Teaching with Technology

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Policy Reform and Professional Labor in the Digital Age

Tomi Koljonen

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Abstract

Despite the unpredictable consequences of technological change on professional work, varied stakeholders increasingly expect professionals to adopt new technologies in their work practices. These demands can further become inscribed in public policy reforms. How do such technology-related policy reforms shape professional work? And how do professionals navigate the pressures of these reforms? To understand these questions, I studied technological policy reform in the Finnish educational system during the 2010s. I leverage insights from a 16-month ethnographic study of Finnish schoolteachers, extensive archival materials, and interviews with field participants.

  In the first essay, I draw on my ethnographic fieldwork to understand how organizations balance professional autonomy and managerial control during technology alignment. My findings suggest that an intra-professional division of labor—specialization of work tasks within a given professional community—might allow organizations an alternative pathway to navigating technological change as a middle ground between unfettered professional autonomy and strong managerial control.

  In the second essay, I examine the field-level dynamics of technological policy reform: how can professions reclaim autonomy over technological choices amidst stakeholder demands of technology adoption? My analysis shows that teachers and supportive stakeholders then engaged in the process of relational deconstruction, a coalescence of varied actors around critical narratives about the technology reform. Following this contentious period, educational stakeholders negotiated technological resettlement, which accommodated teachers' and their stakeholders' demands.

  In the third and final essay, I return to my ethnographic data to understand workers' experiences at the receiving end of educational policy reforms. I focus on how members of occupational sub-groups navigate occupational inequality in the workplace. Drawing on the literature on identity work, I find they engage in three identity narratives to cope with occupational inequality. However, a labor process reading of these findings shows these very same narratives also engage workers in "games," which contribute to the organizational and institutional system producing their experiences of inequality.

  Altogether, my dissertation contributes to understanding how technological change alters professional labor in the digital era. Overall, this research proposes that scholars of work, technology, and professions pay renewed attention to who is involved in these technological alterations, whose interests they serve, whose not, and how their consequences are distributed.

Acknowledgments

It takes a village to raise a child. I believe academic work—and ethnographic research in particular—is still mistakenly seen as embodied in great individuals with magnificent ideas. This myth could not be further from the truth. On the verge of academic adulthood, it is remarkable to reflect on all the people who helped me carry out the research I present in this dissertation. More importantly, you have had a lasting influence on me as a person in the last five years. Thank you.

First and foremost, I want to thank my dissertation chair, Nina Granqvist. I remember talking to you for the first time for an exercise where we had to interview one of our department's doctoral alumni and learn about their dissertation process. This meeting was the beginning of a mentoring relationship that has inspired my research and how I approach academic work. First, you have influenced my research through extensive reading and commenting on my writing. I have appreciated your kind but incisive comments, which have always pushed my work forwards. Second, since telling me the story of your doctoral studies, I have learned (or tried) to follow your advice of trusting the inductive, qualitative research process. I am grateful that your role grew during my dissertation process and look forward to collaborating in one way or another. Thank you, Nina!

I also appreciate the work of my committee members, Olli-Pekka Kauppila and Eero Vaara. OP, thank you for believing in me and taking me in as a student and research assistant in 2017. Your advice helped me take the initiative and develop confidence early on in my doctoral journey. Your insights and guidance were invaluable as I started to pursue a research career. I also learned a lot from the teaching opportunities you gave me. Eero, thank you for taking the time to guide me during crucial points of my doctoral studies. Your comments and thoughts on my research, papers, and career were always full of wisdom. Your generosity to people, open-mindedness, and passion for organizational scholarship are something I aspire to.

I am also grateful to my pre-examiners, professors Amit Nigam and Callen Anthony, for taking the time to read and engage with my work. It was a great pleasure to receive such insightful feedback from two scholars whose work I love. Thank you, Amit, for also agreeing to serve as my opponent. I look forward to welcoming you to Helsinki and debating my work with you.

I have also been lucky to collaborate with some genuinely amazing co-authors. First, Curtis Chan can only be described as a shadow member of my

The ethnographic part of this dissertation does not happen without my participants. I am indebted to the teachers, staff, and students of Mainland, who allowed me to take part in their working lives for such a long period. I hope that you recognize your world from what I have written. I have followed the wishes of the school faculty and the ethnographic tradition in protecting the anonymity of the school and its members. I wish I could mention you by name, especially those of you who went above and beyond my expectations to help me observe your work and the lives you live and cope with the struggles of fieldwork. You not only helped me become an ethnographer but profoundly shaped me as a researcher and a person. Thank you.

Tomi Koljonen
25th July 2022
Helsinki, Finland

Contents

List of Essays

This doctoral dissertation consists of a summary and the following three essays.

1. Koljonen, T. and Chan, C. K. Aligning Technology and Professional Work with an Intra-Professional Division of Labor: The Case of Teachers at a Finnish School. Unpublished essay.

2. Koljonen, T. Dismantling Digitalization: How Stakeholders and Relational Deconstruction Shape Technological Change in the Professions. Unpublished essay.

3. Koljonen, T. and Koistinen, J. Situated Narratives: Identity Work, Organizational Inequality, and the Labor Process in the Work of Finnish Schoolteachers. Unpublished essay.

1. Introduction

1.1 Preface

"Only a teacher can make the curriculum come alive."
John Dewey, 1901 (as cited in Miettinen, 1990)

Mari arrives at Mainland at 7.15 in the morning[1]. She makes her way to the art teachers' office—a compact space with a few desks and a rich assortment of supplies such as paints, brushes, and canvases organized in windowed cabinets—and sits at her desktop computer. Her first class doesn't start until a couple of hours later, but there's plenty to get done. She first checks her email before starting to plan her afternoon class for eighth graders. Then, Mari logs in to Wilma—software teachers and parents use to communicate with one another—and quickly replies, "Thank you for letting me know," to a parent who has sent a message about their son being sick today. "I try not to spend too much time with this, but the use of Wilma has exploded, "she explains, staring at her screen with a furrowed brow:

> "[The software has] become a world of its own; you can only see the tip of the iceberg from the outside. You should put in your lesson plan, and make notes about your class. You should continuously give personal feedback. If you change the seating arrangement, it's, in theory a student wellbeing matter, you; you should write that down. Tomi, why did you spill that cup of water on your desk? That should be written down!"

Mari then checks out Yammer, the internal social media the school's teachers use to communicate with one another about various issues. She has quite a positive view of the technology—"I don't think anyone wants to go back to the endless email threads we had before"—even if she confesses to sometimes preferring to "solve matters face-to-face [with colleagues], it's often quicker." But she feels the platform supports coordination and communication with colleagues because their varied and autonomous schedules mean "you might go days, or even weeks without seeing someone."

The clock is ticking, and Mari realizes her next class begins in about 10 minutes. I help her carry some supplies to the classroom. I find myself a seat on the left side of the classroom and watch as the 30-strong class of seventh graders enters the room. Mari has turned the classroom document

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[1] Throughout this dissertation, I use pseudonyms—such as Mari or Mainland—to talk about individual participants and the school organization where I conducted my ethnographic study. On occasion, I've modified identifying details to protect the anonymity of my participants.

camera[2] on, showing a hand-drawn seating arrangement. Students are talking with each other as they begin finding their seats, and someone complains, "how do you teachers always care about where we sit?". Mari is doing a roll call and observes that we are still missing a few students. I notice Mari is talking considerably louder than in other situations to make herself audible over the students' chatter. We are five minutes in, and two students arrive late. Mari leaves the front of the class with a couple of quick steps and goes outside the class to meet the students before letting them in. One of them, Henri, sits close to me with a McDonald's mug in his hand and takes a sip of his drink. He is quickly caught by Mari, but Henri just brags with a smile on his face how he "smuggled it in" without her seeing. Mari asks the class to take "a deep breath" (she takes one, at least). She tells the class "we'll work on color theory", which is met by moans from students.

Prompted by Mari, the kids start picking up supplies, grabbing watercolors, brushes, and water mugs. Both the projection screen and camera are on in the front of the class, and Mari begins quizzing some of the colors: two different reds, yellows, and assorted blues. Joel, an energetic student sitting near the middle of the class, guesses one of them right "Prussian [blue]!". Mari is skeptical, asking him, "you cheated?. "No way, I promise," Joel defends but then admits he saw the answer in a friend's notebook. Mari writes the correct answer in her notebook displayed on the document camera. Students are shouting over each other loudly[3].

Meanwhile, Taavi has been attaching his seat to the table using a tape roll he has sourced from the class's cabinets. However, the jig is up. Mari goes over to remove the tapes with a stern look on her face. Suddenly, Henri has sprung up, and he is on the right side of the class holding big piles of yellow paper in both hands. Taavi quickly joins the charade, but Mari breaks them up and returns them to their seats. Then, Jenni, a school aide wearing a beanie and a grey hoodie, comes over to surveil Taavi. Mari comes over to tell Taavi will get a message in Wilma stating he has to bring over replacement tape to the next class "[it has to be] 2cm wide (…) You cannot just use my supplies like that!". By now, many students are working on completing their secondary colors. Karri, another aide with a robust build dressed in a black hoodie and jeans, shepherds Henri back into his place: it is not an easy task as he keeps jumping around and changing directions. Karri settles in front of me, presumably to have a look at Henri and Taavi. Mari asks the students to "take the colors back and start cleaning up" and urges them to "go back to your places." "When we clean up, it means you put the brushes in their place, not all over the place." After a minute of at least some cleaning-like activity, the class follows Karri out of the class.

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Schools are an integral part of society. They are organizations in charge of education—giving our children systemic instruction in selected bodies of

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[2] A document camera, or a digital overhead, is in practice a modern version of the classic overhead projector.

[3] Ethnographers are warned against using terms like loud to describe observed behaviour. What I mean here is extremely loud by standards outside the school world.

knowledge. Meanwhile, schoolteachers are the professionals in charge of the teaching jurisdiction (Abbott, 1988; Lortie, 2002). While Mari is a fictional character[4], the opening vignette captures many of the practices and aspects needed in teachers' work. To perform teaching, teachers must navigate actors such as students and parents, tools like computers, software, and paintbrushes, and concepts such as color theory and student wellbeing. In particular, technology plays a growing role in teachers' work today, providing new opportunities for classroom teaching, student learning and participation, and communications with parents and peers.

However, only looking at teachers' daily work obscures the cultural and institutional arrangements that make their work possible (Eyal, 2013). While Finnish schoolteachers have historically been considered authoritative and autonomous (Sahlberg, 2000; Salo, 2005; Säntti, 2007), the institutional and organizational structures around professional work (Simpson, 1985) are primarily defined by politicians and policymakers. How Mari's work is supposed to be achieved is a matter of educational policy. However, even if the tasks of schools are defined in law, expectations of what schools should do are not exclusively legal but negotiated in workplaces and the public arena (Abbott, 1988). In Finland—just like everywhere else—educational policy reforms are often highly contested, with many actors seeking to define the means and ends of the educational system (Salminen, 2012; Simola, 2015; Tyack & Cuban, 1995). Nonetheless, if policymakers and other stakeholders want to reform the practices of schools and teachers, they often introduce new educational policies.

Of course, organizational theorists know these public policy reforms do not directly change organizational practices. A long line of research in organizations and their external environments recognizes that such institutional prescriptions are often ambiguous without explicit compliance rules (Dobbin & Kelly, 2007; Edelman, 1992), relatively easily decoupled from organizational practices (Bidwell, 2001; Meyer & Rowan, 1977), and interpreted, adopted, and contested by powerful, autonomous frontline professionals (Kellogg, 2011, 2012; Lipsky, 1980; Micelotta & Washington, 2013; Zacka, 2017).

This dissertation examines this latter aspect of public policy implementation in organizations. In particular, I consider what happens when policy reforms regarding professions are related to technology[5]. While academics and practitioners have predicted that technological developments will have drastic consequences for professional work (Bailey & Barley, 2019; Brynjolfsson & McAfee, 2014; Faraj et al., 2018; Susskind & Susskind, 2015), they rarely address how these changes are not only driven by technological change but increasingly prevalent, normative beliefs about the benefits of technology for organizing. However, given how technological progress is

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[4]   The opening vignette is not related to any single teacher, but the field notes and interview excerpts are real.

[5]   In my empirical case, this dissertation, and the literature I discuss, the word technology most often refers to various information and communication, or digital technologies. For example, I do not consider organizational practices, routines, or structures as technologies.

increasingly linked to societal issues and public benefit (Jasanoff & Kim, 2015), I find it reasonable to suggest that policy reforms regarding professionals' technological practices will become more common in the near future.

As my empirical case, I studied recent policy reforms attempting to 'digitalize' teaching and the Finnish educational system during the 2010s. The reforms are exemplified by the new national core for basic education and high school curricula implemented in the fall of 2016 and other policies and programs across the national government. These policies represented a significant departure from prior educational policy because they foregrounded the importance of technology in teaching, made more detailed recommendations about the use of technology than before, and allocated significant financial resources to ICT implementation in schools[6] (Valtioneuvosto, 2017) during a period where educational policy was otherwise characterized by financial austerity (Tervasmäki & Tomperi, 2018).

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[6] 121 million, to be precise.

1.2   Teaching with Technology

Studying the formalization of such beliefs as policy reforms regarding technological change is essential because of two interrelated trends in professional work. First, a wide variety of professional stakeholders now share a strengthening cultural belief in the utility and desirability of technology. Evidence from different fields of social scientific research, including management, sociology, and science, technology and society (STS), all point to a similar trend: professional autonomy regarding technology choices is increasingly tied with other actors' demands. For instance, global and government elites now encourage pro-technology policy and decision-making (Avgerou & Bonina, 2020; Schiølin, 2020). For managers and executives, digital transformation represents "a new normative mindset," promising gains in control and efficiency (Leonardi, 2008; Mazmanian & Beckman, 2018; Petre, 2021; Schildt, 2020, p. 30). Social movements mobilize not only around shared concerns but also new technologies connected to their cause (Dutta et al., 2018; Pacheco et al., 2014). Even professional associations—the actors traditionally responsible for protecting professional interests—now join the choir in demanding experts adopt new technologies at work (Bechky, 2020). On the frontlines, customers demand that professionals incorporate technology in services because they want novel, high-tech services (Beane, 2019). These expectations regarding technological change and implementation cannot be ignored by professionals in organizations whose work is now often complicated with technologies that do not necessarily fit with their traditional everyday work practices (Anteby & Chan, 2018; Pachidi et al., 2021; Pine & Mazmanian, 2017).

Second, social scientific research increasingly depicts a pattern wherein a variety of actors seek to control, redefine, and contest professional jurisdictions through regulation, corporate innovation, and accountability strategies (Galperin, 2020; Huising, 2014; Kellogg, 2011). Professionals are in no way safe from increasing demands regarding accountability, openness, and quantification of organizational practices (Espeland & Sauder, 2007; Heimstädt & Dobusch, 2020; Power, 2021). Unlike the great, 'classical' professions of the past (Parsons, 1939; Wilensky, 1964), not even legal, financial, or medical experts are safe from the scrutiny of external actors, including diligent regulators, reform-minded politicians, and angry clients (Canning & O'Dwyer, 2016; Micelotta & Washington, 2013; Wiedner et al., 2020; Wang et al., 2021). This development has two opposite implications for professions and society. On the one hand, stakeholders can demand improved services and contributions to the common good from professions (Chown, 2020; Kellogg, 2011). On the other, it undermines the very idea of professions as social actors who have the autonomy to enact their values and use their expertise to serve the public in the best way they see fit (Abbott, 1988; Starr, 2017). While this line of research has not been explicitly linked with the study of work and technology, several studies show how forcefully adopted technologies can dramatically alter the nature of occupational work (Anteby & Chan, 2018; Pine & Mazmanian, 2017).

Taken together, increasing attempts to control professional work and the belief in technology as the right way to organize might lead one to

suggest professionals have less autonomy regarding technological change within their jurisdiction. To understand how professionals attempt to navigate such pressures, previous scholarship on work, technology, and professions provides an illuminating starting point.

Professionals' Reactions to Technological Change

To survive and thrive, professions must react to technological changes and their effects on professional jurisdictions. Technological developments may replace existing work tasks (Abbott, 1988; Kahl et al., 2016), provide opportunities for jurisdictional expansion (Burri, 2008; Zetka Jr., 2001), or afford novel work practices (Brayne, 2017; Mackenzie, 2015; Turkle, 2009). Within workplaces, various technologies play a crucial role in experts' daily work (Anthony, 2021; Knorr-Cetina, 1997; Leonardi, 2011), learning practices (Beane, 2019; Orr, 1996), and demarcating work tasks from other professionals (Barley, 1986; Bechky, 2003). According to a well-established stream of research on work, technology, and professions, professional groups make technology choices based on whether or not available tools fit their values and practices (Bailey & Leonardi, 2015; Bechky, 2020). Past research shows how professional reactions to technological change leads to both adoption and non-adoption of new technological affordances in organizations.

Professionals embrace new technological tools to help expand or elevate professional jurisdictions by creating new tasks, enhancing status, and increasing efficiency or creativity (Abbott, 1988; Bailey & Leonardi, 2015; Barley, 1986; Burri, 2008; Furman & Teodoridis, 2020). For example, gastroenterologists were able to wrestle away jurisdiction from surgeons by adopting the surgical scope (Zetka Jr., 2001). Architects embraced digital three-dimensional representations of building projects, enhancing their creativity and collaboration with other professionals (Boland et al., 2007). Many social scientists have delved into computational research methods to develop theories from previously unmanageable sets of textual data (Edelmann et al., 2020).

In other cases, professionals may reject or resist the adoption of new technologies if they interpret them as incompatible with their practices, moral values, or knowledge base (Anteby & Chan, 2018; Bailey & Leonardi, 2015; Bechky, 2020; Christin, 2020; Pachidi et al., 2021; Wiedner et al., 2020; Zuboff, 1988). Previous research has uncovered several strategies professionals may follow in such cases. First, professionals may hive off undesirable tasks related to new technologies to lower-status workers. Hiving off refers to a process where professionals delegate less desirable work tasks to members of other professional groups (Hughes, 1958; Huising, 2015). Barley's seminal study on introducing CT scanners in hospitals is an example of this strategy: radiologists often defer technology-mediated decision-making to lower-status technicians (Barley, 1986). Another study found that pharmacists left most work-intensive and arduous interactions with a dispensing robot to pharmacy assistants (Barrett et al., 2012).

Second, technological rejection includes studies where professionals downright refuse to adopt new technologies in their work. For example, controlled substance experts resisted new analytical techniques because of poor fit with their professional values of task variety and autonomy (Bechky, 2020). Meanwhile, structural engineers rejected automated links and remote work to avoid calculation errors and maintain local domain expertise (Bailey & Leonardi, 2015). Finally, professionals may resist technological change via symbolic action, meaning they decouple use from official demands, pretend to implement technologies while not using them, or minimize contact with them. For instance, journalists and legal professionals have sought to minimize the influence of algorithms with various buffering strategies (Christin, 2017). In another study, account managers acted as if they were ready to collaborate with data scientists and pretended to use new software even when they rarely made use of its suggestions (Pachidi et al., 2021). However, symbolic action and non-engagement might be dangerous strategies for professionals to pursue. The study of account managers found that they eventually lost their jobs because they failed to adapt work practices with technology implementation (Pachidi et al., 2021). A study of airport security personnel showed how workers tried to avoid intense technological surveillance, which only resulted in managers increasing surveillance efforts (Anteby & Chan, 2018).

While the scholarship on work and technology has established over and over again the unpredictability of implementing technology in occupational work practices (Barley, 1986; Leonardi & Barley, 2010), most of the studies summarized above have one constant: within a given occupational community in a given organization, responses to technological change are relatively aligned. Furthermore, this alignment usually results in professionals either accepting or rejecting technology. This is where the findings of my research on Finnish school teachers and their responses and practices following technological policy reforms provide new insights into the work, technology, and professions literature. As I will elaborate in Essay 1, at Mainland, the site of my ethnographic research, teachers did not respond to technological policies as a unified community nor along their subject-group lines. In contrast, a novel, intra-professional division of labor emerged and persisted around technology-related practices. Meanwhile, Essay 2 shows how on the field level, some teachers' and stakeholders initially resisted policy reforms around implementations leading to resettlement about the role of technology in teaching jurisdiction rather than apparent acceptance or rejection of technology in teaching.

Work, Technology, and Professions: Towards a Middle Ground Approach

To understand the findings of my study, we need to pay closer attention to how occupational differences might arise around technological change. In order to do this, I draw on organizational and sociological literature that suggests the

possibility of middle-ground outcomes and heterogeneity in technology implementation in professional work.

Sociological theory does acknowledge the possibility of intra-professional differences. For instance, Bucher and Strauss (1961, p. 326) argued that professions are not homogenous groups but rather "loose amalgamations of segments" patterned around variation in professional values, identities, and interests. Van Maanen and Barley (1984) theorized professions, not as monolithic social groups but as consisting of varied and more local occupational communities. In the seminal System of Professions, Abbot (1988) similarly discussed internal differentiation within professions, even if he mainly considered such differentiation between professional specializations. Concerning technology, organizational theorists have suggested that technological change might be better conceptualized as a continuously negotiated order, rather than an external force that jerks the equilibrium in another direction (Dokko et al., 2012).

For the purposes of my work[7], perhaps the most relevant discussion of professional stratification comes from Eliot Freidson (1984), who proposed it as a response to trends (e.g., working within complex organizations, legal challenges) that might undermine professional autonomy. More precisely, Freidson suggested that two specialized elites were emerging within professions as a response to social and economic change. The first he defined as an administrative elite responsible for working as managers and directors who control and evaluate "rank and file" professionals' work (p. 1). Second, a professional "knowledge elite" based in academic organizations would construct the technical standards utilized by these administrative elites. Altogether, Freidson posited that while these two elites might constrain the average professional's autonomy, they would still help the entire profession maintain autonomy. Freidson's suggestion that professionals may stratify their ranks to protect from external shocks remains thought-provoking.

However, this type of internal stratification thesis has received surprisingly little attention in the work, technology, and professions literature. Heterogeneity in professional work, especially regarding technology, may have been previously underexamined because scholars have typically focused on occupational communities as their unit of analysis. Occupational communities are defined by their shared "values, beliefs, norms and interpretations" about professional actions (Van Maanen and Barley, 1984, p. 303). Membership in collectives is based on the validation of others (Goffman, 1959), and to maintain legitimacy, professionals need to learn how to enact occupational values or risk peer disapproval (Anteby, 2008b; Becker, 1973; Fine, 2007). Occupational values, morals, and enforcement help maintain consensus around what is

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[7] In contrast to Abbott (1988), who depicted technological changes as a force that opened up task juris-dictions to fierce professional competition, Freidson's internal stratification thesis might better describe professions with a relatively settled and legally protected jurisdiction, such as the one's I studied.

normatively acceptable, establish desired ways of being, and construct status hierarchies within work collectives (Anteby, 2010; Lamont, 1992)[8].

Scholarship in communities of practice occasionally discusses technical mastery as a foundation for status and recognition within the occupational community. For instance, craft workers took pride in the minute material differences and embodied practices that separate them from professional peers who work for big corporations (Ocejo 2017). Similarly, Orr's (1996) classic study of copy machine technicians shows how high-status members of an occupational community primarily base their reputation on superior technical expertise. In a recent empirical exception, Howard-Grenville et al. (2017) found that heterogeneity in frames held by different occupational members played a crucial role in introducing green chemistry. Barley's (1986) seminal study on the introduction of CT scanners in radiology departments found differences in how occupational members engaged differently with the new technology.

Two recent studies also show junior professionals may have varied possibilities for building expertise around new technologies. A study of investment bankers and algorithmic technologies found that some bankers partitioned analysis and interpretation of algorithmic outputs across junior and senior roles, while other senior bankers involved junior experts in interpreting analysis (Anthony, 2021). In the partitioning group, these practices led to black boxing technology use and further constrained the junior bankers' development of technological expertise. Beane's (2019) study of robotic surgery showed how surgical trainees suffered from limited opportunities to learn the new technology. This led to select trainees engaging in "shadow learning," which encouraged premature specialization and decreased learning opportunities. All together then, these recent studies imply that within-profession variation in technology use can lead to undesirable organizational and occupational outcomes. Nevertheless, while giving illuminating insights into the competition, distinction, and endogenous change in occupational communities, these studies have not discussed how such intra-professional differences could be beneficial to professionals and their organizations, nor how they might relate to exogenous pressures of technology adoption.

Overall, while the broader occupations literature acknowledges the possibility of within-occupation differences, these insights have not been fully applied to understanding technological change in the professions. Even recently, prominent studies have offered occupational affiliation or occupational community membership to explain experts' technology choices (Bailey & Leonardi, 2015; Bechky, 2020). My study suggests an intra-professional division of labor—specialization of work tasks within a professional community—around technology can offer a compromise between professional autonomy and managerial control in the alignment of new technologies, as they

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[8] Interestingly, recent empirical studies on journalists and scientists find variation in the enactment of professional values both within the workplace and during careers (Evans, 2021; Reid & Ramarajan, 2021), which raises interesting questions about occupations' cultural coherence.

empower pro-technology professionals to pursue new technological expertise without threatening the autonomy and identity of resistant professionals.

1.3   Case and Methods

The Finnish educational system (Figure 1) consists of early childhood education and care, general education, vocational education and training, higher education and research, and adult education. The school system is primarily public[9], and all Finns are by law required to attend school until they are 16 years old. The technological policies and reforms discussed in this paper are mostly but not exclusively related to the general education system, which consists of basic education (years 1-9) and high school (years 10-12). Overall, the national educational system is one of Finland's most central institutions, and the Finnish society expects schools to solve not only educational but social and cultural issues (Simola, 2015).

Schoolteachers are one of the most valued professions in Finnish society. For instance, according to a nationally representative survey published by Suomen Kuvalehti[10], which studied the respect of occupations in Finland, vocational teachers were ranked ninth, special education teachers 11th, subject teachers 12th, and primary school teachers 31st, out of a total of 379 occupations (Lappalainen, 2018)[11]. Most teaching jobs in basic or high school education were thus ranked higher than CEOs, lawyers, academics, or high-ranking military officials. Following the Basic Education Reform, teaching became strongly professionalized beginning in the 1970s, with teacher education moving from teacher seminaries to universities (Simola, 1997). Since then, school principals, basic education, special, and subject teachers have been required to hold a master's degree (Valtioneuvosto, 1998). Teachers' interests are represented by a national labor union, The Trade Union of Education in Finland (OAJ), which has over 116 000 members.

Other key stakeholders in the educational system include bureaucratic organizations, elected officials, teachers, interest groups, citizens, and experts. Beginning with bureaucratic organizations, the highest authority in education is the Ministry of Education and Culture (MINED). The ministry is responsible for planning, outlining, and implementing the educational policy outlined by the national government. Another key institution is the Finnish National Agency for Education (EDUFI), an expert organization working under the ministry. EDUFI is responsible for developing education and training and educational guidelines such as national core curricula. On the local level, cities or municipalities organize general education. Large cities, Helsinki are important actors as they provide education for tens of thousands of students and employ thousands of teachers. Elected officials include the Finnish
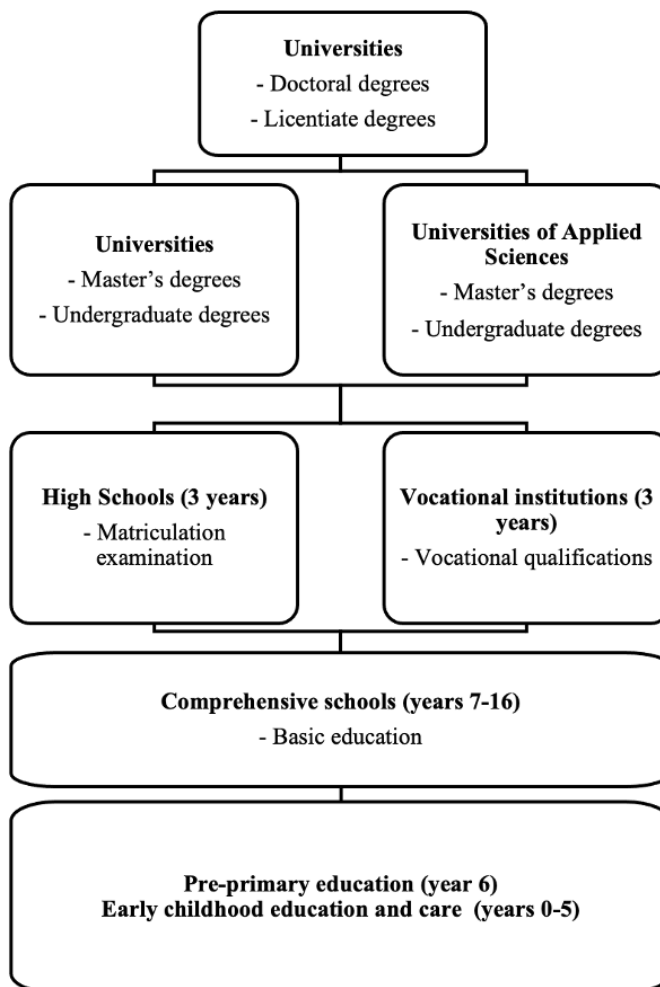
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[9] Most educational providers are public, even if private educational organizations exist on almost all levels of education. Private non-profits (e.g., high schools, universities) are most often publicly funded.

[10] A major Finnish weekly news magazine.

[11] Medical, rescue, police and aviation related professions inhabit the other top ranks.

government, members of the parliament, and local city or municipal council representatives. The ruling government appoints a Minister of Education to lead the educational arm of MINED.

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│     Universities     │   │ Universities of Applied  │
│  - Master's degrees  │   │         Sciences         │
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│ High Schools (3 years)│  │ Vocational institutions  │
│  - Matriculation     │   │        (3 years)         │
│    examination       │   │ - Vocational             │
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│            Pre-primary education (year 6)           │
│    Early childhood education and care (years 0-5)   │
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Figure 1. The Finnish educational system[12].

As a central, national institution, the educational system attracts the attention of a broad selection of interest groups. These include organizations representing industry, parents and families, students, teacher students, and others. Many of these groups are also actively involved in policymaking. Individual citizens play a role in the educational system as participants as students or parents, voting in elections, and participating in public discussion. Finally, numerous actors make claims of expertise in educational manners. These experts include university

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[12] Figure adapted from The Finnish National Agency of Education, 2021. Accessed June 24th 2021 at: https://www.oph.fi/en/education-system

researchers, public intellectuals, or domain experts with knowledge applicable to educational issues.

Technology and Digitalization in the Finnish Educational System

Forms of technological change have been pursued in the Finnish educational system for decades. General mentions of media and technology in the national core curricula date back to 1970 (Säntti, 2020), and the Ministry of Education and Culture established its first ICT strategy in 1995. Yet, the results of those programs have remained minor (Hoikkala & Kiilakoski, 2018), and the long-term effects of technological policies on teachers' work have been modest. In 2013, current teachers reported using fewer ICTs in their daily work compared to 2012 (Sairanen et al., 2014). Another study conducted by the European Commission found that Finnish teachers had less supplemental technology education than their EU peers on average (European Schoolnet, 2013). Overall, in the early 2000s, the use of technology in the Finnish educational system remained low.

Similarly, there was scant high-level political interest in driving educational, technological reform. For instance, the 2007 government program states, "New technology is widely used and the operational capabilities of the remote high school will be improved." (Valtioneuvosto, 2007) without going into any details on how the government plans to reach this goal. While the basic education core curriculum of 2004 did acknowledge the importance of ICTs as phenomena students should understand (Opetushallitus, 2004), any subject-specific recommendations on technology use were still inconsistent and quite scarce. Similarly, the 2011 government of Katainen stated in its program: "The use of information and communication technologies in education will be strengthened" without prioritizing particular technology-related actions above a myriad of other topics included in their summary of educational policy (Valtioneuvosto, 2011).

However, in the early 2010s, the public and policy discourse regarding technology in Finnish schools changed. These new narratives highlighted the need for Finnish schools to update their working methods with increased information and communications technology use. In particular, these claims were based on the belief that schools were out of touch with fast-developing information and communication technologies. Analyses by Finnish scholars of technology and education (Parviainen, 2015; Saari & Säntti, 2018) have in particular pin-pointed a 2010 "National Strategy for ICT in Education" published by the Ministry of Transport and Communications (LVM) as the root source of the pro-technology discourse. This policy document claimed new technologies were vital in producing desired learning outcomes in Finnish schools:

> It is the precondition of preserving Finnish competitiveness and welfare that our comprehensive education produces the best learning achievements in the world. To best support learning we must develop, utilize and apply latest technologies in daily instruction and learning. (Ministry of Transport and Communications, 2010).

Similar to LVM's national strategy, the pro-technology narratives often included idealistic and enthusiastic rhetoric about the possibilities of technology in education (Mertala, 2019; Selwyn, 2016). Most importantly, as both academics and journalists have mentioned, these narratives were highly influential in shaping discourse regarding technology in the teaching jurisdiction. At the same time, counter-narratives were largely missing. For example, when the prominent academic education journal Kasvatus ran a special issue on educational technology, the editors noted they received no submissions representing critical views on the issue (Pirhonen & Häkkinen, 2014). Similarly, a newspaper editorial wondered if anyone dated to challenge the attempts to increase technology use in Finnish schools (Etelä-Suomen Sanomat, 2014).

These new narratives paved the way for broad public policy reforms in the mid-2010s. This technological reform consists of public policy interventions, such as government strategy and various development projects. In particular, new national curricula published in 2014 for basic education and 2015 for high school represented the first time that information and communications technology became a central issue in both basic education and high school curricula (Opetushallitus, 2014, 2015)[13]. The 2014 basic education curriculum described information and communication technology (ICT) as one of seven critical skills taught in Finnish schools. Together, the curricula defined ICTs as crucial to teaching and gave broad recommendations on their use in certain subjects and courses. However, the curricula did not make many recommendations on which specific technologies to use in which situation—leaving teachers and schools a degree of local discretion, even when clearly constraining their autonomy in making technology choices.

My study mainly focuses on what happened next. In this dissertation, I do not attempt to make claims about whether this technological reform has succeeded or not, nor about the degree of implementation across Finnish schools. In what might be a further disappointment to some readers, I have even less to say about whether these reforms can benefit student learning. My methods, ethnography and inductive archival research, are quite poorly suited to answer such questions. However, my study can provide insights regarding other essential questions about this reform—how schoolteachers and their work have been shaped by and shaped these technology-related public policy reforms, and with what consequences to professional work, organizations, and public policy?

Overview of Empirical Data and Research Methods

This dissertation is based on three distinct but related sets of empirical data: ethnographic fieldwork, archival materials, and semi-structured interviews with participants in the field of education in Finland (see Table 1 for a summary). For more details on my methodological approach and ethnographic fieldwork, please refer to the Methodological Appendix.

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[13]   Those interested in the details should refer to Appendix 1, in which I compare ICT guidelines of 2003 and 2015 high school curricula.

Table 1. Overview of Data.

Archival data		
Source	**Role in analysis**	**Amount (pages)**
Government programs 2003-2020	Understanding the role of technology in the national educational strategy	583
National Core Curricula 1985-2019	Understanding the development of educational policy	2162
Parliamentary debates 2015-2019	Understanding the roles of government and opposition in discussing the reform	64
Policy papers of political parties	Understanding the content and change in political parties views on technology and education	1809
Stakeholder reports, policy documents, press releases	Understanding the viewpoints and actions of various stakeholders	3824
Media materials	Understanding the development of public discourse on technology in education, and the technological reform itself	296
Ministry files	Understanding the role of various ministries in driving the reform	5609
Academic research	Exploring academic research on the subject, use as secondary sources, validating interpretations	1215
City files	Understanding how cities approached the technological reform	173
Blog posts and social media	Understanding individual politicians' and experts views	9
OECD files	PISA results	64
		15808 pages
Qualitative field data		
Observations	Understand occupational culture, and organizational, managerial, and professional practices around technology.	Approx. 400 hours
Ethnographic interviews	Understand the subjective experiences and meanings of teachers and other frontline participants.	21 interviews
Semi-structured interviews	Understand the interpretations, frames, and actions of field-level stakeholders.	16 interviews

First, I studied school teachers' work at a Finnish school Mainland for 16 months, beginning in Fall 2018 and ending at the end of 2019. My access to Mainland started with a personal introduction to a school management member and presenting my research design to school faculty. I started my field work in September 2018 and spent around 10 hours a week at Mainland until May 2019. In the fall of 2019, I continued my field work by spending around 5 hours per week at the school. My observations included classroom instruction ranging for grades seven to twelve across a variety of subjects. I also took part in other aspects of school life including teachers' meetings, parent-teacher nights, cafeteria lunches, and coffee in the teachers' lounge. I also attended various school traditions like Independence Day and Christmas parties. I captured my observations by making real-time jottings in my notebook or phone and later wrote down asides, comments, and more detailed field notes (Emerson et al., 1995). In addition, I wrote both descriptive and analytic memos to capture empirical themes to stimulate my emerging theoretical ideas. I complemented my observations with 22 ethnographic interviews with teachers and school staff.

I sampled for range first, attempting to interview actors from various subjects (Small 2009). During my second year of fieldwork, I focused on informants that could elaborate on my emerging theoretical hunches regarding technology use at the school. I returned to my participants for two additional interviews in the Spring of 2021 to refine emerging themes in data analysis. I also gathered various archival materials to support my observational and interview data.

To understand the technological policy reforms on the field level, I collected a unique set of archival materials which cover a period beginning in the 1980s and ending in 2021. These include data from multiple primary archival sources, including government programs, media material, ministry reports and strategies, national core curricula for both basic education and high schools, political parties' programs and policy statements, parliamentary debates, and blog posts by relevant stakeholders. In addition, to further improve my understanding of these field-level dynamics, I conducted 16 semi-structured interviews with policymakers, public servants, policy experts, and executives representing a variety of stakeholders. My sampling strategy was theoretical, based on the stakeholders I had identified as active in the reform process during my analysis of archival data. Due to the Covid-19 pandemic, the interviews were conducted and recorded virtually, with one in-person interview as the exception.

I analyzed my empirical materials by drawing on inductive and abductive traditions of qualitative social scientific research (Charmaz, 2014; Tavory & Timmermans, 2014). In the ethnographic tradition, I attempted to retain my participant's voice and lived experience (Geertz, 1973; Van Maanen, 2011b) while also scrutinizing the data for theoretically meaningful social and cultural patterns of action (Tavory & Timmermans, 2013). I clarify my specific analytical approaches further in each research essay.

Overall, I spent the last three years conducting extensive ethnographic and archival research into how teachers and other educational stakeholders have interpreted, adopted, and shaped these policy reforms. As research in work, technology, and professions would predict, the policy reforms have not played out as planned. What is surprising is how these policy reforms have not played out as planned.

Summary of Contributions

How has schoolteachers' work been shaped by and shaped these technology-related public policy reforms? Insights from my 16-month ethnographic study of Finnish schoolteachers, extensive archival materials, and interviews with field participants help us understand this question. In particular, my analysis of these empirical materials produced two important and counter-intuitive findings.

First, my ethnographic study of schoolteachers' work at Mainland provides an on-the-ground look at how teachers and their managers attempted to align technology with work practices within organizations after the policy reforms. My analysis shows how an intra-professional division of labor—

specialization of work tasks within a given professional community—offers organizations, their managers, and the local professional community a novel pathway to navigating technological change by balancing professional autonomy (Bailey & Leonardi, 2015; Bechky, 2020) and organizational interests (Pachidi et al., 2021; Vallas, 2006). This division of labor supported managers' and certain professionals' enthusiasm about new technological affordances in professional work without undermining professional autonomy and more traditional work practices espoused by other professionals. With this study, I extend our understanding of technology alignment in professional work by positing intra-professional divisions of labor as a middle-ground between managerial and professional approaches (Huising, 2014; Kellogg, 2021). Additionally, this case contributes to the re-emerging literature on power, work, and technology (Leonardi & Barley, 2010; Zuboff, 1988) by theorizing power dynamics amongst managers and professional peers in legitimating technology use. In particular, I elaborate on how managers can navigate technology by implementing a 'soft power' approach, which can help them transcend the class conflicts often associated with technology use in organizations (Vallas, 2006; Zuboff, 1988).

Second, my field-level study of technological policy reforms shows how a variety of stakeholders played a role in constructing and reshaping technological policy in the Finnish teaching jurisdiction. My analysis shows teachers and supportive stakeholders engaged in what I call relational deconstruction, a coalescence of varied actors around critical narratives about the technology reform, which criticized the material, moral, and knowledge assumptions of the reform, casting new policies as a failure. Finally, my analysis shows both pro-technology discourse and educational policy have taken a step back when it comes to technology, leading to a new settlement on the role of technology in the teaching jurisdiction. This study contributes to understanding the field-level dynamics of technological change in the professions (Abbott, 1988; Dokko et al., 2012; Kahl et al., 2016; Nelson & Irwin, 2014) by extending our understanding of how professionals can shape technological change on the field level, and to the relational perspective on professions (Anteby et al., 2016; DiBenigno, 2020; Eyal, 2013; Nigam et al, 2016) by theorizing the role different stakeholders play in shaping the role of technology in professional jurisdictions.

Finally, by drawing again on my ethnographic data, I examine how teachers perform identity work in the context of occupational inequality. This research adds to understanding inequality within occupations (Campero, 2021; Chan & Anteby, 2016) and identity work in organizations (Brown, 2021; Snow & Anderson, 1987) by making two contributions. First, my findings extend our understanding of engaging forms of identity-based control in organizations (Anteby, 2008a) by showing how unequal employees enact occupational commitment and professional identity similarly, or even more so than their privileged colleagues. Second, a labor process interpretation (Burawoy, 1979) of these narratives shows how professional identity work in the context of inequality is also aligned with organizational and institutional ends, suggesting

that professional identity works as a mechanism for the reproduction of occupational inequality.

Outline of the Dissertation

This dissertation consists of three further sections. In Part 2, I provide summaries of my three research essays. Essay 1 examines with the organizational dynamics in the context of the reform, and based on my ethnographic data, shows how different professionals and their managers navigate technology use on the frontlines of the teaching profession. Essay 2 zooms out to the field level, and is based on my archival and interview research. This essay analyzes how professionals can renegotiate professional autonomy after facing demands of technology adoption. Essay 3 takes a further look at the differences between teachers and explores how some professionals navigate experiences of occupational inequality.

In Part 3, I discuss the implications of my research for organizational research and practice. In the methodological appendix, I describe and reflect on my data collection and methodological choices following the ethnographic tradition. Part 4 includes the full research essays.

2. Summaries of Research Essays

Essay 1. Aligning Technology and Professional Work with an Intra-Professional Division of Labor: The Case of Teachers at a Finnish School

  Organizations and their managers often desire to align new technologies to professionals' work, but they depend heavily on professionals to actually utilize such technologies in work practices. Organizations thus face a tension. On the one hand, if professionals are granted extensive autonomy in technology implementation, they may reject new technological possibilities and fail to utilize technological innovations. On the other hand, if managers attempt to coerce professionals into using technology to meet their organizational goals, this may result in resistance and conflict. How can organizations navigate this tension between professional autonomy and managerial control in adopting new technology? Findings from our 16-month study of Finnish schoolteachers indicate that an intra-professional division of labor—specialization of work tasks within a given professional community—can allow organizations, managers, and professionals an alternative strategy to navigating technological adoption. This division of labor supported managers' and certain "reconfigured" professionals' enthusiasm about new technologies in professional work, without undermining professional autonomy and the more traditional work practices espoused by "restrained" professionals. Our analysis suggests that this division of labor emerged and persisted through three processes in particular. First, an intra-professional division of labor began to emerge through the divergence of professionals' frames and practices, which we call a segmentation of professional practices. Second, this division of labor began to persist as both managers and professional peers legitimated such segmentation of work. Third, these practices were reinforced in an ongoing manner, with reconfigured professionals engaging in external-facing roles and restrained professionals hiving-off technology-related work to reconfigured teachers. Our study contributes to scholarship on work, occupations, and technology by showing how an intra-professional division of labor can help managers, professionals, and organizations align technology with professional work practices, and to the literature on power, work, and technology by theorizing the role of managers and professional peers in legitimating technology use.

Essay 2. Dismantling Digitalization: How Stakeholders and Relational Deconstruction Shape Technological Change in the Professions

Professions depend on professional autonomy to make technology choices that fit their goals and practices. However, this autonomy is increasingly constrained by stakeholder expectations and demands regarding technology implementation. How can professions reclaim autonomy over technological choices amidst stakeholder demands of technology adoption? I study this question by conducting an inductive qualitative study of technological policy and reform in the Finnish educational system. Reformist stakeholders were first successful in framing a need for technological change in teaching and gained wide-ranging support for technology-related policy reforms. Yet, when these reforms were implemented, new practices were quickly deemed incompatible by frontline professionals and other professional stakeholders. My analysis shows teachers and supportive stakeholders engaged in the process of relational deconstruction, a coalescence of varied actors around critical narratives about the technology reform, which criticized the material, moral, and knowledge assumptions of the reform, casting new policies as a failure. In the end, reformist discourse diminished, and a new 2019 high school curriculum reinstated a degree of teachers' autonomy. Overall, this case allows me to theorize a novel process by which professionals shape technological change demanded by external stakeholders, and the central role supporting stakeholders play in this process. This study contributes to research on technology, work, and occupations, and the relational perspective on professions.

Essay 3. Situated Narratives: Identity Work, Organizational Inequality, and the Labor Process in the Work of Finnish Schoolteachers

We examine how identity work contributes to the reproduction of organizational inequality. Drawing on narrative and interactionist approaches to identity work, we theorize situated narratives—defined as the patterned, but varied summoning of identity narratives across social situations—play a key role in aligning identity work with organizational inequality. Based on a 16-month ethnography of Finnish schoolteachers' work, we found a group of teachers responded to inequality by enacting three situated narratives: distinct selves, highlighting the value of their work and construction of boundaries; professional selves, emphasizing expertise and collaboration with other teachers; and activist selves, mobilization of grievances and alliance-building aimed at organizational and institutional change. While these narratives enabled teachers to construct identities as valuable professionals, by drawing on labor process theory, we also interpret the enactment of these narratives as games contributing to the school system producing their experiences of inequality, while doing little to improve their marginalized position. Our

findings contribute to research in identity work, identity and control, and organizational inequality.

3. Discussion

The technological policy reforms I studied were introduced with great expectations. Surely, with a political and societal imperative to change, advanced new technology, and increased financial resources, schools and teachers would take "the digital leap" and embrace information and communications technology. However, the reforms have not played out as their proponents intended. Even after significant planning and investment, recent evidence indicates increases in teachers' technological expertise remain modest at best, while student skill levels are stagnant (Tanhua-Piiroinen et al., 2020).

However, it is equally hard to interpret the current situation as a failed attempt at reform. As my ethnography of Mainland shows, some schools have a renewed focus on what they do with technology, and a significant number of teachers are working hard to implement ambitious technological solutions in their teaching. My field-level evidence shows teachers' and their stakeholders' resistance to technology use in schools has not resulted in a broad rejection of the technological policy reform but rather, revisions to policy reforms that might better support teachers' attempts at technology alignment. In the following, I will discuss the theoretical implications of my work (summarized in Table 2), followed by a summary of events that have unfolded around and after my fieldwork, before ending with a discussion of the practical implications of my work.

Table 2. Summary of Essays, Findings, and Contributions.

Source	Essay 1: Aligning Technology and Professional Work with an Intra-Professional Division of Labor: The Case of Teachers at a Finnish School	Essay 2: Dismantling Digitalization: How Stakeholders and Relational Deconstruction Shape Technological Change in the Professions	Essay 3: Situated Narratives: Identity Work, Organizational Inequality, and the Labor Process in the Work of Finnish Schoolteachers
Primary literature	Technology alignment in professional work (Bailey et al., 2022; Barley, 1986)	Professions and technological change (Abbott, 1988; Nelson & Irwin, 2014)	Identity work (Brown, 2015), inequality in organizations (Amis et al., 2020)
Interpretive or secondary literature	Intra-professional heterogeneity (Bucher & Strauss, 1961) Power and technology (Leonardi & Barley, 2010; Zuboff, 1988)	Relational lens on occupations and professions (Anteby et al., 2016; Eyal, 2013)	Labor process theory (Burawoy, 1979)
Data collection and analytical tradition	Ethnography, grounded theory (Charmaz, 2014)	Archival data, interviews, historical process perspective	Ethnography, abductive analysis (Tavory & Timmermans, 2014)

		(Vaara & Lamberg, 2016)	
Key findings	I present how an intra-professional division of labor—specialization of work tasks within a given professional community—emerge and persist through three processes: segmentation, the divergence of professionals' frames and practices; legitimation, the support and acceptance of divergent practices; and the reinforcement of roles around technology use.	My analysis shows teachers and supportive stakeholders engaged in the process of relational deconstruction, a coalescence of varied actors around critical narratives about the technology and technological reform, which criticized the material, moral, and knowledge assumptions of the reform, casting new policies as a failure.	I show how professionals who experience inequality enact three identity narratives: distinct selves, professional selves, and activist selves. However, a labor process interpretation of these narratives shows how professional identity work is also aligned with organizational and institutional ends.
Contributions	The emergence and persistence of an intra-professional division of labor provides organizations, managers, and professionals a novel strategy for navigating technology alignment in professional work	I theorize a novel process—relational deconstruction— by which professionals and their stakeholders can shape technological change in professional jurisdictions.	My study enhances understanding of identity work processes and their consequences in the context of occupational inequality.

3.1 Implications for Theory

3.1.1 Contributions to Work, Technology, and Professions

First, my study advances understanding of technological change in the professions. Scholars have long understood technological change as one of the most critical influences on professional work (Abbott, 1988; Barley, 1986; Leonardi & Barley, 2010). My research extends this literature by revealing the importance of technological divisions of labor within occupations (Essay 1) and highlighting the role of professional stakeholders in how technological change alters professional jurisdictions (Essay 2). With these findings, I intend to contribute to understanding a certain "middle-ground" in how technological change plays out in the professions. Instead of seeing technical developments as external forces that punctuate an equilibrium (Dokko et al., 2012), professional labor in the digital age is characterized by continuous negotiations about the role of technology in professional work within and across workplaces.

Intra-professional divisions of labor provide a new way to understand how organizations attempt to adopt technological affordances while balancing the tension between professional autonomy and managerial control. Previous research has often highlighted how these approaches can potentially harm organizational outcomes. In the case of professional autonomy, such outcomes may include non-adoption or inter-professional conflict (Anthony, 2021; Beane, 2019; Ferlie et al., 2005), while managerial control may encourage class conflict, technology avoidance, and coordination problems (Anteby & Chan, 2018; Pachidi et al., 2021; Pine & Mazmanian, 2017; Vallas, 2006). By providing a middle ground between the two approaches evident in previous literature, my analysis suggests organizations can also use this approach to accommodate divergent interests between professionals. On the end of technology-minded professionals, intra-professional divisions of labor can

allocate resources and rewards, thus empowering them to pursue new technological practices. In the end, for technology-critical professionals, this arrangement can avoid undermining the status and expertise of skilled professionals who place more value on traditional work practices.

In addition, this finding suggests renewed attention to within-occupation differences in technology adoption as an analytically meaningful phenomenon. Scholars in occupations and professions, including those interested in technology, have mostly adopted occupational groups and affiliations as their unit of analysis (Abbott, 1988; Bailey & Leonardi, 2015; Bechky, 2020). While occupational values, practices, and language encourage commonalities between occupational members (Fine, 1996; Van Maanen & Barley, 1984), professions are also social collectives that bind together heterogeneous identities, values, and interests (Bucher & Strauss, 1961). My work suggests that such heterogeneity can become particularly visible and consequential at times of technological change (see also, Howard-Grenville et al. 2017). While previous scholarship has identified intra-professional variation as a barrier to implementing new practices (Kellogg, 2011), my case suggests partitioning new practices within an occupation might be a viable strategy for professionals as they seek to maintain autonomy from managerial control practices.

Moving to a higher level of analysis, this finding also suggests a possible mechanism by which occupations splinter into new sub-groups. Research has long recognized that technological change sometimes produces breakaways, where a group of professionals eventually establish a new occupational group or a new profession (Abbott, 1988). Freidson (1984) suggested that professions react to external change by creating new managerial and knowledge elites. Emerging technologies (Bailey et al., 2022) might provide an opportunity for the emergence of new "technological elites" from within professional ranks. Current examples of these divisions of labor can be found in several contexts. For instance, many researchers have embraced computer science methodology and developed the collective identity of computational social science (Edelmann et al., 2020; Evans & Aceves, 2016). In classical music, most symphony orchestras continue to play canonical pieces by Bach and Mozart, while the musical, aesthetic, and technological boundaries are pushed by a significantly smaller avant-garde community (Räihälä, 2021). Future research might look more closely into field-level dynamics and organizational microfoundations of these divisions of labor. Other researchers might find exciting pathways in following the trajectories of individual professionals who pioneer the use of certain technologies within their profession (cf. Nigam & Dokko, 2019).

Second, my findings contribute to understanding the role of various stakeholders in how technology alters professional jurisdictions. The literature on occupations and professions is increasingly taking a relational turn, which puts increased focus on the role of inter-professional collaboration and coordination, client power, and the role a variety of stakeholders can play in professional work (Anteby et al., 2016; Croidieu & Kim, 2018; Eyal, 2013).

Scholars of technology and organizations are similarly engaging with the idea that new technologies are not "stable entities" but rather "a set of evolving relations" (Bailey et al., 2022). However, to date, these relational dynamics have been rarely extended to understanding field-level technological change in professional jurisdictions (for an exception, see Kahl et al. 2016 for a study on task-integration with other professions as a survival strategy). Thus, while providing illuminating insights on how professions navigate times of technological change (Abbott, 1988; Nelson & Irwin, 2014), previous studies have not highlighted how professional stakeholders, including policymakers, managers, clients, and other audiences, can influence these processes.

The process of relational deconstruction represents a novel response to undesirable technological change in the professions. This process is similar to existing research as it shows that professionals can shape the impact of technological change in their jurisdiction. Prior studies have theorized tactics that experts may more or less successfully use within organizations, such as hiving off, technological rejection, and symbolic action (Barley, 1986; Barrett et al., 2012; Bechky, 2020; Pachidi et al., 2021). However, in the current context, where the value given to technologies by stakeholders is increasing, previously successful tactics may be dangerous as they risk alienating key stakeholders. My findings suggest that in such situations professions can benefit from openly declaring their unhappiness with changes and leveraging the support of key stakeholders (in my case, students and parents, and expert audiences).

However, this theorization comes with a critical boundary condition. In my case, professionals were not able to (nor did they want to) fully reject technology in their jurisdiction, but rather, their and their stakeholders' resistance led to resettlement around how technology relates to professional work. While my research shows how such resettlement was reached after bold attempts at shaping professional work, future research on how professions navigate the macro-level processes (Kahl et al., 2016; Nelson & Irwin, 2014) might want to look more closely at how such technological settlements emerge progressively over a more extended period of time (Baba et al., 2021) and whether and how resettlements might dissolve or transform.

3.1.2   Contributions to Power, Work, and Technology

Power was a central concern in the early seminal studies of work and technology (Thomas, 1994; Zuboff, 1988). After a brief lull in interest (Leonardi & Barley, 2010), scholars are again paying renewed attention to how power relations between workers, managers, and technologies influence organizational processes (Anteby & Chan, 2018; Anthony, 2018; Curchod et al., 2020; Kellogg et al., 2020; Rahman, 2021). My study contributes to this re-emerging literature on power, work, and technology by extending our understanding of power relations between managers and professionals (Essay 1) and the powerful role of professional audiences (Essay 2).

To understand the role of power in my findings, I have drawn on Giddens' conceptualization of power (Giddens, 1979, 1984) which focused on the possibilities of actors to intervene in social practices or influence how others

intervene. More particularly, following Giddens, I adopt an expansive view of who demonstrates power, which means that in addition to attributing power to those higher up in social hierarchies (for instance, in my case, elected officials, policymakers, and educational leaders), one should account for seemingly subordinate actors. With this approach, my study makes two contributions to the study of power, work, and technology.

First, my ethnographic research elaborates on managers' role in aligning technology with professional practices. However, I depart from recent literature, which focuses on class conflict between workers and managers or technology companies (Anteby & Chan, 2018; Curchod et al., 2020; Rahman, 2021; Vallas, 2006). Instead, my findings regarding the persistence of an intra-professional division of labor at Mainland suggest managers can play a more conciliatory role in aligning technology with professional work.

This approach can have two different positive organizational outcomes. First, regarding professionals skeptical of new technologies, a "soft power" approach could negate the threats to status and autonomy that more heavy-handed managerial tactics might incubate (Currie et al., 2012; Kellogg, 2011; Micelotta & Washington, 2013). Second, on the converse, this approach does not limit experts' technological ambitions (Anthony, 2021; Zuboff, 1988). In contrast to surgical trainees who had to engage in shadow learning (Beane 2019), Mainland's technology enthusiasts had the opportunity to go beyond managerial expectations, experimenting with new technologies in teaching.

Second, this study also contributes to recent sociological and organizational scholarship highlighting the multifaceted role professionals' beneficiaries, clients or audiences play in professional work (Anteby & Holm, 2021; Eyal, 2013; Sauder, 2008). However, much of this research has theorized client power as an antagonistic force professionals have to navigate (Calarco, 2020; Karunakaran et al., 2021). For example, Sauder and Espeland (Espeland & Sauder, 2007; Sauder & Espeland, 2009) have shown how the introduction of rankings systems by US News and World has resulted in wholesale changes in law school management and administration. Chan and Hedden (2021) observed that business school career advisors often masked or moderated their values to fit client interests better. A third study showed that professionals often suffer from clients' poor understanding of their work (Vough et al., 2013).

In contrast, my study shows how clients and other stakeholders can intervene in technological developments to the advantage of professionals. In particular, as changes to professional work practices—such as public policy reforms—directly affect how beneficiaries like students, patients, or corporate clients experience professional services, they may mobilize against change initiatives if they are dissatisfied with new work practices. For professionals, this mobilization may allow them to renegotiate the initial change mandate, leading to additional material resources and a more widely shared understanding for their position. This finding extends a recently emerged literature that has previously suggested professional audiences may support professionals by either helping to create new or extend previous professional mandates (Augustine, 2021; Eyal, 2013), or direct participation in expert work (Croidieu

& Kim, 2018; Epstein, 1996) but in contrast, focuses on technological change and the reconfiguration of a pre-existing mandate, rather than mandate emergence or expansion.

3.1.3 Contributions to Occupational Inequality

Occupations are central to understanding inequality and social mobility (Blau & Duncan, 1967; Maria & Grusky, 2005; Weeden, 2002). Recently, similar to the organizational turn in the study of inequality (Acker, 2006; Amis et al., 2020; Tilly, 1999; Tomaskovic-Devey & Avent-Holt, 2019), scholars have begun to interrogate more closely how dynamics within occupations reproduce inequality between groups and individuals (Campero, 2021; Chan & Anteby, 2016; Jenkins, 2020; Martin-Caughey, 2021; Turco, 2010). Even when individuals belong to the same occupation or even hold the same job, they may experience inequality. My study contributes to this literature by focusing on worker experiences of occupational inequality and how they attempt to navigate them (Essay 3). In this essay, I theorized that workers engage with certain identity narratives because they are supported by certain situations made available by the organization they work for. This has two important implications for understanding occupational inequality.

First, while occupational members experienced various inequalities, many opportunities for identity enactment were similar to those of their more privileged colleagues. The experiences of occupational inequality thus did not translate to decreased commitment to the occupation (Becker, 1960; Pratt et al., 2006), but rather, our participants with experiences of inequality enacted work identities that portrayed themselves as expert professionals.

This finding extends identity and control literature (Alvesson & Willmott, 2002; Brown & Coupland, 2005; Kunda, 1992; Thornborrow & Brown, 2009) by adding to our understanding of engaging forms of control (Anteby, 2008b, 2008a). While organizational control based on identity is often met with cynicism and attempts at distancing it (Alvesson & Robertson, 2016; Fleming & Spicer, 2003), our participants voiced perhaps more, not less intense commitments to their occupation when compared with their privileged colleagues. Prior studies have focused less on which organizational members engage in identity-based control (Alvesson & Willmott, 2002) or even suggest that lower-status members of organizations are less likely to engage with them (Kunda, 1992). We suggest that workers who face inequality might be as likely as their more privileged peers to engage with identity-based control mechanisms in professional work contexts.

This leads us to the second contribution: the possibility that identity work can serve as a mechanism for occupational inequality. While prior research has shown how actors succeed or struggle to address inequality with identity work (Fernando et al., 2020; Gray et al., 2018; Monahan & Fisher, 2020), to our knowledge, these studies have not explicitly connected identity work with reproduction of inequality (Amis et al., 2020). Our findings suggest that identity work benefits institutions and organizations through acceptance of

normative control (Barker, 1993; Kunda, 1992) and provides actors opportunities for distinction and action, aligning workers' identity construction with the system defining their unequal positions. To give a more concrete example, our findings suggest that the capability to resist may often serve institutional interests. Previous studies have theorized how workers balance resistance and compliance (Bristow et al., 2017). However, our findings suggest this balancing act may, in many cases, favor the interests of employers and institutions—such as CMS scholars producing articles in desirable journals. We do not mean to imply that workers are engaged in the wrong kind of resistance but highlight how institutions may benefit from resistance tactics by tying them together with the labor process.

3.2 Reform Revisited

Before moving into a short discussion of the practical implications of my research, I want to contextualize my findings by discussing two aspects that readers may have in their minds: the generalizability of my ethnographic findings beyond the context of the case organization, and the possible effects of the ongoing Covid-19 pandemic on technology use in schools.

3.2.1 Intra-Professional Divisions of Labor outside Mainland

My ethnographic research design is, of course, unsuitable for statistical generalizability (Small, 2009). However, a recent report commenced and published by the Finnish Ministry of Culture and Education on ICT use and digitalization following the 2016 policy reforms provides interesting data to compare my findings with. The report examined the digitalization of schools across Finland and was based on surveys and interview data collected between 2017 and 2019 (Tanhua-Piiroinen et al., 2020), corresponding with the timing of my ethnographic study at Mainland fieldwork.

The survey shows that teachers' ICT skills remain highly varied. A group of 10 percent self-reported "major deficiencies in ICT skills" (skill level 1 out of 5) and 53 percent "basic ICT skills" (skill level 2 out of 5). The remaining 37 percent of teachers reported having ICT skills at 3 out of 5 or higher. Twenty-one percent reported, "advanced pedagogical ICT skills" (level 3), 12 percent chose "I am a versatile ICT user, and I provide peer support" (level 4), and 4 percent reported, "I am an ICT expert who shares knowledge and develops community competences" (level 5). Regarding technological specialization, the report showed that 90 percent of schools had implemented the role of digital tutors, showing that managers outside of Mainland also directed available resources to technology-related roles and practices. However, quite surprisingly, the survey does not provide evidence that the digital tutors' work is spilling over to their peers. Between 2017 and 2019, teachers' ICT skills (as objectively evaluated by an ICT exam and as subjectively self-reported) or programming capabilities did not improve statistically significantly.

Altogether, this recent report is relatively consistent with my findings regarding the intra-professional division of labor at Mainland by

showing significant divergence in teachers' engagement with technology. However, as Mainland is a teaching school with high status and visibility, I do not expect it to represent an average Finnish school in terms of technology use. While my study showed teachers were quite evenly split between reconfigured and restrained professionals, the survey data suggest the group of restrained professionals might be more prominent overall. Nonetheless, those interested in the processes underlying the national survey findings might use my study as a lens to explore the more general patterns of technological reform.

3.2.2 Covid-19 and Digitalization in Schools

Only a few months after I finished my ethnographic fieldwork in late 2019, the Covid-19 pandemic disrupted the work of teachers around the world, including in Finland. In March 2020, Finnish schools moved to remote teaching for two months. While schools mostly returned to in-person instruction the following fall, regional responses to the pandemic moved select regions and education levels into remote arrangements during the 2020-2021 school year. Based on my interactions with field participants, I am aware that many participants in the field of education might interpret my findings through the lens of the pandemic. This is why I want to briefly discuss how the pandemic and its influence on technology use in schools might relate to my research findings.

In my discussions with field participants—especially those enthusiastic about the possibilities of technology in teaching—I have often heard schools' use of technology might be a silver lining to the epidemic. For many of these practitioners, the ability of teachers to deliver lectures online is evidence that schools and teachers made the digital leap 'overnight'. They are right in the sense that numerous teachers and schools displayed incredible flexibility at the outset of the pandemic. However, these enthusiastic interpretations gloss over the fact that many schools struggled to implement remote teaching (Sainio et al., 2020) and the adverse student health outcomes experienced during virtual schooling (Hietanen-Peltola et al., 2020). However, the more significant question is whether Covid-19 will have a lasting effect on the use of technology in schools? While this is, of course, an empirical question for future research to answer, I find reasons to be skeptical of Covid-19 encouraging sustained change in teachers' technological teaching practices.

First, while the literature on occupations and professions has focused more on gradual change driven by regulation or technology (Huising, 2014; Nelson & Irwin, 2014) rather than times of crisis, theory does not provide strong support for the idea that sudden external shocks result in lasting changes in professional practices. For example, while Canadian resident physicians and nurses enjoyed temporary status boosts during the SARS pandemic, most did not enjoy lasting benefits from their contributions to fighting the disease, and hospitals reverted to the conventional professional hierarchy post-pandemic (Kent & Dacin, 2022). Other studies indicate that professionals might attempt to navigate times of crisis by focusing on pre-existing institutional and occupational practices rather than pursuing dramatic change (Beunza & Stark, 2003; Wright et al., 2021).

Second, based on my finding that teachers were already segmented in their technology use, I find it hard to see delivering remote lectures adding something to teachers' toolkit that is theoretically different from what was already being done in schools. For sure, many more teachers can now deliver their instruction remotely. Nevertheless, have their technological abilities improved overall? Have their technological choices overall become more ambitious? To use the vocabulary of my ethnographic analysis, I have doubts whether remote teaching has transformed restrained teachers into reconfigured ones. This is a question you can also ask yourself. Has your embrace of Zoom as a technology caused you to think of or use other technologies differently?

Third, various educational stakeholders have contested remote teaching, similar to the initial technological policy reforms. However, concerning remote teaching, the resistance has been even more robust. Politicians, parents, interest groups, and students have been resolutely against continuing remote education after the initial implementation in the Spring of 2020. Even as new waves of the pandemic have hit Finland, decision-makers have primarily continued to keep in-person teaching open, based on various concerns regarding learning, equality, and student mental health. This stance has mostly persisted, even in the face of the Omicron variant which has caused significant amounts of virus infections in schools. The overall consensus seems to be that remote schooling should be, at the most, the last resort. A critical observer might note that if we see technologically mediated teaching and learning in such a negative light, should we not similarly scrutinize all technology use in schools? My overall takeaway from this discussion is that Covid-19 may have made the technological frames used in public discussion more, not less, critical.

Finally, while my data collection primarily took place before the pandemic, my interviews and interactions with field participants indicated that technological enthusiasts, especially digital tutors, continued to bear a heavy responsibility in making virtual learning happen by supporting their peers with technical issues and providing guidance on best remote teaching practices. I do not think it is unreasonable to suggest external shocks such as covid reinforce rather than reintegrate intra-professional divisions of labor around technology. Overall, I would encourage restraint when hypothesizing about how the pandemic has encouraged technology use in schools. On the converse, the negative experiences and critical public discussions around the phenomenon of remote schooling might make technology use in schools not more but less desirable for politicians, professionals, and their clients—students and parents.

3.3 Implications for Practice

My research also offers some insights to practitioners in the field of education. I have no doubt discussions around the role of technology in Finnish schools will continue, even if they are currently on a brief hiatus. Without a doubt, educational policy will also have to address how teachers are expected to use increasing technological possibilities in their work. However, both history

(Hoikkala et al., 2019) and my research show that attempts to change how technology is used within schools are extremely challenging. In the following, I attempt to balance policymakers' and teachers' perspectives and offer recommendations on pursuing future policy regarding technology in schools in a manner that better considers occupational culture and practice.

3.3.1 Implications to Educational Managers

The technological policy reforms have placed educational managers, such as principals or those working in leadership roles for educational organizers, in a challenging situation. From the level of politicians and policymakers, managers have been handed a strong mandate to increase the use of information in technologies. At the level of schools, any attempts to implement this mandate are often challenged by material constraints on the one hand and professional autonomy on the other. At the same time, principals, similar to many of their teachers, are challenged by their education and expertise not focused on understanding technological issues. To these managers, I offer two suggestions on how to navigate technology in education.

First, based on the findings of my ethnographic research, I suggest managers employ 'soft power' in attempting to align institutional expectations of technology implementation with their teachers' work. I suppose that many educational managers already know the need to carefully navigate teachers' autonomy when introducing new work practices in schools. However, I encourage managers to pay special attention to this as they tackle technology questions at schools. When teachers express doubts over the implementation of technology, my data indicate even their most dramatic criticisms come from genuine concerns over student well-being, scientific evidence, and fit with their subject matter. Here, both theory and my own empirical evidence suggest that managers will achieve much better results with such professionals by encouraging incremental change (Kellogg, 2021). Rather than alienating them with control practices, such as accountability, measurement, and forced implementation, that undermine professional autonomy and work motivation (Hallett, 2010; Pine & Mazmanian, 2017), this more subtle approach can encourage professionals to find technological practices that fit their pedagogical philosophy. However, this approach should not be confused with not managing technology use at all. As my findings show, teachers enthusiastic about using technology in their work can benefit immensely from their technology practices' social and material support[14]. Moreover, even if survey research does not yet provide significant support for peer-learning of technology in Finnish schools (Tanhua-Piiroinen et al., 2020), research in communities of practice would indicate that over time, other teachers' technological expertise might spill over to colleagues through collaboration and interaction (Anthony, 2021; Bridwell-Mitchell, 2016; Orr, 1996).

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[14] Whether or not technology should be prioritized over other educational concerns is a much broader issue (Tervasmäki & Tomperi, 2018), which I do not attempt to discuss here.

Second, managers should feel open to drawing on their teachers' technological expertise when considering new initiatives or investments. As professionals who are every day engaged with students and pedagogical practice, teachers are the actors who have the best information on what technical solutions a given school might need. However, managers should also know how delegating technological work within organizations distributes power between subject groups and teachers. I suggest managers not only draw technological input from mathematics and natural science subject groups (which might appear positioned to take charge of technological change) but also accommodate opinions and advice from a broad range of subjects. For instance, my observations showed how teachers from various arts and crafts subjects were often at the forefront of experimenting with new technology in teaching. Technology-related tasks might be distributed consistently to support the work and learning of professionals who are otherwise facing precariousness due to reduced teaching loads. If this is achieved, technology use in schools can become a process that alleviates rather than reifies occupational inequalities between subject groups. For example, while many math teachers are enthusiastic proponents of ICT in schools, in my experience, they rarely struggle to reach their teaching allocation without ICT-related extra-role work.

3.3.2 Implications to Teachers

For teachers, the demand to implement technology in their work practices creates a different problem. On the one hand, the curricula, their managers, and many colleagues expect them to develop new competencies around information and communications technologies. On the other hand, attempting to use these new competencies and technologies in practice is often difficult. In the classroom, even the most straightforward use of technology can become an insurmountable task when combined with 25 students with different personalities, motivations, and skill levels. In my fieldwork, I saw countless examples of technology use—initiated by both teachers and students—disrupting the teaching flow. I find it easy to understand why some teachers are cautious of doing more with technology or have become worn out with the difficulties technology use causes in the classroom. My recommendations to teachers are based on two assumptions I learned from my participants. First, from the technology-minded professionals, I have adopted the belief that students do benefit from learning information technology at school. From the more critical teachers, I have learned the importance of maintaining professional autonomy and critically examining when and how technological affordances support teaching goals.

One of the key risks I see in my data is that technology becomes a fault line between teachers, dividing the occupation into those who are technology-driven and those who are not. To retain a sense of occupational community, I suggest teachers should not make their judgments regarding technology in isolation but collaboration. Those teachers who are more enthusiastic can provide valuable insights to their colleagues. While the value of peer learning may have not yet translated to general increases in ICT capability,

that does not mean it is useless—for instance, both my data and the OPH survey indicate the work of digital tutors is greatly appreciated. However, on the converse, tech-savvy teachers would do well to cultivate a critical mindset and keep in mind that technological choices in teaching should, in most cases, be the means to learning, not the ends. Meanwhile, those who hold more reservations about technology might, in addition to technology-minded professionals, draw on more conservative colleagues' ideas, which might be better suited to classroom implementation. At the same time, I believe they should continue to establish the legitimacy of teacher autonomy and use technology as they best see fit.

3.3.3   Implications to Policymakers and Elected Officials

Without a doubt, educational policymakers will continue to grapple with the question of technology. For policymakers, the challenges of reform are related to balancing political ambitions and expectations with the everyday work of schools. Based on my data, I offer a few suggestions on how to approach technology-related educational policy in the future.

First, I advocate for broader participation in the policymaking process. In my fieldwork with field-level participants with various stakeholders, I was struck by how different policymakers, industry, and research representatives echo similar discourses and are often familiar with one another. As Darius Ornston (2018) writes in his insightful analysis on the strengths and shortcomings of Nordic policymaking, closely knit policy networks can be useful for adaptivity but can also lead to policies that also result in overshooting and overcommitment. The technological policy reforms I have depicted in this dissertation have not been a failure, but they do bear characteristics of overshooting with sped-up implementation and a lack of research evidence for initiatives. For instance, my participants noted how technology-related additions were made at the last minute to educational policies. Archival materials indicate the practical difficulties voiced by teachers after implementation seemed to surprise the political elite, even when research covering weaknesses in teachers' skills and schools' resources was widely available (European Schoolnet & Liège, 2013; Sairanen et al., 2014; Salomaa et al., 2017). I believe such oversights could be alleviated by implementing insights from a broader group of teaching professionals. I find it hard to believe working groups almost solely consisting of technology industry representatives, elite academics (cf. Freidson 1984 on knowledge elites), and educational organizers will produce a view grounded in classroom instruction. Post-reform, teachers who could provide expertise on these issues should be widely available. Likewise, policymaking might benefit from the broader participation of students and parents.

On a similar note, following the recommendations of a recent report by the National Audit Office of Finland (Valtiotalouden tarkastusvirasto, 2020), I advocate for broader, more ambitious inclusion of research evidence in policymaking processes. In addition to technology-driven research in education and psychology—which appeared to dominate pre-reform public discussion and

policymaking—social science research should be drawn on for additional insights on how technology can be purposefully aligned with occupational practices.

Finally, politicians and policymakers would do well to extend their time horizon regarding educational policy regarding technology. Several experienced policymakers mentioned how technological priorities and ambitions vary between governments and ministers, and government bureaucracies lack a clear understanding of the overarching technology strategy and their organizational roles (again, see Valtiotalouden tarkastusvirasto, 2020). As a result, educational policy around technology sometimes appears more driven by short-term projects rather than long-term initiatives. For example, transferring the financial responsibility of the digital tutor initiative from the state to local educational organizers might undermine what was arguably the most successful and popular technology-related policy initiative. To achieve technological change purposeful for societal goals, educational technological policy should be constructed across governments and with a close ear to the experiences and concerns of expert bureaucrats. Most educational reforms fail to achieve meaningful long-term change in classroom instruction (Bidwell, 2001; Tyack & Cuban, 1995). If there is a broad consensus in Finland that technology can be helpful for educational purposes, any change that gets us there will have to be based on carefully implemented policies based on rigorous, multidisciplinary research.

3.4 Conclusion

With my dissertation, I sought to examine how technology-related public policy reforms shape professionals' work. When I embarked on this research journey, I expected to find a relatively straightforward answer to this question. Perhaps teachers would accept the reforms and move collectively toward a more technology-driven professional future. Or, they would primarily resist and reject the technological mandate and continue their work more or less similar to before. However, my research indicates both realities—at least for now—seem to co-exist in a somewhat calm negotiated order.

This research has led me to believe the consequences of technological policy reform are unlikely to end near the end of the acceptance-rejection continuum. As my research shows, such reforms will, by nature, have a high level of ambiguity, which may, in turn, encourage intra-professional differences and reform contestation. In these situations, power relations between professionals, their managers, and field participants will shape the role of technology within organizations and in the professional jurisdiction. Overall, based on these findings, I encourage scholars of technology, work, and occupations not only ask how technology alters professional work, but also, who is involved in these alternations, whose interests such changes serve, who's not, and how their consequences are distributed.

4. Methodological Appendix

Why Study the "Digital Leap"?

Like many ethnographers[15], my research was first guided by broad empirical research interests rather than a specific theoretical agenda. I started my doctoral studies with a vague idea of studying work and technological change. Through coursework, reading, and reflection, I became interested in work, technology, and occupations research. In particular, I remember reading Steve Barley's seminal 1986 article (Barley, 1986, 1990), and being fascinated by his study and writing. I did not know that was the kind of work I could do in this field! I read more in the occupations literature and started to think about how I could study technological change in the professions.

Around this time, I noticed the most influential newspaper in Finland, Helsingin Sanomat, was running many stories on technology in education. Much of this reporting was related to the recent policy reforms regarding technology use in schools. The policy reforms and the broad, government-led technological mandate in education were often referred to as "the digital leap"[16]. I started following this reporting and the accompanying debates on the newspaper's opinion page. Recent technological reforms appeared to have become a contentious issue in the field of education. However, while the discussions captured the different perspectives and sentiments of actors, they did not tell what teachers were doing with this broad technological mandate inside schools and their classrooms. Guided by my new research interests in professions and technology, I decided to explore the messy reality of technological policy reform on the frontline of teaching. After pitching an initial research plan around this phenomenon to my advisors, colleagues, and department faculty and receiving encouraging comments, I decided to do my dissertation research on the phenomenon.

4.1   Access

After I decided to study technological reform in the educational system, I started to have discussions with friends and acquaintances who worked in the field of

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[15]   My methodological appendix is inspired by a long tradition of ethnographic confessionals (Van Maanen, 2011b). One of my key inspirations has been Katherine Turco's excellent appendix at the end of The Conversational Firm (Turco, 2016).

[16] My translation for the Finnish expression "digiloikka".

education. One of them, Emma[17], happened to work at Mainland. After an enjoyable lunch discussion about her work and school, I was intrigued by the school's role as a teaching school, which meant it was a high-status institution in the field of education. I hypothesized that the teachers there would have high professional autonomy while still feeling institutional pressure to translate educational policy to practice. As a scholar interested in occupations, I was also interested in the school's role in socializing new occupational members. Emma also shared her insights on school management, who she described as supportive of research and development activities. She was also kind enough to let me mention her name when I decided to reach out to the school.

My engagement with Mainland began in the Spring of 2018. That is when I met with Mika, one of the school's principals in his office. We talked about his work, Mainland, and some of the general changes ongoing in the field of education. I mentioned that I was looking for an organization where I could do fieldwork, and I might be interested in studying Mainland. Mika was receptive to this idea and invited me to share my research plan with the school leadership. However, when I did so over email, I did not receive a response for a few months. But in August 2018, Mika responded to me, asking if my inquiry was still relevant. I was excited, and we immediately scheduled a time when I could come to the school and present my research to the school faculty in a teachers' meeting.

I went to Mainland in early September 2018 to present my plans for ethnographic research at the school. Looking back at the presentation, I presented my research interests in a very general way, which was probably accurate considering I didn't know what would come out of my fieldwork. While one member of school leadership was inquisitive to know more and asked some pointed questions about what exactly I was going to do, I also remember the teachers did not have almost any questions about my research. I guess for them, my research was just one of a dozen issues that were brought to their attention in the staff meeting.

I remember feeling weird when I walked out of the auditorium. While I had been expecting to celebrate the moment of getting access (Contreras, 2019, p. 161), I found the actual situation somewhat anti-climactic. I realized that the schools' managers had most likely decided to give me access before my presentation—they just hadn't bothered to tell me yet[18]. Moreover, I realized that the hard work of developing and maintaining access had just begun (Cunliffe & Alcadipani, 2016), and I had to win over at least a degree of trust from my participants in practice.

Upon entering the field, I realized I had to figure out how to collect my data and conduct the study. My research was not sponsored by the local university or a larger research project. I had a relatively weak mandate from management, with no formal organizational role or resources to work with. I

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[17] Like other participant names, Emma is a pseudonym. I am immensely grateful for her help in gaining and for her support during the early stages of my field work.

[18] I guess organizational gatekeepers are completely unaware of the grand expectations and meanings ethnographers hold regarding access.

ended up accepting these limitations, and I believe independence from any larger research agenda helped me pursue what I saw as valuable and exciting. Despite the data collection challenges I will soon describe; the managers and staff of Mainland afforded me excellent access to their daily work. I was free to roam the school halls and talk to anyone I wanted to. I had terrific access to classroom instruction, and I doubt many adults have recently seen as many teachers teach as I did in my 16 months in the field. When I joined the teachers for lunch or coffee, they were generally willing to share their feelings, curious to hear about my research, or most commonly, just discussing the comings and goings of everyday life. When managers and staff saw me in parent-teacher meetings, they seemed happy and surprised with what I believe they perceived as a commitment on my part. Overall, I am incredibly grateful for all the time and space my participants gave me. Without their support, I believe this would have been a much less interesting dissertation.

4.2 Fieldwork

4.2.1 Data Collection

I tried my best to go into the field with an open mindset. I intended not only to understand how teachers use technology in the classroom but to gain a broad understanding of the occupation and its culture. In the end, most of this data will be "unused." Nevertheless, I believe approaching the teachers' work with a broad perspective helped me better understand the phenomena I wrote about. Altogether, my ethnographic study of Mainland lasted 16 months, from September 2018 to December 2019. I spent around 10 hours per school week at Mainland during the first academic year of nine months, and after the summer holidays, around 5 hours per week in the fall of 2019. Since I was interested in how teachers use technology, most of my observations are from the classroom. I attended faculty and teacher trainees' classes, across various subjects. In the end, I observed most of the subjects taught at the school and saw dozens of faculty teachers and teacher trainees give instruction.

I also tried my best to understand teachers' work outside the classroom. The general teachers' meetings were an exciting place to observe how school management communicated with the faculty and which teachers had a voice amongst the school faculty. In contrast, smaller meetings provided a more intimate view of how teachers made sense of their work and discussed pedagogical choices amongst faculty and their teacher trainees. Going to parent-teacher meetings helped me observe relations between teachers and parents and how the school communicated its practices to essential stakeholders. Various celebrations such as the Independence Day and Christmas parties not only provided a fascinating window to understanding the schools' traditions but also revealed a more informal side of the professional culture as teachers participated in drama and musical performances. The cafeteria and coffee room were places where I learned more about the lives of teachers' outside the school and had to answer a question or two about my own.

For most of my time at the school, I wrote down ethnographic jottings during my observations. Most of the time, I went the traditional route and took notes with a small notebook and pen. But in other instances, I found technological devices more appropriate for taking notes in a social setting. When students were working with their laptops or PCs in class, I felt it was more appropriate to take field notes using my laptop. After informal interactions such as discussions in the hallway or cafeteria, I often took down jottings with the notes program on my phone. After fieldwork, I refined and elaborated on the jottings and wrote more detailed field notes alongside initial feelings and comments as "asides" (Emerson et al., 1995). When I encountered an interesting event or recognized a broader theme or pattern, I wrote descriptive and analytic memos.

I complimented my observations and field notes with 22 ethnographic interviews with teachers and school staff (Spradley, 1979). At the outset of the study, I sought to interview participants from a variety of subjects, sampling for range (Small, 2009) so that a) I could gain a reasonable understanding of the teacher practices and culture across subjects, b) and to ensure that any emerging findings would not be limited to certain subject groups. My interview questions (please refer to Appendix 2 for interview guides) were initially general and related to themes like teachers' personal career narratives, daily work practices, educational reforms, use of technology, and school culture. Later, I oriented my data collection more around the use of technology and conducted specific interviews with informants who could elaborate on my emerging interests and theoretical ideas. For example, during these interviews, I prodded informants more closely about their interpretations and actions regarding technological reform. In addition, the dozens of informal discussions with teachers at the school helped me understand what I saw in the classroom and outside of it.

Finally, I collected various archival materials better to understand Mainland's institutional and organizational context. These materials mainly consisted of publicly available documents from the school website, associated organizations, and various educational institutions. Occasionally, I asked teachers to share presentations or other materials I had seen them use. I also took photos of presentation slides, assignments written on paper, exam papers, and various other material artifacts I encountered at the school.

4.2.2 Researcher Position

Ethnographers often seek to uphold behavioral standards regarding their interactions, technique, and identity that are impossible to reach (Fine, 1994). I went into the field trying to be someone Fine describes as the "friendly ethnographer" (p. 272), attempting to please my participants and making sure they were not bothered by my research. I think this approach at first seemed natural to me. At almost every school or workplace, I was everyone's friend, a nice guy who attempts to span different social groups. However, after some fieldwork, I realized this would not work at Mainland.

During the initial phases of my fieldwork, I struggled to create rapport with the schools' teachers. I quickly realized my role at the school was non-existent; many teachers barely had an idea someone was doing research at the school. This fieldwork was my first ethnography, and due to my independent role, I was unsure how to get my research going. Luckily, after my research presentation to the school's faculty, a couple of teachers reached out to me, and I was able to get started by setting up a couple of interviews. These helped me immensely in learning more about these people and the school and teachers' work more generally. Crucially, early interactions with these participants also gave me some sense of social belonging at the school.

I then found it natural to start my observations by attending the classes of these early interviewees. Observing someone's class often gave me ideas on who and what to observe next, and I then reached out to further teachers to find out when and where they were teaching. Initially, I was conscientious about making sure teachers were okay with me observing their classes. However, as my fieldwork went on, I realized my observations were not an issue to teachers. They were, after all, very used to teacher trainees coming in and observing their classes. At the end of my fieldwork, I walked into a classroom and settled in the back row. If I didn't know the teacher, I introduced myself afterward.

All ethnographers are likely familiar with the feeling that some participants gravitate towards them, while others consciously maintain a distance[19]. Over time, I developed friendly, if not close, relationships with many participants. I would stop and chat with them if we crossed paths in the hallway, or I would have a few words with them in between classes. At first, these short conversations felt more like research, and I tried to account for them in my field notes, but eventually, I stopped taking notes of these interactions because they felt peripheral to my study. For instance, I once had a long conversation on a field trip with a teacher but decided afterward it felt a little bit too personal to include in my "data." On the converse, many teachers were much less interested in me. No one ever explicitly voiced doubts about my research, but I feel several teachers consciously maintained their distance from my research. To give you an example, I remember an instance where I was interviewing a teacher in the teachers' lounge, and another teacher walked by, asking what we were doing. When they heard we were in the middle of conducting an interview, the teacher quickly retreated and made a joke about not wanting to be on tape. Now individually, this seems like an innocent event, but I could sense similar avoidance throughout my study from this teacher and others. In the end, I don't think these dynamics played an essential role in my findings[20], as I was able to observe these teachers' classes nonetheless. However, I feel it's important to acknowledge many teachers probably did not want to be too involved in this

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[19] In the end, I don't think we really know why some people confide in us (Desmond, 2016), and others don't.

[20] With regards to my research essays, I was able to collect data on 1) both teachers who were more critical and teachers who were more positive about technology, and 2) teachers who experienced occupational inequality and those who did not have such experiences thanks to a more privileged position.

study. There may have also been benefits to this distance, as I did not experience getting caught up in workplace politics or conflicts.

I consciously maintained a distant relationship with the schools' managers. Since the managers gave my access, I did not want the teachers to see me as a consultant or evaluator working for them. In addition, I did not want to have too much contact with them because felt. This approach of course meant trade-offs regarding what I could observe. For example, even after receiving initial approval from administrators, I could not gain access to any of the information systems used by school staff. This decision made by a school manager was legitimated with student privacy concerns but also felt like a convenient way to limit what I could study. Nevertheless, I did not press too hard on this issue since I did not want to alienate a manager who, on occasion, seemed a bit skeptical of my research project and thus risk my research access.

Students are, of course, the most important social group at the school. However, my interactions with students were quite limited. I was quite surprised at how indifferent they were to my presence. I can only speculate as to why, but my guess is that teaching school students were already sensitized to teacher trainees and other observers sitting at the back of the classroom. I occasionally chat with students before, during, and after classes, but these chats never ended prominently influencing my analysis. As far as I could observe, students did not seem particularly passionate about my analytical foci, technology, and occupational inequality. I never participated in the classroom by disciplining students, nor did teachers expect me to do so. Yet, on more than one occasion, teachers noted it was nice to have me in the classroom to increase the "adult presence." I sometimes participated in classroom exercises so I could get a better sense of what the teachers expected students to do. In the end, I believe interviewing students and having more interactions with them could have added a further layer of nuance to my study[21]. However, I also believe paying less attention to them as a group was a necessary way to narrow down the scope of my study. Of course, students did feature prominently in my field notes, as I continuously observed their interactions with teachers. School leadership took care of securing research consent and communication about my research to students and their parents. I chose not to observe classes where students or their parents had communicated not consenting to research (educational ethnographers sometimes exclude participants without consent from their fieldnotes because they might have access to only one or two classrooms). Overall, I have taken steps to ensure I do not present data that could reveal students' identities.

Finally, I want to elaborate on my own identity, and how that related to the fieldwork I carried out. I was born in Finland, I am white, heterosexual, and identify as male. I come from a middle to upper-middle-class upbringing and went to "good" schools from middle school onwards. I received my university education at one of the most prestigious schools in the country. After graduation and before my research career, I worked in public relations in

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[21] See Paju (2011) for a fascinating school ethnography that prioritizes the student perspective.

consulting and finance. Suffice to say, my life has been relatively privileged, even by Finnish standards.

Many of these characteristics—particularly my class background—helped me blend in at the school and make sense of the cultural meanings exchanged between participants. However, readers should note that these attributes may have made me impervious to social dynamics that may have been more evident to someone with a different background and disposition. I did not go to Mainland for school, but I know many people who did, and my life trajectory in many senses probably resembles those that the school alumni often take. I could sometimes observe the occasionally elitist culture of the great school with curiosity, but much of it I probably missed.

Regarding gender, I was acutely aware that I was a male studying a traditional majority-female occupation[22]. In addition, the technological focus of my research was already somewhat masculine, a clear departure from the tradition of Finnish school ethnography (Lappalainen et al., 2008), which has illuminated us to gender dynamics reproduced in education. During my fieldwork, I sometimes noticed hints about gender that I now realize I probably did not have the sensitivity to pursue critically. Also, considering my fieldwork, I do not think it was a coincidence that I had a good rapport with many young male teachers who were close to my age. To counter possible biases encouraged by these relations, I have attempted to collect data that captures a variety of perspectives, including across gender, age, and subject lines.

I have zero belief in the myth that ethnographers can be a fly-on-the-wall or entirely unobtrusive to the social practices they study (Fine, 1994). Still, during fieldwork, I consciously sought to integrate with the field site and participants, for example, by altering my social behaviors and dress. I am generally a pretty talkative and outgoing person. However, during social situations with teachers and other participants in the field, I took a more observant, passive role than I would typically have, attempting to fade into the background a little bit. I can sometimes be a know-it-all, but in the field, I attempted to emulate something akin to a teacher trainee eager to learn from experienced teachers. Instead of voicing my opinion, I prioritized listening to what my participants had to say. I am not known to be a flamboyant dresser in any sense, but at school, I always attempted to dress in simple casual clothing, following the lead of most teachers and teacher trainees. I usually wore a waterproof sports jacket, a black backpack, and a baseball cap. Whether it was these strategies, or just my age and disposition, I was often mistaken for trainees by teachers and students alike. I was pretty happy about this confusion, as it allowed me to take the background observer role that I feel was beneficial to my study. However, these situations also reminded me of my low social status in the setting and reinforced my sense of being an outsider.

Some readers might find this approach disingenuous or, at the very least, overly strategic. However, I am convinced that it is essential to be conscious and transparent about how we alter ourselves to integrate with our

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[22] 77.7 and 68.9 percent of teachers are female in basic education and high school respectively (Ope-tushallitus, 2020a, 2020b)

field sites. Moreover, I am not sure if such integration attempts made during ethnographic research are distinct from the ways we attempt to belong in any other kinds of social settings. My approach is guided by the belief that ethnography is about prioritizing the viewpoint of your participants, which is why I do not go into the field to express my authentic self, but rather give my participants as much space as possible.

4.2.3 Almost a Hero

Even when acknowledging the difficulties of doing fieldwork, ethnographers often present themselves as heroic researchers who overcome any obstacle they face (Contreras, 2019). During my fieldwork, I often compared myself to this heroic ideal. I doubted whether my data were good enough, my research design and process rigorous enough, and my connections with participants deep enough. In hindsight, I realize most ethnographers share these concerns. What I report in this dissertation is the best study I could do at the time, and in the end, I am pretty content with the results. I now think these insecurities stemmed from the fact that my fieldwork rarely progressed as I had planned. While Barley acutely observes (1990) that ethnography emerges from the "precarious balance between the controlled and the uncontrolled," I struggled mightily with the uncontrolled aspects of fieldwork.

I have, on occasion, described my entry to the field as starting a new job without having a manager, colleagues, or any onboarding. As I explained in the data collection section, I struggled with getting my fieldwork going in the beginning, and this feeling returned to me from time to time as I grappled with the lack of control I had over what was happening in the field. The school is a big, relatively unstructured organization, and it is hard to attach yourself to social groups when you are not automatically part of any. In addition to over 60 teachers, Mainland had tens of other staff members and hundreds of students in comprehensive and high school. For large parts of the year, the school was overrun by over 100 teacher trainees from the local university.

The unpredictability of school life made it hard to carefully pre-plan my data collection daily. Each teacher follows their schedule with little general knowledge of what other people are doing at the same time. Timetables attached to classroom doors gave ideas on when classes would be held, but deviations from these schedules were a rule, not an exception. I often turned up to class only to see it was canceled or moved. Other times, a teacher trainee was teaching rather than the teacher I wanted to observe. What added to the difficulty of coordinating my research with teachers' schedules was that as I did not have access to school ICT systems, I could not communicate directly with teachers except with email, a tool the faculty used quite inconsistently. During my fieldwork, I sent dozens of emails that went unanswered and failed to set up interviews with numerous participants. A participant once forgot to come to an interview. Later, I learned not to take this personally, as I saw this was all part of the often-hectic everyday life of schools, but such instances often made data collection a frustrating experience for me.

These coordination challenges reached a low point during the first fall of my data collection in 2018. I wanted to observe a particular teacher's classes, but could not find the class despite looking into several possible classrooms and consulting with the school's door attendants. At that point, the frustration of fieldwork boiled over and I walked out of the school building in a fury. In my field notes for the day, I write, "all I get are closed doors and unanswered emails. "I remember my heartbeat rising and my breath getting quicker. I remember a hazy, dizzy feeling in my head. I later realized I probably had a panic attack. I never told anyone about this incident and kept going to the field. This, in hindsight, was a mistake and I would not recommend anyone push through such challenges during fieldwork without seeking help or guidance. Now in time, I learned to cope with such changes to my plans by just changing them on the go and doing some other data collection, but the fieldwork felt overwhelmingly difficult at the moment.

Schools, like other institutions, categorize people and maintain relations of power (Giddens, 1984; Willis, 1977). As Shamus Khan notes in his outstanding ethnography of an elite US boarding school, members must thus find a space where they feel comfortable (Khan, 2011). For me, the classes of certain teachers provided a place where I felt welcome and relaxed even when fieldwork became tough. I believe there was something about the relations they created with their students and the warm, empathetic atmosphere they cultivated that made me feel good. While I, unfortunately, cannot name these participants, I hope they know who they are.

Finally, the researcher's fieldwork and personal life are not exclusive. While there are logistical and cultural benefits to doing "close to home" ethnography, there are also challenges. I could not often detach myself from other work and personal commitments and sometimes found it hard to prioritize fieldwork. I constantly felt guilty about not spending more time at my field site. In the end, I did the amount of fieldwork, but I still cannot escape the feeling that I missed out on collecting so much more data. When I was at Mainland, I found a place where I could escape difficult thoughts and emotions and situations where I could not push them back. Throughout my fieldwork, I navigated a difficult time in a relationship, which ended close to my study's end. Exiting the field at the end of 2019 felt highly symbolic. I had, in many ways, just finished a significant phase of my life and was unsure about what the future would hold.

Ultimately, I am incredibly grateful to the people who made my study possible. The teachers, managers, and other workers of Mainland are an incredible community of educational professionals, and I was lucky to have the opportunity to learn from watching them work. Despite the challenges I experienced, you were generous with your time and patient with my questions. During the 16 months I spent at the school, many of you played a more prominent role in my life than you can imagine. Thank you.

4.3   Data Analysis and Writing

I elaborate on my specific analytical choices and the more technical steps I took to arrive at the findings I present in each research essay. Here, I will concentrate more on my approach to data analysis, how I became interested in the insights that led to me writing the research essays I have presented here, and the process of writing out my ethnographic findings.

My analytical approach draws from two related but distinct data analysis approaches: grounded theory and abductive analysis. First, my research has many characteristics that align with what is perhaps the most prevalent tradition of qualitative research, grounded theory. To give a few examples, my data collection was guided by the notion of theoretical sampling, where data collection and analysis determine further data collection (Glaser & Strauss, 1967). With both my interviews and observations, I was more concerned with range and data that could be theoretically informative rather than random sampling (Small, 2009). I used the traditional grounded theory techniques in my data analysis, including initial and focused coding and memo-writing alongside semiotic analysis (Charmaz, 2014; Spradley, 1979).

An abductive approach to qualitative research also inspires my data collection and analysis, and in particular, the writings of Iddo Tavory and Stefan Timmermans (Tavory & Timmermans, 2013, 2014). Increasingly popular with management scholars (Augustine et al., 2019; Mantere & Ketokivi, 2013; Reilly, 2018), abductive analysis puts particular emphasis on "speculative theoretical hunches" out of empirical findings and then developing these hunches through analyzing variation throughout a research study (Tavory & Timmermans, 2014). In contrast to grounded theory, the relationship between data analysis and prior theory is closer, as theorizing is developed in relation to existing literature.

To give an example of this process in my study, I will use the concept of "intra-professional division of labor" as an example. Prompted by reviewer comments from a journal, I returned to my data to look for new and exciting analytical angles and theoretical insights. I started by coding my field notes and then discussed these analyses with my co-author, Curtis. We compared our emerging analyses with different research literatures. For instance, our comparisons were inspired by reviewer suggestions on practice diffusion, technological disruptions, and occupational commitment. During this analytical process, I wrote memos that included data and interpretation that could speak to these themes. The strongest link between our emerging analysis and existing research literature was in the technology use and work and technology literature (Leonardi & Barley, 2010; Orlikowski, 2000). We then analyzed our data more systematically and compared our developing findings while immersing ourselves in this literature. While we considered variation over time and across situations, we observed that variance between actors was most salient in our data (Tavory & Timmermans, 2013). We concentrated our analytical efforts at understanding differences in teachers' technology use. This was also the most promising avenue for theorizing since previous research had often considered occupational communities as aligned with their technology

choices (Bailey & Leonardi, 2015; Bechky, 2020). Other recent studies had observed somewhat similar dynamics but not foregrounded them (Anthony, 2021; Beane, 2019), so we decided this was a promising pathway for theorizing.

I see data analysis and writing as almost indistinguishable phases in the research process, and in many cases, I like to jump to writing to facilitate my data analysis. For instance, instead of only writing separate analytical memos, I often write memos directly in my manuscript drafts just to remove them from later drafts. I might outline and sketch out new subsections under my analytical categories and then go back to my data to see whether my data could support these new ideas. I also do extensive headwork (Van Maanen, 2011a) and try to go back to my fieldwork experience to represent findings from a viewpoint relevant to my participants. I feel these more creative writing processes provide a good balance with more systematic analytical techniques of coding and analytic induction (Becker, 1998). Finally, while I like to work on my own or in close collaboration with just one co-author, I consider my friends, peers, and reviewers as essential to my theorizing and writing process. I think the way I do analysis leads to interesting analytical insights. However, as a balance, I rely heavily on others to push back on my ideas and improve the fit between theory and analysis in my work.

References

Abbott, Andrew. (1988). *The System of Professions: An Essay on the Division of Expert Labor*. Chicago: University of Chicago Press.

Acker, Joan. (2006). Inequality Regimes: Gender, Class, and Race in Organizations. *Gender and Society*, 20, 441–464.

Alvesson, Mats, & Robertson, Maxine. (2016). Money Matters: Teflonic Identity Manoeuvring in the Investment Banking Sector. *Organization Studies*, 37, 7–34.

Alvesson, Mats, & Willmott, Hugh. (2002). Identity Regulation as Organizational Control: Producing the Appropriate Individual. *Journal of Management Studies*, 39, 619–644.

Amis, John M., Mair, Johanna, & Munir, Kamal A. (2020). The organizational reproduction of inequality. *Academy of Management Annals*, 14, 195–230.

Anteby, Michel. (2008a). Identity Incentives as an Engaging Form of Control: Revisiting Leniencies in an Aeronautic Plant. *Organization Science*, 19, 202–220.

Anteby, Michel. (2008b). *Moral Gray Zones: Side-Productions, Identity, and Regulation in an Aeronautic Plant*. Princeton, NJ: Princeton University Press.

Anteby, Michel. (2010). Markets, Morals, and Practices of Trade: Jurisdictional Disputes in the U.S. Commerce in Cadavers. *Administrative Science Quarterly*, 55, 606–638.

Anteby, Michel, & Chan, Curtis K. (2018). A Self-Fulfilling Cycle of Coercive Surveillance: Workers' Invisibility Practices and Managerial Justification. *Organization Science*, 29, 247–263.

Anteby, Michel, Chan, Curtis K., & DiBenigno, Julia. (2016). Three Lenses on Occupations and Professions in Organizations: Becoming, Doing, and Relating. *Academy of Management Annals*, 10, 183–244.

Anteby, Michel, & Holm, Audrey L. (2021). Translating Expertise across Work Contexts: U.S. Puppeteers Move from Stage to Screen. *American Sociological Review*, 86, 310–340.

Anthony, Callen. (2018). To Question or Accept? How Status Differences Influence Responses to New Epistemic Technologies in Knowledge Work. *Academy of Management Review*, 43, 661–679.

Anthony, Callen. (2021). When Knowledge Work and Analytical Technologies Collide: The Practices and Consequences of Black Boxing Algorithmic Technologies. *Administrative Science Quarterly*, 66, 1173–1212.

Augustine, Grace. (2021). We're Not Like Those Crazy Hippies: The Dynamics of Jurisdictional Drift in Externally Mandated Occupational Groups. *Organization Science*, 32, 1056–1078.

Augustine, Grace, Soderstrom, Sara, Milner, Daniel, & Weber, Klaus. (2019). Constructing a Distant Future: Imaginaries in Geoengineering. *Academy of Management Journal*, 62, 1930–1960.

Avgerou, Chrisanthi, & Bonina, Carla. (2020). Ideologies Implicated in IT Innovation in Government: A Critical Discourse Analysis of Mexico's International Trade Administration. *Information Systems Journal*, 30, 70–95.

Baba, Sofiane, Sasaki, Innan, & Vaara, Eero. (2021). Increasing Dispositional Legitimacy: Progressive Legitimation Dynamics in a Trajectory of Settlements. *Academy of Management Journal*, 64, 1927–1968.

Bailey, Diane E., & Barley, Stephen R. (2019). Beyond Design And Use: How Scholars Should Study Intelligent Technologies. *Information and Organization*, 30.

Bailey, Diane E., Faraj, Samer, Hinds, Pamela J., Leonardi, Paul M., & Krogh, Georg Von. (2022). We Are All Theorists of Technology Now: A Relational Perspective on Emerging Technology and Organizing. *Organization Science*, 33, 1–18.

Bailey, Diane E., & Leonardi, Paul M. (2015). *Technology Choices*. Cambridge, MA: MIT Press.

Barker, James R. (1993). Tightening the Iron Cage: Concertive Control in Self-Managing Teams. *Administrative Science Quarterly*, 38, 408–437.

Barley, Stephen R. (1986). Technology as an Occasion for Structuring: Evidence from Observations of CT Scanners and the Social Order of Radiology Departments. *Administrative Science Quarterly*, 31, 78–108.

Barley, Stephen R. (1990). Images of Imaging: Notes on Doing Longitudinal Field Work Author. *Organization Science*, 1, 220–247.

Barrett, Michael, Oborn, Eivor, Orlikowski, Wanda J., & Yates, JoAnne. (2012). Reconfiguring Boundary Relations: Robotic Innovations in Pharmacy Work. *Organization Science*, 23, 1448–1466.

Beane, Matthew. (2019). Shadow Learning: Building Robotic Surgical Skill When Approved Means Fail. *Administrative Science Quarterly*, 64, 87–123.

Bechky, Beth A. (2003). Object Lessons: Workplace Artifacts as Representations of Occupational Jurisdiction. *American Journal of Sociology*, 109, 720–752.

Bechky, Beth A. (2020). Evaluative Spillovers from Technological Change: The Effects of "DNA Envy" on Occupational Practices in Forensic Science. *Administrative Science Quarterly*, 65, 606–643.

Becker, Howard S. (1960). Notes on the Concept of Commitment. *American Journal of Sociology*, 66, 32–40.

Becker, Howard S. (1973). *Outsiders: Studies in the Sociology of Deviance*. Free Press.

Becker, Howard S. (1998). *Tricks of the Trade: How to Think about Your Research While You're Doing It*. Chicago: University of Chicago Press.

Beunza, Danie, & Stark, David. (2003). The Organization of Responsiveness: Innovation and Recovery in the Trading Rooms of Lower Manhattan. *Socio-Economic Review*, 1, 135–164.

Bidwell, Charles E. (2001). Analyzing Schools as Organizations: Long-Term Permanence and Short-Term Change. *Sociology of Education*, 74, 100–114.

Blau, Peter M., & Duncan, Otis Dudley. (1967). *The American Occupational Structure*. New York: Wiley.

Boland, Richard J., Lyytinen, Kalle, & Yoo, Youngjin. (2007). Wakes of Innovation in Project Networks: The Case of Digital 3-D Representations in Architecture, Engineering, and Construction. *Organization Science*, 18, 631–647.

Brayne, Sarah. (2017). Big Data Surveillance: The Case of Policing. *American Sociological Review*, 82, 977-1008.

Bridwell-Mitchell, Ebony N. (2016). Collaborative Institutional Agency: How Peer Learning in Communities of Practice Enables and Inhibits Micro-Institutional Change. *Organization Studies*, 37, 161–192.

Bristow, Alexandra, Robinson, Sarah, & Ratle, Olivier. (2017). Being an Early-Career CMS Academic in the Context of Insecurity and 'Excellence': The Dialectics of Resistance and Compliance. *Organization Studies*, 38, 1185–1207.

Brown, Andrew D. (2015). Identities and Identity Work in Organizations. *International Journal of Management Reviews*, 17, 20–40.

Brown, Andrew D. (2021). Critical Review - Identities in and around organizations: towards an identity work perspective. *Human Relations*. In Print: https://doi.org/10.1177/0018726721993910.

Brown, Andrew D., & Coupland, Christie. (2005). Sounds of Silence: Graduate Trainees, Hegemony and Resistance. *Organization Studies*, 26, 1049–1069.

Brynjolfsson, Erik, & McAfee, Andrew. (2014). *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies*. New York: W. W. Norton & Company.

Bucher, Rue, & Strauss, Anselm. (1961). Professions in Process. *American Journal of Sociology*, 66, 325–334.

Burawoy, Michael. (1979). *Manufacturing Consent: Changes in the Labor Process Under Monopoly Capitalism*. Chicago: University of Chicago Press.

Burri, Regula Valerie. (2008). Doing Distinctions: Boundary Work and Symbolic Capital in Radiology. *Social Studies of Science*, 38, 37–64.

Calarco, Jessica Mc Crory. (2020). Avoiding Us versus Them: How Schools' Dependence on Privileged "Helicopter" Parents Influences Enforcement of Rules. *American Sociological Review*, 85, 223–246.

Campero, Santiago. (2021). Hiring and Intra-occupational Gender Segregation in Software Engineering. *American Sociological Review*, 86, 60–92.

Canning, Mary, & O'Dwyer, Brendan. (2016). Institutional Work and Regulatory Change in the Accounting Profession. *Accounting, Organizations and Society*, 54, 1–21.

Chan, Curtis K., & Anteby, Michel. (2016). Task Segregation as a Mechanism for Within-job Inequality: Women and Men of the Transportation Security Administration. *Administrative Science Quarterly*, 61, 184–216.

Chan, Curtis K., & Hedden, Luke N. (2021). The Role of Discernment and Modulation in Enacting Occupational Values: How Career Advising Navigate Tensions with Clients. *Academy of Management Journal*. In Print: https://doi.org/10.5465/amj.2020.1014.

Charmaz, Kathy. (2014). *Constructing Grounded Theory* (2nd ed.). London: SAGE.

Chown, Jillian. (2020). Financial Incentives and Professionals' Work Tasks: The Moderating Effects of Jurisdictional Dominance and Prominence. *Organization Science*, 31. 887–908.

Christin, Angèle. (2017). Algorithms In Practice: Comparing Web Journalism And Criminal Justice. *Big Data and Society*, 4, 1–14.

Christin, Angèle. (2020). *Metrics at Work: Journalism and the Contested Meaning of Algorithms*. Princeton, NJ: Princeton University Press.

Contreras, Randol. (2019). The Broken Ethnography: Lessons from an Almost Hero. *Qualitative Sociology*, 42, 161–179.

Croidieu, Grégoire, & Kim, Philip H. (2018). Labor of Love: Amateurs and Lay-expertise Legitimation in the Early U.S. Radio Field. *Administrative Science Quarterly*, 63, 1–42.

Curchod, Corentin, Patriotta, Gerardo, Cohen, Laurie, & Neysen, Nicolas. (2020). Working for an Algorithm: Power Asymmetries and Agency in Online Work Settings. *Administrative Science Quarterly*, 65, 644–676.

Currie, Graeme, Lockett, Andy, Finn, Rachael, Martin, Graham, & Waring, Justin. (2012). Institutional Work to Maintain Professional Power: Recreating the Model of Medical Professionalism. *Organization Studies*, 33, 937–962.

Desmond, Matthew. (2016). *Evicted: Poverty and Profit in the American City*. New York: Crown.

DiBenigno, Julia. (2020). Rapid Relationality: How Peripheral Experts Build a Foundation for Influence with Line Managers. *Administrative Science Quarterly*, 65, 20–60.

Dobbin, Frank, & Kelly, Erin L. (2007). How to Stop Harassment: Professional Construction of Legal Compliance in Organizations. *American Journal of Sociology*, 112, 1203–1243.

Dokko, Gina, Nigam, Amit, & Rosenkopf, Lori. (2012). Keeping Steady as She Goes: A Negotiated Order Perspective on Technological Evolution. *Organization Studies*, 33, 681–703.

Dutta, Sunasir, Rao, Hayagreeva, & Vasi, Ion Bogdan. (2018). Plug Power: Social Movements and Electric Vehicle Charging Stations in California, 1995–2012. *Research in the Sociology of Organizations*, 56, 21–52.

Edelman, Lauren B. (1992). Legal Ambiguity and Symbolic Structures: Organizational Mediation of Civil Rights Law. *American Journal of Sociology*, 97, 1531–1576.

Edelmann, Achim, Wolff, Tom, Montagne, Danielle, & Bail, Christopher A. (2020). Computational social science and sociology. *Annual Review of Sociology*, 46, 61–81.

Emerson, Robert M., Fretz, Rachel I., & Shaw, Linda L. (1995). *Writing Ethnographic Fieldnotes*. Chicago: University of Chicago Press.

Epstein, Steven. (1996). *Impure Science: AIDS, Activism, and the Politics of Knowledge*. Berkeley, CA: University of California Press.

Espeland, Wendy Nelson, & Sauder, Michael. (2007). Rankings and Reactivity: How Public Measures Recreate Social Worlds. *American Journal of Sociology*, 113, 1–40.

European Schoolnet, & Liège, University of. (2013). Survey of Schools: ICT in Education – Benchmarking Access, Use and Attitudes to Technology in Europe's Schools. Report, European Commission.

Evans, James A., & Aceves, Pedro. (2016). Machine Translation: Mining Text for Social Theory. *Annual Review of Sociology*, 42, 21–50.

Evans, J. (2021). How Professionals Construct Moral Authority: Expanding Boundaries of Expert Authority in Stem Cell Science. *Administrative Science Quarterly*, 66(4): 989–1036.

Eyal, Gil. (2013). For a Sociology of Expertise: The Social Origins of the Autism Epidemic. *American Journal of Sociology*, 118, 863–907.

Faraj, Samer, Pachidi, Stella, & Sayegh, Karla. (2018). Working and organizing in the age of the learning algorithm. *Information and Organization*, 28, 62–70.

Ferlie, Ewan, Fitzgerald, Louise, Wood, Martin, & Hawkins, Chris. (2005). The Non-spread of Innovations: The Mediating Role of Professionals. *Academy of Management Journal*, 48, 117–134.

Fernando, Mario, Reveley, James, & Learmonth, Mark. (2020). Identity work by a non-white immigrant business scholar: Autoethnographic vignettes of covering and accenting. *Human Relations*, 73, 765–788.

Fine, Gary Alan. (1994). Ten Lies of Ethnography: Moral Dilemmas in Field Research. *Journal of Contemporary Ethnography*, 22, 267–294.

Fine, Gary Alan. (1996). Justifying Work: Occupational Rhetorics as Resources in Restaurant Kitchens. *Administrative Science Quarterly*, 41, 90–115.

Fine, Gary Alan. (2007). *Authors of the Storm: Meteorologists and the Culture of Prediction*. Chicago: University of Chicago Press.

Fleming, Peter, & Spicer, André. (2003). Working at a cynical distance: Implications for power, subjectivity and resistance. *Organization*, 10, 157–179.

Freidson, E. (1984). The Changing Nature of Professional Control. *Annual Review of Sociology*, 10: 1–20.

Furman, Jeffrey L., & Teodoridis, Florenta. (2020). Automation, research technology, and researchers' trajectories: Evidence from computer science and electrical engineering. *Organization Science*, 31, 330–354.

Galperin, Roman V. (2020). Organizational Powers: Contested Innovation and Loss of Professional Jurisdiction in the Case of Retail Medicine. *Organization Science*, 31, 508–534.

Geertz, Clifford. (1973). *The Interpretation of Cultures*. New York: Basic Books.

Giddens, Anthony. (1979). *Central Problems in Social Theory: Action, Structure, and Contradiction in Social Analysis*. Berkeley, CA: University of California Press.

Giddens, Anthony. (1984). *The Constitution of Society*. Cambridge: Polity.

Glaser, Barney G., & Strauss, Anselm L. (1967). *The Discovery of Grounded Theory: Strategies for Qualitative Research*. Chicago: Aldine Transaction.

Gray, Barbara, Johnson, Tiffany, Kish-Gephart, Jennifer, & Tilton, Jacqueline. (2018). Identity Work by First-Generation College Students to Counteract Class-Based Microaggressions. *Organization Studies*, 39, 1227–1250.

Hallett, Tim. (2010). The Myth Incarnate: Recoupling Processes, Turmoil, and Inhabited Institutions in an Urban Elementary School. *American Sociological Review*, 75, 52–74.

Heimstädt, Maximilian, & Dobusch, Leonhard. (2020). Transparency and Accountability: Causal, Critical and Constructive Perspectives. *Organization Theory*, 1.

Hietanen-Peltola, Marke, Vaara, Ssarianna, Laitinen, Kristiina, & Jahnukainen, Johanna. (2020). Etäkoulu heikensi avun ja tuen saantia opiskeluhuollosta - myös kuraattori- ja psykologipalveluissa. Accessed February 15, 2022: http://urn.fi/URN:ISBN:978-952-343-605-3

Hoikkala, Tommi, Karhunen, Hannu, Kiilakoski, Tomi, Mäkynen, Marja, Torsti, Pilvi, & Hirvola, Matti. (2019). Koulutuksen digiloikka: Miten onnistumme suomalaisten osaamisen päivittämisessä. Helsinki: Teollisuuden palkansaajat ry.

Hoikkala, Tommi, & Kiilakoski, Tomi. (2018). Digitalisaation pedagogiikka ja jatkuvan oppimisen ristiriidat. In Koulutuksen Digiloikka. Helsinki: Teollisuuden palkansaajat ry.

Howard-Grenville, Jennifer, Nelson, Andrew J., Earle, Andrew G., Haack, Julie A., & Young, Douglas M. (2017). "If Chemists Don't Do It, Who Is Going To?" Peer-driven Occupational Change and the Emergence of Green Chemistry. *Administrative Science Quarterly*, 62, 524–560.

Hughes, Everett C. (1958). *Men and Their Work*. London: The Free Press.

Huising, Ruthanne. (2014). The Erosion of Expert Control Through Censure Episodes. *Organization Science*, 25, 1633–1661.

Huising, Ruthanne. (2015). To Hive or to Hold? Producing Professional Authority through Scut Work. *Administrative Science Quarterly*, 60, 263–299.

Jasanoff, Sheila, & Kim, Sang-Huyn. (2015). *Dreamscapes of Modernity: Sociotechnical Imaginaries and the Fabrication of Power*. Chicago: University of Chicago Press.

Jenkins, Tania M. (2020). *Doctors' Orders: The Making of Status Hierarchies in an Elite Profession*. New York: Columbia University Press.

Kahl, Steven J., King, Brayden G., & Liegel, Greg. (2016). Occupational Survival Through Field-Level Task Integration: Systems Men, Production Planners, and the Computer, 1940s–1990s. *Organization Science*, 27, 1084–1107.

Karunakaran, Arvind, Orlikowski, Wanda J., & Scott, Susan V. (2021). Crowd-Based Accountability: Examining How Social Media Commentary Reconfigures Organizational Accountability. *Organization Science*. In-press: https://doi.org/10.1287/orsc.2021.1546

Kellogg, Katherine C. (2011). *Challenging Operations: Medical Reform and Resistance in Surgery*. Chicago: University of Chicago Press.

Kellogg, Katherine C. (2012). Making the Cut: Using Status-Based Countertactics to Block Social Movement Implementation and Microinstitutional Change in Surgery. *Organization Science*, 23, 1546–1570.

Kellogg, Katherine C. (2021). Local Adaptation Without Work Intensification: Experimentalist Governance of Digital Technology for Mutually Beneficial Role Reconfiguration in Organizations. *Organization Science*, In-press: https://doi.org/10.1287/orsc.2021.1445.

Kellogg, Katherine C., Valentine, Melissa A., & Christin, Angèle. (2020). Algorithms at work: The new contested terrain of control. *Academy of Management Annals*, 14, 366–410.

Kent, Derin, & Dacin, M. Tina. (2022). Status Licensing: Incorporating Subordinates in Organizational Responses to Disruption. Working paper, The University of Warwick.

Khan, Shamus R. (2011). *Privilege: The Making of an Adolescent Elite at St. Paul's School*. Princeton, NJ: Princeton University Press.

Knorr-Cetina, Karin. (1997). Sociality with Objects. *Theory, Culture & Society*, 14, 1–30.

Kunda, Gideon. (1992). *Engineering Culture: Control and Commitment in a High-Tech Corporation*. Philadelphia: Temple University Press.

Lamont, Michèle. (1992). *Money, Morals, and Manners: The Culture of the French and the American Upper-Middle Class*. Chicago: University of Chicago Press.

Lappalainen, Sirpa, Hynninen, Pirkko, Kankkunen, Tarja, Lahelma, Elina, & Tolonen, Tarja. (2008). *Etnografia metodologiana: Lähtökohtana koulutuksen tutkimus*. Tampere: Vastapaino.

Lappalainen, Tuomo. (2018). Ammatit ykkösestä viimeiseen. *Suomen Kuvalehti*. June 1, 2018.

Leonardi, Paul M. (2008). Indeterminacy and the discourse of inevitability in international technology management. *Academy of Management Review*, 33, 975–984.

Leonardi, Paul M. (2011). When Flexible Routines Meet Flexible Technologies: Affordance, Constraint, and the Imbrication of Human and Material Agencies. *MIS Quarterly*, 35, 147–168.

Leonardi, Paul M., & Barley, Stephen R. (2010). What's Under Construction Here? Social Action, Materiality, and Power in Constructivist Studies of Technology and Organizing. *Academy of Management Annals*, 4, 1–51.

Lipsky, Michael. (1980). *Street Level Bureaucrats*. New York: Russell Sage.

Lortie, Dan C. (2002). *Schoolteachers* (2nd Ed.). Chicago: University of Chicago Press.

Mackenzie, Donald. (2015). Mechanizing the Merc: The Chicago Mercantile Exchange and the Rise of High-Frequency Trading. *Technology and Culture*, 56, 1–52.

Mantere, Saku, & Ketokivi, Mikko. (2013). Reasoning in organization science. *Academy of Management Review*, 38, 70–89.

Maria, Charles, & Grusky, David B. (2005). *Occupational Ghettos: The Worldwide Segregation of Women and Men*. Redwood, CA: Stanford University Press.

Martin-Caughey, Ananda. (2021). What's in an Occupation? Investigating Within-Occupation Variation and Gender Segregation Using Job Titles and Task Descriptions. *American Sociological Review*, 86, 960–999.

Mazmanian, Melissa, & Beckman, Christine M. (2018). "Making" Your Numbers: Engendering Organizational Control Through a Ritual of Quantification. *Organization Science*, 29, 357–379.

Mertala, Pekka. (2019). (Vasta)kertomuksia koulutuksen digitalisaatiosta. *Kasvatus & Aika*, 13, 26–45.

Meyer, John W., & Rowan, Brian. (1977). Institutionalized Organizations: Formal Structure as Myth and Ceremony. *American Journal of Sociology*, 83, 340–363.

Micelotta, Evelyn R., & Washington, Marvin. (2013). Institutions and Maintenance: The Repair Work of Italian Professions. *Organization Studies*, 34, 1137–1170.

Monahan, Torin, & Fisher, Jill A. (2020). Sacrificial Labour: Social Inequality, Identity Work, and the Damaging Pursuit of Elusive Futures. *Work, Employment and Society*, 34, 441–456.

Nelson, Andrew J., & Irwin, Jennifer. (2014). "Defining What We Do—All Over Again": Occupational Identity, Technological Change, and the Librarian/Internet-Search Relationship. *Academy of Management Journal*, 57, 892–928.

Nigam, Amit, & Dokko, Gina. (2019). Career resourcing and the process of professional emergence. *Academy of Management Journal*, 62, 1052–1084.

Nigam, Amit, Huising, Ruthanne, & Golden, Brian. (2016). Explaining the Selection of Routines for Change during Organizational Search. *Administrative Science Quarterly*, 61, 551–583.

Opetushallitus. (2004). Perusopetuksen opetussuunnitelman perusteet 2004. Report, Finnish National Agency for Education.

Opetushallitus. (2014). Perusopetuksen opetussuunnitelman perusteet 2014. Report, Finnish National Agency for Education.

Opetushallitus. (2015). Lukion opetussuunnitelman perusteet 2015. Report, Finnish National Agency for Education.

Opetushallitus. (2020a). Opettajat ja rehtorit Suomessa 2019: Esi- ja perusopetuksen opettajat. Report, Finnish National Agency for Education.

Opetushallitus. (2020b). Opettajat ja rehtorit Suomessa 2019: Lukiokoulutus. Report, Finnish National Agency for Education.

Orlikowski, Wanda J. (2000). Using Technology and Constituting Structures: A Practice Lens for Studying Technology in Organizations. *Organization Science*, 11, 404–428.

Ornston, Darius. (2018). *Good Governance Gone Bad: How Nordic Adaptability Leads to Excess*. Ithaca, NY: Cornell University Press.

Orr, Julian E. (1996). *Talking About Machines: An Ethnography of A Modern Job*. Ithaca, NY: Cornell University Press.

Pacheco, Desirée F., York, Jeffrey G., & Hargrave, Timothy J. (2014). The coevolution of industries, social movements, and institutions: Wind power in the United States. *Organization Science*, 25, 1609–1632.

Pachidi, Stella, Berends, Hans, Faraj, Samer, & Huysman, Marleen. (2021). Make Way For The Algorithms: Symbolic Actions And Change In A Regime Of Knowing. *Organization Science*, 32, 18–41.

Paju, Petri. (2011). Koulua on käytävä - Etnografinen tutkimus koululuokasta sosiaalisena tilana. Doctoral Dissertation, Nuorisotutkimusseura.

Parsons, Talcott. (1939). The Professions and Social Structure. *Social Forces*, 17, 457–467.

Parviainen, Jaana. (2015). Teknologisoituva koulu oppimisen elämyspuistona: valtion opetusteknologiastrategian jalkauttaminen kouluihin 2010-luvulla. *Kulttuurin-tutkimus*, 32, 3–14.

Petre, Caitlin. (2021). *All the News That's Fit to Click: How Metrics Are Transforming the Work of Journalists*. Princeton, NJ: Princeton University Press.

Pine, Kathleen H., & Mazmanian, Melissa. (2017). Artful and Contorted Coordinating: The Ramifications of Imposing Formal Logics of Task Jurisdiction on Situated Practice. *Academy of Management Journal*, 60, 720–742.

Pirhonen, Antti, & Häkkinen, Päivi. (2014). Tieto- ja viestintäteknologia koulussa – uskomuksia ja niiden kyseenalaistamista. *Kasvatus*, 45, 415–417.

Power, Michael. (2021). Modelling the micro-foundations of the audit society: Organizations and the logic of the audit trail. *Academy of Management Review*, 46, 6–32.

Pratt, Michael G., Rockmann, Kevin W., & Kaufmann, Jeffrey B. (2006). Constructing Professional Identity: The Role of Work and Identity Learning Cycles in the Customization of Identity among Medical Residents. *Academy of Management Journal*, 49, 235–262.

Rahman, Hatim A. (2021). The Invisible Cage: Workers' Reactivity to Opaque Algorithmic Evaluations. *Administrative Science Quarterly*, 66, 945–988.

Reid, E., & Ramarajan, L. 2021. Seeking Purity, Avoiding Pollution: Strategies for Moral Career Building. *Organization Science*. In-press: https://doi.org/10.1287/orsc.2021.1514.

Räihälä, Osmo Tapio. (2021). *Miksi nykymusiikki on niin vaikeaa?* Jyväskylä: Atena.

Reilly, Patrick. (2018). No laughter among thieves: Authenticity and the enforcement of community norms in stand-up comedy. *American Sociological Review*, 83, 933-958.

Saari, Antti, & Säntti, Janne. (2018). The rhetoric of the 'digital leap' in Finnish educational policy documents. *European Educational Research Journal*, 17, 442–457.

Sahlberg, Pasi. (2000). *Opettajana koulun muutoksessa*. Porvoo: WSOY.

Sainio, Miia, Hämeenaho, Pilvi, Nurminen, Tiia, Aro, Tuija, Torppa, Minna, & Poikkeus, Anna-Maija. (2020). Hyvinvointi keskisuomalaisissa kouluissa henkilökunnan näkökulmasta poikkeusolon aikana 2020. Report, University of Jyväskylä.

Sairanen, Heikki, Vuorinen, Mikko, & Viteli, Jarmo. (2014). Opeka vuonna 2013 - Trendejä opetusteknologiassa. Report, University of Tampere.

Salminen, Jari. (2012). *Koulun pirulliset dilemmat*. Helsinki: Teos.

Salo, Ulla-Maija. (2005). *Ankarat silkkaa hyvyyttään: Suomalainen opettajuus*. Porvoo: WSOY.

Salomaa, Saara, Palsa, Lauri, & Malinen, Ville. (2017). Opettajaopiskelijat ja mediakasvatus. Report, Kansallinen audiovisuaalinen instituutti.

Sauder, Michael. (2008). Interlopers and Field Change: The Entry of US News into The Field of Legal Education. *Administrative Science Quarterly*, 53, 209–234.

Sauder, Michael, & Espeland, Wendy Nelson. (2009). The Discipline of Rankings: Tight Coupling and Organizational Change. *American Sociological Review*, 74, 63–82.

Schildt, Henri. (2020). *The Data Imperative*. Oxford: Oxford University Press.

Schiølin, Kasper. (2020). Revolutionary Dreams: Future Essentialism And The Sociotechnical Imaginary Of The Fourth Industrial Revolution In Denmark. *Social Studies of Science*, 50, 542–566.

Selwyn, Neil. (2016). Minding Our Language: Why Education and Technology is Full of Bullshit … And What Might Be Done About It. *Learning, Media and Technology*, 41, 437–443.

Simola, Hannu. (1997). Kouluhallituksen varjosta tieteen valoon: Kasvatustiede ja opettajankoulutuksen tieteenalaistuminen. In J. Kivirauma & R. Rinne (Eds.), *Suomalaisen kasvatustieteen historia - lyhyt oppimäärä* (pp. 215–256).

Simola, Hannu. (2015). *Koulutusihmeen paradoksit: Esseitä suomalaisesta koulutuspolitiikasta*. Vastapaino.

Simpson, Richard L. (1985). Social Control of Occupations and Work. *Annual Review of Sociology*, 11, 415–436.

Small, Mario Luis. (2009). "How Many Cases Do I Need?": On Science And The Logic Of Case Selection In Field-Based Research. *Ethnography*, 10, 5–38.

Snow, David A., & Anderson, Leon. (1987). Identity Work Among the Homeless: The Verbal Construction and Avowal of Personal Identities. *American Journal of Sociology*, 92, 1336–1371.

Spradley, James P. (1979). *The Ethnographic Interview*. Orlando: Holt, Rinehart and Winston.

Starr, Paul. (2017). *The Social Transformation of American Medicine: The Rise of a Sovereign Profession and the Making of a Vast Industry* (2nd ed.). New York: Basic Books.

Susskind, Richard, & Susskind, Daniel. (2015). *The Future Of The Professions: How Technology Will Transform The Work Of Human Experts*. Oxford: Oxford University Press.

Säntti, Janne. (2007). Pellon pientareelta akateemisiin sfääreihin: Opettajuuden rakentuminen ja muuttuminen sotienjälkeisessä Suomessa opettajien omaelämäkertojen valossa. Doctoral Dissetation, University of Helsinki.

Säntti, Janne. (2020). Joukkoviestinnästä digiaikaan – Tieto- ja viestintätekniikka suomalaisen perusopetuksen opetussuunnitelmien perusteissa 1970–2014. *Kasvatus & Aika*, 14, 60–79.

Tanhua-Piiroinen, Erika, Kaarakainen, Suvi-Sadetta, Kaarakainen, Meri-Tuulia, & Viteli, Jarmo. (2020). Digiajan peruskoulu II. Report, Ministry of Culture and Education.

Tavory, Iddo, & Timmermans, Stefan. (2013). A Pragmatist Approach to Causality in Ethnography. *American Journal of Sociology*, 118, 682–714.

Tavory, Iddo, & Timmermans, Stefan. (2014). *Abductive Analysis: Theorizing Qualitative Research*. Chicago: University of Chicago Press.

Tervasmäki, Tuomas, & Tomperi, Tuukka. (2018). Koulutuspolitiikan arvovalinnat ja suunta satavuotiaassa Suomessa. *Niin & Näin*, 2, 164–200.

Thomas, Robert J. (1994). *What Machines Can't Do: Politics and Technology in the Industrial Enterprise*. Berkeley, CA: University of California Press.

Thornborrow, Thomas, & Brown, Andrew D. (2009). "Being Regimented": Aspiration, Discipline And Identity Work In The British Parachute Regiment. *Organization Studies*, 30, 355–376.

Tilly, Charles. (1999). *Durable Inequality*. Berkeley, CA: University of California Press.

Tomaskovic-Devey, Donald, & Avent-Holt, Dustin. (2019). *Relational Inequalities: An Organizational Approach*. Oxford: Oxford University Press.

Turco, Catherine J. (2010). Cultural Foundations Of Tokenism: Evidence From The Leveraged Buyout Industry. American Sociological Review, 75, 894–913.

Turco, Catherine J. (2016). *The Conversational Firm: Rethinking Bureaucracy in the Age of Social Media*. Columbia University Press.

Turkle, Sherry. (2009). *Simulation and Its Discontents*. Cambridge, MA: MIT Press.

Tyack, David B., & Cuban, Larry. (1995). *Tinkering Toward Utopia: A Century of Public School Reform*. Cambridge, MA: Harvard University Press.

Vaara, Eero, & Lamberg, Juha Antti. (2016). Taking Historical Embeddedness Seriously: Three Historical Approaches To Advance Strategy Process And Practice Research. *Academy of Management Review*, 41, 633–657.

Vallas, Steven P. (2006). Empowerment Redux: Structure, Agency, and the Remaking of Managerial Authority. *American Journal of Sociology*, 111, 1677–1717.

Valtioneuvosto. (1998). Asetus opetustoimen henkilöstön kelpoisuusvaatimuksista. Legal document, Prime Minister's Office.

Valtioneuvosto. (2007). Pääministeri Matti Vanhasen II hallituksen ohjelma. Report, Prime Minister's Office.

Valtioneuvosto. (2011). Pääministeri Jyrki Kataisen hallituksen ohjelma. Report, Prime Minister's Office.

Valtioneuvosto. (2017). Ratkaisujen Suomi: Puolivälin tarkistus. Report, Prime Minister's Office.

Valtiotalouden tarkastusvirasto. (2020). Yleissivistävän koulutuksen opetus- ja oppimisympäristöjen digitalisointi – Kooste sidosryhmien näkemyksistä.

Van Maanen, John. (2011a). Ethnography as Work: Some Rules of Engagement. *Journal of Management Studies*, 48, 218–234.

Van Maanen, John. (2011b). *Tales of the Field: On Writing Ethnography*. Chicago: University of Chicago Press.

Van Maanen, John, & Barley, Stephen R. (1984). Occupational Communities: Culture and Control in Organizations. In B. M. Staw & L. L. Cummings (Eds.), Research in Organizational Behavior (Vol. 6, pp. 287–365). JAI Press.

Vough, Heather C., Cardador, M. Teresa, Bednar, Jeffrey S., Dane, Erik, & Pratt, Michael G. (2013). What Clients Don't Get About My Profession: A Model Of Perceived Role-Based Image Discrepancies. *Academy of Management Journal*, 56, 1050–1080.

Wang, Milo Shaoqing, Raynard, Mia, & Greenwood, Royston. (2021). From Grace to Violence: Stigmatizing the Medical Profession in China. *Academy of Management Journal*, 64, 1842-1872.

Weeden, Kim A. (2002). Why do some occupations pay more than others? Social closure and earnings inequality in the United States. *American Journal of Sociology*, 108, 55–101.

Wiedner, Rene, Nigam, Amit, & da Silva, Jose Bento. (2020). General Practitioners Are from Mars, Administrators Are from Venus: The Role of Misaligned Occupational Dispositions in Inhibiting Mandated Role Change. *Work and Occupations*, 47, 348–377.

Wilensky, Harold L. (1964). The Professionalization of Everyone? *American Journal of Sociology*, 70, 137–158.

Willis, Paul. (1977). *Learning to Labour: How Working Class Kids Get Working Class Jobs*. New York: Columbia University Press.

Wright, April L., Meyer, Alan D., Reay, Trish, & Staggs, Jonathan. (2021). Maintaining Places of Social Inclusion: Ebola and the Emergency Department. *Administrative Science Quarterly*, 66, 42–85.

Zacka, Bernardo. (2017). *When the State Meets the Street*. Cambridge, MA: Harvard University Press.

Zetka Jr., James R. (2001). Occupational Divisions of Labor and Their Technology Politics: The Case of Surgical Scopes and Gastrointestinal Medicine. *Social Forces*, 79, 1495–1520.

Zuboff, Shoshana. (1988). *In the Age of the Smart Machine*. New York: Basic Books.

Appendices

Appendix 1. Subject-Specific ICT Guidelines in the 2003 and 2015 National Core Curricula for High School

Subject	ICTs in Curriculum 2003	ICTs in Curriculum 2015	Change[23]
Finnish language and litera-ture	(Teaching goals) can choose and critically evaluate various sources, reliability of information, usability, and motives, can use information and communications technologies in learning the subject.	Texts are produced, interpreted, and shared individ-ually and collectively, also using information and communications technologies. (students) can utilize information and communica-tions technologies in a variety of ways in all sec-tions of the subject, and understands the effects of digitalization on language, texts and interaction.	++
Second official language, Finnish	Not mentioned	(students) can utilize information and communica-tions technologies in a variety of ways in all sec-tions of the subject, and understands the effects of digitalization on language, texts and interaction.	+
Foreign languages	Not mentioned	Information and communications technologies are used in a natural way as part of the study environ-ment.	+
Maths	Not mentioned	Students are trained to use computer software to learn mathematics, and as aide in problem solving. Study of mathematics utilizes dynamic mathematics software, symbolic calculation software, statistical software, spreadsheets, word processing, and digi-tal materials when appropriate. It's also important to evaluate the utility and constraints of various aides.	++
Biology	Not mentioned	Information and communications technologies are used in a variety of ways to support learning about biology.	++
Geogra-phy	Can gather, interpret, and critically evaluate geographic information such as (…) digital, and other me-dia sources, and also utilize infor-mation technology in a variety of ways in presenting geographic knowledge.	Teaching utilizes learning environments from out-side the school, including web environments.	0
Physics	In addition, school and non-fiction books, digital databases and do-main experts are sources of natural science knowledge.	Information and communications technologies are used e.g. for modeling, research, and production of outputs.	+
Chemistry	Not mentioned	Information and communications technologies are used for modeling, research, and production of out-puts.	+
Psychol-ogy	Not mentioned	Learning utilizes the capabilities of information and communications technologies in a variety of ways.	+
Civics	Not mentioned	Can source varied societal and current materials from various sources, also by utilizing information and communications technologies.	+
History	Not mentioned	No mention	0
Religion	Not mentioned	Teaching utilizes various study environments, infor-mation and communications technology capabilities and activating work practices in a variety of ways.	+
Ethics	Not mentioned	The capabilities of information and communications technologies are utilized in a variety of ways.	+
Physical Education	Not mentioned	Sports technologies can be used to support achiev-ing study goals.	+
Music	Not mentioned	Students develop capabilities to utilize technology in musical expression.	+
Arts	Ability to apply media technology in one's own visual work	New technologies and media environments are both objects of research and media for visual pro-duction.	+
Total	**4/16 subjects = 25 percent**	**15/16 subjects = 94 percent**	

[23] Coding key: - = decrease, 0 = similar, + = small increase, ++ = large increase

Appendix 2. Technology in Educational Policy, Government Programs 2003-2019

Govern-ment (named after PM)	Years	Political parties (prime minister's party in bold)	Minister of Culture and Education	Technological educational policy
Vanhanen I	2003-2007	**Centre** (Liberal conservative), Social Democratic Party (Labor party), Swedish People's Party (Liberal centrist)	2003-2005 Haatainen (Social Democratic Party) 2005-2007 Heinäluoma (Social Democratic Party)	The operating conditions of small upper secondary schools are supported, for example, by co-operation between upper secondary schools and across municipal borders, as well as by expanding online teaching. Remote high school operations are secured. [Information society] The program promotes competition in the communications market and enhances the use of information society services in business, education, healthcare, administration and the daily lives of citizens.
Vanhanen II	2007-2011	**Centre**, Coalition (Conservative), Green League (Green liberal) Swedish People's Party	2007-2008 Sarkomaa (Coalition) 2008-2010 Virkkunen (Coalition)	Development of e-learning and information society projects in educational institutions supported. [Second degree] New technology is widely used and the operational capacity of the remote high school will be improved. "
Katainen	2011-2014	**Coalition**, Social Democratic Party, Green, Left Alliance (Left-liberal), Swedish People's Party, Christian Democrats (Christian-conservative)	2011-2013 Gustafsson (Social Demoracts) 2013-2014 Kiuru (Social Demoracts)	The use of information and communication technologies in education will be strengthened.
Stubb	2014-2015	**Coalition,** Social Democratic Party, Green League, Swedish People's Party, Christian Democrats	2014-2015 Kiuru (Social Demoracts)	The digital revolution in teaching and learning is strongly promoted, e.g. through the development and deployment of a training cloud.
Sipilä	2015-2019	**Centre**, Coalition, True Finns (Right, populist - Until 2017), Blue Reform (Right, populist - 2017-2019)	2015-2019 Grahn-Laasonen (Coalition)	"[Skills and Training section] Government Objectives: Learning environments have been modernized, with opportunities for digitalisation and new pedagogy utilized in learning. New learning environments and digital materials for primary schools Update the learning methods and environments of basic education to meet the challenges of development and emphasize the skills base of the future. The aim of the project is to improve and reduce learning outcomes differences that have arisen. (…) — Expanding learning methods by introducing digital learning environments. — Reforming pedagogy. Implement development programs for teacher and in-service training.
Rinne	2019	**Social Democratic Party**, Centre, Green League, Left Alliance, Swedish People's Party	2019 Andersson (Left)	"Taking into account sustainable development and climate education, digitalisation, economic and working life skills and sexuality and equality education as cross-cutting themes at different levels of education. "
Marin	2019 onwards	**Social Democratic Party**, Centre, Green League, Left Alliance, Swedish People's Party	2019 Andersson (Left)	(Adopted the program of Gov. Rinne)

Appendix 3. Interview guides

Example Interview Guide, Ethnographic Study

Professional background and career

- Can you tell me how you became a teacher?
- (If not already answered)
- How long have you been a teacher?
- How long have you taught at Mainland?
- Can you tell me more about your educational background?
- How about other work experience before teaching?
- Teaching is often seen as a 'calling', what do you think of this belief?

Current work

- What does a "basic" day at work include for you?
- Can you walk me through a recent day at work, e.g., what happened yesterday?
- And what about a schoolyear, how would you describe that?
- What are the favorite parts of your job?
- What about the least desirable aspects?
- How would you describe your current job satisfaction?
- What changes, if any, would you like to see with regards to your work and tasks?

Identity

- How would you describe yourself as a teacher?
- How would you like to develop as a teacher?
- What does autonomy mean in teachers' work?

External responsibilities

- What kind of roles, if any, do you have outside teaching?
- How and why did you get this role?
- What does the role involve?
- Who else participates with you on this?

Structural changes

- What are some of the most significant changes during your career?
- How would you describe your feelings about the new curricula (National core 2015/2016)?
- How do you see the role of the technological policy reforms (National core 2015/2016)?
- Possible follow-ups for all questions:
  - How has it influenced your work?
  - Can you give me a concrete example? Can you give me another example?
  - How might changes be resisted?
    - Prompt: Some interviewees have noted that resistance is very subtle; others claim it's more vocal?
- Technology question: How do you see the role of technology in teaching now compared to before?

Organization and relationships

- How would you describe Mainland as a workplace?
- How would you describe the work culture here?

- How would you describe your relations with other teachers/students/parents?

<u>Ending</u>
- We talked about many interesting themes, but was there something you still wanted to say or something I forgot to ask?

Example Interview Guide, Field Level Study

Background and career
- Could you tell me about your career and background in your own words?
- (If not already answered)
  - How long have you been at your current organization?
  - How would you describe your current role?

Organization (customized to respondent)
- What is your organization's role in the field of education?
- How would you like to develop this role?
- Which actors are your closest collaborators?
  - Follow-up
  - Can you tell me more about collaboration with x?
  - What about organization y?
  - How do you collaborate with teachers/students?
- What is your role in educational policy?
  - Follow-up
  - How would you describe your participation opportunities?
  - How do policy reforms / new curricula relate to your work?

Policy reforms and technology
- What are your thoughts on recent policy reforms around technology? (Give examples if needed)
  - Follow-up
  - How have they influenced your organization?
  - Can you elaborate on x?
- I read report/paper x. Can you tell me more about it?
  - Follow-up
  - Why was the project initiated?
  - How was it received?
  - What was your role?
  - What happened next, any particular outcomes?
- Has your organization initiated other projects related to the reforms?
  - Follow-up
  - Can you elaborate on x?
  - Can you give me another example?
- How has the perspective of your organization been implemented in reforms?
- What is your perspective regarding the implementation of these reforms?
  - What has perhaps surprised you?
  - What have been some of the most critical enablers of reform?
  - What about some of the key challenges?
- Role of teachers?
- What is your take on the public debate around these issues?
- How do you see the current situation? What about the future?

Ending
- We talked about many interesting themes, but was there something you still wanted to say or something I forgot to ask.

Despite the unpredictable consequences of technological change on professional work, varied stakeholders increasingly expect professionals to adopt new technologies in their work practices. Such demands can become inscribed in public policy reforms. However, professionals' autonomy over work practices and resistance to coercive attempts at change can complicate such reforms. How do such technology-related public policy reforms shape professionals' work? How do professionals navigate the pressures of these reforms? To understand these questions, I studied technological policy reform in the Finnish educational system during the 2010s. I leverage insights from a 16-month ethnographic study of Finnish schoolteachers, extensive archival materials, and interviews with field participants to explain how technological policy reforms shape and are shaped by professional work.

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