p. 198) by describing the test drive (Ronell, 2005) as an emancipatory vehicle. Backer and Lewis wrote:

> Against the pressure to measure up, rank, and quantify the student (and increasingly the teacher and administrator), the test should be taken to fundamentally form a new sense of self, mark a starting point/point of departure, and finally to draw attention to unexplored potentialities of the world. (p. 206)

Backer and Lewis resisted neoliberal hegemony over the concept of testing, which they saw as a potential vehicle for liberation, rather than oppression. Given how Torrance, and Backer and Lewis, emphasized the Foucauldian valence of the word technology as it relates to neoliberalism, the distinction between ICT and Foucauldian technologies became rather blurry in this literature. Today's standardized assessments, for example, are digital assessments inextricably bound with the global education corporations (e.g., Pearson) that produce them. In this way, the speed and efficiency of digital technologies become virtually indistinguishable from Foucauldian technologies for neoliberal governmentality.

As Brass (2016) argued in his analysis of the Common Core State Standards (CCSS), "the CCSS have also shifted the entrepreneurial focus to the *education technology* sector as part of a transnational trend towards digital education governance, datafication, gamification, and algorithmic governmentality" (p. 235). When it comes to the concept of technology, this literature highlights the fraught relationship between Foucauldian technologies of neoliberal governmentality and auditing, assessment, and instructional technologies.

Neoliberalism, Educational Technologies, and Policy

In the most general sense, the emergence of neoliberal policy has been marked by, as Larner (2000) described it, "a shift from Keynesian welfarism towards a political agenda favouring the relatively unfettered operation of markets" (p. 6). Given that digital technologies have accelerated the expansion of free-market dynamics (Harvey, 2005), and have done so as such technologies have made their way into schools, researchers have turned to policy initiatives related to ed-tech to consider how they support the neoliberalization of education. Au (2016), for example, detailed how the Obama-era Race to the Top (RTTT) and CCSS initiatives fractured the uneasy alliance between neoliberals, neoconservatives, and religious fundamentalists when No Child Left Behind was written into law during the George W. Bush administration.

Of the reviewed research, Au (2016) was the only scholar to discuss neoliberals as a coherent group, which includes individuals with a range of ideological positions who hold in common a steadfast belief in the efficacy of markets to address social problems. As Au explained, although neoliberal practices such as value-added measures (VAM) and standardized curricula, which both rely on ICT for implementation and propagation, remained intact over Obama's tenure, neoconservatives and religious fundamentalists recoiled at RTTT's federally mandated auditing practices, claiming they represented governmental overreach.

Often connected to student growth and learning outcomes, VAM are numerical scores used to account for the overall positive, neutral, or negative effects teachers have on their students (Collins & Amrein-Bearsdley, 2014). The concept of value-added itself derives from economics, in where it essentially refers to the difference between the price of a product and its cost of production. For Au (2016), by appropriating an economics concept to account for the effect teachers have had on students as measured by standardized assessments, the relation between teachers and students is reformulated as an economic one. Crucially, educational technologies are the primary means by which this relation is both enacted and mediated: Students take electronic standardized assessments that calculate and integrate their scores into massive data banks, only to be redirected back at teachers in the form of a VAM. Indeed, it is difficult to see how such large-scale auditing practices could exist without the speed and connectivity provided by ICT.

Whereas Au's (2016) policy analysis is some number of steps removed from schools, Amory (2012) moves closer by studying specific manifestations of instructional technologies in educational spaces. Drawing on activity theory, Amory offered an account of how neoliberalism gained traction in educational technology, explaining that educational technologies reinforce hegemonic behaviorist instructional practices. Such behaviorist instructional practices, in Amory's view, are linked to Apple's (2001) analysis of neoliberalism, education, and socioeconomic inequalities. Looking at prior research around reusable learning objects, learning management systems, and video games, Amory (2012) claimed such implementations of educational technologies could reduce the educational process to one driven by auditing practices and "conveyor-belt driven instructional ideologies" (p. 51). Ultimately, Amory argued that although discourses around education technology are future-oriented, the neoliberalized pedagogies driving them remain firmly rooted in the past, and thereby limit the potential for ICT to support the kinds of meaningful educational transformations touted by proponents of ICT in educational spaces.

Similarly, Saltman (2016) suggested that the propensity for ed-tech companies to develop, market, and sell digital tools and platforms that effectively homogenize the curricula is aligned with neoliberal efficiencies within neoliberal policy frameworks. Moreover, Saltman observed that despite the rhetoric of venture philanthropists like Bill Gates, Silicon Valley's efforts in education represent thinly veiled attempts to secure a future user-base predisposed to purchasing a given company's hardware and software. It is not difficult, for example, to see how the corporate-subsidized infusion of Google Chromebooks throughout U.S. schools could represent such consolidation; after all, they represent more than half the mobile devices delivered to the country's schools (Singer, 2017). Analyzing the Obama-era Every Student Succeeds Act, Saltman (2016) described how various technology corporations (e.g., Pearson, Apple, Google) have leveraged neoliberal policy directives to weaken the local autonomy of educators with standardized curricula, thereby undermining educators' agency and self-efficacy as their labor is replaced by learning management systems.

Moltó Egea (2014) analyzed policy documents produced by ed-tech companies, the Organization for Economic and Co-operate Development, and international education researchers to show how discourses around instructional technologies are entangled with those of the "knowledge society" (p. 277), which he argued represents a "neoliberal meta-narrative" (p. 277) oriented around issues of economic regulation, privatization, and wealth accumulation. When such discourses

dominate, according to Moltó Egea, educational technologies can be reduced to mechanisms for the production of human capital in preparation for exchange in the marketplace. Such neoliberal discursive dominance elides other values, meanings, and purposes in education, such as collective good, equity, and conservation.

Importantly, neoliberal policy initiatives around digital technologies are a global phenomenon (Andreasson & Dovemark, 2013; Burch & Miglani, 2018; Tayan, 2017; Thomas & Nayan, 2011). For example, Tayan examined Saudi Arabia's King Abdullah Public Education Project, also known as the *Tatweer reforms*, a core feature of which is the implementation of educational technologies throughout Saudi public schools. Drawing on Foucault's (1988; 2008) concept of neoliberal governmentality, Tayan argued that the Tatweer reforms positioned the educator "as a tool of and for the state, motivated by global market forces under a transnational neoliberal governmentality that imposes power on individuals" (p. 67). In this view, ICT in education become entangled with discourses related to competition, productivity, and profit, which for Tayan have displaced the potential of ICT to support more meaningful forms of teaching and learning.

Drawing on Rose's (1999) and Foucault's (1988; 2008) thinking about governance, Andreasson and Dovemark (2013) examined policy documents related to auditing and assessment technologies developed and implemented by two Swedish ed-tech companies—Unikum and InfoMentor—for Sweden's public schools. Andreasson and Dovemark analyzed the student assessments teachers were required to complete using the Unikum and InfoMentor platforms to argue that such technologies establish discursive frames whereby student subjectivities are disciplined according to state-sanctioned, neoliberal objectives. The program's focal traits— "behaviours, attitudes, responsibility, independence, entrepreneurship, relationships, cooperation and flexibility" (p. 487)—function within an economic grid of intelligibility that formulates education primarily as means of developing valuable human capital.

Thomas and Nayan (2011) offered a similar argument in their analysis of the Malaysian government's Smart Schools Initiative, which aimed to transform the country's schools in preparation for the demands of the 21st-century global economy through the implementation of assessment, audit, and instructional technologies. Describing the tensions between Malaysians' nostalgia for a pious Islamic past and desire for prosperity in a global economy, the authors examined how the Malaysian government appeared to leverage education policy (e.g., Smart Schools Initiative) in an effort to construct identities that balanced Islamic piety with economic competitiveness. Thus, Thomas and Nayan showed how educational technologies might function as vehicles for discipline and governance on a national scale.

Research focused on the relation between neoliberalism, educational technologies, and policy seemed to share the core idea that such policies produce educational realities as much as they describe them, an assumption shaped largely by Foucauldian concepts of discipline and governmentality. Importantly, these authors do not dismiss technology altogether in response to its entanglement with neoliberal forces; rather, they have called attention to the various ways neoliberal ideology can influence policies around ed-tech. Moltó Egea (2014), for example, spoke to the possibility for ed-tech to be rehabilitated in ways that "dismantle the normative 'subject of education' as an entrepreneurial, self-regulated and flexible learner," and that nurture the "other desirable qualities of human beings we could discover from this fragmented, technologically rich world" (p. 281). However, resistance appears to

be a matter of principle and hope in this literature, as few articles offer evidence of resistance at the policy or local levels.

Nevertheless, such resistance to the neoliberal influence of ed-tech is beginning to emerge. In 2018, for example, the British Columbia Teachers' Federation published a report, *Educational Technologies and Teacher Autonomy,* where it engaged with the neoliberalizing effects of standardization, personalization, privatization, and datafication. The report highlighted the critical question of how such mechanisms can be resisted. Whereas scholars critical of neoliberal policies have emphasized how personalization supports the responsibilization of students for the free-market economy, the British Columbia Teachers' Federation asked, "How can 'personalized' learning be defined so that it builds on and supports the fundamental goals of public education, including equity and inclusion?" (Gacoin, 2018, p. 4). That a professional organization like the British Columbia Teachers' Federation is now engaging with the effects of Canadian neoliberal ed-tech initiatives—the document makes explicit reference to neoliberalism—marks an important move toward the influence of actually existing neoliberalism on the people most affected by it: educators and students.

Neoliberalism, Educational Technologies, and People

Teachers. If research on neoliberal ed-tech policies reflects the manifestation of neoliberal ideologies and discourses within institutional, political, and commercial spheres, research on neoliberalism, ed-tech, and people might be expected to demonstrate whether and how such ideologies and practices come to bear on educators and students in schools. Researchers should be asking crucial questions about what evidence exists that teachers and students are being disciplined through education technologies to become people who perform their jobs and live their lives according to market rationalities. This is a difficult question to answer, but if researchers cannot provide evidence of actually existing neoliberalism at the intersections of education and technology, critics might conclude that neoliberalism in this context has little critical utility.

Although Andreasson and Dovemark's (2013) work was foregrounded in ed-tech policy, they also aligned it with case study research to examine how teachers responded to the implementation of Unikum and InfoMentor. In addition to describing how such auditing technologies have the potential to produce neoliberalized subjectivities, they employed ethnographic methods to investigate whether it actually happened. Ultimately, their findings were mixed. Whereas some teachers responded quite positively to the auditing technologies—suggesting such technologies heightened accountability in ways that enhanced the teachers' sense of professionalism—other teachers felt their professionalism was undermined completely, claiming their pedagogical knowledge was moot in an environment where Unikum and InfoMentor defined what constitutes effective teaching and learning. Such mixed responses underscore Ganti's (2014) call for "contingency in our representations of social, political, and economic life" (p. 99). Researchers critical of neoliberalism must account for the nuanced, idiosyncratic influences of market rationalities on education.

In their study of the growing Indian ed-tech movement, Burch and Miglani (2018) examined how technocentrism—which they defined as the assumption that technology is an intrinsically good and reliable means by which to address social problems—had become a central mechanism for the expansion of neoliberalism at

essentially all levels of public and private education in India. Drawing on institutional theory's emphasis on social fields, Burch and Miglani showed how neoliberal values pervade India's ed-technocentrism at the policy and institutional levels through to the local teacher level. One of the few included studies that did not cite Foucault's concept of neoliberal governmentality, Burch and Miglani emphasized the concrete ways that market-based rationalities pervade the social realities of education. Similar to Andreasson and Dovemark (2013), Burch and Miglani employed qualitative methods to investigate how educational technologies applied neoliberal pressures to educators via quantification and audit. In a particularly striking example, Burch and Miglani quote a teacher who said the following of her experience with such an auditing technology:

> It is important for the principal to know how a teacher teaches or what is going on in the class. But looking at software usage numbers only does not really tell much. I could be logged in, looking at student reports, but may not do much after that. I don't want login for the sake of increasing my [usage] numbers. (p. 609)

This teacher spoke of the discomfort she felt at signing off on her usage time for her principal because she thought the number did not represent anything meaningful about her practice, but simply represented the amount of time she spent logged into a particular website. It is important to note that the teacher's resistance was not to the principal's oversight, but rather to how the auditing technology was compelling a degree of dishonesty from her—a prime example of actually existing neoliberalism, particularly in its "contradictory, destructive character" (Brenner & Theodore, 2002, p. 353). This teacher's resistance highlights a compelling example of how individuals are not without agency when subject to neoliberal policy's efforts to govern them from a distance.

In a similar case study, Perelman (2014) explored how staff at an Israeli secondary school responded to the influence of the auditing technology MASHOV (Hebrew for "feedback"), a learning management system, on their practice and professional identities. Perelman found that all school administrators and a minority of teachers spoke positively about MASHOV, appreciating its transparency and accountability, although most teachers reported that it undermined their professional identities and nurtured a style of performativity that did not reflect the realities of the classroom. Like Burch and Miglani (2018), Perelman limited his analysis of neoliberalism to initiatives aimed at accountability, efficiency, and decentralization in education. Similar to Andreasson and Dovemark (2013), Perelman's findings were somewhat mixed, with some teachers appreciating the heightened accountability and others feeling insulted by it. To underscore the role played by auditing technologies (i.e., MASHOV), Perelman reported a comment from a participant:

> One of the moms called me and complained about the fact that her daughter failed my class and that I didn't do anything to prevent it. Luckily, I referred her to MASHOV, where everything had already been documented, from the frequent absences of her daughter from most of my lessons to my many attempts throughout the year to call the mother and inform her about it . . . .She (the mother) was then speechless! Before MASHOV I never had this kind of cold, firm evidence. (p. 121)

The teacher's appeal to MASHOV as providing "cold, firm evidence" demonstrates the ability of educational technologies to mediate human relations through neoliberal accountability schemes.

Emphasizing neoliberalism as an economic system, Thomas and Yang (2013) found that the integration of ICT in Taiwanese education—an initiative driven by neoliberal education policies—was exerting a de-professionalizing, dehumanizing pressure on educators and alienating them from their pedagogical identities. Like Moltó Egea (2014), Thomas and Yang did not reject technology *tout court*; rather, they called for remedies that shift away from "centralized, standardized, top-down" (p. 124) approaches in favor of those with more critical, supportive orientations.

Such a critical and supportive approach to educational technology—specifically as a response to neoliberal reforms in education—was at the core of O'Donnell's (2018) study related to the *Frente Popular Darío Fernández*, a progressive social movement in Argentina. Drawing on theories of affective pedagogy, O'Donnell described how teachers at a Freirian-based workshop used social media platforms to tell stories that countered the alienation they felt as a result of top-down, market-driven reforms in their schools and communities. O'Donnell situated her study within Argentina's historical connections to neoliberal economic institutions like the World Bank and International Monetary Fund, which offered Argentina financial incentives to neoliberalize their economy. What set O'Donnell's study apart was its depiction of technology-driven resistance. Social media technologies are not generally construed as educational technologies, and yet they too are entangled with neoliberal discourses (Nica & Taylor, 2017). That said, O'Donnell's study demonstrated how technological tools might be used to subvert social, economic, and pedagogical alienation through Freirean empowerment.

Students. Although research around the influence of neoliberalism on education technologies has examined policy and, to a lesser extent, educators, there has been a considerable lack of attention to students in this literature. This lack of attention persists on a global scale, so one cannot completely impute it to the various bureaucratic difficulties (e.g., institutional review boards) of gaining research access to students in the United States, though it is likely such difficulties do play a key role. For this review, I found just two empirical studies related to neoliberalism, ed-tech, and the experiences of P-12 students. These two studies foregrounded neoliberalism as a phenomenon of inquiry in relation to students' use of education technologies. What was striking about both studies (Jocson, 2016; Valdivia, 2017) is that they emphasized student resistance to neoliberal influences on their education.

Jocson's (2016) ethnographic project described how secondary students used ICT to create place-based multimedia narratives that functioned as a critical response to neoliberalism's tendency to narrow curriculum and instruction. Drawing on new materialist theories to understand the relationality between students, technology, and physical space, Jocson showed how teachers and students employed education technologies in ways that disrupted the influence of neoliberal auditing and assessment reforms by honoring a wide of range of lives, experiences, and values. Similarly, Valdivia (2017) described how digital media production in a Chilean secondary school allowed for authentic student responses to the pressures of neoliberal standardization. In light of Chile's fraught history with neoliberalism—Milton Friedman (1991), one of the fathers of neoliberalism, referred to his economic interventions there as the "Miracle of Chile" (p. 4)—Valdivia noted how educational technology has come to be a primary tool to support standardization in an overall neoliberal regime. At the same time, Valdivia showed how students can deploy digital technologies to resist the neoliberal narrowing of their education.

Whereas Jocson's (2016) and Valdivia's (2017) studies offer support for what scholars focused on neoliberalism and ed-tech consistently speak to—that is, the potential for ICT to be used as tools for resistance to neoliberalism—the small number of such studies highlights the need for more empirical work on how students use digital technologies in neoliberalized educational contexts. Literacy scholars have shown how technologies can be used in meaningful ways that support identity work (e.g., Robinson, 2018) and social justice (e.g., Scott & White, 2013). Putting such work in explicit dialogue with actually existing neoliberalism could improve researchers' and educators' understanding and ability to create conditions and practices that rupture the market-logics of education in ways that support inclusivity, equity, and social justice.

Limitations

First, a core limitation of this review is the focus on neoliberalism itself. My emphasis solely on research that operationalized the concept of neoliberalism in relation to ed-tech served as a constraint on this project. There are related concepts (e.g., late-state capitalism and advanced capitalism) that attempt to describe similar states of affairs—that is, globalized market forces and their relation to socio-material conditions—that education researchers have similarly taken up (e.g., Means, 2017; Williamson, 2018). Although such alternative concepts are important, the articles included here demonstrate how scholars have used the concept of neoliberalism to understand the influence of market logics on ed-tech policy and the people subject to it. What may set neoliberalism apart as an analytical framework is that it can be used to theorize neoliberal subjectivity alongside neoliberal ideological and political dynamics (Larner, 2000). It is important to consider neoliberalism not as an end, but as a process, with differing and uneven effects for the individuals subjected to it, retaining the indication of an overarching logic due to its diffusion across space (Springer, 2016).

When scholars attend to neoliberalism as a protean and processual dynamic, they can illustrate how neoliberalized ed-tech can exert idiosyncratic effects, such as undermining teacher agency in some contexts while empowering students to resist neoliberal discourses in others. What such work points to is the idea that technologies are laden with histories and values, that neither they nor potentially totalizing discourses like neoliberalism will be able to offer a comprehensive account of how a social milieu, including education, is governed. Such a possibility should not necessarily diminish critical work around the influence of neoliberalism and educational technology, but rather call attention to the ways technologies and discourses can enter into complex, mutually constitutive relations that bear upon people's lives. At the same time, however, it is up to the scholars who appeal to neoliberalism in their work to do so in ways that grapple with its contingency and idiosyncrasy and reflect both its status "out there" and "in here" (Springer, 2016, p. 22).

Another limitation of this review relates to the geographical distribution of the included authors and articles. The relatively small sample of reviewed articles made it difficult to deliver any sweeping claims about neoliberalism and global ed-tech. At the same time, however, it is worth emphasizing that researchers in a relatively wide range of countries (e.g., Saudi Arabia, Chile, Argentina, Canada, Taiwan, and the United States) have taken interest in the relationship between technology and neoliberal ideology, policy, and governmentality, which at minimum

underscores the global expansions of neoliberalism and its critiques in concert with the global expansion of ICT.

Conclusion

Results indicate that ICT have functioned as a primary mechanism by which P-12 education institutions, teachers, and students are disciplined by increasingly globalized market logics. Whether they appear in the guise of auditing, assessment, or instructional technologies, such technologies deploy numerical technologies to measure, predict, reward, and punish the people subject to their influence, and they do so in order to produce valuable human capital to be exchanged in a global labor market. Moreover, research examining how teachers have responded to market-based educational reforms connected to educational technologies supports the notion that such reforms can result in teacher deprofessionalization and disengagement. That said, more research is needed—both in the United States and abroad—that seeks to understand the impact of neoliberal educational technologies on teacher subjectivities, as neoliberal auditing, assessment, and instructional technologies continue to be implemented at all levels of education. In addition to ethnographic work at the classroom level, large-scale survey studies aimed at administrators and classroom teachers could offer important insights into how people are responding to the pervasive influence of market-driven ed-tech initiatives.

Indeed, this research reviewed here has largely focused on policy documents and has been communicated through critical commentary, with less attention given to actually existing neoliberalism as it manifests in the behaviors and dispositions of teachers and students. Schmeichel et al. (2017) drew a similar conclusion from their review of research on neoliberalism and education, arguing that absent a growing body of empirical scholarship, there is potential for the effects of neoliberalism on people to be exaggerated, distorted, or under-appreciated. Given the degree to which techno-evangelistic discourses like the Silicon Valley narrative (Waters, 2015) suggest that ed-tech supports equitable education, neoliberal critiques of corporate-backed ed-tech reforms are an important means by which scholars and educators can remain vigilant of persistent structural inequalities, particularly as they may be perpetuated by educational technologies.

What distinguishes the reviewed literature focused explicitly on neoliberalism and ed-tech, however, was the consistency with which authors spoke to the potential for ICT to support humanizing pedagogies that mitigate the inequities and contradictions of global capitalism. Despite their accounts of how educational technologies exert neoliberalizing pressures on institutions and people, the reviewed authors asserted that these same technologies can be used to rupture such pressures. Of course, as the articles reviewed demonstrate, there is more work to do in this regard; more empirical research is needed that examines the impact of neoliberalizing educational technologies on those most affected by them—teachers and students, in particular. Such research might consider, for example, the millions of students around the world who currently spend a large part of their school days using Google Chromebooks to access the Google Education Suite, which their teacher manages through Google Classroom. What impact are such practices having on students' attitudes and beliefs about education? About technology? About their futures? How, if at all, are teachers and students using these same technologies in ways that run counter to their neoliberalized auditing, assessment, and instructional purposes, or in ways that nurture critical literacy, equality, and social justice? To the extent that such

research deploys neoliberalism as a critical conceptual framework, it should follow Ganti's (2014) call for nuance and contingency in its representations of neoliberalism in an effort to support the policies and people subject to its influence.

References

Amory, A. (2012). Instructivist ideology: Education technology embracing the past? *Interactive Learning Environments*, *20*, 41–55. https://doi.org/10.1080/10494821003714707

Andreasson, I., & Dovemark, M. (2013). Transforming insecurity into a commodity: Using the digital tools Unikum and InfoMentor as an example in Swedish education. *European Educational Research Journal*, *12*, 480–491. https://doi.org/10.2304/eerj.2013.12.4.480

Apple, M. W. (2001). Comparing neo-liberal projects and inequality in education. *Comparative Education, 37*, 409–423. https://doi.org/10.1080/03050060120091229

Atia, M. (2012). "A way to paradise": Pious neoliberalism, Islam, and faith-based development. *Annals of the Association of American Geographers*, *102*, 808–827. https://doi.org/10.1080/00045608.2011.627046

Au, W. (2016). Techies, the Tea Party, and the Race to the Top: The rise of the new upper-middle class and tensions in the rightist politics of federal education reform. *The Educational Forum*, *80*, 208–224. https://doi.org/10.1080/00131725.2016.1135378

Backer, D. I., & Lewis, T. E. (2015). Retaking the test. *Educational Studies*, *51*, 193–208. https://doi.org/10.1080/00131946.2015.1033524

Barthes, R. (1972). *Mythologies*. (A. Lavers, Trans.). New York, NY: Hill and Wang.

Behrent, M. C. (2013). Foucault and technology. *History and Technology*, *29*, 54–104. https://doi.org/10.1080/07341512.2013.780351

Brass, J. (2016). A governmentality perspective on the common core. *Research in the Teaching of English*, *51*(2), 230–240.

Brenner, N., Peck, J., & Theodore, N. (2010). Variegated neoliberalization: Geographies, modalities, pathways. *Global Networks*, 10, 182–222. https://doi.org/10.1111/j.1471-0374.2009.00277.x

Brenner, N., & Theodore, N. (2002). Cities and the geographies of "actually existing neoliberalism." *Antipode*, *34*, 349–379. https://doi.org/10.1111/14678330.00246

Burch, P., & Miglani, N. (2018). Technocentrism and social fields in the Indian EdTech movement: Formation, reproduction and resistance. *Journal of Education Policy*, *33*, 590–616. https://doi.org/10.1080/02680939.2018.1435909

Collet-Sabé, J. (2017). "I do not like what I am becoming but . . .": Transforming the identity of head teachers in Catalonia. *Journal of Education Policy*, *32*, 141–158. https://doi.org/10.1080/02680939.2016.1253873

Collins, C., & Amrein-Beardsley, A. (2014). Putting growth and value-added models on the map: A national overview. *Teachers College Record*, *116*(1), 1–32.

Friedman, M. (1991). *Economic freedom, human freedom, political freedom*. Smith Center for Private Enterprise Studies. Retrieved from http://calculemus.org/lect/07pol-gosp/frlect.pdf

Foucault, M. (1982). The subject and power. *Critical Inquiry, 8*, 777–795. https://doi.org/10.1086/448181

Foucault, M. (2008). *The birth of biopolitics: Lectures at the Collège de France*, *1978–1979*. In M. Senellart, F. Ewald, & A. Fontana (Eds.). New York, NY: Palgrave Macmillan.

Gacoin, A. (2018). *Educational technologies and teacher autonomy*. Retrieved from British Columbia Teachers' Federation website: https://www.bctf.ca/uploadedFiles/Public/Publications/ResearchReports/2017-TC-02.pdf

Ganti, T. (2014). Neoliberalism. *Annual Review of Anthropology*, *43*, 89–104. https://doi.org/10.1146/annurev-anthro-092412-155528

Gershon, I. (2011). "Neoliberal agency". *Current Anthropology*, *52*, 537–555. https://doi.org/10.1086/660866

Harvey, D. (2005). *A brief history of neoliberalism*. New York, NY: Oxford University Press.

Jagodzinski, J. (2015). The challenges of art education in designer capitalism: Collaborative practices in the (new media) arts. *The International Journal of Art & Design Education*, *34*, 282–295. https://doi.org/10.1111/jade.12088

Jocson, K. M. (2016). "Put us on the map": Place-based media production and critical inquiry in CTE. *International Journal of Qualitative Studies in Education*, *29*(10), 1269–1286. https://doi.org/10.1080/09518398.2016.1192698

Larner, W. (2000). Neo-liberalism: Policy, ideology, governmentality. *Studies in Political Economy*, *63*, 5–25. https://doi.org/10.1080/19187033.2000.11675231

Means, A. J. (2017). Education for a post-work future: Automation, precarity, and stagnation. *Knowledge Cultures*, *5*, 21–40. https://doi.org/10.22381/KC5120173

Moltó Egea, O. (2014). Neoliberalism, education and the integration of ICT in schools. A critical reading. *Technology, Pedagogy and Education*, *23*, 267–283. https://doi.org/10.1080/1475939X.2013.810168

Nica, E., & Taylor, L. (2017). New media technologies, digital sharing, and the neoliberal economy. *Ekonomicko-manazerske spektrum*, *11*, 103–110. https://doi.org/10.26552/ems.2017.2.103-110

O'Donnell, J. L. (2018). Affecting solidarity: Buenos Aires teachers countering professional alienation and exploitation through *Mate* and new media. *Multicultural Education*, *25*(2), 57–61.

Organization for Economic Co-operation and Development. (2015). *Students, computer and learning: Making the connection*. Retrieved from http://www.oecd.org/publications/students-computers-and-learning-9789264239555-en.htm

Perelman, U. (2014). What are the relationships between teachers' engagement with management information systems and their sense of accountability? *Interdisciplinary Journal of e-Skills and Lifelong Learning*, *10*, 217–227. https://doi.org/10.28945/2070

PowerSchool 21. (2018). Our mission. Retrieved from https://www.powerschool21.com/ourmission

Robinson, T. B. (2018). Lights, camera, courage: Authentic assessment and multimodal composition. *English Journal, 108*(1), 25–31.

Ronell, A. (2005). *The test drive*. Urbana, IL: University of Illinois Press.

Rose, J., & Spencer, C. (2016). Immaterial labour in spaces of leisure: Producing biopolitical subjectivities through Facebook. *Leisure Studies*, *35*, 809–826. https://doi.org/10.1080/02614367.2015.1031271

Rose, N. (1999). *Governing the soul: The shaping of the private self*. London, UK:

Free Association Books.
Saltman, K. J. (2016). Corporate schooling meets corporate media: Standards, testing, and technophilia. *Review of Education, Pedagogy, and Cultural Studies*, *38*, 105–123. https://doi.org/10.1080/10714413.2016.1155953
Schmeichel, M., Sharma, A., & Pittard, E. (2017). Contours of neoliberalism in U.S. empirical educational research. *Curriculum Inquiry*, *47*, 195–216. https://doi.org/10.1080/03626784.2017.1283592
Scott, K. A., & White, M. (2013). COMPUGIRLS' standpoint: Culturally responsive computing and its effect on girls of color. *Urban Education*, *48*, 657–681. https://doi.org/10.1177/0042085913491219
Shannon, M. B. (2016). Supporting families: A historical lens on the contradiction of support and neoliberal objectives. *Social Work & Social Sciences Review*, *18*(3), 1–11.
Singer, N. (2017, May 13). How Google took over the classroom. *The New York Times*. Retrieved from https://www.nytimes.com/2017/05/13/technology/google-education-chromebooks-schools.html
Springer, S. (2016). *The discourse of neoliberalism: An anatomy of a powerful idea*. London, UK: Rowman & Littlefield.
Tayan, B. M. (2017). The Saudi Tatweer education reforms: Implications of neoliberal thought to Saudi education policy. *International Education Studies, 10*, 61–71. https://doi.org/10.5539/ies.v10n5p61
Thomas, M. K., & Nayan, R. (2011). Smart schools for saving the soul: A juxtaposition of neofundamentalist and neoliberal discourse concentrations in contemporary Malaysia. *Discourse: Studies in the Cultural Politics of Education*, *32*, 513–529. https://doi.org/10.1080/01596306.2011.601550
Thomas, M. K., & Yang, WL. (2013). Neoliberalism, globalization, and creative educational destruction in Taiwan. *Educational Technology Research and Development, 61*, 107–129. https://doi.org/10.1007/s11423-012-9277-y
Torraco, R. J. (2005). Writing integrative literature reviews: Guidelines and examples. *Human Resource Development Review*, *4*, 356–367. https://doi.org/10.1177/1534484305278283
Torrance, H. (2017). Blaming the victim: Assessment, examinations, and the responsibilisation of students and teachers in neo-liberal governance. *Discourse: Studies in the Cultural Politics of Education*, *38*, 83–96. https://doi.org/10.1080/01596306.2015.1104854
Valdivia, A. (2017). What was out of the frame? A dialogic look at youth media production in a cultural diversity and educational context in Chile. *Learning, Media and Technology*, *42*, 112–125. https://doi.org/10.1080/17439884.2016.1160926
Waitoller, F. R., & Kozleski, E. B. (2015). No stone left unturned: Exploring the convergence of New Capitalism in inclusive education in the U.S. *Education Policy Analysis Archives*, *23*, 1–33. https://dx.doi.org/10.14507/epaa.v23.1779
Wan, T., & Millward, W.T. (2019, August 7). U.S. edtech funding already nears $1 billion in first half of 2019. *Ed Surge.* Retrieved from https://www.edsurge.com/news/2019-08-07-us-edtech-funding-already-nears-1-billion-in-first-half-of-2019
Watters, A. (2015, May 17). Ed-tech and the Californian ideology. Retrieved from

http://hackeducation.com/2015/05/17/ed-tech-ideology
Williamson, B. (2018). Silicon startup schools: Technocracy, algorithmic imaginaries and venture philanthropy in corporate education reform. *Critical Studies in Education*, *59*, 218–236. https://doi.org/10.1080/17508487.2016.1186710