



Making It Your Own: Understanding Teachers' Orientations to Technology in Practice

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Making It Your Own:
Understanding Teachers' Orientations to Technology in Practice

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Dissertation Committee
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A Thesis Presented to the Faculty
of the Harvard Graduate School of Education of Harvard University
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Table of Contents

<i>Abstract</i> _____	<i>iii</i>
1. Introduction _____	1
2. Troubling Resistance and Compliance: Background and Conceptual Framing	8
3. “Tell Me About You as a Teacher”: Methodological Process _____	18
Data collection and description of participants _____	18
School and district context _____	25
Coding and analytic process _____	27
Limitations _____	32
4. Feeling Behind _____	36
<i>Introduction: The problem of keeping up</i> _____	36
<i>“I’m already way behind”: Technology as something you are supposed to be doing</i>	37
<i>“I’m not good at it”: Reframing reality as personal failing</i> _____	42
<i>“There’s got to be other ways”: Dissatisfaction with practice and yearning for a different kind of purpose</i> _____	46
<i>“That’s what I love about the technology”: Finding ways out of keeping up</i> _____	49
<i>Conclusion</i> _____	56
5. Foregrounding Purpose _____	61
<i>Introduction</i> _____	61
<i>Articulating Purposes</i> _____	65
Purpose 1. Understanding _____	69
Purpose 2. Identity _____	73
Purpose 3. Engagement _____	76
Purpose 4. Interactions _____	80
Purpose 5. The World Beyond _____	84
<i>Conclusion</i> _____	90
6. Making it Your Own _____	91
<i>Introduction</i> _____	91
<i>Iteration</i> _____	92
<i>Support</i> _____	97
<i>Divergence</i> _____	104
<i>Conclusion</i> _____	109
7. Embracing Open and Critical: Conclusion and Implications _____	112
<i>Conclusion: Being open and critical</i> _____	112
<i>Implications: Making the space for open and critical</i> _____	118
Appendix _____	124
Appendix A. Interview Protocol _____	124

Appendix B. Coding Tables	130
<i>Bibliography</i>	<i>134</i>

Abstract

Too often, teachers are not given meaningful opportunities to participate in discussions about the purposes of education and the interaction of purposes and practices, key conversations about the means and ends of teachers' work (Ingersoll, 2003; Johnson, 1990). This problem has particular manifestation in the area of educational technology, where discussions about what to do and why are frequently dominated by actors other than teachers, such as administration or designers and producers of the technology itself (Bowers, 1988; Buckingham, 2007; Cuban, 2001). Consequently, the categories for understanding how teachers relate to educational technology have been largely binary: compliance with or resistance to the plans and visions of integration formulated by others. This project, based on qualitative interviewing with teachers about the terms in which they understood and thought about their own practice, intervenes in these conversations in two ways. The first is by offering an alternative framing to resistance/compliance as a way to talk about teachers and technology, that of teachers as both open *and* critical in their orientation to technology in classroom practice. This is an orientation to technology characterized by *selective* use of technological tools and practices in the service of teachers' own sense of purpose for themselves, their students, and their classrooms. Secondly, rather than focusing on the perception of teacher resistance as the central problem in efforts at meaningful technology integration, I argue that we should be concerned with what some teachers described as the anxiety-provoking pressure to "keep up" with technology, an idea reflected in dominant discourse that positions

technology as the driver of necessary educational change and equates lack of use with bad teaching. In considering the implications of this study I argue that the orientation of being both open and critical towards educational technology, while contrasting with dominant discourse, is resonant with existing research on how people (and teachers) learn and how meaningful educational change takes place.

1. Introduction

We cannot separate out the purposes that underly education from the practices that are meant to enact those purposes (Biesta, 2006; Dewey, 1938; Franklin, 1999). Yet, too often, teachers are not given meaningful opportunities to participate in discussions about the purposes of education and the interaction of purposes and practices, key conversations about the means and ends of teachers' work (Ingersoll, 2003; Johnson, 1990). Rigid prescription of practices for teachers, absent their own active meaning-making, rarely results in desired change (Fullan, 2016; Tyack & Cuban, 1995). The complex, ambiguous, and situated nature of teaching and learning is such that compliance with a plan of action prescribed by others is inadequate to address the judgments and decisions that will arise in practice (Cohen, 2011; Franklin, 1999; Putnam & Borko, 2000; Schön, 1983).

This problem is given particular expression in the area of educational technology, where excitement about the promise of educational technology to "solve" the problems of education tends to obscure necessary conversation about the definition of those problems and the complex work of teachers in addressing them (Cuban, 1986; Selwyn, 2014). Discussions about what to do and why regarding educational technology are frequently dominated by actors other than teachers, such as administrators or designers and producers of the technology itself (Bowers, 1988; Buckingham, 2007; Cuban, 2001). But when technology as solution fails to deliver on its promise of revolutionary change, it is people, like teachers, who are blamed (Cassidy, 2004; Franklin, 1999; Morozov, 2013). One consequence of this bind has been the reproduction of binary categories for

understanding how teachers relate to educational technology: compliance with or resistance to the plans and visions of integration formulated by others.

This project was born out of my own concerns as an elementary classroom teacher. I experienced educational technology as something that was pushed upon me in a way that foreclosed questions of both purpose and practice. In my time as a teacher, educational hardware and software were increasingly proffered as the solution to a range of perceived educational problems, including students' need for academic differentiation and intervention as well as increased engagement and motivation. The suggested uses of these tools often felt misaligned with the things that I valued in teaching and learning. Further, attempts by myself or my fellow teachers to raise concerns about our own need for more learning experiences, the potential unintended consequences of use, and conflicting understandings of what was important in students' intellectual and social-emotional development were sometimes interpreted as resistance to necessary change.

When I began my doctoral studies, I found two things. First, I encountered a more thoughtful and nuanced conversation about technology and its relationship to teaching and learning. This included Papert's (1980) excitement about the kinds of interactions and thinking computers could enable, Mishra and Koehler's (2006) theorization of the situated and complex nature of technological pedagogical content knowledge, and Wiske's (2006) discussions of meaningful learning using technology. In addition, the specific concerns about technology use that I had seen voiced by teachers only to be dismissed as resistance to change were themselves reflected in academic research (Cuban, 1986, 2001; Ertmer, 2005; Hew & Brush, 2007; Turkle, 2011). Yet, as I will explore more fully

in chapter 2, “Troubling Resistance and Compliance,” I also found a parallel to what had troubled me in practice. I saw the dominance of research that foreclosed necessary conversation by and with teachers about what they were doing and why through naming teacher resistance to technology as a problem to be overcome (e.g., Stieler & Jones, 2019). The persistence of this resistance/compliance binary prompted me to want to uncover other ways to talk about teachers and technology that might be more reflective of teachers’ own perspectives and experiences.

This study sought to move beyond these binary categories towards a fuller understanding of how teachers themselves think and feel about the use of educational technology. Chapter 3, “Tell Me About You as a Teacher,” describes the in-depth, qualitative interviewing approach through which I tried to create space for teachers to talk about their practice and thinking in their own terms. The ideas that came out of those conversations enable me to intervene in discourse about teachers and technology in two ways. First, I found that when teachers saw themselves as driven by their own sense of *purpose*, their own vision of practice, their own ideas of what was and was not important for student learning, they were neither compliant nor resistant towards technology. Instead, they were both open *and* critical; they engaged in *selective* use of technological tools and practices in the service of their own sense of purpose for themselves, their students, and their classrooms. Secondly, rather than focusing on the perception of teacher resistance as the central problem in efforts at meaningful technology integration, I argue that we should be concerned with what some teachers described as the anxiety-provoking pressure to “keep up” with technology. This idea of technology as something to keep up with is invited by

dominant cultural discourse that locates the value of technology in its newness and difference.

Chapter 4, “Feeling Behind,” describes this orientation to technology defined by the need to keep up, where teachers experienced educational technology as something they were *supposed* to be doing, that everyone else was already doing. Teachers who spoke about this feeling of a need to keep up communicated stress and anxiety in relationship to technology and a dissatisfaction with their practice. This dissatisfaction stemmed from how they described their responses to the Sisyphean task of having to keep up, ranging from “saying yes to everything” and consequently feeling as though they were never able to actually be in control of anything, to shutting themselves off from possibilities that they acknowledged might ultimately be valuable. These responses help us see that, rather than opposites, compliance and resistance are parallel problems, rooted in a shared lack of self-authored motivation, of internally-defined purpose (Ryan & Deci, 2000). Their description of this orientation involved a reframing of the realities of work and learning noted by other teachers—the unreliability of tools, the time it takes to learn new things, the support needed for that learning, the differences in practices between themselves and others—as personal failings. These teachers expressed a yearning for uses of technology in the classroom that felt meaningful to them, the time and space to iterate on their practice with technology, and more support in this process.

Chapter 5, “Foregrounding Purpose” presents an orientation to technology that was purpose-driven, where teachers drew a contrast with what they perceived to be use for the sake of use and asserted a desire for what they did in the classroom to be grounded in their sense of what was best for their

students. Teachers drew on a range of purposes in their decision-making, referencing considerations about *understanding, identity, engagement, interactions, and the world beyond*. Because it was these purposes that were primary, rather than the use of technology in and of itself, teachers were excited about the potential for technology to support their pursuit of these purposes, but also conscious of the potential for negative consequences of use, skeptical of claims of educational technology as a panacea, and forceful in their assertion that one thing might not work for all students or in all circumstances. They were both open *and* critical towards technology.

Chapter 6, "Making It Your Own" explores the enactment of a purpose-driven orientation to technology in practice, where teachers emphasized the importance of *iteration, support, and divergence*. They described thinking about why and how to use educational technology in an ongoing way that involved trying things out, seeing how students responded, and making adjustments in light of these observations of actual use along with their sense of overarching purpose. Teachers spoke about the role that others played in helping them develop ideas of things they wanted to do with technology and learn how to bring those ideas into being. This was a description of support without prescription. They valued getting ideas from others not because they would then do exactly the same thing, but because those ideas helped them figure out what they could or might want to do in the context of their own classroom and students. Lastly, teachers expressed a comfort with *divergence*, a comfort with being different from others in their practices with technology. These included differences in the extent of use overall, the uptake of specific tools and practices,

and the conclusions that one might come to about the role that technology could or should play in the enactment of shared purposes.

While the terms in which teachers spoke about the purposes that were important to them overlapped in some ways with dominant discourse around the benefit of educational technology for student learning and preparation for success in a digital society (e.g., Liao, Ottenbreit-Leftwich, Karlin, Glazewski, & Brush, 2017), they also complicated an understanding of those purposes and the assumption of their relationship to technology use. Teachers shared a preoccupation with finding effective ways to engage students in learning and support the substance of their understanding, as well with the responsibility to prepare students for the world beyond the classroom, but they came to different conclusions about the role that technology did and could play in those processes. The specifics of these negotiated (Hall, 1980) and contested meanings reflect the importance of space for teachers to talk directly about purposes for technology use, reinforcing arguments that those conversations cannot and should not be assumed or subsumed by a focus on the instrumentalities of teaching with technology (Bowers, 1988; Bulfin, Johnson & Bigum, 2015; Selwyn & Facer, 2013).

Chapter 7, “Embracing Open and Critical” moves further into a discussion of the implications of this work—why I think teachers being open and critical towards technology is something to be excited about, and how to create more space for that orientation to flourish. While engaging in this study reinforced my previously held conviction that our current discourse around teachers and technology is limiting and counterproductive, I was also surprised by what I found here. For the majority of teachers I spoke with, those who did not feel as though technology was something they needed to keep up with, the area of

technology was much less emotionally fraught than I anticipated. As I came to understand, it was the orientation of being purpose-driven and the resulting simultaneous stances of being open *and* critical towards technology that enabled this, and I found myself looking to these teachers as models for myself. I saw them as models of how to move beyond the anger and frustration that I had experienced as a classroom teacher when I did feel pressure to use educational technology in ways that were in conflict with my own purposes for student learning and my own value for professional judgement and discretion. I also saw them as models of practice, and felt myself responding to the excitement they expressed about uses of technology that were meaningful to them, that enabled student construction of understanding and sense of ownership over learning. As I prepare for my own return to classroom teaching, I am tremendously grateful for the opportunity to learn from these teachers about an orientation to technology in classroom practice that I aspire to enact.

2. Troubling Resistance and Compliance: Background and Conceptual Framing

The field of educational technology has been haunted by the perpetuation of a simplistic binary of resistant and compliant as the only available positions for teachers to take up in their orientations to technology in classroom practice. I purposefully use the word *haunted*, rather than *dominated*, to capture how, despite various forms of complicating evidence and direct critique, this narrative still frames the terms of discussion. As this chapter will illustrate, this limited and limiting binary results from the way in which both academic research and popular discourse assumes the purposes for the use of educational technology and prescribes the practices teachers must engage in to realize those purposes. This discourse stands in contrast with other ways of thinking about teachers and teaching that highlight the necessity of giving teachers the opportunity to take ownership over both the means and ends of the work they are doing.

In education we have skipped the question of *whether* particular technologies should be used and jumped right in to *how* they should be used (Cuban, 1986; Selwyn, 2011). The field remains dominated by what have been termed “instrumentalist” approaches to educational technology (Bigum, Bulfin, & Johnson, 2015), in which the question of purpose is presented as fixed and determined and the focus is on what teachers should be doing. Specifically, the purpose for use of technology is often narrowly constructed in terms of preparation for the new world, that use of educational technology in and of itself as well as the learning that supposedly would not be possible otherwise are necessary for students to function successfully in contemporary society (Culp, Honey, & Mandinach, 2005; Selwyn, 2011; Selwyn, Dawes, & Mercer, 2001). This

is reflected in statements such as the following, “Technology has been deemed essential for potential benefits to student learning as well as for preparing students for an increasingly digital society” (Liao, Ottenbreit-Leftwich, Karlin, Glazewski, & Brush, 2017, p. 523). This statement is typical of contemporary educational research, and, strikingly, offers a citation to a report produced by the joint venture of an educational non-profit (Project Tomorrow) and an educational technology company (Blackboard).

The assertion that “this is the way the world is now” is one that philosophers of technology have frequently identified as central to a self-perpetuating justification for systems in ways that close off necessary questioning (Warren, 2008). Rather than taking this assertion of the purpose of use of educational technology at face value, it is precisely because the past two decades reflect the ever-increasing presence of educational technology as an unquestioned feature of schools that it is even more essential to “acknowledge that notions such as ‘technology-enhanced learning’, ‘learning technology’ and ‘e-learning’ are largely sets of value preferences—that is, social imaginaries and ideological formations that present common (and often persuasive) understandings of how things ‘should be’ and ‘will be’” (Selwyn, 2014, p. 11). As will be referred to throughout this work, I am concerned with the discourse of educational technology as something that both reflects and effects the reality surrounding it (Rogers, 2011; Wodak & Meyer, 2010). Thus, the following descriptions of educational technology research are presented not simply as evidence of what is, but also as illustration of how ideas of “what is” are constructed.

This assumption of purpose and the attendant prescription of practice—the expectation from others of what teachers should be doing with educational technology—has been noted in research describing the long-standing belief in technology as panacea for a range of perceived educational problems, and assertion of teachers as impediment to the realization of that solution due to their resistance to the integration of technology. Calling out a cycle of “exhilaration/scientific-credibility/disappointment/teacher-bashing” (p. 5), Cuban’s (1986) foundational study of waves of educational technology illustrated how over-inflated claims that technology would revolutionize education led to the blaming of teachers when that revolution inevitably failed to materialize. Franklin has directly connected this “inherent trust in machines and devices” to “a basic apprehension of people” (1999, p. 25), helping us understand how intertwined these two narratives—technology as panacea and teachers as resistant—are. As further examples will illustrate, it is the position of “resistant” teacher that is the explicitly named component of this binary. Yet, to name the position of “resistant” teacher as problem is to discursively constitute the position of “compliant” teacher as solution (Davies & Harré, 1990).

There have been two strands of empirical research within the field of educational technology that provide a foundation for exposing the limitations and constraints of this compliant/resistant binary, even while illustrating its tenacity. The first strand consists of empirical studies either challenging, or complicating, the idea of teachers as resistant to technology through descriptive studies of teachers’ actual practice, investigations of teachers’ perspectives on educational technology, and explorations of the contexts in which both the work and teachers’ orientation toward it take place. Early descriptive studies of

computer use in classrooms critiqued the idea that technology alone would be the driver of changed practice and the blaming of teachers as resistant through showing how actual computer use depended on what teachers thought was valuable for student learning (Cuban, 2001; Schofield, 1995). Using in-depth qualitative methods, these studies illustrated a range of modes of engagement with computer use in classrooms, from nonuse, through use that reinforced existing pedagogy, to use as part of changing practices towards student-centered learning, and noted that teachers were not inherently technophobic or resistant to change.

Studies that attend to teachers' own perspectives on their practice have found that teachers often do want to change their practices and use of technology, even if they don't always know how. Using observations and interviews, Demetriadis et al. (2003) studied a group of teachers who were in support of a shared vision of technology integration yet still expressed a lack of confidence with technology and experienced conflict between goals of adoption and other imperatives. Further, teachers' usual pedagogical practices can change with the introduction of technological tools, as teachers' lack of technological fluency ironically prompts them to revert to more didactic methods (Bers, Ponte, Juelich, Viera & Schenker, 2002).

Other studies have explored how the environments that surround teachers can invite resistance through demanding compliance with unrealistic goals and methods. While these studies do not necessarily advance the idea of resistant teacher as a position, they imply legitimacy to that stance. Much of the impetus for technology in schools has come from outside of the profession, thus exacerbating the subordination of teachers to the interests of designers,

companies, and districts (Buckingham, 2007; Cuban, 2001). School- and society-level conditions may invite resistance through practices such as top-down mandates that fail to acknowledge teachers' perspectives and world of work (Grieshaber, 2010) or market forces pushing out products that aren't ready or useful (Buckingham, 2007).

One important feature of the environment is how educational technology is talked about. Ottenbreit-Leftwich, et al., 2010 posit the theory that the dominance of talk claiming that teachers are resistant to technological change may in fact be making it true, as researchers adopt an epistemological approach that begins from comparing teacher practice to a pre-determined set of best practices, rather than looking for what teachers are actually doing. Studies of educational technology discourse across research (Oliver, 2011), policy (Convery, 2009), and advertising (Selwyn, Dawes, & Mercer, 2001) have shown that discourse to largely assume resistance or ask for compliance through positioning teachers' knowledge and agency as secondary to the promise of technology.

I want to specifically call attention to the "digital natives" (Prensky, 2001) discourse, which asserts an inherent generational difference in relationship to technology use. There has been extensive interrogation of the idea that there are natural, and beneficial, ways that students engage with new technologies, as well as arguments that the assertion of this natural affinity detracts from the need for schools to teach students *how* to engage with technology (Buckingham, 2007; Selwyn, 2009). With implications for the impact of this discourse on teachers, Smith (2013) has noted that the metaphor of "digital natives" serves to close off the possibility that teachers have the authority to question if and how instructional technology is used. Despite these critiques, the use of the term

“digital natives” as shorthand for an assertion of inherent generational difference is still prevalent in popular discourse (e.g., Acker, 2020).

A second strand of research, housed within the field of teacher learning about technology, has provided the potential to go further in exposing the limitations of resistant/compliant as a way to understand teachers’ orientations towards their work, with technology or otherwise. Mishra and Koehler’s (2006) seminal articulation of Technological Pedagogical Content Knowledge (TPACK) responded to a lack of theorizing about the use of technology in education as well as a tendency for learning experiences for teachers to focus on decontextualized technological skill building. Asserting that the domains of technological, pedagogical, and content knowledge are interrelated and reciprocal in nature, the authors emphasized teaching, and teaching with technology, as complex and situated, stating that there will never be one right way to use technology. While Mishra and Koehler repeatedly noted the importance of moving beyond “what” questions to “how” questions regarding teachers’ engagement with technology, they don’t address “why” questions. These were gestured to more directly by Ertmer’s (1999, 2005) investigation of teacher beliefs as barrier to technology integration. Ertmer argued that the ongoing failure of technology to result in changed pedagogy stemmed from lack of attention to the impact of teachers’ own beliefs about teaching, learning, and technology on how and why they used specific tools.

Despite these critiques, the discursive construction of teacher resistance as central problem (and the implied suggestion of teacher compliance as solution) in the field of educational technology remains dominant. Sometimes this is stated explicitly, as in research that names teacher resistance to technology as a central

motivator (e.g., Hung, 2018; Rigler, Jr., 2016; Sánchez-Prieto, Huang, Olmos-Migueláñez, García-Peñalvo, & Teo, 2019; Stieler & Jones, 2019), or categorizes teachers in relationship to technology along lines of use with resistance named as a problem (Graves & Bowers, 2018). More often the binary of resistant and compliant stances remains implicit. The research in this area (starting from two widely-cited literature reviews: Hew & Brush, 2007; Lawless & Pellegrino, 2007) falls into five major categories, all of which take technology integration as defined by others as the goal, and are concerned with teacher beliefs and experiences as they support that idea of integration. This includes research focused on increasing technology “acceptance” amongst teachers (e.g., Sherer & Teo, 2019), increasing teacher’s TPACK (e.g., Vongkulluksn, Xie, & Bowman, 2018), and overcoming barriers to technology integration (e.g., Francom, 2020; Liu, Dawson, & Barron, 2017; Teo, Zhou, & Noyes, 2016). It also includes research about the kinds of learning experiences that promote technology integration for pre-service (e.g., Kale, 2018; Nelson & Hawk, 2020; Zipke, Ingle, & Moorehead, 2019) and in-service teachers (e.g. Barton & Dexter, 2020; Karlin, Ottenbreit-Leftwich, Ozogul, & Liao, 2018; Woodward & Hutchinson, 2018), and studies examining teacher use of a specific technological tool or practice (e.g., Constantine & Jung, 2019; Schroeder, Curcio, & Lundgren, 2019).

While this kind of research does acknowledge the complexity of factors that impact teachers’ use of technology, including external conditions (e.g., school-level supports, sustained and contextualized professional development) as well as internal characteristics (e.g., beliefs in the value of technology, comfort and confidence with technology), it operates from an assumption that lack of use, or lack of a particular kind of use, is the problem, and more use, or thinking in a

certain way about use, is the solution. Teacher's own ideas about educational technology and its value are only of interest to the extent to which they support that externally-defined vision for use. For example, a recent exploration of teacher beliefs concerning technology comes to the conclusion that, "There is still a lack of concerted and direct effort to positively influence teachers' value beliefs towards technology" (Saubern, Urbach, Koehler, & Phillips, 2020, p. 79). This kind of research reflects the presumption of a simplistic relationship between beliefs and actions leading to the idea that one need only change teachers' beliefs about technology in order to change their actions. While this presumption was not fundamental to Ermter's original work, its persistence is noted in a recent literature review by Tondeur, van Braak, Ertmer, and Ottenbreit-Leftwich, 2017. As I experienced in practice, the idea that teacher beliefs matter to technology integration can be misinterpreted to justify administrators, producers, and designers not only telling teachers what to do with educational technology, but also what to believe about it.

Part of what leads me to the conclusion that these are limited ways of talking about teachers and technology is the difference between research that recommends telling teachers directly what to believe about technology and research that has shown that a reason for the failure of many efforts at educational change is the fallacy that you can give meaning to others, rather than giving them the space to create it for themselves, which necessarily involves struggle and potential rejection of ideas (Fullan, 2016). This alternative way of thinking about change and how it happens is rooted in a particular understanding of the work of teaching. This is an idea of teaching (and, by extension, teaching with technology) as complex, multi-faceted and situationally-

specific that recognizes the validity of individual teachers' ideas about their work, understanding of what is important, and responsive decision-making about the needs of their students (Cohen, 2011; Dewey, 1902; Hughes, 2005; Lampert, 2001; Schön, 1983). This conception of teaching does not leave space for a prescriptive model of practice, a model in which teachers can be told exactly what to do, a model in which they can either comply or resist another's vision of their work.

These different ways of thinking about the work of teaching have implications for the methodological approach that can best illuminate that work. I place the present study alongside recent investigations concerning teachers' own perspectives on educational technology and their use of it in classrooms that trouble the compliant/resistant binary. In-depth qualitative studies investigating how teachers think and feel about using educational technology absent an *a priori* idea of best practice found that teachers considered any imperative to use a particular technology in general as secondary to student learning needs, making their decisions about what to do and why in the interests of their understanding of what was best for students (Orlando, 2015; Ottenbreit-Leftwich et al., 2010). Yet work in this tradition continues to be small, exploratory, and often done in countries other than the United States (including the work of Orlando (2010), Demetriadis et al. (2003), and Selwyn et al. (2001)). While there is overlap between international contexts, there is also evidence that the narrative of technology as panacea has a specifically entrenched manifestation in the US (Nye, 1994), as does the construction of ideas of teachers' compliance and resistance (Ingersoll, 2003; Lortie, 1975).

In the next chapter, I turn to the process by which I tried to understand the terms in which teachers themselves thought about their work with educational technology, their own descriptions of the practices in which they engaged and the purposes that drove those practices.

3. “Tell Me About You as a Teacher”: Methodological Process

Moving beyond the binary categories of resistant and compliant towards a fuller understanding of teachers’ orientations to technology necessitated investigating teachers’ own perspectives on and construction of meaning in their work. In-depth qualitative interviewing was the method best suited to this investigation (Kvale, 1996). The interview is a shared site of knowledge construction (Guba & Lincoln, 1994), and this study invited teachers into the project of constructing potential alternatives to the narratives being told about them. In my own experiences as a teacher, the phrase “the research says...” was often used to silence and could function as one aspect of the lack of opportunities for teachers to engage in important conversations about educational technology. My approach purposefully attempted to push back against an idea that theorizing is solely the domain of the researcher with a conviction that individuals at all levels can and do engage in theorizing about their work (Caldwell, 2008). Thus, I ask the central research question, “How do elementary classroom teachers understand their orientations to technology in classroom practice?”

Data collection and description of participants

The data for this study consisted of semi-structured interviews with 15 elementary classroom teachers in a small, urban district in the Northeast. This sample size allowed for the kind of rich description of individual experience and nuance within it that characterizes this kind of qualitative work (Willig, 2013),

but was also broad enough to help me understand something about the range of individual experiences (Luttrell, 2010a; Seidman, 2013).

General education elementary school teachers represented a valuable group within which to explore how teachers conceptualize their orientation to technology in classroom practice and how that orientation is constructed in the surrounding environments. Different subject areas involve different ideas about knowledge, pedagogy, uses of technology, and the role of the teacher (Mishra & Koehler, 2006; Shulman, 1986). Yet elementary teachers teach across the subject areas, providing an opportunity to foreground a more global orientation to technology. Further, elementary teachers are more often subject to the legacy of teaching as a female-dominated profession whose work is seen an extension of care rather than intellect (Lortie, 1975). This lack of voice and autonomy on the part of teachers (and its gendered dimension) has been magnified in the development of educational technology, as lack of technical expertise has served to further delegitimize teachers' authority to speak on issues of practice (Papert, 1993).

In contrast with other similarly scoped studies of teachers' views on technology use (e.g., Orlando, 2015; Ottenbreit-Leftwich et al., 2010), I did not limit my sample to teachers who had been deemed "exemplary" in their teaching practice or technology use. I recruited teachers through a combination of methods, starting in the spring of 2018. At three schools, after securing the permission of principals to speak with teachers, I asked the school-based technology specialists to recommend teachers they thought might be willing to speak with me. I emphasized that I was interested in talking with teachers across a range of experiences and comfort levels with technology. I followed up directly

over email with the teachers suggested by the technology specialists. At the first school, the technology specialist recommended five teachers, four of whom responded when I contacted them directly. I reached out to a fifth teacher at the school who had been recommended to me by a former colleague in the system, and who also agreed to participate. At one school, only one person was suggested. After making contact with that teacher, I directly emailed the rest of the teachers on the grade 3-5 team, explaining the nature of the project and asking if they would be willing to participate. This resulted in two further interview participants. At another school, the technology specialist recommended two teachers, one of whom was willing to speak with me and one of whom was not. This first interview participant recommended three other teachers, who agreed to participate after I contacted them directly over email (two that spring and one the following fall). At the fourth school, the principal directly secured participation from three teachers, following discussions with me in which I again emphasized a desire to speak with people across a range of experiences and comfort levels.

Interviews took place over one or two sessions (in one case three). Most interviews lasted for around 90 minutes in total, with the outliers being one that took place over 45 minutes and one over two hours. Two interviews were conducted over the phone and the rest were done in person. All in-person interviews except for one part of one took place in the school buildings where teachers worked, all in teachers' classrooms except for one in the hall outside the classroom and one in the school library. One part of one interview occurred over the summer and the rest during the school year, either before school, after school, or during teachers' scheduled preparation periods. The classroom-based settings

allowed easier access to artifacts that teachers referred to during the interviews, such as classroom layout and posters, examples of assignments, and pieces of technology hardware in the classroom. However, it is also possible that the school-based setting constrained how teachers may have felt comfortable expressing thoughts and feelings about colleagues or administration, even though these issues were not the focus of the interview. As an opportunity to more fully immerse myself in the data and in acknowledgement of the important and complex decisions that go into the act of transcribing (Rubin & Rubin, 2005; Seidman, 2006), I transcribed all the interviews myself and then listened to the recordings a second time to check each transcript for accuracy. For each participant, I shared the interview transcript and invited them to make any changes they might want. One participant requested that some portions of the interview not be included in the final transcript.

In total, I interviewed 15 teachers across four schools in the district. All teachers were lead teachers in grades 3-5 general education classrooms. 13 were female and 2 were male. I interviewed at least 3 teachers in each school. The schools ranged from 6-9 classroom teachers total in grades 3-5 (having two or three sections of each grade level), so I interviewed between 1/3 and 5/6 of the total 3-5 team at each school. Five teachers had taught for less than 10 years overall (not necessarily all in their present school or district), five for between 10 and 20 years, and four for more than 20 years. I was unable to directly verify the years of experience of one teacher, but contextual evidence suggests that she would fall into one of the latter two categories (i.e., she was not new to teaching). None of the teachers were in their first few years of teaching. Some of the teachers I spoke with described being so overwhelmed in their first few years of

teaching by the magnitude and complexity of the task that they were not able to think about use of educational technology in meaningful ways.

As noted previously, I felt it was important to the purpose of this project to speak with teachers across a range of comfort levels and experiences concerning educational technology. My fear was that teachers would hear calls to participate in a research study about teachers and technology as being only about people who identified as “tech people,” or would assume that I only wanted to talk to people about their proficiency or accomplishments with technology. As noted previously, my concerns were motivated by the dominance of research approaches that categorize teachers by how well or how much they use educational technology, as well as by popular discourses of teachers as resistant to change or technology-phobic. That is, I was anticipating educational technology potentially being a locus of anxiety and insecurity for some teachers, and that this might make them less inclined to volunteer to participate in the interview study. Yet, in the interests of trying to get beyond the categories of compliant and resistant that have persisted in discussions of teachers and technology, it was even more necessary to speak to a wide range of people. I hoped that foregrounding my own identity as a former classroom teacher in recruitment efforts and conversations might make teachers more comfortable or inclined to discuss something that could be an area of discomfort or lack of confidence. A few teachers during the interviews did refer to the fact that I was a teacher when they were relating pressures they were under, managing multiple demands, or things not working out as planned, saying something like, “you’re a teacher, you understand.”

In the interests of getting at this range of teachers, I did use this language of differing comfort levels with technology during the recruitment process, with principals, technology specialists, and teachers themselves. And the final sample of fifteen teachers reflects real diversity of age and teaching experience and identity in relationship to technology. A few teachers directly acknowledged anxiety and discomfort around educational technology. Some others said that technology was not especially their “thing” but that they didn’t have any strong emotional valence about it one way or another. Another core group described themselves as “comfortable” with technology but often distinguished themselves from “early adopters” or people who were really “tech-savvy.” And a final few did claim some sort of “tech” identity. These categorizations did not track neatly to years of teaching experience, even though teachers often referenced ideas about older people being less proficient with technology. Below is a table summarizing the participants, key demographic factors, and their relationship to the final research question.

Table 1.

Description of Participants

Pseudonym	Gender	Grade	School	Years Teaching	Tech Identity	Dominant Orientation*
Beth	F	4 th	A	<10	Comfortable	FP
Marcy	F	5 th	A	10-20	Comfortable	FP
Grace	F	3 rd	A	10-20	Neutral	FP
Ellen	F	5 th	A	20+	“Flustered but also expert”†	FP
Beatrice	F	3 rd	A	^	Neutral	FP
Obi	F	3 rd	B	20+	Enthusiast	FP
Pam	F	5 th	B	20+	Uncomfortable	KU
Stephanie	F	4 th	B	<10	Neutral	FP
Whitney	F	3 rd	B	10-20	Neutral	FP
Diana	F	4 th	C	<10	Neutral	KU
Jean	F	5 th	C	20+	Uncomfortable	KU
Michael	M	3 rd	C	10-20	Comfortable	FP
Sally	F	5 th	D	<10	Comfortable	FP
David	M	4 th	D	<10	Enthusiast	FP
Jasmine	F	5 th	D	10-20	Enthusiast	FP

Note: * FP=Foregrounding Purpose, KU=Keeping Up

† This is a direct quote from Ellen describing what is missed in how others see her in relationship to technology. As noted elsewhere in this text, Ellen most clearly shows the limits of these descriptors.

^ I was unable to directly confirm Beatrice’s years of experience. Based on contextual evidence, I would guess that it was definitely not less than ten and possibly more than twenty.

Yet, even as I used that language then and now, I want to acknowledge how slippery and problematic it is. This issue, and the interaction between teachers’ ideas about themselves and broader cultural discourses will be discussed at more length throughout this work. Here I note that teachers’ descriptions of themselves in relation to their comfort with technology (or how they referenced others’ ideas of them) were not a clear or straightforward indicator of something meaningful about how they described their thinking

about or practice with technology. An important part of the findings of this study are that those kinds of commonly used terms and descriptors (comfortable, proficient, anxious, phobic, good with tech, ect.) are not the answer to the question of how teachers understand their orientations to technology in classroom practice.

School and district context

The district within which the research took place has a reputation for valuing autonomy and professional discretion on the part of teachers, and perhaps relatedly also for the presence of both traditional and more progressive pedagogical elements. Because the purpose of the study was to better understand the range of individual orientations to technology in classroom practice that teachers might have, I focused on teachers only in grades 3-5. These are the grades that have high-stakes standardized testing, and that was often something teachers referred to. These references were both in the context of the district shifting over to doing those tests on computers, but also because of the way the existence of the tests in their grade prompted them to think in general about issues of curriculum and instruction, pacing and differentiation.

There were general categories of technological tools that teachers across the sample continually referenced. These tools are reflective of the greater focus on science and social studies in grades 3-5 and the shift away from teaching students how to read and write to using those skills in the service of other disciplinary learning. Third grade was also the beginning of students learning typing as a skill with the assumption that they would increasingly be using it for

writing. The general categories of technological tools that participants most frequently referenced included:

- Google Documents for writing
- Google Classroom for assignments and projects
- Projection technology (including document cameras)
- Skill reinforcement software (such as *Lexia Reading* and *Symphony Math*)
- Chromebooks for writing and typing
- Content area videos
- PowerPoint slides for lessons
- Online research
- Assistive technology (i.e., speech-to-text software)

Having the participant sample limited to grades 3-5 in the same district also meant that there was general continuity in the school and district-based infrastructure around educational technology that teachers interacted with and referenced in discussing their own orientations to technology in classroom practice. An important element of this infrastructure was the school-based technology specialist. These specialists split their time weekly between two schools. At each school, they worked directly with students starting in grade 1 as part of library/media class, where they would directly teach technological skills that students might need for things like taking the state's high-stakes standardized assessments online or doing research online. This was also a place where they would introduce students to programs and applications they might use in the classroom. They could work collaboratively with teachers, at the

teachers' discretion, to plan projects in the classroom, and frequently sent out by email suggestions for new tools and uses. There were also school-based technicians who were available to provide technical support to teachers when things like printers or Wi-Fi were not working. In addition, the district offered periodic professional development courses around educational technology, often introductory courses on using Google Documents or Google Classroom, or projection technologies such as the Bright Link. Despite this overall continuity, teachers did refer to some differences in the technological resources between the schools, including things such as differing ratios of students to Chromebooks and functionality of hardware.

Coding and analytic process

To make sense of these interviews, I used a process of thematic analysis supported by iterative coding and memoing (Boyatzis, 1988; Luttrell, 2010b). I began by open coding of each interview transcript. Then I wrote an analytic memo for each interview participant trying to answer the research question for that one person. These analytic memos served two central purposes. First, I used them to generate themes as part of the coding process. Secondly, they were a place where I was able to capture a sense of the whole individual, including elements that might not be reflected in a final coding structure more aligned to the specific research question, but which were helpful in understanding how that individual related to the research question, or the broader context for understanding their orientations to technology. For example, these memos were a place where I might note areas of connection and dissimilarity between how

teachers discussed their orientation to technology and their orientation to other elements of their practice, or how they made use of previous work experiences or school settings in describing their orientation to technology.

In the summer of 2018, when I had completed approximately two-thirds of the interviews, I engaged in an initial analytic process using a subset of five interviews, all done with teachers at the same school. After open coding and writing the analytic memos described above, I generated an initial thematic coding structure (see Appendix B for this and subsequent coding structures). This coding structure focused on four sets of conceptual pairings that I saw reflected in these interviews. I found that teachers were both *open* and *critical* in their general orientation to technology. They described drawing on both *principled* and *pragmatic* considerations in their decisions about what, when, and how to use technology in the classroom. They spoke about both *needing support from others* in bringing into being their practice but also *asserting the self*, their own vision of practice. And they described things they *aspired* to do in practice and also things that they were *frustrated* by in relationship to educational technology. Using NVivo qualitative software, I applied this coding structure back to the full transcripts of those five interviews, generating new themes, condensing, or expanding themes as needed.

After completing the process of conducting all the interviews, transcribing them, engaging in open coding, and writing analytic memos, I went back to the thematic structure that had resulted from the first cycle of analysis. Referring to an outline of that coding structure, I read through all the analytic memos (including the original five) and made preliminary notes about themes that had not been present and should be included. While many of the themes generated

by the initial subset resonated as I continued with interviews, there were also perspectives and experiences not reflected by this initial group. One of the key ideas that emerged through looking at this full group was the distinction between teachers enacting their orientations to technology as part of trying to keep up with something they felt they were supposed to be doing versus seeing that enactment as what one teacher called “solving problems of practice,” (what I later came to refer to as “foregrounding purpose”) where they were driven by their own sense of what was important to them and how technology might play a role in it. This process produced a revised thematic structure.

I applied this revised coding structure to the full set of interviews using NVivo qualitative software, removing, condensing, and exploding themes as needed throughout this process. I then wrote analytic memos about each set of themes as categorized under the conceptual pairings open & critical, principled & pragmatic, self & others. Through this coding and memoing process, I realized that these conceptual pairings, while they had been useful in helping me to see things in the sample and organize my initial thoughts, were not actually useful in terms of expressing what was going on with the participants in their own terms. This resulted in a third set of codes, focused on teachers’ general orientations to technology, the specific considerations that they drew on in enacting those orientations, and the context in which that enactment took place (how those orientations were negotiated in relationship to the technological tools themselves, other people, and cultural discourse around teachers and technology).

Through these iterative rounds of coding and writing, I began to see that the distinction I had drawn between “keeping up” and “solving problems of

practice” was not a tangential point a central idea. I have struggled with how to refer to the orientation that is not about “keeping up.” The phrase “solving problems of practice” was taken directly from an interview with a teacher, but I came to see that it did not fully reflect the character of this perspective across multiple teachers, especially the way in which teachers could come to find value in a given piece of technology after they had begun using it, that their purpose for use could be emergent. I then named this alternative orientation “open & critical” in reflection of the way that the teachers who expressed it were able to comfortably describe being both excited and concerned about the potential impact of technology use on their students, and how they described that perspective prompting them to engage in purposefully selective use of given technological tools and practices. However, I realized that while the idea of being both open *and* critical was an important characterization of the perspectives of these teachers and an important alternative to the binary of resistance and compliance that characterizes much discourse in the field, naming the orientation as such was making a jump from teachers’ descriptions of themselves to my analysis of those descriptions. In teachers’ own descriptions of their orientation to technology they emphasized the importance of having a purpose, a meaning, behind their decision to use a given piece of technology. Because that sense of purpose was primary, there were times when they saw technology serving that purpose and times when they did not. Consequently, in the chapters that follow the orientation of “foregrounding purpose” is contrasted with that of “keeping up.”

Because of the way the qualitative analysis in this work relies on the subjective interpretation of evidence, I am conscious of the impact of my own

personal beliefs. I acknowledge that this project is born out of my own troubling experiences with and perceptions of the general lack of reflection about use of technological tools in elementary school classrooms, the lack of legitimacy accorded to teachers' own voices and perspectives, and the prevalence of unexamined assumptions about what progress looks like in teaching and learning. I have worked to be reflective about my biases and how they are shaping my analysis of the data. I offer the description of my research and analytic process above in the interests of methodological transparency (Anfara, Brown, & Mangione, 2002). I have followed strategies suggested by Maxwell (2010) for increasing validity in qualitative research. Throughout the chapters that follow I provide extensive direct quotes from interview transcripts so that readers can compare my analytic conclusions to their own. I repeatedly shared early writing drafts with colleagues so that they could challenge my analysis. In addition to sending interview transcripts to all participants and inviting feedback, I also engaged in "respondent validation" during interviews by summarizing back to participants the central ideas I thought they were communicating, and asking them whether I was understanding them correctly and whether there were important ideas I captured (see full interview protocol in Appendix A). Sometimes this prompted clear verbal confirmation of my conclusions. For example, when I used the word "curation" to summarize back to Michael, a third-grade teacher, something he articulated about needing someone else to sift through the many suggestions of uses of technology, he responded, "there you go." Sometimes this opening prompted participants to raise important issues that I hadn't understood previously. For example, Beth, a fourth-grade teacher, responded by saying "I think the one thing is the

frustration of it, that I don't think I've talked about." We then spoke in more depth about her concerns with unreliable hardware, a theme that echoed across other teachers.

On the one hand, what I have found here has reinforced my conviction that talking to teachers directly about their work enriches an understanding of the complexity of that work and speaks back to the narrow constructions that dominate discourse. But on the other hand, my beliefs were challenged in this process. Perhaps because these were terms in which I understood (or wanted to understand) my own orientation to technology when a classroom teacher, I thought I would find ways of thinking and being that could be understood as examples of "principled resistance" (Santoro & Cain, 2018). Yet this was not what was actually here. Instead, the majority of teachers in this study expressed an orientation to technology in practice that transcended notions of resistance and compliance, where they were open to and excited about uses of educational technology that they saw as enabling the kinds of learning and classroom experiences they valued, but also concerned uses of technology that might be unaligned with their values or undermining of the kinds of thinking and being they sought to develop in students. That is, they were neither compliant *nor* resistant, they were both open *and* critical.

Limitations

There are two primary limitations to this study. The first is that I did not engage in any direct observation of teachers' actual classroom practices. The comments throughout this work about "meaningful" use, and variety of use amongst teachers, are based entirely on teachers' descriptions of their practices.

As will be explored more fully in the final chapter, there is an existing research base to support the idea that when teachers' feel that they are able to make and enact decisions about what is meaningful for students in their own work, that does result in meaningful learning for students. But there is also research that shows that teachers' ideas about what is meaningful in their practice, or their sense of their practice, does not always match the practice itself (e.g., Cohen, 1990). For the purposes of this study, it is more important how teachers thought and felt about what they did than what they actually did, but the lack of direct observation means that there is some limitation to what can be concluded about the meaning of what teachers did with technology, particularly in comparison to research that would be able to more fully triangulate teachers' ideas about their work, observations of the work itself, and its impact on students.

The second limitation was one I was not fully aware of until completing the study. I picked this district as a research site partly out of accessibility considerations; it was geographically convenient to me and I was optimistic about gaining entrance. But I also thought it would be a substantively useful location. The district had robust technological resources and infrastructure (an IT department, school-based technology specialists and technicians), but it also did not identify as at the forefront of technological innovation or foreground technology use in classrooms as part of its core identity, as some other districts do. I thought that this somewhat moderate position of the district in relationship to technology would allow for more of a range of individual orientations to technology in practice, as those orientations would not be overly determined by either lack of resources or a district culture that selected for technological enthusiasm or capability.

While I consider those reasons for district selection valid in light of the findings, there were ways in which I did not take into account other areas in which the district might be not representative. I knew that the district had a reputation for valuing teacher autonomy and professional discretion. In fact, part of the district identity is that it is, for lack of a better term, not quite like other districts. It was not until I completed the study that I was able to see how this aspect of district identity and culture was as important in relationship to the research question as the technological elements were. The findings of this study, the answer to the question “how do teachers understand their orientations to technology in classroom practice,” has everything to do with the extent to which teachers experience and assert agency—including elements of autonomy and professional discretion—in relationship to others’ (both specific others in their daily lives and the unnamed, amorphous others of cultural discourse) ideas of what they should or should not be doing with technology and why. In this study, the majority of teachers (twelve out of fifteen) articulated an orientation to technology in practice that involved foregrounding their own sense of purpose for use and a comfort with divergence from others’ practices, and emphasized the importance of making practice with technology their own. It was the minority (three out of fifteen) who expressed an orientation to technology that was dominated by their sense that they needed to keep up with someone else’s ideas of what they should be doing. Given how the district thinks of itself in relationship to others, this should not have been a surprise to me in the way it was as I was engaged in analysis. It seems probable that in districts where there is less emphasis on teacher agency and professional discretion, there may be more evidence of the orientation I call “keeping up.”

While this limits the representativeness of the sample, I believe it changes, rather than simply limits, the value of the study overall. Even if the unique character of the district contributed to the preponderance of teachers expressing orientations to technology characterized by foregrounding purpose rather than needing to keep up, the voices in this study are still those of general education classroom teachers in regular public schools (not pilot, not charter) in an urban district that serves a racially and socio-economically diverse student population. In those ways, these teachers are very much like others throughout the country. If the character of the district means that what they express should be taken as aspiration, rather than reflection of a broader reality, then it seems an attainable aspiration, an aspiration we can learn from.

4. Feeling Behind

Introduction: The problem of keeping up

I want to begin by looking at the experiences and perspectives of three teachers—Jean, Pam, and Diana—whose description of their orientation to technology in classroom practice most directly reflected some of the key ideas of dominant cultural discourse named in chapter 2: that use of educational technology was something teachers were supposed to be doing and that lack of use was a failing, that use of technology was necessary to prepare students for success in the world and that its value thus lay in its break from the past and past educational practices. In other words, these teachers described an orientation to technology in which they felt that technology was something they needed to keep up with, a constant stream of new tools, ideas, and practices coming from an external source. Perhaps most importantly, they communicated this orientation in the context of expressing the feeling of being behind.

Teachers who felt they needed to “keep up” expressed anxiety and dissatisfaction in relationship to their practice with educational technology. These affective responses seemed driven by a sense that the time it took to learn something new and the support needed to do it were personal failings, rather than realities of work and learning. Both anxiety and dissatisfaction were also rooted in how these teachers described their responses to trying to keep up with technology, which included both saying yes to everything that was suggested and saying no to things that might be valuable, and their sense that other imperatives of teaching and learning could come into conflict with the idea that technology use in the classroom was always good. Yet, the experiences of these

teachers also suggest a way out of the problem of keeping up, a different kind of orientation to technology in practice. Even though their orientation to technology was dominated by a sense of trying, and failing, to keep up with something that was external to themselves, all three had moments where that orientation seemed different, where they described examples of practice with technology that they found meaningful and valuable. In these moments, they seemed able to access a sense of purpose that was about using technology in the service of what they wanted to do in the classroom, rather than using it because they felt they were supposed to.

“I’m already way behind”: Technology as something you are supposed to be doing

Jean:

Right, and now, as you know, by the time I've learned it, there's another better one that you have to learn. So, because I'm probably doing Google Classroom, and you might be going, oh, she has no idea about so and so which is a thousand times better, but I'm sure that's what's happening. You know, it's like the cell phones, you get one and then next year it's a thousand times better, and you've already paid all this money. So here I am feeling I'm already way behind.

Pam:

But, like, every year it's something. So technology means I need to pay attention, I just need to pay attention to the new tools they have out there now. And I don't always do that.

Diana:

I just know there's stuff that can make my life and the kids' lives much better. That I'm sure about. Actually, every year there's this list of ten best apps, or ten best websites, or ten best things to use in your classroom. And every year we get that list, and [my husband] is like, [excited voice], "Oh, I'm going to use that one, I'm going to

use that one." And I'm like, [overwhelmed voice] more stuff, that I don't know if I can use. That I feel behind now.

These quotes reflect the stress and anxiety associated with educational technology that the orientation of keeping up seemed to prompt. Both Jean and Diana talked about "feeling behind," feeling as though they have already failed in some way. Jean makes reference to the idea that I, as the interviewer, might be thinking about things that she does not know about and should. This was something I was not doing, and was trying hard to signal that I was not doing, but I interpret this comment as a reflection of the vulnerability she felt in this area, the consciousness that she might be being judged by others as inadequate in the realm of technology use. In another part of the interview, Pam's initial reaction to the question of what educational technology meant to her was "stress, for one thing." These expressions of affective pain were noteworthy because they were so largely absent from the discussions of most of the other teachers. But, as we will see, that anxiety was not located in the technology itself so much as in the perceived need to keep up with it.

This feeling of being behind reflected the two central elements of the keeping up orientation. First, these teachers felt that using educational technology was something they were *supposed* to be doing. That "supposed to" was not always clearly located in people in their immediate surround (administrators and technology specialists), although Pam did say that she was told to take a professional development course on using the SMARTBoard. Other teachers at the schools where they worked (as well as the two other schools) did not express the same feeling of pressure in relationship to use of technology. Secondly, the orientation of keeping up involved a sense of obligation to use

particular technological tools as part of this idea that educational technology was something you were supposed to be doing. This is apparent in Diana's phrase of a list of suggested applications as "more stuff." That is, any given tool was seen as example of the broader category of "technology," which is what you were supposed to be doing.

These teachers described managing the feeling of having to keep up in different ways. Pam seemed to accept the idea that she would be behind and acknowledged that she often did not take up tools as they were suggested because she experienced them as "one more thing." Jean said that she felt that she had to say yes to all the suggestions of technology that were offered because she felt like she was behind and not doing enough. While seemingly contrasting, there was fundamental resonance between these two responses (saying no to things that might be valuable and saying yes to everything). In both cases, the decisions to take up or reject a given tool or practice were not grounded in a sense of its specific value for teaching and learning as those teachers understood it. Rather, those decisions were driven by a reaction to the perception of a pressure to use technology because it was what they were supposed to be doing.

If it did not come up organically in an interview, I always asked teachers whether they had ever seen or heard a suggestion for use of educational technology that they were concerned by or chose not to take up. Both Pam and Jean's responses to this question reflected the sense that they were not entitled to make such judgements. Pam expressed that she didn't feel as though she knew enough to say. Jean explained,

I think because I'm on the tech bandwagon, and because I still don't use it as much as everyone else, I still feel like I'm not using it as much as everyone else is. I feel like I usually will make the

conscious decision to use it, just because I feel like I'm still a little bit behind the eight ball, and still need to continue to grow and try it. So I feel like I'm always saying yes to the technology, because I feel like I'm still not doing as much as I probably could.

Jean expressed here that because she felt behind, because she felt as though her lack of use in relation to others was a failing or a deficit, she did not feel permission to enact a certain kind of professional discretion and judgement in relationship to decisions around educational technology.

As we will see throughout this chapter, Diana was somewhat different from Jean and Pam, even though she shared keeping up as an orientation to technology. Her response to managing trying to keep up contained elements of both of the other two women. Diana reported using examples of educational technology that she did not find meaningful, because it was what she was supposed to be doing, and she also asserted that she was not going to use things that she knew might be valuable because she was being asked to do too much by the administration without a recognition of what the work entailed. Perhaps most importantly, Diana did not express the same feelings of personal failing that Jean and Pam did. Rather, she located the problem of feeling behind externally, calling out the conditions of work that she did not feel were conducive to supporting her in taking up and learning new tools and practices.

There are two contextual factors that seem relevant to understanding the ways in which Diana was different. The first is that she was younger than Pam and Jean, both of whom had been teaching for more than 20 years and identified as older amongst their colleagues. As explored in the background section, an important element of cultural discourse around teachers and technology involves an assertion of inherent generational differences in competency and facility with

technology, an element that can exacerbate the already existing vulnerability of older teachers to a sense of isolation and feelings of lack of efficacy (Evans, 1996). Secondly, Diana had another career prior to beginning teaching. Even though she described how unhappy she had been in that other field and how that unhappiness prompted her to get into education, she also frequently drew upon this experience in a different world of work as part of critiquing structural elements of school organization and teachers' work.

Diana had touched on this analysis throughout the interview, but returned to it at the end, noting that she had been thinking about how to say this in between our first and second interview.

This is just one of the how many things you've now asked that are ridiculous because, with what support, and do you even understand what you are asking me to do? If we want to make a change in teachers sort of voluntarily improving their craft, wanting to do that kind of thing, we've got to change that dynamic. They're telling us now, right, that Universal Design for Learning is so important. I've studied that, I know it's important. But even so, even with that, with my willingness, I'm still, like, that's ridiculous. Do you know how many things you've asked me to do today? I'm not doing this. And I've only been teaching seven years, right? I don't consider myself burned out, but somebody like me and I'm going to have an attitude like that towards a reasonable—toward a request for something that is going to improve my teaching? I don't think technology stands a chance.

In this quote Diana seemed to be thinking through how that feeling that she called burnout, which she did frame as both unproductive and not positive for the people experiencing it, could be invited by the conditions that surround teachers, most specifically lack of adequate support, lack of trust, and an overload of responsibilities—problems that she saw the push for use of educational technology both reflecting and contributing to.

“I’m not good at it”: Reframing reality as personal failing

An important element of the stress and anxiety associated with educational technology in the orientation of keeping up was a reframing of the realities of work and learning as personal failings. Both Pam and Jean understood part of their relationship to technology as them “not being good at it.” Jean said she was not as “tech-savvy” as others. When I asked Pam to talk about what her use of technology in the classroom might look like in an ideal world, she responded “So the ideal world would be I’m really good at technology too?” She continued, “I think that’s part of my issue is that, I’m not good at it.” When I pressed Pam and Jean to explain why they thought this about themselves (that technology was something they were not good at), they located this perceived deficit in three qualities: it taking them time to learn something new, needing support in that learning, and not being able to fix things when they broke. In discussing all three of these elements, there was an often implicit (but sometimes explicit) naming of an “other,” the idea that there were other teachers (often younger) for whom it didn’t take as much time to learn new things, who didn’t need as much support, and who could fix things when they broke. While this will be explored more fully in subsequent chapters, here I note that all the other teachers with whom I spoke (both older and younger, expressing a range of comfort levels in relation to technology) asserted that it took them time to learn new things and that they needed help to do so, and that technological tools often failed them, but without the sense that those facts meant they were doing something wrong. My point is to call attention to how Jean and Pam interpreted these facts in relationship to themselves, how a discourse of needing to keep up

with technological change invited feelings of inadequacy in relationship to realities of work and learning.

Jean emphasized that part of feeling behind was feeling as though it took her a long time to learn new things, and that she did not see this as true of other teachers. As she explained,

I also put videos up and things like that, but I feel like that's something that everyone does, and it's nothing special. So that's why I think I'm behind the curve. And with the Google Questions, people have been doing those for years and I knew about them but I just haven't had them as a daily part of my lesson. So that's why I feel like I'm still way behind other people. And I know there's so much more that I still don't know, and use. So that's why I call myself very basic.

Within this quote Jean returns continually to the idea that she is behind others. Her expressions of pride in what she has learned to do are quickly followed by assertions that it took her too long to accomplish those things, and that others were able to do something similar faster. We see in this quotation the pressure of keeping up, the way it prompted Jean to feel as though there was always something else she is supposed to be doing with technology that she was not doing.

Pam emphasized feeling as though she needed more support than others in learning how to use educational technology. She described taking a professional development workshop on using the SMARTBoard.

It helped but it didn't. Because I definitely need more one-on-one. In a class like that, everybody has their individual questions, so I definitely really needed a tutor, like somebody in with me, side-by-side, as I'm working through it.

This quote reflects Pam's perception that her need for support was more intensive than others, that they knew things that she did not and her need for support was a reflection of that.

Finally, both Pam and Jean connected their sense that they weren't "good" with technology to their inability to fix software and hardware when it wasn't working. As Jean said, "I feel like if there's a problem with the technology I usually can't trouble shoot it myself. I'm running next door to a teacher that I know does it all the time." In response to my asking Pam why she though she wasn't good at technology, she explained,

My anxiety level goes up. If something happens I don't know how to fix it. So that's why. And, you know, I feel like I'm supposed to be the expert and I'm not. But I've let go of a lot of that. Sometimes the kids are like, I'll do it for you. [laughs] Like, can you just go fix that for me? And they'll come over and they'll do something [makes rapid motion with hands] and I'm like [searching for words].

While Pam described attempting to embrace elements of not knowing and the way it provided opportunities for students to demonstrate their own knowledge (something many other teachers described), she still associated the quickness of knowing and doing with a kind of competence she perceived herself as lacking.

Yet, despite these ways in which they internalized the sense that they were not good with technology, there were also moments where Pam and Jean were able to express that there were structural conditions that they wished were different that they felt impacted the way in which they were able to relate to technology. Jean connected the lack of time to learn something new with the constant turnover of reforms and initiatives. As she explained,

As we've talked about in our school, we take on initiative after initiative after initiative. And, you know, you just want to start doing one thing. I mean, I took one year of tech because the next year we changed our math curriculum, and I took math. I'm not an expert in this, but I want to be an expert so that I can use it to the fullest in my classroom, and I don't think I am yet. And I'm trying to. But I feel like I'm still not. And if you talk to me next year I bet I still won't be [laughs]. Unfortunately.

Jean had begun this passage by implying that she thought others were able to better make quick decisions and judgements about what kind of educational technology might be valuable to use and why. Again, we see the way in which a discourse of keeping up with technology invited her to think that she is failing in some way compared to others, even as she expresses a reasonable desire, in line with research on learning, to have the time to learn fewer things more deeply. This quote also reflects how Jean saw herself as trying to seek out learning opportunities, but felt frustrated that there were so many new things to learn she could not feel in command of anything.

Similarly, Pam expressed a desire for a kind of ongoing support aligned to her specific needs that would help her learn to use technology in ways she found meaningful. In responding to my questions about what her practice with technology might look like in an ideal situation, she described,

I know I can't have a personal tutor, which would be my ideal. But I did have my co-worker back here, he definitely helped me out with a lot. He took the class with me. So he's definitely more adept at this stuff [snapping fingers]. So he did help, he took the class with me, and he also was in here with me in the class, so I learned how to use a lot of the SMARTBoard slides and tools because of him. But definitely I would—I mean part of it is I should have just, everyday, planned a lesson and used one of these, and then talked to someone, the feedback about like, what worked, what didn't work, would be probably ideal. Or taken the class with a colleague, and you all work through it together. I tried this today, like, how did it work for you?

As did Jean, in part of this passage Pam compares herself unfavorably with others, communicating the idea that others are more adept with technology than she is. But she does this in the context of articulating a desire for something—being able to work with a new tool repeatedly over time, being able to talk to others in her context who are working on the same thing about how it is going—

that we know is an essential part of teacher learning (Ball & Cohen, 1999; Putnam & Borko, 2000).

“There’s got to be other ways”: Dissatisfaction with practice and yearning for a different kind of purpose

We have seen that Pam, Jean, and Diana predominantly related to educational technology as something they were supposed to be doing, with the impetus for use and the purpose for that use being defined, either implicitly or explicitly, by forces outside themselves. Yet, to varying extents, all three expressed dissatisfaction with the practice with technology that resulted from this generalized push for use, and noted moments where their sense of what students needed came into conflict with the technological imperative they felt beholden to.

Diana described two examples where she was using a kind of educational technology because she was supposed to but felt that it was not resulting in meaningful learning. First, she described a project where students were researching national parks using an online website.

The site that they're researching online is really for adults. It's a National Parks website, and they're each researching a different national park. And the intent is really good. It's like, to get deep into understanding a national park. We do have grade level books for them that are much better, but, we also have been pushing them to go online. But it's written for adults. Oy. Navigating that is just hard.

As Diana described, the “push” for students to be online in a generalized sense came at the expense of what she thought was actually best for their learning in this specific instance because they are not able to meaningfully access the

content. She saw a conflict between the purpose of developing a deep “understanding” of a national park through research and the idea that students needed to research online because it was an important skill to learn.

Diana also expressed frustrations around the use of PowerPoint as an example of educational technology, again feeling as though the use of it did not support student learning or engagement. As she explained in reference to the science curriculum,

There is this online component where they have these slide shows that we show. But you *cannot* ask kids to sit for an hour and fifteen minutes through a slide show. You wouldn't even ask an adult to do that. I would complain at a meeting if my principal did that to me. And they have some experiments and hands-on things thrown in, but it's not—*most* of the time it's either I'm reading from the book to the kids, or I'm showing them a PowerPoint. And we already do that for reading and writing and math. So to do that again in science feels like a waste. Because they could be doing something with their hands. And then math, I don't know. I don't know why it's so frustrating but it is. It just feels like, I'm using a PowerPoint because that's what's been done. And I feel like there's got to be other ways.

In this description Diana articulated that she felt the online aspect of the science curriculum was not supporting student learning and was actively counter-productive to what she felt were student needs for hands-on engagement and other forms of learning. Throughout the interview, Diana continually expressed a desire to teach in different ways than she was currently doing, but said she felt at a loss about what exactly those ways might be or how to realize them, as she conveyed here in saying “I don't know why it's so frustrating but it is.” Some of her frustration seemed to be about the limitations of the power of technology to support student learning.

Pam and Jean, who had said explicitly that they didn't feel as though they could speak to uses of technology in the classroom that they thought were

unproductive or harmful because of their own lack of knowledge, also had moments where they expressed a generalized sense of concern that conveyed that there was something wrong with the simplistic idea that “technology is good.” This concern seemed to push back on the idea that technology necessarily helps students learn and engage, and you should use as much as possible, which is part of how they interpreted the messages about technology they were receiving in ways that invited an orientation of keeping up. Although interviews with Pam and Jean were dominated by their sense that they were not using technology in the classroom enough, both made a point of saying that in their ideal world students would not be on screens all the time, that there needed to be a “balance.” Throughout the interview, Jean referenced the idea of calls for limits on “screen time” as something she needed to weigh in making decisions about technology. Pam began by describing the ways she would try and use technology more in the future, and then shifted to saying,

Although it's funny because I talked to some, oh, one of my co-workers, the math coach, said her son, they use computers all the time, and he was so done with screen time. He's in [a nearby suburban district]. He said they're on it *all* the time, for every class. And he's tired of it. So you've got to find balance. The kids still need to work in centers, still need to write things down, still need to work on their handwriting. They still need to open up a book, hard copy, not a Kindle.

Pam and Jean were not able to articulate specifically how they understood the possibility for negative consequences of use of technology in the classroom, just as it was harder for them to articulate the specifics of the positive benefit of technology outside of the generalized ideas that students needed to learn to use technology and it was good for them. But I interpret these generalized critiques,

these expressions of a need for balance, as an indication of dissatisfaction with those externally-defined purposes.

“That’s what I love about the technology”: Finding ways out of keeping up

We have seen how an orientation to educational technology dominated by a need to “keep up” with something defined by others was a locus of stress and anxiety for these teachers. We explored their aspirations for an engagement with educational technology they did not feel they were able to realize in the moment, and how those aspirations reflected yearnings for a different kind of purpose for use, the space to iterate on practice over time, and support in both new learnings and ongoing use. However, the three teachers who described an orientation dominated by trying to keep up—Jean, Pam, and Diana—also each related anecdotes where something different was going on than this dominant orientation, where they were able to engage in practice with technology that they seemed to find satisfying and meaningful. These were all moments in which they spoke about engaging in use, not just because it was what they were supposed to do, but because they felt that a given tool or program enabled them to do something with students that they valued, that it supported their own purposes for teaching and learning. The framing of this as “finding ways out” is not meant to imply a linear narrative of progress. I am not arguing that these three teachers presented keeping up as a problem they had experienced in the past and then had moved beyond. But they did express a different relationship to technology in these anecdotes than in the rest of the interview.

As we have seen, Jean's orientation to technology in practice was dominated by trying to keep up with using technology because she felt she was supposed to, feeling frustrated and overwhelmed that there was so much constant change that she did not feel she could actually master anything, and generally experiencing educational technology as an added layer of difficulty and work in both her planning and her classroom teaching. However, there was a different emotional valence to an anecdote she related about her evolving use of Google Classroom. I want to begin with Jean describing this experience at length.

When I first thought about kids using a computer, I just thought of them typing up the work, and using it as a word processor. Until I took classes, and had help from other teachers where I saw the value with Google Classroom is I give you an assignment, I can see, "Oh, Sarah's doing this. Oh, [someone else]'s doing this." And I can look at it in real-time to see what they're typing, what they're writing. I'm looking at kids and I can comment, right? So that's the value of it. "Oh, you're not answering the question, this is what the question is." Or, "I see you have writing that is just one big paragraph. Don't forget—." So in real-time you can help the kids understand the assignment, or give feedback right away. So that's what I really like about the computers, where we can be helping kids right away, rather than when they've turned in something. I also can go in and write comments and things, and edit their work much quicker than paper and pencil and then giving it back to them. That's what I love about the technology, the best part about it.

In contrast with the rest of the interview, where Jean spoke about using the technology she was supposed to be using, and noted in general that she was "on the tech bandwagon," here she emphasized that she found meaning and value in her use of Google Classroom. Describing the ways in which she used the program to both understand what students were doing and be able to intervene when needed, she repeatedly asserted that this was what she "loves" about the technology, evincing excitement for the value it brought to her teaching as

opposed to just something she is supposed to be doing. This was also an extended passage in which she did not express the frustrations she often returned to about not having enough working devices for her students and the logistical demands that prompted, dealing with the constant flow of new initiatives and reforms, and her own feelings of not being “good” with technology. Unlike much of the rest of her experience with educational technology, her discussion of Google Classroom and what she does with it seemed to be a story of something working for her. In another part of the interview, Jean had talked about her idea of good teaching as being able to check in with individual students, get a sense of their understanding, and provide them with differentiated support. It is just these qualities that she experienced Google Classroom enabling.

When I asked Jean to say more about how she came to understand this value of the program, she noted that other people had told her “You should use Google Classroom” but the reasoning was communicated as “it's easy to use, it's right there, you can see everything at once.” This framing of the purpose for use as one of efficiency did not resonate with Jean as deeply as the ultimate purpose she found, that of being able to understand what students were doing and provide real-time, individualized support. Jean noted that it was harder to get to this deeper level of meaning in conversation with other teachers when “That's how we talk real quickly, there was never really that discussion because, as an elementary school teacher, we have so many plates that we're juggling.” Jean had noted at other places that, because of the pressure of limited time and too many things to do, many of her conversations about educational technology with colleagues remained at the level of logistics: who was using the Chromebooks

and when, how to allocate adult support, ect. Yet as she expressed in this anecdote about Google Classroom, it was a loss that such conversations did not leave room for discussion of the deeper purposes for use that might give that use meaning for her.

Not only was Jean able to access a more individually meaningful sense of purpose in her use of Google Classroom, but she also described finding that purpose through iteration over time and with the support of others. As we have seen previously, Jean was someone who interpreted the time it took her to learn something new and the fact that she needed support from others to do so as personal failings, and also yearned for more time and support around her use of educational technology. Yet here those same qualities are present but as part of a narrative of what helped things work well. She noted that it was not “until I took classes, and had help from other teachers” that she recognized the “value” of Google Classroom as she defined it, the value of supporting her in providing real-time feedback to students around individual areas of need. She went from just giving assignments through the platform to “actually looking at the assignments, in real time.”

For Pam, the moment of difference in her orientation to technology was through the use of Kahoot, an online platform where teachers can create games connected to educational content. Her uptake of the platform was not immediate. She saw a colleague using the platform to do games with students but thought “it’s going to take too long.” She also heard about the platform from her grade level colleague. As she described,

Kahoot—the first year, I didn't use it at all. And she used it. "Oh, it's so easy!" I'm like, yeah, I'm not doing that. And the next year I was

like, "Ah, this is so much fun!" So it took me—it takes me longer to accept that it's a good thing for the kids.

I asked Pam to clarify what she was thinking when she thought "I'm not doing that" and she said, "I'm not going to do one more thing," again reflecting the frustration of experiencing educational technology as another thing you are supposed to be doing (in the context of multiple other demands) rather than something to use selectively in the service of realizing your own vision of practice.

While this initial response to the Kahoot platform was characteristic of Pam's general response to educational technology within her orientation of keeping up, she ultimately changed her mind. Because she had noted earlier in the interview that this platform was one she used "a lot" I asked her to talk about what had changed. She responded.

The group I had needed a lot of review. A lot of review. A lot of review. So I couldn't do the same thing all the time. So that's when I started using it. I was like, this is so much fun, this is so great.

In Pam's recounting, what prompted her to change her mind after her initial rejection of the platform was a genuine need within her classroom. She had students who needed more practice, and she wanted to find ways to vary her teaching to meet this need. She had a clear purpose for use that was grounded in her own sense of her students and her own professional judgement about what she needed to do differently as a teacher. This appears to have prompted uptake of the previously rejected platform in a way that the general idea voiced by others that it was fun and engaging could not.

Pam went on to describe how her use of the Kahoot platform changed over time, reflecting a kind of iteration that she had described wanting but not

being able to enact with technology in general. She noted how “at first I just used it at the end of the year for review, just kind of like a little filler and some more fun stuff. But then I started using it throughout.” As this quote reflects, while she initially thought of the games she could create through the platform as something added on to her core teaching, she came to see it as something she could use to support learning. She also explained that she had initially had students using it as individual players in games, but then shifted to doing more partner work because of her concerns that students who were struggling were often feeling frustration and shame and responding by not wanting to participate and “just click[ing] any answer.” In the space for this iteration, Pam was able to make professional judgments about how to use the program, not just to react with using it or not using it. Pam responded to what she saw in students’ actual use of the platform and made adjustments in how she used it based on her own values as a teacher. She found the repeated practice valuable but was concerned about students’ experience of themselves as learners.

Another element of the iteration that Pam described was her own increased sense of competence and confidence with the platform through use over time. As she explained,

I definitely use that way more often now, and I can actually create a game quickly now. It used to take me forever, like, what should I ask, but now I know the questions and I kind of can type them in and—so that does help.

As part of feeling as though she had to keep up with technology, Pam had lamented what she perceived to be her own failings in not being “good at it” and it taking her time to learn something new, tying together ideas of quickness and inherent skill or facility with technology. Yet here she noted that as she got better

at something she experienced a possibility of growth as opposed to a fixed skill. Her response also illustrated how what can be perceived as speed or quickness is actually about knowing the kinds of things to think about (Bransford et al., 2000).

Diana's example of a use of educational technology she found meaningful was also centered on Google Classroom. As had been a theme throughout the interview, she explained that she first learned about the platform from her husband, a middle-school teacher and technology enthusiast.

My husband introduced it to me [laughs]. And he uses it in the middle school. And when he was explaining it to me it was like, wow, that would make grading and giving feedback so much more streamlined. And so I thought about it, and I thought about okay, elementary, we worked out some kinks as we were talking, and I was like, I can see this being useful in some subjects in elementary, too. So then I started using it last year, at the beginning of the year. And [the technology specialist] helped me just set it up. And then it was really simple, which was how she described it. Set up assignments, they do them, you give them feedback.

Unlike her other experiences of hearing a suggestion of a tool or practice and experiencing it as something else she was supposed to be doing and wasn't, something else she was failing to keep up with, here Diana emphasized that the suggestion for use aligned with something she either was already thinking about or realized she wanted to do. Additionally, she noted that "we worked out some kinks as we were talking," an assertion of making adjustments to someone else's ideas based in the needs of her own context. This is quite different from other examples Diana gave where she was frustrated with using technology in ways she thought she was supposed to when she could tell that it was not meeting her students' needs.

While Diana's initial reasons for trying to use Google Classroom centered around efficiency in her work as a teacher and interactions with students, she

also described coming to find value in the substance of how students responded to online feedback. As she explained,

I have a kid who just loves the computer. So, when he's writing—right now he's writing a report on a national park—and I'll give him feedback about his grammar. If I were to say that in person, he would be so upset because he really struggles to take feedback. He's just one who's had some trauma and stuff, and just, if you even approach his desk he's like [gestures putting head down]. When I write to him online, he doesn't get offended, and he'll ask me a question back, and I can respond. Some kids I wonder if they take it seriously because it's in writing. You know, when you speak it's in your brain or in the air and it's gone, unless you're an aural learner. So, they can keep going back to it and looking at it. Also I think it's interaction that's quicker. Like, I can type quickly and so it's so much easier than them having to sit there with a raised hand, wait for me to get around to three students before I get to them, and then I respond. It just, oddly I think for some of them it feels more personal, or something. Like I'm paying attention to them.

As we have seen in the importance of having the time to iterate, Diana came to see things she found valuable about how Google Classroom enabled her to give feedback to students that she had not realized at the onset.

Conclusion

In this chapter we have seen that orienting to technology in the ways suggested by dominant cultural discourse—in which use is equated with good teaching and non-use with bad, in which the purposes for use are presented as fixed and determined by forces outside of teachers themselves—does not feel good to the teachers experiencing it. Teachers who related to technology in this way identified it as a source of stress and anxiety, and communicated a general dissatisfaction with both the specifics and extent of their use of technology. This dissatisfaction was shared between a teacher who responded to the idea that

using technology was something they were supposed to be doing by saying yes to everything and those teachers who responded by saying no to things that they knew might be valuable. What enabled these teachers to feel different, to find meaning in their practice with technology rather than just trying to keep up, were moments in which they were able to access a personally-defined purpose for their use. In these moments they were able to decide to use a given tool or program, not just because they thought they were supposed to, but because they found it valuable to their own sense of what was important to them in their classroom work. These descriptions of meaningful use involved being able to work with a given tool over time, accessing support from others in learning about it and how to use it, and making adjustments based on their observations of actual use and understanding of the needs of their own classroom.

The way in which these teachers described their responses to keeping up—which, importantly, were experienced by the teachers expressing them as part of the stress and anxiety they felt in relationship to technology—came the closest to describing behaviors that could be characterized as “resistant” and “compliant.” My intention here is not to categorize the behavior of the teachers who expressed the problem of keeping up along these lines. But the resonance between the behaviors described here and these concepts helps to reframe resistance and compliance as parallel rather than opposite stances. This parallel nature is obfuscated by research approaches to teachers and technology that focus solely on behavior, that categorize teachers according to what extent or in what way they are using technology. If we look only at behavior, compliance and resistance are opposite—doing what is asked and not doing what is asked, integrating technology in the classroom and not integrating technology in the

classroom. But if instead we look at teachers' thinking about and perspectives on their use of technology, on their orientation to technology, then these two behaviors are rooted in the shared problem of purposelessness, or purpose being externalized onto others (Ryan & Deci, 2000).

This chapter has illustrated why an orientation defined by keeping up was a problem for those experiencing it, and the conclusion to this dissertation will argue that is a problem more broadly, a way of relating to technology that is counterproductive to meaningful teaching and learning, to meaningful efforts at educational change. But I feel wary of leaving the experiences of Jean, Pam, and Diana without some broader context for understanding them. I am worried about an interpretation of these experiences that reinforces damaging narratives of teachers and technology, that would conclude that especially Pam and Jean didn't feel good about their work with technology because they were simply, as they themselves asserted, "not good at it." It is important that we not take these assertions of facility or competency in relationship to technology at face value. I mean this in ways that go beyond the well-documented self-reinforcing cycle of ideas about competence, the way that thinking that you are fundamentally competent prompts you to act in ways that reinforce that competency (Bandura, 1993; Dweck, 2016). There is certainly evidence in the statements that Pam and Jean made of what could be termed a "fixed mindset" about competency in relationship to technology. Yet I also want to give credit to these teachers for persisting in trying something when they were not feeling competent with it, when a common response to feelings of lack of competency is to shy away from challenge and hide evidence of failure (Bandura, 1993; Dweck, 2016). Jean described making technology one of her professional goals because she felt that it

was something she wanted to better understand and use in her classroom. Jean and Pam especially were open about the vulnerability and lack of competency they felt and willing to talk to me about it. There seems to be a tension between the idea that competency is reinforced or undermined by beliefs about competency, and the assertion of feelings of competency as a basic human need (Ryan & Deci, 2000).

There are two ways I worry about how this research on the self-reinforcing cycle of ideas about competency intersects with these issues. The first is a concern that this literature can be used in some sense to blame those who lack the privilege to be defined by their competency and not their incompetency, and how that privilege has everything to do with the way our society has been culturally constructed (McDermott & Varenne, 1995). But I also worry about how it can be used to imply that feelings of competency are entirely the result of mindset, and thus entirely in the control of those experiencing them. It's like the equivalent of yelling at someone "feel better about yourself." Bandura (1993) states explicitly that just telling people they are competent does not increase self-efficacy. People have to actually experience themselves being competent to change their beliefs about themselves. My argument here is that the dominant cultural discourse on technology invites teachers like Pam and Jean to feel bad about themselves for not being able to accomplish the Sisyphean task of "keeping up" that they understand practice with technology to constitute.

Yet, as the next two chapters will explore, this is not the only way that teachers can orient to technology, even if it is the way invited by dominant discourse. As Hall (1980) helps us see, some meanings are more available to be taken up by others, *and* there are different ways to interpret cultural signifiers.

My argument is ultimately about the responsibility to attend to the elements of the social surround that invite different orientations to technology, rather than an argument about individual factors that might lead a teacher to one orientation over another. I did not do the kind of research that would enable me to answer that question but also, as noted earlier, I am wary of the implications of that kind of research and the way it can be used to characterize people as “good” and “bad” teachers in relationship to technology. In thinking through the complexity of these issues about the relationship between individuals and the social surround, and where we locate the responsibility for behavior and ways of thinking, I am reminded of Anthony Giddens’s (1984) argument that people’s actions reproduce the structures that both enable and constrain them, his cautions against the potential pitfalls of not taking agents seriously enough (seeing people as puppets to larger social forces beyond their control), and not taking structures seriously enough (seeing people as completely independent of the social surround). While this dissertation focuses especially on cultural discourse as an element of those structures, the following chapters will illustrate what we can learn from individuals who make meaning and act in different ways.

5. Foregrounding Purpose

Introduction

The previous chapter explored an orientation to technology expressed by teachers who focused on the idea, resonant with dominant cultural discourse, that educational technology was something they needed to keep up with, something they were supposed to be doing. That orientation was associated with feelings of stress and anxiety in relationship to technology, and with a dissatisfaction with practice. Yet, we also saw moments in which these teachers were able to access a more meaningful, satisfying relationship to technology. Those were moments in which they were able to foreground their own purpose for use of educational technology, apart from the idea that it was something they were supposed to be doing.

This chapter will examine an orientation to technology dominated by this sense of self-authored purpose, one which was shared by the majority of the teachers with whom I spoke. I will explore five themes that emerged from teachers' discussions of the specific considerations that were important to them in their decisions about how, why, and when to use any given piece of educational technology. These purposes focused on the substance of their students' learning and experience in the classroom, and fell into the following categories: *understanding, identity, engagement, interactions, and the world beyond*.

In illustrating how teachers discussed these considerations, I want to highlight two ideas. First, these specific considerations were overlapping with, but also importantly distinct from, the purposes for use emphasized in dominant discourse. That is, while teachers did reference ideas about things like

preparation and engagement, they were not as central as other values and considerations. It is useful to think of the majority of these teachers as mostly being in what Hall (1980, p. 172) would term a negotiated position in responding to dominant discourse. This encoding position, “acknowledges the legitimacy of the hegemonic definitions to make the grand significations (abstract), while, at a more restricted, situational (situated) level, it makes its own ground rules.” That is, teachers referenced or seemingly acknowledged the legitimacy of dominant ideas about why educational technology was important, but the specificity of their descriptions of their own work and thinking nuanced and complicated the understanding of these purposes and their relationship to technology use.

This leads to the second major idea. Teachers could share a sense of purpose for students or the classroom, could share a sense that something was important and should be thought about, but come to different conclusions about what that purpose might mean for whether they should or should not use technological tools and practices. Teachers expressed excitement about the possibilities for technology to support the things they cared about but also caution and concern about the potential for negative consequences of use. In contrast with dominant discourse, neither the understanding of the purposes themselves nor the implications of the purposes for use of technology in the classroom came across as fixed or determined.

Lastly, I want to note that while teachers spoke about these purposes grounded in the substance of their students’ learning and experience in the classroom as the central drivers behind their thinking about educational technology and its value, they did also reference two pragmatic considerations that intersect with issues raised in the previous chapter. How teachers experience

the conditions of their professional work is connected to how they understand their ability to respond to what they perceive as the needs of their students, and there is a long and problematic history of teachers' concerns about their work conditions being used to call into question the legitimacy of their moral stance on what is important in schools and classrooms (Hargreaves, 1994; Santoro, 2018). What is presented here is in no way intended to reinforce that damaging narrative, but rather given in the interests of further illustrating the complex ecology within which these teachers understood themselves as thinking about and making decisions regarding their practice with educational technology.

The teachers whose orientation to technology was characterized by foregrounding purpose expressed that they had too many different things to do and attend to, that their thinking about educational technology took place in the context of multiple demands on their time and attention. This was a feature of the teaching environment that had contributed to Pam, Jean, and Diana's feeling that technology was "one more thing" they had to do. Beatrice, a third-grade teacher, linked this context specifically with decisions about uptake of educational technology, explaining:

I think teachers generally have too much on their plates, and therefore make decisions based on their particular interests, the most pressing requirements coming down from above. And technology is either embraced or pushed aside because of those, almost more than anything else. It's just the number of things teachers are being told to do.

In fact, some teachers did reference how they experienced educational technology as alleviating the problem of limited time, such as housing preparation materials and lesson plans on a shared drive to enable ease of collaboration with colleagues, planning from year to year, and flexibility in

working from home. Yet, and this will be explored more in the next chapter, teachers also emphasized that the uses of technology that they found meaningful simply took time. As Ellen expressed, “I feel like if time slowed down, and I didn't have to cover so much, I think I could use technology in some wonderful ways that would support creative, deep thinking.”

Secondly, almost every teacher spoke about technological tools not working properly or failing in the moment. Rather than interpreting this as a personal failing, or a reflection on their own capacity with technology (as we saw Pam and Jean doing), teachers asserted that this reality was counter-productive to student learning in ways that they found frustrating, and could impact their thinking about when they wanted to use educational technology. Teachers noted that they would try to fix things (although they weren't able to fix something like the Wi-Fi going out or a projector bulb bursting) but emphasized that the process of doing so was both a cognitive drain on them and disruptive to student learning. As Stephanie, a third-grade teacher, expressed, “it can really disrupt learning, if you've planned things on technology and then something happens.” In relating why she stopped using the SMARTBoard, Beth, a fourth-grade teacher said, “I'd lose all of this, I'd *lose* children because I had to click on all the twelve dots to make it centered, then a marker wouldn't work.” As we will see throughout this chapter, it was these fundamental concerns with student learning and experience in the classroom that were primary for teachers in their purposes for use of technology.

Articulating Purposes

Teachers spoke explicitly about the foregrounding of purpose in their orientation to technology in practice, of the primacy of considerations that were not about using technology because they were supposed to, or because of some generalized idea of its benefit or value. They used words like “purposeful,” “useful” and “valuable” to describe examples of technological tools and uses they aspired towards and tried to enact. As Grace, a third-grade teacher, explained:

I think I never want to use technology just to use technology. So, is this piece of technology, whatever it is, advancing the learning in some powerful way. Or is it just technology just to have technology, you know, what is the purpose behind it? And it can be that we’re using this piece of technology because you need to learn how to type. It can be as simple as that. But I always want there to be a reason that I’m choosing to use something.

As Grace highlights here, she saw the importance of having a sense of purpose in contrast with an idea of use for the sake of use, or the substitution of a technological imperative for a learning imperative as the driving force behind her use of educational technology. Other teachers used the phrase of wanting technology to “enhance the learning” to express this distinction.

In drawing attention to this foregrounding of purpose it is important to note that teachers did not always describe their personally held reasons for use as being fully formed prior to that use. Instead, it was the *searching* for purpose, the *desire* for meaning that was most significant here, that stood in contrast to an orientation to technology driven by reactions to other people’s ideas of what you were supposed to be doing. Teachers sometimes noted that this foregrounding of

purpose was both aspirational and enacted. As Sally, a fifth-grade teacher, acknowledged:

Do I come in with a firm sense of that with every single lesson that I could explain eloquently? No! But, moving towards that, really understanding what is the purpose, what is the learning objective here, what are the kids taking away from it, and what tools will help enhance that.

As Sally's comment reflects, teachers held this sense of purpose as important even when they could not fully articulate what it might be, or even as they acknowledged the complexity of figuring it out.

Some teachers, like Grace, described wanting to have a clear purpose in mind for their initial use of a technological tool, that the sense of purpose was a primary factor in what they decided to take up or not. For others, that sense of purpose could be emergent as they related a process of figuring out what they wanted to do with a given tool as part of taking it up and trying it. Beatrice, a third-grade teacher, talked about those concurrent processes in describing how valuable she found meetings with the school-based technology specialist where they would talk through the kinds of things she *could* do with Google Classroom in the context of her own classroom. Beatrice noted that the grading function of the platform was not useful in her school, because they didn't have traditional grades, but that she and the specialist hoped to talk about, "What kinds of stuff could I export? Is there data that might be useful besides just traditional grades? Let's find out." The conversation Beatrice described here was taking place as she was already using elements of Google Classroom with her students, but she saw herself as still engaged in a process of discovering other elements of purposeful use. She saw this process as somewhat open-ended; she was interested in finding out what the purpose might be.

This emphasis on foregrounding purpose in an orientation to technology was shared across teachers who might otherwise differ in their general interest in and enthusiasm for technology, or even in the extent of their use overall. Obi, a veteran third-grade teacher, had a striking way of conveying this principle, that a use of educational technology should be driven by a purpose connected to what the teacher was trying to achieve. Obi was one of a smaller group of teachers who identified as a technology enthusiast, who described interest in and excitement about technology as a feature of her identity. She spoke with pride about how the technology specialist would give her opportunities to pilot new hardware and software, saying, "I'm always the guinea pig for the new technology because he knows I'll use it." Yet, while this tech-identity may have led Obi and others like her to look to technology as a resource for their practice more than others, it did not mean that she felt a need to use technology in all circumstances. In describing her excitement about using Google Documents in the classroom and its implications for the writing process (as opposed to earlier forms of word processing), she explained:

It's not publishing—just having a typed copy of something does not mean your work is high quality. Is this as creative as you could be? Is there voice in your writing? Is it using transition words, is it using metaphors, is it using simile? All those literary tools that we use to enhance writing. That doesn't come up just by typing your draft and saying, "Yes, I'm finished. It's published." Like, it looks good on paper because the print is perfect. I mean, you could do that on paper. So, then there's no point in having the technology if that's all you're going to do with it.

Obi would often comment, "you don't need technology for that" when talking about what she considered a use of technology without purpose. This conveyed the idea that, if a teacher or student was going to engage in use for the sake of use, they may as well not use technology at all.

As teachers emphasized thinking about the reason why they might want to use technology in the service of their goals for their classroom, they described engaging in what I would term purposefully selective use of given tools and practice. This description of use stands in contrast to both the trying to use everything and not using things that might be valuable described by teachers in the previous chapter. In an implicit speaking back to the idea of technology as panacea for problems of teaching and learning, many teachers explained that they felt they needed a variety of materials and media at their disposal as a teacher, not all of them digital or computer-based. Even if teachers did not fully explain the specifics of how they thought this variety of modes benefitted students, they were clear that though they might experience a given technological tool or practice as valuable, that didn't mean they ceased to see and utilize the value in tools and practices they had used previously, or that they considered "non-technological". Michael, an enthusiastic proponent of digital tools like Google Docs for writing, addressed this idea directly, describing his classroom as "it's kind of old school in here, I guess. You see I have chart papers and things. But those are good for the students, having those things up is really helpful to them." While his use of the phrase "old school" was an acknowledgement that others might see his continued use of non-digital tools like chart paper as "behind the times" in some way, he followed this with an assertion that having such visual displays in the classroom benefitted students.

Moving beyond the generalized assertion of the importance of having a sense of purpose rather than engaging in use for the sake of use, I want to look more carefully at the specific terms in which teachers articulated the purposes that informed their orientation to technology in classroom practice.

Purpose 1. Understanding

One of the primary considerations that teachers spoke about being interested in and excited by was the possibility that technology could be used to support student understanding. Ellen explained how she saw such digital resources able to illustrate otherwise hard to see concepts.

We can't see plants moving, but they're moving all the time. It's just because we have the wrong time frame to see plant time unfold. But with a stop motion camera or time-lapse photography, you can then speed it up and see plants basically doing yoga, or something like opening and closing. So, I've shown these movies, time-lapse movies, where the entire class stands up and starts acting like plants opening and closing, and that's very powerful. Just like a microscope allowed scientists to see a whole world that they weren't even aware existed, I think technology can reveal things.

Ellen's emphasis here, which echoed across other teachers, was how powerful it was for students to see things, how those visual representations helped them understand things about the world they wouldn't have been able to otherwise.

Some teachers also referred to their ability to effectively model skills in the classroom as a part of the purpose of using technology to enable student understanding. These examples often focused on the value of projection technology to enable them to show things clearly, including solving problems in real-time, talking through examples together or using examples of student work as models. Obi enthusiastically described this process of modeling.

Having the document camera brings everything you are doing to life. I can model how to add up numbers, where the kids can actually see my hands and see what I'm doing, so that when it's projected there they see it large-size. I remember one year I was teaching kids how to read a ruler and for years it's like, you have them with their rulers, and they're trying to do it, and then one day I said, "Duh, you can get the see-through ruler on the overhead projector. You can put that underneath the document camera, magnify it, and they can see you measure something."

As Obi noted at the end of this quote, some of the value she found in using the document camera for modeling emerged through use. She had not had the specific idea when she initially took up the tool, even though she had been excited about the possibilities for providing visual examples that she experienced when herself taking a class where the teacher used a document camera.

Some teachers were excited by how they saw the potential for educational technology to support students' construction of their own understanding, especially in contrast to teachers telling them things. Beth gave an example of this in describing a recent activity where she had had students look at interactive maps to determine patterns in waves of immigration over time, and the significance of those patterns for United States history. She noted:

They were just so excited, and noticing things all over the place and getting really excited about the things they noticed, and just very animatedly saying, like, "Oh, look at this!" and "Oh, this is something I noticed!" And then our conversation afterwards was really bringing all of the things that they all noticed together. And it was a very rich discussion.

Beth explained that she felt the alternative would have been her just telling students what the patterns were, "me talking to them about patterns over the course of American history and them taking notes about it," and that students were both more engaged and understood better because they were in a position to construct the understanding for themselves.

Yet, some teachers also expressed concerns about how technology might mediate their ability to support student understanding. Marcy, a fifth-grade teacher, related that while she was open to trying to use the SMARTBoard and excited about the potential for it to support her work with students in mathematics, she ultimately found the tool counter-productive. Partly as a result

of the bugginess of the software and the time she had to spend calibrating the tool, she explained, “I actually found it be kind of imprecise. But when I’m doing geometry or coordinate graphing, you actually need that to be *really* precise.

And scale affects all of that.” She went on to say that,

Kids did find it engaging, so it was really fun to use the pens and come up, and I liked how large it was, but it wasn't actually helping them learn more powerfully, and it was actually often throwing in additional kinks.

There are two elements of what Marcy said here that resonate with larger themes. First, she noted that the pragmatic considerations of how frustrating and difficult the tool was to use (the “additional kinks” she referred to), played a role in her thinking about whether it was worthwhile to use. Secondly, she stated that even though she perceived students as engaged by use of the SMARTBoard (a theme that will be discussed more fully later in this chapter), that didn’t mean that she felt it supported the substance of their understanding.

For many other teachers, their rejection of the idea of a straightforwardly beneficial path between student understanding and use of technology came through in the context of an assertion that not everything works for every student. This came up some in relationship to assistive technology, where teachers noted that things like speech-to-text software might enable some students to express themselves in important ways, but that the software didn’t work for students who needed more support with planning and organization, or whose verbal expression was too difficult for the programs to effectively transcribe. The idea of not everything working for every student was more frequently discussed in relation to skill reinforcement software programs like *Lexia Reading* and *Symphony Math*. These programs were invested in by the

district and often recommended as an intervention through the Response to Intervention (RTI) process for students who had been identified as struggling with grade level skills. Such programs provided students with repeated skill practice in things like recognizing and reading sound-letter patterns or solving mathematical equations. Most teachers noted that, while they thought such programs could be useful, they had students who aggressively disliked the programs or for whom they otherwise didn't work. Beatrice, a third-grade teacher, explained how she saw the range of responses by different students to these programs, beginning with drawing a parallel between her own learning style and those of some of her students.

Some kids, and I'm one of them, I can do really well at those programs and none of it sticks in my head and it's an utter waste of time. For other kids it really does help them, so it's idiosyncratic. And then there's a third category of kids where I have no idea whether or not it has any effect on their multiplication skills, but they're kids who have such a negative reaction to time pressure. And for some of them it stresses them out past the point that it's not worth it.

As Beatrice noted, she was willing to use the programs for students for whom they were genuinely useful, but as a classroom teacher she observed either a lack of benefit for others or a distinct detriment. Many other teachers discussed finding other ways for students to get the kind of skill practice these programs promised, such as through flashcards or in partner work. In these situations, teachers acknowledged what they considered to be the value of the overall tool or program, but were articulating an orientation in which their professional judgement that things didn't work for every student meant they had to make more involved and complicated decisions than what they often perceived as the simplistic suggestion by others that such programs were "the" solution to

students' struggles. It was the purpose of skill practice that they valued, not the use of the programs in and of themselves, so they saw the programs as valuable as they served that purpose.

Purpose 2. Identity

Teachers also referenced considerations about the way in which use of technology in the classroom might impact students' identity as learners, their ideas of what it meant to be a learner. Teachers discussed wanting students to feel pride in their work and accomplishments and valuing uses of technology that they felt supported this process. Michael spoke about the use of technological tools in writing to enable expression, including both typing in Google Documents and speech-to-text software. He connected this to students' self-conception, explaining:

And especially, if you see a student who has just been *struggling* with writing—and I bring that up because for many students writing is extremely tedious, difficult, and spirit-breaking—and to see them using the voice-to-text, and feeling successful, and changing their perception of themselves. That's just really powerful.

One other dimension of students' relationship to learning was the idea that a few teachers expressed of wanting students to feel a sense of ownership over their work, and valuing uses of educational technology that they saw as enabling that. This was a theme Marcy returned to throughout the interview. She noted that writing in Google Docs afforded students the opportunity to create their own organizational systems, and to more easily say what they wanted from her as their teacher or what they needed help with. She also spoke about the

importance of the document camera in enabling students to share their own work, that “it means that I don't own the board, that I don't own what's shown.”

However, the ways in which technology might impact students' relationship to learning was also a site of caution and concern. Some teachers expressed caution about how technological tools might invite students to not trust their own capability and independence as learners. This idea could come through in a concern about overreliance on tools, such as spellcheck, getting in the way of students developing a confidence that they could figure things out for themselves. A few teachers explained that this consideration prompted them to occasionally limit the use of the computer for writing, or introduce it later in the year, so that students would develop some internal check before relying on the technology. Other teachers came at this consideration through a concern with students being able to persist with uncertainty. Some perceived certain forms of technology as inviting a demand for immediate response (either games or online searching). As Beth said, she worried about students losing the experience of just “living in a question for a while.” Obi further articulated this consideration in describing her concerns with how students were interacting with computer-based skill reinforcement software.

You're just treating it like it's a video game. You need to add these two numbers together, get the right answer, and click it on the screen. To do that you need a paper and pencil next to you and you need to add those numbers up. That's just the reality. And kids fight that. And I think that's my biggest pet peeve, for kids to think, “oh, yeah, I'm just going to press buttons [makes electrical clicking sounds] and I'm done.” As opposed to understanding that I need to do some kind of thinking and work first. So my hope is that kids realize that they need to think and evaluate what the task is before they respond or interact with the computer. And oftentimes I think they don't.

Obi went on to describe how this concern prompted her to talk directly to students about the importance of still working through problems (often with pencil and paper next to them) when they were using computer-based software, as well as why she introduced programs strategically throughout the year. Stephanie, a fourth-grade teacher, described something similar in making adjustments to a research project on the States after noticing that students were able to quickly Google answers to questions like “What is the most populated city in Nevada?” She decided that, rather than just being able to find the information, it was important to her that students engage in some “critical thinking” about what kinds of information different reference materials had to offer.

Most of the teachers with whom I spoke expressed a value for supporting students in feeling like it was okay not to know things. Yet, to further complicate how teachers understood the relationship between technology and students’ relationship to learning, some teachers felt that technology was a productive area for students to develop a healthy relationship to not knowing. This often came through in teachers talking about their own modeling of this relationship through their use of technology in the classroom. Sally described an example of her thinking through how to project a slide without the speaker notes showing:

I’m modeling how to look for things. I’m figuring out how to do something in real-time in front of them. Like, I don’t actually know what I’m doing, let’s try it out.

A few teachers noted that this seemed to be an area where students were more willing to not know, and less worried about it, and how valuable that was.

Beatrice explained:

And because you're not *supposed* to know how to do the stuff with technology, you don't feel stupid when you're asking each other for help. So, there's that level, too. It is kosher to say, "How do I do this on the computer?" in a way it's not okay to say, "How do I read this word?" Which is really wrong, but that's the way the world seems to be.

As reflected in this statement, Beatrice, along with some other teachers, wanted students to feel more okay with not knowing, and saw that as an important orientation to learning, even if they recognized ways that social and educational norms pushed against it. They valued technology as an area where they perceived there to be more space to have this struggle. For Beatrice especially, this also came through in her articulation of the concept of wanting students to have the goal of knowing enough to use something, rather than becoming proficient by some external standard. She spoke about a group of students who wanted to learn how to use Garage Band software to make music for a class play, sought out an adult to support them, and learned what they needed to know. In her telling of the value of this as an educational experience involving technology, the students weren't concerned with knowing everything, but they were invested in what learning the program could enable them to do for their own purposes, and she saw this as a valuable way to approach learning how to use technological tools specifically, as well as tools and skills in general.

Purpose 3. Engagement

Almost all teachers in some way referenced the relationship between educational technology and student engagement as part of their thinking about what, when, how, and why to use particular technological tools and practices. Teachers often discussed student engagement as something they aspired to; they

wanted to see students engaged in their learning and they were open to things that might engage students more or more deeply. Sometimes teachers explicitly connected this to the substance of understanding, the idea that if students were more engaged they would learn more, as in the example from Beth in the previous section where students identified patterns of immigration across time using interactive maps. But more often than not, engagement just stood on its own as a given value, with some teachers asserting that students just were engaged more by things like videos and interactive games. Sometimes teachers located this potential for engagement in the medium itself, and at other times they located it in the existence of variety for student experience in the classroom. As a few teachers said, sometimes you just needed to “spice it up,” to play a review game on the computer or use Google Docs for discussion instead of talking in person. However, a few of the teachers who described themselves as using educational technology for the purposes of engagement lamented the need to keep students engaged so constantly, offering the perspective that student stamina and attention had changed over time (often ascribing this to increased use of screens and other digital technologies outside of school) and more was required to keep students engaged than used to be.

One noteworthy way in which student engagement and its relationship to technology was discussed was through the idea that teachers saw themselves as capitalizing on student interest. Even some of the teachers described above who lamented the need for screens to keep students engaged also spoke positively about how, if students were going to be interested in platforms like YouTube and want to spend time there, they would encourage them to use the platform for

educational purposes, such as looking at videos to help them learn their multiplication facts. As Beatrice explained:

And so, there are certain things that it's useful for and certain things that it's not, but it's one of many ways to approach something, and it's a way that many, many kids are easily seduced into caring. So, for heaven's sakes, why not exploit it?

This idea of “exploiting” or “taking advantage” came up repeatedly, where some teachers might have complicated feelings about the reasons why students found work online or with computers so engaging, but they felt as though it was foolish on their part not to utilize that interest if it was going to better enable them to meet other purposes and goals for learning. And, as reflected in the quote from Beatrice, this was also a place where the idea that not everything worked for every student would also come up. Beatrice was someone who expressed that she often found it a bit silly how engaged some students were by things like skill reinforcement software (which she felt was basically the same as a worksheet, an idea expressed by a few other teachers as well), but she was still going to make use of that engagement if it would help any students to learn.

There was some variety in how teachers made sense of this observation that students were engaged by learning experiences that incorporated technology. Sally argued for the sense of being beholden to students’ seeming engagement by screens, computers, and other forms of technology, whatever the cause of that engagement might be. While also at one point noting that students could be a bit “zombified” by screens she stated that teachers had a responsibility to meet students where they were and talk to students in their own language. As she explained, teachers had an obligation “to tap into the fact that these kids are living in a technology world. They exist in that and for us to not

tap into that, we're not taking advantage of having a common language." Sally gave educational technology as one example of a larger argument about the responsibility on the part of teachers to be familiar with students' cultural context (including clothes, popular culture, and forms of communication) even if teachers didn't themselves share that context.

Marcy was the person who spoke back directly against the simplistic narrative that technology necessarily promoted student engagement in meaningful and productive ways. This was noted previously in her description of deciding that, while students found work on the SMARTBoard engaging, she did not think it supported their understanding. She was also named explicitly that this narrative was part of cultural discourse, that it was an idea offered by others that she was responding to. In discussing her sense that teachers were often being marketed to, she described,

And people are always like, *always* like, "Here, give this buzzer system and then kids don't have to speak in class and they can push a button." And I'm like, "Whoah!" I often think more about what are the needs of my classroom versus what seems really appealing and new. And then I try to think, like, okay, I want to wait this out a little bit to see are there other teachers using it, are there PDs where teachers can find out more? Have there been good research studies or articles that are coming out? And, does it actually address a need that my students have, or does it seem gimmicky to, like, motivate them? Because I actually think that I don't need devices to motivate students, and that students don't need devices to be motivated.

Here Marcy communicated concern about the idea of motivation and engagement as a driving force absent other considerations of impact on students, and she rejected the idea that forms of digital technology were necessary to engage students in their learning. While no other teachers were as direct as Marcy in her rejection of what she perceived as a simplistic claim that technology

was a means to engagement, the previous discussion of some teachers' skepticism about the benefits of skill reinforcement software for all students was connected to this theme. Such programs often advertise that students will be engaged in skill practice in ways they would not be otherwise because of the digital platform (see, for example, <https://www.lexialearning.com/products/core5>).

Purpose 4. Interactions

In discussing how they thought about the relationship between educational technology and interactions between themselves and their students, teachers spoke to technology mediating feedback mechanisms as well as their ability to have a sense of what students understood and were doing in the classroom. Teachers emphasized the ease with which they were able to give students feedback through the comment feature of Google Docs, the ability to communicate with students in real-time as they were working, and their perception that students were more receptive to this feedback, that it was both less emotionally charged and more able to be integrated into the revision process.

Sometimes teachers talked about getting a sense of what students knew specifically in relation to accountability, to work completion and time on-task. David spoke about being able to "oversee" students' writing and collaboration with one another through Google Docs and Google Classroom, and a few other teachers noted that having assignments both posted and submitted online eliminated the possibility that students could lose things and allowed them to

more easily see who had and had not completed their work. This ease of accountability was noted as a positive benefit but not something teachers evinced a lot of passion or excitement about (Beatrice referred to it as “stupid little accountability things”). In contrast, one of Stephanie’s central preoccupations in discussing why she utilized computer-based activities for learning (and why she wished she could do so even more than she was currently doing) had to do with the extent to which she felt it gave her a better sense of her students’ understanding than she was able to glean otherwise. As she explained:

There’s this really great angles website, where the kids actually have to use their mouse to move the angles to measure them. When I stumbled upon it, I was like, "Thank you!" When we're learning measurements and we learn that it's down to the degree, I can't supervise eighteen kids getting the degree, but with this, they know, because it will say, oh, you're off by four degrees, oh, you're off by three degrees. So, I'd say the technology comes into play when I don't think that there's a non-technological way to do it as well.

As Stephanie explained at another point in the interview, while she did have ways of doing what she called “checks for understanding” as part of face-to-face whole group lessons, she felt that having students working on computers allowed her to get a sense of what they knew more efficiently (in real time, being able to quickly scan the class rather than take a bunch of materials home after the fact) and with greater accuracy because she could see what each individual was doing. Stephanie also came back to the foregrounding of purpose here, noting that she thought about technological resources when she felt there was a learning need she couldn’t meet in other ways.

Many teachers also spoke to how they saw educational technology able to support collaboration between peers. Much of this collaboration occurred in the realm of writing, through the use of Google Docs and Google Classroom, but

some teachers also used these platforms to support group projects, noting that it was much easier to pass documents back and forth between group members. Beth articulated the benefits of this technology for collaboration between peers, explaining her value for what she called “the community shareableness” of digital writing tools.

Kids don't just share their documents with me they share them with each other. It has really made our writing community feel like a real community. The amount of kids who write together is really incredible and kids I wouldn't even think would do writing projects together are collaborating and that has been really amazing. I think before Google Drive, I would always suggest, like, it's really fun to work on writing together, and it's just really hard to if you are in separate places and you are writing with a pencil and paper. Even if you are writing on Word and having to email it to people, it is just—I think a lot of the technology we have now enables collaboration. Which is great, because *that's* what I want kids to be doing.

There are two things that Beth emphasized here that were echoed by other teachers in discussing their practice around Google Docs and why they found it so valuable for supporting student collaboration in writing. The first is that collaboration often seemed to emerge naturally between students through the ease of sharing enabled by the platform. Even when it wasn't a requirement of assignments, students wanted to share their work with one another. The second was that collaboration on writing (whether joint authorship or utilizing peers for feedback) was something teachers had always valued and encouraged but were now seeing more existence of in practice.

Yet, just as teachers were excited about the potential for educational technology to enable these kinds of interactions around work and learning, they were also concerned about the limitations of technology for mediating this process. Some teachers expressed caution about what could be known about student understanding from the use of technology-mediated assessments,

specifically screeners in reading and math and the new computer-based version of the state's high-stakes standardized assessment system, which had been recently introduced. A later section will look more in depth at how this prompted Marcy to make adjustments to her use of an online reading screener because of her concern about its limited ability to reflect an understanding of students' needs. Ellen also spoke to the frustration of what could be known from the computer-based screeners in contrast with an in-person reading assessment, explaining that:

I'm sitting there and I listen to them, *and*, when I hear someone read aloud, I could, if I felt like it, do a running record. And I could figure out, ooohh, what this person actually is struggling with is embedded clauses or something like that. Whereas the computer thing will only tell me they got this score.

For teachers who expressed this caution, it was often located around the shift to computer-based standardized testing. Teachers articulated concerns that students' performance on the tests would reflect their familiarity with the platform rather than their actual understanding. In an echo of concerns about the kind of thinking invited by technology, others noted that some features of the online testing platform, such as the inability to go back to a previous page and the inability to record mathematical thinking graphically, ran counter to how they taught students to think about things in the classroom. However, not all teachers agreed with these concerns about the online testing platform, with Michael noting that his students seemed able to persist longer than previously and Beth asserting that students were so familiar with working on computers that, while she had concerns about high-stakes standardized testing in general, they were not attached to the computer-based format.

Lastly, in articulating their specific considerations in thinking about the relationship between educational technology and interactions between themselves and their students, a few teachers asserted the continued importance of direct, face-to-face interactions with students. Some brought this up this consideration in relation to thinking about their actions as a teacher while students were working on the computer. Whitney, returned repeatedly throughout the interview to her concern with the suggestion that technology could be seen as a replacement for the teacher, identifying an idea that she saw coming from broader discourse. She spoke about the importance of flexibility in movement (with implications for whether the projection screen in the classroom could be linked to more than just one desktop computer) and being able to interact with the students *as* they worked on the computer. As she explained:

Otherwise they would just be at home on the computer and we'd be here. And I think proximity and interaction with me is important. I mean, I'm *teaching* them. I need to see their growth, I need to be able to observe their growth. I need to be able to move from that direct instruction to that facilitator-coaching model. I can't do that in one place. I need to be able to be there and then move over there.

Other teachers spoke about attending to physical proximity as an important element of interaction while students were working on the computer, such as having some students sit with them at a table while working in Google Docs, even if they might communicate about the writing through the online platform.

Purpose 5. The World Beyond

Lastly, in discussing the reasons why they might or might not choose to use educational technology, teachers referenced purposes related to the world

beyond the classroom, namely those of preparation and equity. We have seen the idea of “preparation” as part of dominant discourse on why teachers should use educational technology in the classroom. While most teachers did assert that part of what they thought about in their practice with educational technology was some sense that students needed to be “prepared” for the world beyond their classroom, the specific ways in which they discussed it again complicate both a simplistic conception of preparation and the assumption of a straightforwardly beneficial relationship between technology use and preparation for the world beyond the classroom. Teachers also came to different conclusions about what a value for equity meant for their work with technology.

Teachers might emphasize that students would need to know how to do research online, type, and utilize platforms like Google Classroom for assignments in their work in middle school or high school. Some teachers focused on needing those skills for the world of work and general functionality in a digital society. They would use phrases like “this is the world” or these are “life skills now” to articulate this idea of technological preparation. However, there is a distinction between this idea of preparation and that of seeing technology as valuable in its potential to enable different kinds of teaching and learning (Ertmer, 1999; Papert, 1980; Wiske, 2006). Indeed, amongst the teachers I spoke with, the idea of students being prepared in their use of technology often seemed disconnected from the other purposes teachers discussed about how they saw educational technology intersecting with the substance of student understanding and learning experience. These considerations were articulated in the context of a general sense of responsibility for students, their learning, and the implications of that learning for the world beyond the classroom. But that

sense of responsibility was not interpreted as implying only one kind of practice with technology. David used the phrase “life skills” to refer both to using technological devices and having students work with pencil and paper.

Stephanie lamented the fact that one of the reasons she felt she was encouraged to use technology was specifically preparing students for online testing.

Two teachers more directly offered a critique of the idea that technology should be used to prepare students for the world as it is. Beatrice came at this idea of preparation and life skills and its relationship to technology use from a slightly different perspective, and specifically around the idea of programming. While programming did not come up in most interviews, Beatrice’s way of thinking about preparation intersects with larger conversations about the role of computational programming and thinking in K-12 education (e.g., Wing, 2006).

Because the programming languages that kids learn now are going to be obsolete by the time they want to use them professionally anyways. The concepts underlying them are going to be reasonably similar, and every single one of those concepts is the kind of concept that will enrich your understanding of literature, or how to make soup, or how to get your house clean without driving yourself crazy. Approaches to doing things, you know what I mean. And so the idea of a loop, that's kind of what housework is, really. You pull out a variable and you put in the other one. And so they're very directly applicable, and they are fun, and you can use them immediately.

Beatrice was someone who expressed value for cross-subject thematic connections and described herself as drawn to uses of educational technology that supported her and students in making those connections. That value for connection was reflected in how she complicated the idea of classroom technology use in the service of preparation, noting that the specific programs students will be using in elementary school won't be the same later, but the thinking they enable could be valuable.

While Beatrice's challenge to the dominant framing of technology use as preparation was pragmatic, Ellen offered a philosophical challenge.

I think this whole coding, that's a big indoctrination thing, like everybody should be coding. Like, coding is *the* way to go. And I don't know, when there's this huge propaganda thing about coding, what happens to life science. Maybe life science is actually really what's going to change—maybe a very deep understanding of photosynthesis is what will save the world. As opposed to computers. If people really understand about carbon dioxide, and life, they'll understand climate change and they'll be willing to make changes in their life based on their *life* science. And physics, and energy, really understanding what happens when you burn oil. Maybe that's more important than coding. Or, maybe, it's more important in elementary school for people to understand the nature of our problem.

Here is another example of Ellen specifically naming the discourse she was responding to, the discourse against which she defined and articulated the things that were valuable to her as a teacher, the purposes that drove her own decisions about use of educational technology. Ellen pushed back against the idea that influence of digital technologies in contemporary society was a fait accompli and offered an alternative way to think about the responsibility of schools to prepare students for the world.

In another example of thinking about the world beyond the classroom, many teachers referenced considerations related to conceptions of equity in discussing how, when, and why they decided to use technological tools and practices in the classroom. These considerations had to do with the relationship between students' experiences in school and the context of their lives outside of school, with attention to what might exacerbate and what might alleviate the consequences of structures of inequality along lines of race and class. There wasn't always a lot of specific detail to these discussions of equity, but it was clearly something that many teachers were thinking about. This in and of itself is

significant, as there have been repeated calls for the importance of thinking about practice with educational technology as embedded in a broader social context (Bowers, 1988; Bromley, 1997; Selwyn & Facer, 2013; Selwyn, 2017). Yet, again, teachers came to different conclusions about what a concern for equity might prompt them to do in relationship to their practice with technology.

Sally, who said explicitly that considerations of social justice were a central component of her teaching, spoke about how she saw the potential for technology to both alleviate and exacerbate inequality, in schools as well as society at large. As she explained:

So that idea of opening up this world to people who had never envisioned that even—whether or not they want to do it, it's like, do I even have access to this? Well, there are so many people that don't even think that they have access. And those fall along all sorts of lines—race, gender, etcetera. So, when I think about technology, and I think about it from a social justice point as well, becoming overly reliant on it is really unfair to people that don't have access. And it's not even about providing technology at school. If everything is based in the technology, all the kids that get to go home and play around on their computers are getting additional practice that other kids are not getting. And if your ability to be successful is based on that, then we're skirting a really huge issue.

There were two main areas in which other teachers brought up issues of equity. The first has already been addressed in some ways, which was the recent shift to a computer-based version of the state's high-stakes standardized assessment. As part of their concerns about what could be known about student learning from these assessments, some teachers noted that this use of computer-based technology could exacerbate inequality because some students would perform better due to their greater familiarity and facility with the medium. Relatedly, some teachers spoke about issues of equity regarding at-home access to computers and the internet impacting their choices about utilizing technology

in the classroom. A few teachers asserted that they made the choice not to assign homework through Google Docs because not all their students had access at home. Whitney argued for the perspective that a lack of equity in access should prompt restraint in use and connected to this point to her broader concerns about equity in distribution of technological resources (1:1 ratios of students to Chromebooks, updated hardware, reliable Wi-Fi) across the district.

I think there's a great benefit to incorporating technology in the classroom, but again it comes down to the equity issue. If we're going to expect our children to leave school also technologically prepared for the technology that *we* utilize on a day-to-day basis then we have to provide them with those tools in that classroom. And if we're not going to readily do that across all environments with equitable access, then we can't expect—it shouldn't be anywhere. You can't have classrooms where every child has their own personal laptop, and the SMARTBoard works all the time, and it's touch screen, and all of these other things. And then classrooms where your Chromebooks are ten years old and falling apart and your SMARTBoard never works. It's just not going to work. We're not going to produce equally technologically literate citizens.

Whitney connected considerations of equity with a sense of responsibility for preparation for the world outside the classroom. Yet, other teachers referenced those same considerations, along with the perception of unequal at-home access, as a reason why they felt it was even more important to use technology in school as much as possible. As David explained:

Just, life skills now. Almost everything you do is digital. So, a lot of [students], they like to go on and do coding and stuff. And so, I think it's a life skill in preparing them for the future and stuff that they're going to need to be able to do. And a lot of them don't have access to computers at home and so they get their technology time at school.

David referenced the same consideration of utilizing technology as preparation for life outside the classroom but concluded that a conception of equity was best served by increasing school use to compensate for inequity in at-home access.

Conclusion

This chapter has explored an orientation to technology in classroom practice characterized by teachers foregrounding their own sense of the purpose for their use. We have looked at the specific terms in which teachers discussed the purposes that were important to them as they thought about whether or not, and how, to use technology in their classrooms, namely considerations about: *understanding, identity, engagement, interactions, and the world beyond*. While these considerations overlapped in some ways with the purposes for technology use highlighted in dominant discourse, they were also different in specifics and emphasis. Perhaps most importantly, teachers expressed both excitement and concern about the role that technology might play in enabling these purposes in the classroom, and they could share a value or purpose but also came to different conclusions about what that purpose should mean for their use of technology.

The next chapter, "Making it Your Own," will explore the enactment of an orientation to technology grounded in teachers' own sense of purpose, and how that enactment was different from the descriptions of trying to keep up with technology.

6. Making it Your Own

Introduction

In this chapter I want to explore how teachers described the enactment of an orientation to technology that was grounded in their own sense of purpose for use. The title of this chapter, “Making it Your Own,” is taken from an interview with a veteran kindergarten teacher in the district. I did not include this interview in the formal data for the study because this was the only teacher I spoke with who worked in a K-2 setting and the difference in context mattered, even if some core themes were the same. This teacher expressed that “making it your own” was a necessary part of her process with learning how to use any new curriculum or initiative. She said that she would first try to do the curriculum as written, and then, through that process, figure out where she needed to make changes or adjustments in light of her sense of her students’ needs (individually or developmentally). For this teacher, “making it your own” was always the goal, and something she communicated a desire for more ways to do with educational technology specifically.

Three themes emerge in the description of this enactment. First, teachers communicated that their enactment of an orientation to technology involved *iteration*, it involved change over time informed by ongoing reflection about what was important to them and what they were seeing in their students. Secondly, teachers conveyed that enacting an orientation to technology grounded in their own sense of purpose still involved important kinds of *support* from others. Lastly, the ways in which teachers talked about enacting an orientation to technology characterized by foregrounding their own sense of purpose conveyed

an embrace of *divergence* in practice, a comfort with being different from one another in the specifics of what they might do in their classroom.

These themes stand in direct contrast to many of the negative associations that teachers in an earlier chapter described experiencing when they felt that educational technology was something they were trying, and failing, to keep up with. Pam and Jean located the idea that they were “not good” with technology in the fact that it took them a long time to learn new things and that they needed help to do it. This feeling was connected to their perception that this was more true for them than for others, and that others were using educational technology in ways that they were not. As this chapter will illustrate, the need for time to figure out and enact meaningful practice with technology, and the need for support from others in doing so, was shared across teachers regardless of age, or experience, or interest in or facility with technology. As the previous section explored, teachers could, and did, share the idea that having a sense of purpose for their use of technology was important, but could come to different conclusions about how to understand those purposes and what they might imply for use. Yet, these shared elements of an orientation did not mean that teachers described their practice with technology as being entirely like those around them or described feeling as though they needed to be like those around them.

Iteration

Most teachers emphasized that their process of thinking about what, when, why, and how to use educational technology was an ongoing one that involved trying things out, seeing how students responded, and making

adjustments in light of these observations of actual use along with their sense of overarching purpose. This theme has echoed throughout the preceding sections in teachers' descriptions of changing use over time, of exploring, of being open to a purpose that might not be fully realized or articulated yet. This iteration involved change over time, as teachers described purposes emerging through use and actual use reencountering purpose as they made adjustments to their practice. It also involved iteration on multiple considerations. As reflected in the previous section teachers referenced multiple categories of purposes in relation to decisions around educational technology, including thinking about students in the classroom, their own work as teachers, and the world beyond the classroom. Teachers emphasized that this iterative process—thinking through what they wanted to do, considering the impact of actual use, and making adjustments—took time as well as cognitive energy. Because the nature of this theme involves change over time and thinking about multiple considerations at once, the best way to illustrate it is through two in-depth descriptions of individual teachers talking through their iterative process around a specific piece of educational technology. First, we will look at how Beth thought through the benefits and drawbacks of using Google Docs for writing feedback, and then at how Marcy adjusted the way she was using a district-mandated computer-based reading screener to get a sense of students' reading capabilities and needs.

After describing her enthusiasm for how shifting students to writing using Google Documents had enabled them to collaborate with one another and receive more targeted feedback from her, Beth went on to say that she had begun to think about when she shouldn't be using the program, when it might be useful for students to return to writing with paper and pencil, or how she might need to

moderate the way the program facilitated a demand for immediate feedback. As she described,

I think I wonder a lot, just in the world, is the amount of screen time that we have having detrimental effects, especially in terms of, we all expect things now to come so quickly and to be able to figure something out immediately and we're losing, kind of the just living in a question for a while because you can't find the answer right away. Or, like, my kids expect feedback on writing at a rate that is not necessarily realistic. And I've pulled back a lot on that. I don't know, I think in terms of mindset just expectations around what is possible and just time and space. But there's a lot of other things affecting that, too, besides technology. But that's something I think about.

Beth expressed concerns about how the more immediate forms of feedback that this program (and others) enabled might be negatively impacting her students' ability to sit with questions, something that she also thought was important. I want to note especially her final sentence here, that this is something she thinks about. It isn't that she presented herself as having figured out the "right" answer to how to balance her concerns and excitement about educational technology, it's that, just as she saw herself as being in a constant state of curiosity about and openness to new possibilities of tools, she was also in a constant state of thinking about potential negative consequences and concerns.

Beth went on to describe that she had pulled back on giving students such immediate feedback, noting:

I think the quality of their writing was better if I was doing it, but their independence was better if I did conferences much more strategically and more spread out. And I decided in the end, quality of one piece of writing versus building independence, independence is more important to me.

One of the elements of iteration that Beth highlights here is the necessity of weighing multiple factors and considerations in the relationship between technology and student learning as well as her own work as a teacher. It is

precisely because teachers experienced their decisions in relationship to use of technology as taking into account these multiple factors that it wasn't always possible to know ahead of time what the outcome would be and it was necessary to consider actual impact and make adjustments as needed.

This element of iterating on practice was present in Marcy's description of her use of a district-mandated online reading screener. The reading screener asked students to read multiple passages of text and scored them on oral reading fluency, with teachers able to input data that impacted this final score solely about the time it took students to read the passage and any miscues they had made. The district recommended (aligned with the product's marketing) that the use of the screener replace more time-intensive 1:1 reading assessments and be used to make decisions about small-group instruction and other needed interventions. Marcy explained her response.

We realized was that it actually was catching more kids than we were finding in need of help. I was like, "Wait, this kid was flagged on the screener, but I'm seeing this and this and this." And so that used to be the only method we used. And we now have shifted our thinking around it, to screen everybody, knowing that it will catch more kids. We spent a year investigating how this software was working for us. And we found out that it was good that kids who were not flagged actually don't need time-intensive 1:1 screening. But, we shouldn't use that for groupings. And, of the kids who were then flagged, we knew that it would then catch all the kids who struggle, and then we could be more efficient with who do we actually need to do 1:1 assessments with. And we learned that the 1:1 assessments with teachers were much more valuable, though time intensive. But it meant that I wasn't having to benchmark all kids in my class, which takes *weeks* at the beginning of the year. So, we could get to instruction quicker because of the technology, but it always took trying out the software, and then seeing what is was *actually* doing and then using our own expertise to decide.

As Marcy explained here, she did ultimately find value in the reading screener enabling her to make sure that students in need weren't escaping notice, and to

be more strategic in the deployment of her time in further diagnostic assessment. But this involved using the screener in a way that was somewhat different from the district's or designer's recommendation for use, and in a way that, as she emphasized, developed over time and in response to observations of actual impact. Marcy's description of this process also reflects how consideration of multiple purposes prompts iteration. As she noted, efficiency, which is often offered as the purpose for use for these kinds of computer-based assessments, was something she cared about in this situation, in terms of being able to get the most information about student reading in the least amount of time. But this consideration was balanced against the need for a nuanced and substantive understanding of student capability and need, a purpose for which the screener was limited in its value.

In both of these case studies, teachers described being open to the value that the technological tool might bring to their teaching, but also concerned about the actual impact on students in relationship to the initial purpose for use (giving writing feedback, assessing student reading levels) as well as other purposes (student independence, a deeper understanding of student need). Neither teacher chose to discontinue use of the program or platform, but both made adjustments to their original use informed by their thinking. These anecdotes reflect the importance of being able to work with a given tool over time. They also reflect how such iteration is grounded in a sense of professional judgment and discretion, the "expertise" that Marcy emphasized. The next section will explore more how this need for professional discretion plays out in relationship to the simultaneous need for support from others.

Support

Teachers articulated that there were things they wanted from others to bring into being the relationship to practice with technology that they might want. They valued the ways that others might give them ideas of things they could do as well as help them learn how to do something. They also asserted that the process of learning how to do something was a continuous one and might involve formal learning experiences as well as more ongoing support. Yet teachers communicated a desire for support that was not a form of prescription, describing their engagement with others as part of a process of making a given technological tool or practice their own. They valued getting ideas from others not because they would then do exactly the same thing, but because those ideas helped them figure out what they could or might want to do in the context of their own sense of purpose and the specific considerations most present to them in issues of student learning and their work as teachers. The many teachers who spoke about this process of making technological practice their own, or, as some put it, making the “right match,” referenced considerations about how a given tool or practice might fit with their sense of their students’ needs, their own teaching style and pedagogical values, and the way in which they experienced the constraints and demands of their environment. This section will explore what support without prescription looked like in relation to teachers getting ideas from others of things to do with technology, and also their ongoing learning experiences around trying new things.

Getting ideas

One of the ways in which teachers described accessing support in the service of their own vision of practice was through coming into contact with ideas of tools and uses that they may not have been able to come to on their own. While I have titled this section “getting ideas” that is not meant to imply passivity on the part of teachers. Rather, it is meant to emphasize that this was an area where teachers spoke about appreciating what others brought to them. Teachers described finding out about things they did not know about or might not have thought of otherwise that felt connected to what they might want to do in their classroom regarding technology. Teachers mentioned that the school-based technology specialist would send out emails with ideas and suggestions of things they might want to try, and a few teachers said they would go and watch the technology specialist teach their students in class (even though this was their own preparation period) because it helped them to see more of what they could do. Teachers also referenced just learning about things through word of mouth with colleagues. Jasmine, a fifth-grade teacher, described such a situation.

Last year, when I was pioneering the new ELA curriculum, I remember one of my colleagues from another school said, “I just gave the assessment, and I put it in my Google Classroom.” And I said, “What?! What is this Google Classroom you’re talking about?” I said, “How did you do all that?” So, I was shown by a colleague over at [another school in the district] who is currently the grade 4/grade 5 teacher. And then I started exploring on my own because I have not been formally trained on Google Classroom, so I still have a lot to learn. But one of the things that prompted me to think about incorporating it into this subject of social studies at least, and ELA, was that I had children working at different times.

What Jasmine described here was echoed by many other teachers, who related some version of this, “Oh! Tell me more,” when hearing about an idea for a use of technology that seemed interesting, or intriguing, or felt resonant with their

own purposes for what they were trying to do in their classroom. Jasmine described a situation where the idea of Google Classroom had meaning for her because she was struggling with figuring out how to manage the complex classroom logistics of students finishing work at different times.

Within the theme of getting ideas as a form of support there were two distinct strands. First, teachers valued the ways others might expand their imagination of the set of possibilities for what they could do with technology in the classroom. Some teachers spoke about the role that others (both specialists and colleagues) played in helping them see more possibilities of what could be done. Obi, a veteran teacher, spoke in general about how important it was to get out of her own classroom and into others', to see what they were doing, because it helped her continue to grow in her own practice. She specifically talked about getting ideas of things to do with technology from the gym teacher, such as using the "Just Dance" program. As she explained, "It kind of just makes you think and look at the different ways people use technology in their environment."

Yet some teachers, including those who might in other circumstances express value for how others helped them see possibilities they wouldn't otherwise have imagined, also expressed feeling overwhelmed by the need to navigate through the myriad suggestions of things to do with technology that were sent to them. We saw this sense of being overwhelmed by too many things to do in the problem of "keeping up" explored in the previous chapter. As Beth expressed, "There's so much out there that I don't tend to search widely myself because it's too intimidating." Multiple other teachers offered some version of this statement, communicating that there was so much out there that they didn't feel time spent wading through it was especially valuable given all the other

demands on their time. Consequently, teachers appreciated a second form of support that I would describe as *curation*, as someone else (often the school-based technology specialist, as well as subject area coaches and colleagues) doing that work of narrowing down possibilities so that there was a greater chance of more quickly finding something that they wanted. As Grace noted, even suggestions that would come from the district technology department could be less helpful, because,

I guess it just seems like they're not always applicable. And sometimes it's too much information and sometimes it's not enough. And I think over time I've just realized that the best place for me to get information is from [the technology specialist]. Like, she'll just distill whatever we need to know down to what we need to know.

Grace emphasized here something that others expressed in describing their value for curation, which was the sense that there were more or less valuable sources for them to get ideas from. Because teachers were driven by their own sense of purpose and focused on making the right match between a technological tool or practice and themselves and their classroom (which might have to do with teaching style, student needs, pedagogical approach, grade level, ect.), they especially valued ideas of things they could do from people who they felt better understood their specific context, as opposed to suggestions of technology that were thrown at teachers more generally. As described previously, some teachers' sense of caution about technological tools and practices was based in a skepticism of the marketing to teachers around technology that often felt disconnected from teachers' own values and concerns.

Accessing learning experiences

Beyond just getting ideas of things they could do with technology, teachers also expressed value for others in support of the process of actually learning how to do whatever it was they might want to do with the technology. Teachers spoke about formal learning opportunities, such as professional development and other classes, as well as ongoing, informal learning at the school-level where they might work with the technology specialist or a colleague to learn how to use a new program or application. Sometimes these learning experiences were a place to get the ideas that prompted their excitement about technology. Grace described how the excitement she experienced by having the opportunity to be “in the position of student” during a voluntary workshop on Lego WeDos generated a different valence to her usual orientation to technology in the classroom. After relating how intellectually engaged she was by the problem-solving challenge in the workshop and how she wanted that experience for her students, she reflected, “I use educational technology and I’m interested in it, but it’s not my biggest passion. So, I felt like it was unusual for me to be like, ‘Oh, yeah, let’s do this!’”

Teachers expressed value for the possibilities for learning they saw demonstrated through those tools that they hadn’t imagined before. Beth, who described herself as very willing and able to problem-solve and figure out how to use things on her own, still found a PD class on the Bright Link valuable because, “it gave me the time and the space to play around with it and to see some new things [pause] and just get comfortable using the board as more than just like a projector.” As Beth emphasizes here, there was something about the cognitive space provided by the formal learning opportunity that helped her

grow her practice with the tool in ways that would have been more difficult to do on her own. Similarly, Michael described finding valuable a general technology class he took through the district because there were other people there to support him as he was exploring with different tools and trying new things. As he explained, “a lot of it was we had time to look at tutorial videos, and then we would do some stuff, and then if we were having any issues they would be there to help us.” The support of more knowledgeable or experienced others as he was trying to learn how to use a new tool was something that Michael, and other teachers, found helpful.

Some teachers specifically noted how ongoing support from others was a necessary element of learning how to use technology in the classroom because the process of using technology was an iterative one, and because ongoing support at the individual and school-level could be more aligned with their individual sense of purpose, with their context and what they were interested in doing with the technology in their classroom. This was exemplified in Beatrice’s description of the way that she utilized the school-based technology specialist in helping her learn how to use Google Classroom. As she explained:

I basically asked, "Hey, can you show me how this works?" And so we have a once a week meeting. I think about okay, here's one thing I can do, alright, let's go to the next step, what's the next step. Tomorrow we're meeting to talk about grades. And we'll be meeting again, then, to talk about how to use it to—it's a question actually, should we use it to support their doing portfolios, or should I just use Google Classroom straight.

Beatrice highlighted three elements here that echoed across the experiences of other teachers. First, she directly sought out support from a more knowledgeable or experienced other to learn how to use something. Secondly, she saw ongoing support as valuable because her process of figuring out how to use a new

technological tool was itself an ongoing one. And lastly, the specific nature of this support included more open-ended conversations about what use might look like in the context of her own individual classroom.

A few teachers also described a different element of the trajectory to the relationship between learning how to use a given technological tool or practice and wanting to use it. We have seen above examples where teachers sought out learning experiences for something they might want to do. But teachers also emphasized how learning how to do something, seeing that they could do it, was generative to their sense that they wanted to use it. Whitney spoke about how much she valued the work that the school-based technology specialist did in helping her see that things were possible. She described the technology specialist

communicating and messaging through his teaching that it *can* be done. This is *how* we get kids to interact—and now that technology is in the classrooms it's kind of cool for me to sit there and watch him teach a class, and see the ways that kids interact with technology with him in the room and the things they're capable of doing via his teaching.

Returning to the idea of seeing possibilities, for Whitney this modeling by the technology specialist was part of helping her see that there were uses of technology that she both found valuable and that seemed possible for her to do in her classroom, that this support from someone else helped her believe that she could and would want to do something she might not have believed otherwise.

This section has explored the specific ways in which teachers described needing others to enact an orientation to technology that was grounded in their own sense of purpose. The next section will illustrate how needing from others did not mean needing to be *like* others in practice. This demonstrates how having one's own sense of purpose can help to alleviate a sense of perceived external

pressure to conform to an idea of what you are supposed to be doing with technology. When we do not feel pressure to be exactly like others, it can be easier to actually *be* with others, to feel connected to them in the ways we need to be.

Divergence

The theme of divergence has echoed throughout this work. The previous chapter illustrated that teachers could have a shared purpose for use of educational technology but come to different conclusions about the implications of that purpose for their practice, whether it would prompt them to take up or reject a given tool. The discussion of support reflected how teachers could want to get ideas and learn things from others but in the service of their own vision of practice, that support did not mean prescription. This section illustrates this theme in two ways. First, I present a case study that shows two teachers coming to different conclusions about the exact same tool in crystallization of the idea that a shared orientation of foregrounding purpose can result in divergent practices. I end by looking at direct assertions by teachers of their comfort with being different from others in their practice with technology in illustration of the idea that foregrounding purpose gives permission for this difference. This is in contrast to the expressions of stress and anxiety that Jean and Pam located in their sense that they were not using technology as much as others, part of their sense of feeling behind.

“I have my own things going on”: Different conclusions about the same tool

When teachers’ thinking about educational technology was driven by their own sense of purpose, one of the ways in which divergence manifested was that they might come to different conclusions about whether uptake of a given technological tool or practice was right for them and their own classroom. This is illustrated in the differing reactions of two teachers, David and Michael, to a behavior management software program called Class Dojo. David and Michael shared many surface characteristics. Both teachers were both male. David taught fourth grade and Michael taught third. While David more clearly identified as a tech-enthusiast, both expressed confidence in relationship to their own ability with technology and spoke about embracing technological tools in their own lives that they then brought into the classroom. Michael had been teaching longer than David (more than ten years as opposed to less than ten years), but neither were brand-new to teaching or identified as veterans.

David had learned about Class Dojo from a colleague and spoke about finding it valuable. As he described,

This year I'm doing Class Dojo for the first time, so that's been new to me. But I really enjoy it. It's made things easier for me just getting in touch, keeping in touch with parents. Sending out classroom messages and keeping parents informed on what we're doing in class more. And it's all available on my computer or on my cell phone. So, setting up parent conferences through that, and just keeping parents more informed and involved in the classroom, that's been huge for me this year.

David noted that in the past he had given out his cell phone number to parents to enable communication, but that approach had drawbacks and this program had the ease of sending a text message without him having to share his private number. David expressed that parent communication

was something that was important to him as a teacher, and that he was looking for ways to manage.

Michael had learned about Class Dojo as part of a general class on educational technology in his master's program. He discussed finding many of the programs he was introduced to in that class valuable, noting that they helped him to do things that he had been trying to figure out how to do, like the RubiStar program that helped him make rubrics for grading. But he responded differently to Class Dojo.

But then as far as the behavior management stuff, I really don't like having kids be called out in front of other people, and you can see this person's in the red and this person's in the green, and it's just like, that's not good, you know? Praise in public and criticize in private or whatever, because when students get anxiety or embarrassment it usually just exacerbates issues. So, I didn't really—and I already have my own things going on, so I don't have a problem with that, so I didn't need to have it solved.

In describing why he didn't take up and use the behavior management program he was presented with in this class, Michael emphasized that it embodied values and practices around behavior that he didn't share, but also, as he noted at the end, that this wasn't something he was looking for a solution around. He felt as though he already had practices in the area of behavior management that worked. Michael's decisions about what to take up or not were grounded in his own sense of purpose, rather than in feeling as though he needed to use something that was suggested by someone else. As he communicates here, that meant he felt comfortable both saying yes and saying no to things as guided by that sense of purpose.

“The tortoise approach”: Comfort with being different

Teachers’ references to their comfort with being different from others in technology use, even as they valued the ideas that others brought to them, often came up in the context of their emphasis on the time it took them to figure out their practice. Simply put, making it your own took time because it involved adjusting and modifying things for your own context rather than simply importing suggestions wholesale. Beth explained this in the context of noting how valuable she found it to get suggestions of new things she could do with educational technology from the technology specialist:

Those are definitely useful. That helps me think about what I could do, and really the limiting, the limiting thing for me is just, I do still have to do a lot of—not a lot, I have to do *some* work to figure out how to do that in my own room, and if I already have something that works, I’m probably going to stick with that for a while, until I have another load lifted in some way and I can devote time to thinking about it more.

As Beth highlighted here, even given a model of use, it took her time to think about what it would look like in her own classroom, and how she might want to use it. As noted previously, teachers might differ in the extent to which they wanted to do more of that thinking before even beginning use, or jump in with trying something and then, as Michael put it, “work out the kinks” as they went.

Another example of making it your own came from Marcy, who taught fifth grade, describing how she reacted to seeing a colleague in grade 1/2 utilizing video and recording technology in the classroom.

She was doing a lot of photos of kids working, a lot of little video interviews. And, at the time I was like, well, yeah, but that seems like a lot of work. And also, why do all that documenting? Are you then creating a bunch of files that you don't need or that don't go anywhere? I already struggle with spatial organization, so, let alone physical, now I've got to deal with digital organization, too. And I also thought there was something [pause] developmentally

necessary versus developmentally maybe inappropriate at first grade versus fifth. So I wasn't doing a lot of recording, watching kids work and recording or photographing or—and then an opportunity came up for us to get iPod Touches, and I didn't have a classroom camera. I was like, let me give it a try. It seems like it's working for her in first grade, I wonder if—what if I decided like one way where it might help me.

Marcy went on to describe figuring out what she felt was a meaningful use of video technology through showing a student who had emotionally shut down videos of times when he was more engaged in learning and helping others, and that visual evidence helping the student get out of a negative psychological space. As she emphasized in the quote above, Marcy felt that the way she saw her colleague using the video technology wasn't exactly right for her own classroom, both because of her own style as a teacher and the age of her students. Yet, she wondered if there was something else valuable she might be able to do with it that she couldn't fully see yet in the present. She was willing to try, open to the idea that there might be something meaningful for her and her students there to discover, but clear that it was not going to be exactly like the model of use she saw in her colleague's work. And, consequently, it took more time for her to figure out what that meaningful use might be for her.

Michael offered a valuable phrase, “the tortoise approach,” for thinking about how he saw the difference between himself and other colleagues in their work with technology. He began by saying that he did sometimes see other teachers doing things, like having classroom websites or using their interactive SMARTBoard more and think that maybe those were things he should be doing. He then explained:

But then I kind of have to take what I'm doing and sometimes I have to figure out how to redesign it or I have to figure out how to plug it in.... I don't get down on myself about it. It's more like I'm going to take the

tortoise approach, so I try to do a few new things every year, rather than try to do seven things, which is just way too overwhelming.

There are two important, and importantly connected, ideas in this quote. The metaphor of the tortoise invokes an idea of time, of speed. Other teachers also directly emphasized the value in taking on fewer things, not feeling as though they had to take up every piece of educational technology that was suggested, and taking the time to think things through and do them in ways that felt meaningful. As Michael conveys in this quote, doing less but being able to focus on it in more depth was something that teachers found valuable throughout their practice, not just in the area of technology. We have seen that, contrary to the way in which teachers who felt like they had to keep up emphasized feeling behind, most teachers expressed that engaging in work with technology that they found meaningful took time partly because that meaning was grounded in the idea of making it their own.

But Michael was prompted to offer this metaphor after talking about seeing his colleagues doing things differently from him in their practice with technology. The tortoise metaphor was also a reflection of his comfort with the divergence between his practices and those of others. It was, fundamentally, a rejection of the pressure to keep up, a rejection of the worry that others may seem to be speeding along ahead of you, an assertion of the value of doing things your own way and in your time.

Conclusion

The past three chapters have illustrated two contrasting orientations to technology in practice. The first was an orientation to technology dominated by a

feeling of needing to keep up with others' ideas of what you should be doing. The second was an orientation driven by one's own sense of purpose. There was a difference in the emotional valence and relationship to teaching and technology that these orientations prompted. Teachers who talked about keeping up were much more likely to identify technology as a source of stress, anxiety, and dissatisfaction. Teachers who emphasized foregrounding purpose were much more likely to talk about finding their practice with technology meaningful and satisfying, even as they saw themselves in a continual process of trying to do things better.

This difference in emotional valence was related to a difference in the descriptions of enacting these two orientations, or in describing what it meant to either try to keep up or to foreground purpose. Teachers described their response to keeping up as either about saying yes to everything (and consequently never feeling in command of anything) or saying no to things that might be valuable, both of which seemed to contribute to a sense of dissatisfaction in practice. In contrast, teachers who spoke about foregrounding purpose described this orientation prompting them to engage in a process of making practice with technology their own, involving intentionally selective use of given technological tools and practices as they felt connected to that underlying sense of purpose.

As this chapter has described, the process of making it your own involved iterating on tools over time and in light of the consequences of actual use, accessing support without prescription, and embracing divergence in practice. It was these three qualities which provided a locus for many of the negative feelings associated with keeping up (teachers thinking they weren't "good" with technology because they needed time to learn, help to do it, and their practice

with technology looked different than others) as well as the yearning for something different, for a more purpose-driven practice. The following chapter more fully explores the need for all teachers to have access to these sustaining elements, in use of technology and teaching more broadly.

7. Embracing Open and Critical: Conclusion and Implications

Conclusion: Being open and critical

I began this work by calling out the problematic discursive binary of teachers as resistant to or compliant with the vision for technology use formulated by others. This study illustrates that, instead of being either resistant or compliant, when teachers foreground their own purposes and engage in making practice with technology their own, they are both open *and* critical towards technology.

Teachers were open to educational technology in terms of being interested in it and looking to it as a potential resource to support their teaching. But this openness was not compliance. Teachers described their openness as driven primarily by excitement about what technology could enable in student understanding, students' interactions with peers and teachers, and students' sense of themselves as learners. Teachers' criticalness towards educational technology was also driven by purpose, specifically caution and concern regarding the kind of thinking invited by digital technology, the limitations of what could be known through technology-mediated teacher-student interactions, and the idea that any given tool would work for all students all of the time. I use the word critical here in its colloquial meaning, as in having concerns about actual and potential negative consequences of specific tools and practices, but also in terms of what has been named a critical perspective on educational technology practice and studies, one that involves questioning underlying cultural assumptions of technological solutionism, thinking about the social context in which both education and technology are embedded, and considering

the kinds of thinking and behavior invited by different tools (Bowers, 1988; Bulfin, Johnson & Bigum, 2015; Selwyn & Facer, 2013).

As explored in the background section, too often the stances of being open and critical are seen as mutually exclusive, rather than interconnected, or mutually constitutive. This is especially true in the area of technology, where the polarization of technophilia and technophobia prompts those offering a critical perspective to declare their general openness while cautioning about the need for a check on the uncritical enthusiasm and embrace they see more widely (Postman, 1993; Selwyn, 2014). As Neil Selwyn has noted, critical challenges to “the orthodoxy that the educational application of digital technology is an essentially ‘good thing’” continue to prompt feelings of blame and upset (2015, p. 249). Yet one of the first things I was struck by in early stages of coding was the way the teachers of this study were able to hold these two stances together, to take as a given that both would be necessary to the work of teaching. In their descriptions of their thinking and practice, being open and critical flowed inevitably from a use of educational technology that was grounded in their own sense of purpose. This meant that their descriptions of their practice involved an emphasis on selective use of tools (rather than trying to use or do everything) as those tools were valuable to them in the service of their own vision of practice.

As a way of moving into a discussion of the implications of this central finding, I offer one final case study of two teachers, Marcy and Ellen. This case study illustrates two points. First, that the orientation of being open and critical is obscured by a narrow focus on what teachers *do* with technology, on categorizing them by their extent or form of use. Secondly, that the importance of being open and critical is part of why, as researchers and practitioners, we

should be concerned about teachers feeling as though technology is something they need to keep up with, and we should be excited about teachers foregrounding their own sense of purpose in the service of making practice with technology their own.

We have heard Marcy and Ellen's voices throughout this text. Looking at external characteristics, they were at opposite ends of the spectrum regarding the kinds of markers in relationship to technology that are generally used to categorize teachers. Marcy was spoken about by colleagues as someone at the forefront of technology use in the school. Ellen said explicitly that she knew others saw her as flustered by technology, even though she challenged the simplicity of this assessment. Yet, there was tremendous overlap in the expression of their orientation to technology, in the way they foregrounded their own sense of purpose and spoke about that sense of purpose informing their excitement and concern about the impact of technology on teaching and learning.

Marcy and Ellen were also the two teachers who most expressed what cultural theorist Stuart Hall (1980) would describe as an oppositional position in relationship to cultural discourse on teachers and technology. They explicitly named elements of that discourse and asserted that their own values and sense of reality were different. We saw this in Marcy calling out the suggestion that students need devices to be motivated, and Ellen's critique of the reification of coding as necessary for preparation for life. Relatedly, they were also articulate about and confident in their own professional knowledge and expertise as teachers. Marcy spoke about her decision to pursue training as a literacy specialist while continuing to work as a classroom teacher, and how that training informed her sense that she could say what was wrong with something like the

district-mandated reading screener that she did not feel was a meaningful reflection of students' reading. Ellen related an experience where her frustrations with the district science curriculum prompted her to put it aside and generate her own curriculum, confident in her ability to both identify those ideas most important for students to know and the activities that would help them learn.

Yet Ellen expressed a vulnerability and an isolation in her relationship to technology that Marcy did not. She told me that she felt others did not share her concerns with the way that market forces operated in a pernicious manner to create a sense of need for technological products in schools. But we have seen Marcy express this same concern in noting that teachers are often "marketed to" around technology and how that prompted a lot of her caution about uptake of new tools. Marcy, along with other teachers, expressed concerns about the kind of thinking invited and the limitations of what could be known about student understanding in use of computer-based assessments in math and reading, often prompting her to adjust the way in which she was using them. Regarding the new online platform for the state's high-stakes standard assessments, Ellen said,

I have **violently**, I was furious, I was so angry when I took the reading tests, because I thought, they're asking people to do things that no good reader would ever do, they are focusing on things that have nothing to do with good reading.

As this quote reflects, the specific critique of the technological tool regarding both its ability to reflect student understanding and the kind of thinking it invites was shared between Ellen and Marcy. But the affective expression of that critique was different.

Ellen described herself as a "fierce Luddite," a term often used colloquially to connote, and dismiss, someone as resistant to technological

change. Yet the actual history of the Luddites and their decision to physically destroy mechanical looms is an example of principled resistance by craftspeople based on clear and stringent analysis of the impact of a new technology on the conditions and substance of their work (Noble, 1983). In the realm of teaching practice, this concept of principled resistance is essentially resistance with purpose (Santoro & Cain, 2018), rather than the resistance that is parallel to compliance, the failure to act that parallels acting without intent. I do not know whether Ellen was using the term colloquially or in its specific historical meaning. My guess is the former, even though her perspective and experiences resonate so strongly with the latter. After our interview, I was moved to send her a copy of David Noble's article on the Luddites and their historical and present meaning. I felt the need to try and validate her perspective because of the ways she conveyed vulnerability alongside the strength of her critique of educational technology. As she said directly at one point, "I'm someone who's very rebellious and independent, and I'm also super anxious about doing what I'm supposed to do."

It matters that in the quote referenced above about the reading assessments, Ellen had begun by offering the idea of generational difference as explanation for why she might think and feel differently than others about educational technology ("Maybe it's a generational thing..."), and then pivoted to an expression of anger—in this case about the kind of thinking invited by a computer-based assessment and the limitations of its ability to reflect the substance of student understanding. While this anger seemed painful and isolating for the person experiencing it, I also want to leave room for it here. I am angry, too. I am angry about the substantive concerns that drive Ellen's critique,

about the way educational technology can be used to forward a circumscribed conception of learning and the purpose of schooling. But I am also angry about the discourse which contributes to teachers like Ellen feeling isolated and vulnerable in their critique, to older and more experienced teachers feeling as though they do not have things to contribute to a discussion about technology and its educational implications. Perhaps, if there was more room for this critique, there would be less need for the anger.

We saw the specter of generational difference as explanation for differences in technology use—and prompt to feeling the need to “keep up”—contributing to Pam and Jean’s ideas that they weren’t “good” with technology. In addition to the critiques of the “digital native” construct noted in the background section, research has found a mixed relationship between teachers’ experience and extent of technology integration (Liu, Ritzhaupt, Dawon, & Barron, 2017), as well as teachers’ age and relationship to pedagogical change and innovation more broadly (Huberman, 1993). While I did not engage in the kind of research that would enable me to make generalizations about the factors that might prompt teachers to one orientation to technology rather than another, I do want to note that, of the four people I spoke with who had been teaching for more than 20 years, two (Jean and Pam) expressed an orientation to technology dominated by keeping up and two (Ellen and Obi) expressed an orientation characterized by foregrounding purpose. But it seems likely that the feelings of vulnerability associated with teachers’ age (Evans, 1996) might make some older teachers more susceptible to the narrative of keeping up, and it is those feelings of vulnerability with which we should be concerned.

Ellen and Marcy were both open *and* critical in their orientation to technology. Ellen led with critique but was importantly open. Marcy led with openness but was importantly critical. I want to close this case study with Marcy's own reference to the importance of giving all teachers permission to be both open and critical, her argument about what this implies for how to bring teachers into work with technology. She ended the interview reflecting upon the need to create the space for all teachers to think about "where does it make sense for technology to be there and where is technology actually getting in the way—*more invitation and less expectations* (emphasis mine)."

Implications: Making the space for open and critical

How can we do what Marcy suggests—inviting teachers into an open and critical relationship with educational technology rather than demanding or prescribing use? We have seen how the orientation of keeping up could get in the way of being open and critical—as it prompted responses from saying yes to everything and saying no to things that be valuable, and made it harder for teachers to feel entitled to exercise necessary professional judgement and discretion in this area. I think that part of what made teachers' discussions of foregrounding purpose and making it your own less emotionally fraught was the comfortable integration of being open and critical towards technology. In these teachers' accounting, being open and critical was just fundamentally what teaching was.

Theorists across multiple domains would agree with the importance of an open and critical perspective. Philosopher Donna Haraway (1991) reminds us

that fear and worship of technology are both an abdication of responsibility for people to think about how and why machines should be used. Learning theorist Donald Schön (1987), philosopher of technology Ursula Franklin (1999), and organizational theorist Karl Weick (1982) all name education as a representative example of work that is complex, nuanced, and uncertain rather than a system of predictable inputs and outputs, emphasizing the need for situational decisions and judgements that only practitioners can make.

More specifically, research has found that a key condition necessary for the integration of instructional technology to serve meaningfully in forwarding the intellectual and social-emotional growth of students is for teachers to have a knowledgeable, purposeful, and agentic relationship to that process (Di Petta, Woloshyn, & Novak, 2008; Dussel, Ferrante, & Sefton-Green, 2013; Hughes, 2005; Ottenbreit-Leftwich et al., 2010). The stance of being open and critical has been called for in a recent practitioner-facing collection emphasizing supporting teachers in reflecting on “big issues and critical questions” rather than using any given tool or practice (Henderson & Romeo, 2015), as well as a research-facing collection asserting the need for a critical approach in the field (Bulfin, Johnson, & Bigum, 2015). However, I note that both of these collections come from outside of the United States, a reflection of the need for space for this perspective in our country.

While I began this work with a critique of the limitations of dominant approaches to research on teachers and technology in their assumption of purpose and prescription of practice, the findings of this study nevertheless resonate with many of the findings of that body of literature. In addition to the foundational work that teacher beliefs matter to how integration of technology is

enacted (e.g., Ertmer, 1999), recent research has emphasized that if teachers think technology is valuable and important they will use it more (Nelson & Hawk, 2020) and that how teachers think about their teaching overall matters more to their actual practice than the integration of any given technological tool (Hershkovitz & Karni, 2018).

Before moving into some recommendations for how to make the space for an open and critical orientation to technology, I want to emphasize one other thing that teachers said directly that they need to do this work in ways that they find meaningful and satisfying. Teachers expressed wanting tools that work consistently and well. We have seen how technological tools breaking contributed to the painful feelings associated with trying to keep up and seeing oneself as “not good” with technology. Yet, again, this was something that *all* teachers expressed. It is unreasonable to expect teachers to take up and use tools when they are worried the tool might stop working. As the teachers of this study highlighted, this is disruptive to student learning and frustrating to efforts to use technology as teachers might want (Derban & O’Neill, 2018). Unreliable and disappointing tools undermine the promise of educational technology to support teaching and learning and invite frustration and demoralization in relationship to technology.

In thinking about what makes the space for an open and critical orientation to technology, I want to spend a bit more time with the three elements that teachers described as essential aspects of the process of making it their own: iteration (especially over time), support, and divergence. These are the elements that the feeling of needing to keep up reframed and reinterpreted as personal failings or reflections of inadequacy, with teachers expressing that they

felt they were doing something wrong because it took them time to learn, they needed support to do so, and their practice with technology looked different from others. That is, there is something about the discourse that invites “keeping up” that can get in the way of making use of iteration, support, and divergence. Further, while there is plenty of other research in support of the role these sustaining elements play in meaningful teaching more broadly, there are also contextual factors within the field of education that push against teachers accessing them.

Teachers expressed wanting the time to reflect and iterate, to refine their practice with technology over time, to do fewer things in depth rather than many things superficially. The importance of this desire is well supported by research on meaningful teaching practice (Cohen, 2011; Lampert, 2001; Schön, 1987), as well as specific work with technology (Francom, 2020; HersHKovitz & Kami, 2018). Yet, Fullan (2016) and Kennedy (2010) have emphasized how the institutional and cognitive drain of reform turnover makes it harder for teachers to have the time to think through and iterate on their practice, to do a few things in depth rather than having to manage many different things.

As many teachers described, this pressure of limited time contributed to the problem of discussions about technology remaining at the instrumental level, with a focus on “what works” and how to do it. When this happens, there is little space for teachers to do the necessary work of engaging with questions of why they should, or should not, use educational technology, to engage with deeper questions of purpose (Bowers, 1988; Sewlyn & Facer, 2013). When reforms become something else to do, rather than an opportunity to think deeply about the underlying purpose, something is lost. We can see this in examples like

learner-centered pedagogy becoming “do centers” (Cuban, 1984) or attempts to teach math in constructivist ways becoming “use manipulatives” (Cohen, 1988, 1990; Spillane & Zeuli, 1999). Other work has called attention to the failure of reform efforts that proceed through telling teachers to “do this” in ways that only allow for relationships of compliance and resistance, and instead emphasized the importance of teachers having the time and space to make meaning of change and enact practices in conjunction with their own contextual needs and values (Coburn, 2003; Fullan, 2016; Richardson & Placier, 2001; Spillane, 2004; Tyack & Cuban, 1995). These ideas about reform presume a different kind of relationship between teachers and their practice, one in which continual reflection, judgment, and decision-making about both the means and ends of teaching in response to unique, messy, and ambiguous situations is both required and desired.

Teachers expressed wanting ongoing learning experiences around technology that responded to their specific needs and context, that enabled them to learn things that were valuable to them, qualities that are consistent with meaningful teacher learning across domains (Ball & Cohen, 1999; Putnam & Borko, 2000; Shulman, 2004), as well as in the area of educational technology specifically (Derban & O’Neill, 2018; Karlin, Ottenbreit-Leftwich, Ozogul, & Liao, 2018). However, there has been a historical tension between teachers accessing support and embracing divergence. Teachers have often taken isolation as the cost of autonomy (Lortie, 1975), yet this isolation has been detrimental to meaningful educational change and improvement (Mehta, 2013).

Schön (1987) has illustrated that is when we feel pressure to replicate others’ practices, to be just like them rather than make the practice our own, that we are least likely to learn from them. Teachers need to feel connected to one

another in ways that don't threaten their sense of autonomy. As foundational learning theorists John Dewey (1900) and Friedrich Froebel (1887) have illuminated, others play an invaluable role in our process of becoming ourselves. We need others to help us understand that being self-determined is part of the goal of development, to give us models that help us better articulate what we want, to give us language and experiences to help us understand what we are thinking and feeling but can't express yet, to broaden our perspective and open us up to possibilities we haven't considered. Throughout this work I have emphasized the importance of teacher agency and autonomy in thinking and practice about educational technology, but the expression of agency is not about release from needing other people. It is about finding different ways to need other people, where their ideas, knowledge, and experience contribute to (rather than replace) the development of your own. The teachers of this study expressed a desire for connection without a loss of autonomy. One of the questions I was asked most frequently at the end of interviews was what other teachers had said, how other teachers were thinking about these things.

Making the space for iteration, support, and divergence requires a different kind of discourse around teachers and technology, one which neither presumes purposes nor prescribes practices, but rather offers these up as substantive questions for teachers to engage with and explore. Fundamentally, I am concerned with protecting against educational technology operating as one more thing that teachers are being told to do. There is danger here because of the consequences for teachers, but also the consequences for the potential of technology to play a role in meaningful educational work. Inviting teachers into an open and critical orientation is one way to do this.

Appendix

Appendix A. Interview Protocol

Interview Protocol-Part 1

Introduction: *I am really interested in hearing from you about how you think and feel about educational technology, about how you make decisions regarding what to use and why, about what is important to you in teaching and learning. I know that when I was a teacher, it sometimes felt as though we were being told to use technology in certain ways, but there wasn't much space to talk about why or what we really thought. I know that isn't everyone's experience, but in looking at research on this topic, it feels like there needs to be more room given for teachers to talk about what they actually think and feel. I am just really interested in gaining a better understanding of how teachers actually orient to technology in their classrooms, and I appreciate your talking with me to help me understand that.*

Tell me a little about yourself as a teacher.

- What are the parts of teaching that you find meaningful or exciting? What are the parts of teaching that you might find frustrating or difficult?
- In all the different things you have to weigh and consider as a teacher, what is most important for you for your students to learn? What would you be most proud of them being able to do at the end of the year?

Think about your most recent day in the classroom (today, yesterday, etc.). Tell me about a decision that you made during, or in preparation for, that day of teaching (or particular lesson).

- What kinds of things did you consider?
- How do you feel about that decision in retrospect?

I'm going to shift now to talking a bit more about educational technology specifically.

When I say the phrase educational technology, what does that mean to you? What things come to mind?

- What feelings do you associate with that phrase?
- What words do you associate with that phrase?
- What tools do you associate with that phrase?
- What practices do you associate with that phrase?

- How is educational technology related to learning?

Tell me about the kind of infrastructure around educational technology that exists at your school. Are there committees? Specialists? Professional development?

- In what ways do you interact with this infrastructure?
- How do you experience its impact on your practice or how you think about your practice?
- Are there opportunities for you to learn about technology and using technology in the classroom? What do those opportunities look like?

Have there been any initiatives around educational technology during your teaching career, at this school or others? If so, what did that look like?

- What messages were conveyed about what you should be doing and why?
- What impact did or didn't this initiative have on your classroom practice?
- If you had gotten to design the initiative, what would you have done differently? Why?

I asked you to bring in some kind of example of the messages that you encounter in your school or district regarding what you should do with educational technology and why. Tell me about the example you brought in.

- Where did you encounter it?
- What do you think it is saying?
- If you got to talk back to it directly, what would you say?

Can you remember how educational technology was talked about in other environments you have been in? For example, your teacher education program or new teacher induction program.

- Were their classes about technology?
- How was technology talked about in relation to learning?
- How was the importance of technology talked about?
- What do you feel you learned about technology in those settings?
- Were there differences amongst the settings you have been in in relation to how technology is talked about?
- Are any of the ideas from those settings things you still think about in relation to your teaching? In what ways?

I want to understand how colleagues and administration, how the culture around you, plays a role in your decision making around technology.

In general, do you tend to do things similarly or differently than your colleagues?

- How would it effect you if a colleague was doing something totally different in their classroom than you were?
- If you can think of a time when you chose to do something different than the norm of what was being done or expected, what prompted you to make that decision? What kinds of things were important to you?

In general, how important is it to you what the school and district administration tell you to do?

- Can you think of a time when the administration told you to do something that you disagreed with? What was what it? Why did you disagree? What did you do?

Can you think of any specific moment or experience that has made an impact on how you think and feel about educational technology? It might have occurred either at school or outside of school, and been something you did or an interaction that you had with another person or a technological tool.

- Tell me about that moment. What happened?
- What did it make you think or feel?
- Why do you think that moment was significant to you?

Thank you so much for your time. Today we've talked about you as a teacher in general, your beliefs and practices, as well as how you've experienced educational technology being understood and defined in the various environments you've worked in. You've emphasized _____. Is there anything more you want to say about that that I haven't asked you about?

Next time I would love to understand more specifics about your practice, how you make decisions around educational technology and the kinds of things you consider valuable.

Interview Protocol-Part 2

Introduction: *When we spoke the other day, you helped me understand how you think about your teaching in general, including the relation of that thinking to what you hear from colleagues and administrators. You also spoke to me about how you have experienced the ways educational technology is defined and understood in environments you have been a part of. Today I wanted to get into some more specifics about how you think about using technology in the classroom, the kinds of decisions you make, and why you make those decisions and not others. I asked you to bring in an artifact that is reflective of how you think about using technology in the classroom. Let's start by talking about that artifact.*

Tell me about the artifact that you brought in.

- Tell me more about the class/lesson/project that produced this artifact.
- What does it show? About you? About how you think about technology? About student learning?
- Do you consider this artifact to be typical of your classroom practice, or not? Why?

Tell me about a recent class/activity/lesson where you chose NOT to use some kind of educational technology.

- Why did you make that choice?
- What was important to you in that lesson?
- How did you understand what the students should learn?
- What did you think were the best methods to enable that learning?
- Was that lesson typical or atypical for you? Why?
- How do you feel about those decisions in retrospect?

Who do you talk to about using educational technology? Give me an example of a time when you sought that person(s) out. What did you want to talk with them about?

- What did you say?
- What did they say?
- What did you feel you got out of that conversation?

In an ideal world, where you could do anything you wanted in whatever way you wanted, what might your use of technology in the classroom look like?

- Would it be any different from your current use? How?
- What kinds of resources or experiences would help you be able to realize that ideal? Materials? Learning experiences? Types of control?

Thank you for talking through your thinking with me. You've emphasized that _____, _____, and _____ were important to you about the students' learning, and that you felt integrating technology afforded opportunities to _____ and _____, but made _____ more difficult. Is there anything else you would like to tell me about how you think about using technology in the classroom?

Appendix B. Coding Tables

Figure 1. Initial coding structure, initial subset of five interviews

<p><u>Pair 1</u> Open</p> <ul style="list-style-type: none"> • Confident • Willing to try • Problem-solving • Curious <p>Critical</p> <ul style="list-style-type: none"> • Cautious • Skeptical • Concerned <p><u>Pair 2</u> Needing from others</p> <ul style="list-style-type: none"> • Seeking out assistance • Knowing about possibilities • Valuing curation <p>Asserting the Self</p> <ul style="list-style-type: none"> • Asserting expertise as teacher • Exercising professional discretion • Acting independently 	<p><u>Pair 3</u> Principled</p> <ul style="list-style-type: none"> • Excited by what technology enables • Concerned about consequences <p>Pragmatic</p> <ul style="list-style-type: none"> • Excited by what technology enables • Concerned about consequences <p><u>Pair 4</u> Aspirational Frustrated</p> <ul style="list-style-type: none"> • Angry • Operating in a system of limited resources • Limited by time
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Figure 2. Revised coding structure, full sample

Part 1- <i>General Orientation</i>	Part 2- <i>Specific Considerations</i>
<p>Open</p> <ul style="list-style-type: none"> • Excited • Curious • Willing to try <p>Critical</p> <ul style="list-style-type: none"> • Cautious • Concerned • Skeptical of claims of others • Thinking about social context • Rejecting one solution <p>Open & Critical (Iterative)</p> <ul style="list-style-type: none"> • Emergent purpose • Making the right match • Considering actual use <p>Keeping Up Solving Problems of Practice</p>	<p>Principled</p> <ul style="list-style-type: none"> • Searching for meaning • The substance of learning <ul style="list-style-type: none"> ○ Supporting understanding ○ Enabling expression ○ The kinds of thinking invited • Interactions around work <ul style="list-style-type: none"> ○ With peers ○ With teachers <ul style="list-style-type: none"> ▪ Feedback mechanisms ▪ Getting a sense of what students know • Relationship to learning <ul style="list-style-type: none"> ○ Sense of ownership ○ Sense of independence ○ Relationship to not knowing <p>Pragmatic</p> <ul style="list-style-type: none"> • Tools <ul style="list-style-type: none"> ○ Ease of use ○ When things don't work • Manageability <ul style="list-style-type: none"> ○ In the classroom ○ In preparation and planning • Time <ul style="list-style-type: none"> ○ Start-up costs <ul style="list-style-type: none"> ▪ Teachers ▪ Students ○ Thinking things through ○ Multiple demands <p>Troubling the distinction</p> <ul style="list-style-type: none"> ○ Preparation for the world as it is ○ Capitalizing on student interest ○ Engagement <p>Principled & Pragmatic (Simultaneous)</p>

<p>Part 3-Negotiating in Context</p> <p>Asserting the self</p> <ul style="list-style-type: none"> • Based on knowledge of students • Based on knowledge of content • Based on knowledge of pedagogy <p>Needing from others</p> <ul style="list-style-type: none"> • Getting ideas <ul style="list-style-type: none"> ○ Valuing curation ○ Seeing possibilities • Learning how to do it • Ongoing support <p>Self & Others (Integrated)</p> <ul style="list-style-type: none"> • Making it your own <p>Making the right match</p>	<p>Part 4-What Teachers Want</p> <ul style="list-style-type: none"> • To be able to say no • Support <ul style="list-style-type: none"> ○ Initial ○ Ongoing ○ Differentiated • Time • Resources • Opportunities to share <ul style="list-style-type: none"> ○ Seeing what's out there ○ Talking things through with colleagues
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Figure 3. Second revised coding structure, full sample

<p>Part 1.</p> <p>General orientations</p> <ul style="list-style-type: none"> • Foregrounding purpose • Experiencing excitement • Being cautious • Rejecting technological solutionism • Willing to try • Iterating on practice <p>Keeping Up vs. Solving Problems of Practice</p>
<p>Part 2.</p> <p>Specific considerations</p> <ul style="list-style-type: none"> • Thinking about students in the classroom <ul style="list-style-type: none"> ○ Understanding ○ Engagement ○ Interactions ○ Relationship to learning • Thinking about their work as teachers <ul style="list-style-type: none"> ○ Manageability ○ Time • Thinking about the world beyond the classroom <ul style="list-style-type: none"> ○ Preparation ○ Equity
<p>Part 3.</p> <p>Context</p> <ul style="list-style-type: none"> • Tools • Others <ul style="list-style-type: none"> ○ Getting ideas ○ Learning how to do it ○ Making it your own • Discourse

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