Digital Learning in the Wild:

Re-Imagining New Ruralism, Digital Equity, and Deficit Discourses

through the Thirdspace

by

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ABSTRACT

Digital media is becoming increasingly important to learning in today's changing times. At the same time, digital technologies and related digital skills are unevenly distributed. Further, deficit-based notions of this digital divide define the public's educational paradigm. Against this backdrop, I forayed into the social reality of one rural Americana to examine digital learning in the wild. The larger purpose of this dissertation was to spatialize understandings of rural life and pervasive social ills therein, in order to rethink digital equity, such that we dismantle deficit thinking, problematize new ruralism, and re-imagine more just rural geographies. Under a Thirdspace understanding of space as dynamic, relational, and agentive (Soja, 1996), I examined how digital learning is caught up spatially to position the rural struggle over geography amid the 'Right to the City' rhetoric (Lefebvre, 1968). In response to this limiting and urban-centric rhetoric, I contest digital inequity as a spatial issue of justice in rural areas. After exploring how digital learning opportunities are distributed at state and local levels, I geo-ethnographically explored digital use to story how families across socio-economic spaces were utilizing digital tools. Last, because ineffective and deficit-based models of understanding erupt from blaming the oppressed for their own self-made oppression, or framing problems (e.g., digital inequity) as solely human-centered, I drew in posthumanist Latourian (2005) social cartographies of Thirdspace. From this, I re-imagined educational equity within rural space to recast digital equity not in terms of the "haves and have nots" but as an account of mutually transformative socio-technical agency. Last, I pay the price of criticism by suggesting possible actions and solutions to the social ills denounced throughout this dissertation.

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CHAPTER 1
INTRODUCTION

As digital media becomes increasingly important to learning in formal and informal contexts, digital literacy, or the skilled and generative use of digital technology tools, is now considered the new fluency for the twenty-first century (CCSS, 2012; Organization for Economic Co-operation and Development [OECD], 2015). From this digital expansion, technology disparities have quickly mapped onto traditional fault lines in social stratification, wherein disadvantaged populations (e.g., racial and ethnic minorities, low-income students, English language learners [ELLs]) are without access to expert tools and instrumental guidance needed for full digital participation (Hargittai & Walejko 2008; Steyaert, 2002). Central to this discussion of twenty-first century competencies is now the notion of the digital divide, or the new gap between the information haves and the have-nots (Steyaert, 2002). And whereas prior concerns revolved solely around issues of technology access, talk of the digital divide has evolved to focus on issues of a second level divide (Hargittai, 2002; Van Dijk, 2005). Hargittai (2002) introduced the broader dimensions of access to consider the different digital literacy skills, competencies, knowledge, practices, and forms of capital that enable empowered participation in today's information and communications technology (ICT). This is significant because with the growing influx of digital tools and income gaps widening, unequal access to digital tools coupled with the second level divide is only amplifying inequalities. By increasing knowledge and literacy gaps as well as disparities in technological skills between rich and poor children, this digital equity crisis is further

restricting marginalized children's chances to participate in the increasingly competitive and globalized labor markets (Neuman & Celano, 2012; Reardon, 2013; Watkins, 2012).

Yet against this background, I further contest that how society, as a whole, understands or conceptualizes its social problems will have lasting consequences for the various practical and political solutions proposed and enacted (Pierce, 2004). Limiting, deficit-based notions of the digital divide assume the disadvantaged merely have less technologies and less developed capacities to use digital technologies in mainstream ways. These immobilizing assumptions frame the problem as stemming from individual's or families' self-made failings. Blaming the individual(s) masks the powerful influence of underlying "structuring structures" (Bourdieu, 1977, p. 90), or the role of the social, cultural, and material conditions mediating how new technologies are used and the consequences of their use.

Ignoring the social/cultural embeddedness of ICTs, many researchers and educators assume that cyberspace spells the "end of geography" (Virilio, 1993, p. 9) and offer a way to overcome the inequitable distribution of resources across neighborhoods, school districts, and communities. Home and school access to digital technologies are proposed as a means of countering what are perceived as the social and cultural limitations of impoverished environments (Graham, 2010). Working from this perspective, educators and policy makers seek to remedy the digital divide through economic or technological one-size-fits-all approaches aimed at helping the poor to "take full economic, social, and civic participation in society" (NIIAC, 1996, para. 11; see also Cuban, 2001; Warschauer, 2008), typically by enhancing school achievement. Examples of such approaches are one-to-one laptop initiatives, which provide all children with a

personal laptop for home and school use. These initiatives are presumed to increase high school graduation rates and grade point averages (Beltran, Das & Fairlie, 2008). However, studies in the U.S. (Gulek & Demirtas, 2005; Shapley, Sheehan, Maloney & Caranikas-Walker, 2009) and meta-analyses abroad (O'Dwyer et al., 2008; Hilbert, 2014) fail to demonstrate this expected increase in learning and test scores.

These "solutions" fail to acknowledge how digital and social inequities are embedded within the families' everyday local and translocal experiences. Monetary investments in technology do little to augment patterns of technology use without attention to broader factors affecting how technology is used (Toyama, 2015; Warschauer, 2008). For example, Katz and Levine (2015) found that immigrant families were wary of using children's school laptops at home for fear that their actions would be subject to the surveillance of school or government authorities, as happened in one Pennsylvania school district (Todt, 2010). Likewise, in one low-income area of California, a large number of families without access to high-speed Internet were dismayed that the district spent $9 million on Apple iPads for home use and complained to their superintendent that the funds might be better invested in other resources (Westervelt, 2013).

Seeking to better examine families' everyday experiences with digital technologies, a number of scholars have pursued innovative qualitative data collection strategies in the home (Clark, 2013; Katz & Levine, 2015; Plowman & Stevenson, 2012, 2013; Plowman, Stevenson, Stephen & McPake, 2012; Taylor, Takeuchi & Stevens, in press). Despite this good work, little attention has been paid to the digital practices of rural families. Even more unfortunate, research examining the impact of socio-economic

status on the digital learning practices within *and* across rural families is virtually non-existent. The few existing studies suggest that general trends, for example towards greater equity in home Internet access, may be different in rural areas. For example, one study of rural broadband adoption found the gap between more advantaged and less disadvantaged rural families' high-speed Internet adoption rates to be increasing, from a 3% difference in 2003 to a 13% differential in 2012 (Whitacre, Gallardo & Strover, 2013). Given educational success is not a singular product of what happens inside the school, but a myriad of permeating forces converging to enact rural students' broad digital practices (Beaulieu, Israel & Wimberley, 2006), many identify the paucity of this type of out-of-school research to be the most pressing issue impeding the improvement of rural education (Provasnik et al., 2007; Reeves, 2012; Whitacre, Gallardo & Strover, 2013).

A promising approach to understanding the complexity of rural young people's experiences with digital media is represented in Leander, Phillips, and Taylor's (2010) review of educational research informed by current theories of space and place and their relationship to learning. These authors argue that prior research on classroom-based as well as out-of-school learning (even scholarship drawing on theories of situated learning) has tended to treat learning as "packed rather tightly within local containers" (Leander, Phillips, & Taylor, 2010, p. 335). These scholars call for future studies that emphasize children's mobility across place and space, to examine how digital learning opportunities are positioned "between human and virtual mobility on the one hand and social mobility or economic mobility on the other" (p. 382). Adequately locating families and, particularly, *rural* families' digital learning inequities through a critical spatial approach would help to expand our terrain of examination and evidence new learning spaces. Yet

still, the politics of space and its relationship to rural families' digital learning remains understudied and undertheorized (Stern, Adams & Elsasser, 2009).

This is unfortunate, as scholars working from a socio-spatial perspective (Foucault, 1984; Lefebvre, 1974; Soja, 1996, 2010) offer an alternative means of understanding how digital inequities are caught up in the conditions of people's everyday lives. While the nature and significance of space has been conceptualized in various ways (Bachelard, 1969; Bahktin, 1981; Foucault, 1984; Latour, 1999; Massey, 2005; Thrift, 2003), the work of Lefebvre (1974) and Soja (1996, 2010) offers a particularly useful lens. Lefebvre (1972) conceptualizes "space" as a complex social product of relationships, wherein power, knowledge, and resources are developed and distributed; in other words, "space is political" (p. 59). With this definition, neither space nor societal inequities can be understood independently of the other (Lefebvre, 1972; Soja, 1996, 2010). All aspects of the spatial are essential to the construction, functioning, reproduction and change of societies as a whole. For example, when most envision a house, they perceive a separate and enclosed entity grounded in certain location. A spatial understanding, however, offers a radically different perspective, such that we see the house as broken open and "permeated from every direction by streams of energy which run in and out of it by every imaginable route: water, gas, electricity, telephone lines, radio and television signals"…where in place of a fixed rational space emerges…"a nexus of in and out conduits" (Lefebvre, 1974, p. 92-93). Similarly, within this nexus of home, school, and community, families confront embedded practices and existing sociocultural and spatial structures, which shape their real and perceived opportunities to appropriate the digital tools and empowered learning practices needed to collectively

transform existing hierarchies of knowledge production. This is not to say that I will argue away entrenched inequities, but instead provide a different way of understanding how access alone is insufficient. And so, by examining the politics of space (which are socially (re)produced and dynamically practiced), we can better account for and address the various situated rural elements that may contribute to the digital divide.

Theoretical Framework

Sociocultural perspectives of learning with digital technologies view learning as situated (Lave & Wenger, 1991), wherein digital artifacts mediate actions and encompass material as well as symbolic social elements (Cole, 1996). Given this, digital practices become widespread and efficacious only with support from the broad digital learning environment—on the grounds that these practices and respective tools fulfill recurring and time-sensitive cultural and social needs (Katz, 2010). Thus, the tools available to a culture matter, but what that culture chooses to do with those tools matters more (Katz, 2010; Takeuchi, 2011; Neuman & Celano, 2012). As such, focusing on technology access or Internet freedom, in themselves, as "great levelers" overlooks issues of innovational inequity (Barron, 2004), or the unequal distribution of essential skills, competencies, practices, and forms of social/cultural capital that enable empowered participation in today's ever-expanding multimedia landscape (Barron, Martin, Takeuchi, & Fithian, 2009; Jenkins, 2006; Tomaya, 2015; Watkins, 2011). However, because this perspective typically lacks an explicit discussion of power in its analysis of the learning process (Fox, 2000; Newell, Robertson, Scarbrough, & Swan, 2009), I draw on socio-spatial theory as a means of overcoming this limitation.

As an analytic and theoretical tool to deconstruct the socio-spatial components of a family's media learning environment and move beyond afore-mentioned deficit approach to the digital divide, I borrow from Soja's Thirdspace theory (1996, 2010). From this critical perspective, "space" houses social relationships of production through which power, values, knowledge, and resources are created and distributed (Lefebvre, 1974). Soja's Thirdspace theory further articulates process-oriented understandings of these power/knowledge distributions through his identification of first, second, and third spaces of interaction in a *trialectics of spatiality* (see Figure 1.1). Firstspace is the traditional *perceived* surface appearances or material outcomes (e.g., ASU's physical campus, buildings, parking lots, manicured lawns and hedges), while Secondspace represents how the space is *conceived* (e.g., ASU as the number 1 in innovation "New American University," "the ivory tower," or as the "party school" or PAC 12 "Sun Devils" competitor). Firstspace reflects the rational perspectives and interests of the dominant, or the top-down snapshot of gentrification measures of ASU's campus malls and streets. On the other hand, Secondspace houses utopian notions of artists, the media, or scientists (Bhabha, 1994; Lefebvre, 1974). For instance, when singing ASU's Sun Devil Fight Song at football games, students conceptualize a space slightly different from the mapped Firstpace. Last, Soja introduces Thirdspace as the "in between spaces" and *lived* experiences of the marginalized "Others" deemed out of place.

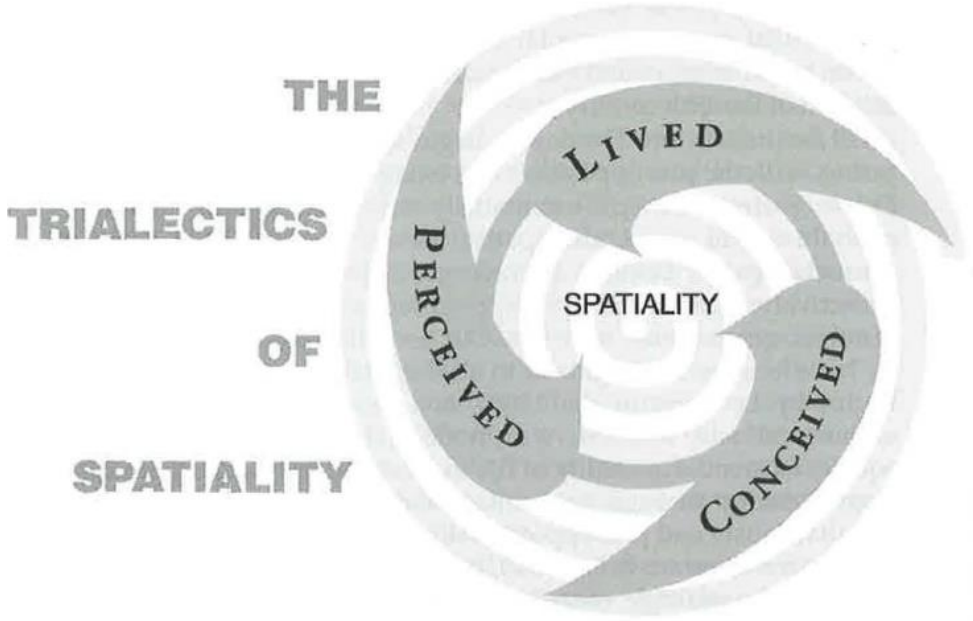


Figure 1.1. Edward Soja's Trialectics of Spatiality (1996, p. 74)

While Thirdspace can be applied to the lived experiences of anyone, because Thirdspace is a less hegemonic and radically open space with unforeseen opportunity for emancipation and empowerment (Bhabha, 1994; Soja, 1996, 2010), it holds particular importance for populations that have been historically marginalized. Extending the ASU example, Thirdspace is actualized through the working practices and beliefs of PhD students as they collectively mediate the Firstspace physical presence of ASU's campus through the Secondspace conceptions of graduate school. Herein, the Farmer 3rd floor "Grad Space" as a Thirdspace for ASU Teacher's College doctoral students would become much more than the First and Second space combined. Despite the original intentions under which the "Grad Space" was constructed, no doctoral student actually goes there to get work done; assigned graduate student study carrels in ASU's Hayden library exist solely for that purpose. Within the Farmer "Grad Space," students enact a

radically open system of lived experience, or Thirdspace, where they collectively negotiate First and Secondspace to achieve their specific goals. This means that the real work of the "Grad Space" takes place in the 15-20 minutes before class, as students gather to gossip, commiserate, and exchange short cuts for completing last minute assignments. Thus for the purpose of my study, Thirdspace theory offers a critical spatial lens for understanding actual lived experience within and across space as well as the possibilities families of low socio-economic status (SES) may create for re-imagining a space's meaning and potential.

This spatial framework, deemed by scholars as an essential critical lens for mapping educational equity across rural spaces, holds particular value for challenging a longstanding deficit model of rural populations that cements their way of life to the ostracized, illiterate, backwards, and inferior (Corbett, 2016; Green, & Letts, 2007; Reid et al., 2010). Green and Letts (2007) argue that "the rural might well be understood not just as a matter of geographical difference, but as increasingly the site of the Other" (p. 14). Presently, a "new ruralism" movement (Resina, 2012, p. 15) looks to disrupt symbols of progress imposed on rural people and counter the push towards ideals of modernity, such as the idealized model of mobile knowledge workers who have little allegiance to local communities (Corbett, 2016; Donehower, Hogg, & Schell, 2011). However, I problematize this new ruralism shift through studies of digital learning among rural families, in order to reposition rurality such that it is no longer "understood or misunderstood as a simpler more natural place left behind by the advance of modern capitalism" (Corbet, 2016, p. 154).

In the case of my study, the appropriation of technology cannot dodge the momentum built from its intrinsic connection to modern ways of being. And to help structure understandings of how modern technologies impact digital learning in rural areas, I introduce defining premises of today's changing times. Briefly described, Giddens's (1991) "dynamism of modernity" (p. 20) characterizes late modernity according to three interdependent components: the *separation of time and space*, the development of *mechanisms disembedded from local contexts*, and the *conscious appropriation of transformative knowledge*. Giddens (1991) believes that because of Internet technologies, globalized knowledge-sharing structures, and advanced transportation systems, social interactions are no longer bound by space, time, or local context. As these local/global and past/future delineations become blurred, we have greater capacity to reflect upon our social futures and consciously re-chart our life course anew. With the dissolving structure of tradition, we can usurp control over the self to treat our identities as an ongoing work-in-progress (Bauman, 2000; Giddens, 1991). At the same time, Bauman (2000) proposes the concept of a liquid modernity, where an increasingly rapid rate of change is seen as the only constant. As a result, social structures (e.g., family, neighborhoods, the economy, political institutions) change so rapidly that they can no longer be thought of as solid social frames of reference. Social life is then marked by a feeling of vulnerability, fragility, and uncertainty. The consequences of our liquid modernity are most readily actualized in contemporary approaches to self-identity (Bauman, 2000). Amid fragile times circulating uncertainty and instability as the raw building blocks of identity, fashioning a durable sense of self is increasingly improbable, as it could never hold onto the needed fixed space to cohere over time. Thus, people have

shifted from a more orthodox time, where they self-identify as "pilgrims" in search of deeper meaning, to one where they perform life as "tourists" in search of multiple but ephemeral social experiences. With self-chosen paths so rapidly replacing institutionalized ones, technology and its self-teaching tools combine with hidden socio-political forces to further isolate marginalized groups by widening knowledge and wealth gaps between rich and poor, urban and rural.

Given this, in this dissertation I suggested Thirdspace as a valuable opening for advancing new ruralism and particularly as a critical force for resisting metaphors of urban dominance and overcoming deficit-based and simplistic "spatial constructions that imagine rurality as modernity's other" (Corbett, 2016, p. 141; see also Donehower, Hogg, & Schell, 2011). According to Corbett (2016), demystifying the rhetoric of rural decay demands that we complicate rural space and any social issues therein (e.g., digital divide). Yet, in order to reject the spatially unsophisticated and simplistic metro-centric and real-imagined binary (Firstspace and Secondspace), we must dig deeper into the complex and lived experiences of the rural families (Thirdspace). The rural education challenge lies in shedding our popular conceptions of rurality as the idyllic placeholder for future resource extraction and tourist development or as the oppressively vacant backdrop to progress only occurring in cities to then "situate rural places not on the periphery of capitalist spatial production, but at its center" (Corbett, 2016, p. 154). Yet, on the contrary, this dissertation aimed to move beyond the meaningless task of re-imagining and/or digitally re-mastering the rural digital landscape into something that is *as attractive as* urban life. Only in mapping one community's (re)production of rural space could I exemplify the more nuanced and powerful rural "identity kits" (Gee, 1990,

p. 142) entangled within families' place-based digital practices. In other words, a variety of significant forces conspire to enact a rural space practiced like no other, and all deeply involved would look upon this production to be no less than central, modern, and worthwhile.

Following this consideration of the powerful and complex role of identity in changing times, Soja's (1996) Thirdspace trialectic also provided a useful frame through which we can prefigure our world and our agency within it. Here, I have interwoven this Thirdspace lens with posthumanist conceptions of nonhuman agency to rethink the nature of space, digital equity, and rural education. Though often understood differently by various scholars, from a humanist lens, agency is the human ability to act on or be a central actor in the world (Jackson & Mazzei, 2011). Posthumanists also ascribe purposeful action to nonhuman agents, which include material conditions as well as nonmaterial circulating beliefs and/or unseen power structures (Latour, 1999; Pickering, 1995). Further, in de-centering the human agent, scholars begin to acknowledge the rhizomatic and nonhierarchical relationality between humans and the nonhuman or the mangling of relational ties configuring this complex network of human and nonhuman agents (Jackson & Mazzei, 2011). From this, we assign smaller details, nonhuman entities, and/or mundane occurrences greater prominence in the construction of our social reality. Herein, for example, this permits the argument that space and place is not only socially constructed by humans, but also that the social is spatially constructed too. Methodologically, implications of a posthumanist lens re-imagine Soja's Thirdspace theory through a more in-depth and structured interrogation of the role of human and nonhuman, material and semiotic, as well as how they shape practices and the connected

spaces therein. In their spatial mapping of equity in educational research, Leander, Phillips, and Taylor (2010) suggest posthumanist analytical tools as:

> "a promising and emerging body of work"…"for reconceiving of learning 'environment,' for challenging current perspectives on agency as a quality unique to individual humans, for considering how power is enacted through particular network formations and flows, and for challenging current perspectives on the relations between humans, tools, and signs" (p. 345).

What limited Thirdspace scholarship exists in the areas of rural education, digital media, the politics of identity, and economic relations, though valuable, tends to place the human as the central all-knowing agent. This follows from the strong emphasis placed on human agency in Thirdspace scholarship. For example, while Halsey (2007) generated Thirdspace spatial understandings of how rural public school principals construct their roles and Edirisinghe et al. (2011) spatially explored the networking of social media, both studies may have overlooked possible tensions existing between humans and nonhuman contingencies. These tensions may have manifested, for example, in the ways people negotiate the space's physical or material constraints to demonstrate how ways of being human in these spaces are, in fact, predicated on nonhuman factors. Similarly, when using Thirdspace perspective to investigate how capitalist modes of economic relations produce/restructure uneven hybrid spaces, Golubchikov, Badyina and Makhrova (2013) discussed the limits of human agency but did not explicitly employ a posthumanist approach. Allen (1997) also chose a more human-centered lens when leveraging Thirdspace theory to re-imagine problematic modernistic identity politics to more effectively capture the experiences of the marginalized. However, harmful deficit-based

models of understanding arise from framing problems as solely human-centered, wherein society blames the oppressed for their own self-made oppression. Accordingly, by searching out various ambiguities being articulated through networked actions distributed between humans and nonhumans across space and time, this scholarship may have better pursued possible controversies and contradictions. Oftentimes, contradictions expose a new multi-dimensionality to the phenomenon that breaks apart and subsequently strengthens our understanding of social life (Latour, 2005).

Lastly, much of Lefebvre's spatial insight came from his research on the role technology played in the shaping of the urban landscape (Elden, 2004). Yet, no one to date has studied the role of technology as an agent in assembling the everyday of the rural landscape (and its production of space therein). Thus, in explicitly incorporating a posthumanist lens (Latour, 1999; Pickering, 1995) that destabilizes the human, we may meaningfully contribute to the literature through better examining the complexity of how rural families, their technology, as well as their technology-mediated practices *flow together* to fashion the world forward.

Objective & Research Questions

In this dissertation, I applied a posthumanist reading of Thirdspace (Soja, 1996, 2010) theory to examine the complex digital equity issues confronting rural neighborhoods of different socioeconomic status (SES). To identify families' everyday digital learning practices as well as the digital learning opportunities potentially available to them in their communities, I employed geo-ethnographic mixed methods. I interpreted my findings using a Thirdspace critical lens for re-centering the importance of rural education and modeling the potential for educational equity across rural spaces.

Borrowing from the posthumanists (Latour, 2005), I also attended to how human agents merge with the nonhuman (material conditions as well as nonmaterial circulating semiotic facts, tools, and/or unseen power structures) to shape practices, networks, and the spaces therein. In so doing, my main purpose here was to show how mapping the politics of space within rural neighborhoods of different SES may better evidence the flow of equity and/or knowledge driving families' digital learning practices. In sum, I incorporated Thirdspace theory and its trialectic considerations to build a posthumanistic case for challenging current binary and predominantly deficit-based assumptions about the digital divide, rural education, and socio-spaces in between.

My primary research questions:

1. How are digital learning opportunities and resources caught up with material space (First Space) and representations of space (Second Space) in one rural community?
2. What are rural families' everyday experiences (Third Space) with digital media in and across these spaces? How are these experiences similar and different for rural families from neighborhoods of different socioeconomic status (SES)?
3. What is the Thirdspace potential for re-imagining educational equity across rural spaces?

Brief Overview of Methods

As stated above, this Exploratory Mixed Methods Research Design (see Figure 1.2) used a geo-ethnographic approach (Matthews, Detwiler & Burton, 2005) to mix quantitative geospatial methods with qualitative ethnographies to serve the larger purpose of representing both qualitative and quantitative data along with their spatial information (Jung & Elwood, 2010). If done well, qualitative narratives can do political work

(Riessman, 2008) and help one to encounter the more quantitative geography as a kind of philosophy encoding our ground truth. Hence, in this mixing of methodologies, no form of qualitative or quantitative data was given more precedence or weight, as the integration of their analysis could serve all research questions and enhance the overall findings.

The primary aim of this chapter was to identify the important theory framing my study. I start with theory, because the real work of scientific inquiry is not theory discovery or confirmation, but theory refinement (Sawyer, 2014). From this needed iterative process of refinement, theory can better reflect real-life practice and changing empirical truths, which are not singular certainty (Nietzsche, 1887/1967). Charged with this task, I forayed into the social reality of one rural Americana and came away with findings and possible theoretical implications for digital learning in the wild.

Overview of Dissertation

In what follows, Chapter 2 will bridge this spatial framing to its mixed research design and trace the methodological movements taken to address my research questions. This will include describing my unique research positioning, while introducing my research site and data sources. Here, I will also introduce and describe my six rural families, their neighborhoods, key townsfolk, community documents, and geographic information system (GIS) data files. Next, I discuss my data collection instruments as well as the analytical tools and various interpretive strategies employed to answer each research questions. I end this chapter with a consideration of study limitations and my means of reconciling these limitations.

Chapter 3 discusses digital learning caught up with space to position the rural struggle over geography and digital equity amid the 'Right to the City' rhetoric (Lefebvre, 1968). This biased rhetoric privileges spatial justice only in terms of being "urban" and "civilized" enough to organize towards emancipation. In this chapter, I therefore contest digital inequity as a spatial issue of justice in rural areas. Methodologically, I combine GIS mapping of broad state-level material inequities with more "qualitative geographies" (Fielding & Cisneros-Puebla, 2009) storying local small-town conceptions of digital learning. Patterns of digital distribution, which privilege higher income residents and wealthy non-resident tourists, bring to light critical questions about the spatiality of injustice and the limited learning opportunities available in lower-income areas that do not fit the idyllic vision of rural Maine. Given its narrow focus on the city and the fact that digital infrastructure often emerges amid tensions between local and global (Star & Ruhleder, 1996), the 'Right to the City' rhetoric can never fully promote the critical spatial consciousness needed to mobilize more just geographies (and any digital inequities within). Rural areas can capture these tensions so much more readily in the unique ways they epitomize "the local" so much better than cities. From this, I structure a critical spatial understanding of the uneven geography of digital learning in the wild, wherein rural spatial justice matters to the fabric of American society.

After exploring the spatial distribution of digital access (i.e., how digital learning opportunities are distributed across space), I looked closer into digital use, or how families living in neighborhoods of different SES were utilizing digital tools. Thus, Chapter 4 situates everyday experiences with digital media across socio-economic spaces

to story rural spatial justice via ethnocartographies (Chapin & Threlkeld, 2001). Methodologically, I employed an ethnographically-grounded research design to spatially understand family and neighborhood case studies from a series of home visits and mobile phone diaries. From this, I employ narrative inquiry to readily dispel the myth that families of low SES are monolithic in their educational practices as well as contest deficit-based perspectives of rural families as inferior, illiterate, and backwards. By positioning findings within a Thirdspace framework, I therein illustrate the transformational possibility of this equity-oriented research agenda.

Chapter 5 poses a re-imagining of educational equity within rural space to re-map digital equity as socio-technical agency. An important goal of the chapter is to propose a posthuman socio-spatial strategy for unraveling the multidimensionality of lived processes influencing digital equity. Herein, I present an analytical example of this posthumanist spatial approach that reassembles the vibrant human/nonhuman performance of place through three successive tasks: (1) start from controversy, (2) trace interplay of networked associations, and (3) find political leverage within the newly reconfigured socio-technical agency. In doing so, I cross-validate conventional GIS maps with a Thirdspace map that stories a lived truth to recast digital equity not in terms of the "haves and have nots" but as an account of mutually transformative socio-technical agency. In these ways, I highlight the possibilities of rigorous, interdisciplinary scholarship and analytic innovations that re-think how humans and nonhumans co-produce technologies and place, as well as the transformations this might enable.

Chapter 6 summarizes major themes and positions this work in relation to the literature gaps via my conclusions and implications for digital learning in the wild. Most

importantly, this chapter introduces a variety of possible actions and solutions to the social ills I denounce throughout this dissertation. These recommendations are specific to my rural population and are otherwise linked to my findings in some way. Furthermore, they are focused on delivering more equity-oriented practices at the community, school, and/or national level. I end this body of work by calling for future studies that extend this research through a variety of theoretical and methodological aims.

CHAPTER 2
METHODOLOGY

Research Design

To support the goals of this dissertation and answer my research questions, I capitalized on a geo-ethnographic approach (Matthews, Detwiler & Burton, 2005) to geospatially explore this model rural microcosm and its visible digital learning opportunities in juxtaposition with rural families' digital learning practices at home and beyond. In most prior GIS studies of the digital divide, researchers have focused primarily, if not solely, on examining geospatial patterns in numerical student outcome data, such as test scores (Bigman & Fofack, 2000; Tate, 2008; Tate & Hogrebe, 2011; Tate, Jones, Thorne-Wallington & Hogrebe; 2012). This quantitative approach, however, fails to capture nuances of everyday phenomenon, such as specific digital practices revealed within families' ethnographic data (Matthews, Detwiler & Burton, 2005). Therefore, this geo-ethnographic study served the larger purpose of representing both qualitative and quantitative data along with their spatial information, as scholars have found GIS to be a powerful tool for mixed methodologists who approach the social sciences from a socio-spatial lens (Frels, Frels & Onwuegbuzie, 2011; Jung & Elwood, 2010).

This brings to light critical implications, as paradigmatic debates continue over opposing ways of thinking about and researching the social sciences. Quantitative researchers uphold generalizability via more rationalistic scientific methods, while qualitative researchers reject the concept of generalizability to instead study social issues through an interpretative lens (Shaffer & Serlin, 2004). Possibly in response to the polarity of the paradigm wars producing "incomplete answers to research questions and

potentially inappropriate inferences based on findings" (Ercikan & Roth, 2006, p. 14), mixed methods have gained increasingly popularity (Gelo, Braakmann & Benetka, 2008). Briefly described, mixed methods "mixes or combines quantitative and qualitative research techniques, methods, approaches, concepts or language into a single study" (Johnson & Onwuegbuzie, 2004, p. 17). While a diversity of perspectives exist on what quality criteria mixed methods should embrace (Creswell & Plano Clark, 2007; O'Caithain, 2010; Tashakkori & Teddlie, 2009), most identify a mixed methods study by its analytical end product demonstrating genuine integration of qualitative and quantitative research strands (Bryman, 2007; Creswell & Tashakkori, 2007; Mertens, 2011).

However, due to pressures to collect an overwhelming amount of qualitative/quantitative data, this analytical end-stage integration remains an elusive target (Bryman, 2007; Frels, Frels & Onwuegbuzie, 2011; Niglas, 2004). As such, more and more scholars are urging mixed methodologists to take up the latest sophisticated technologies, particularly GIS (Frels, Frels & Onwuegbuzie, 2011), to ease the burden of data integration as well as distinguish mixed methods as the "new movement or discourse" or third research paradigm (Johnson, Onwuegbuzie & Turner, 2007, p. 113). Yet, while my GIS maps eased the analytical integration of an overwhelming amount of data through sophisticated spatial techniques layering data for easier analytical thinking and meta-inference making, my GIS maps were also used as backdrop to more pressing realities. This is not to denounce their importance, as I referred to the state-level Maine GIS maps often and kept a printed copy of the GIS neighborhood map of Bingham with me during all home visits. These maps were the days' fundamental canvas on which the

town's class tensions were lived out. Though GIS mapping is descriptively quantitative, my ethnographic fieldwork built rich stories around these maps, but in distinctively qualitative ways. Seen this way, my geo-ethnographic approach required orchestration of both rationalistic *and* interpretive competencies.

Data Site and Research Positioning

First and foremost, I chose the small rural town in central Maine for the setting of this study for several reasons. I grew up and went to school in this town. This helps me to recognize the implicit values of this rural community and understand the history of the school district. As a child, I also frequented the town library, and in my recent visits have seen how the Internet and computer stations have changed the library culture, but have, at the same time, not changed the informal communication channels of the town. I also know the history of many of its families and watched how small towns can work to level opportunity—inside and outside the classroom. Lastly, my life history is one where I have been/am being mobile across the class structure. And when reaching across social and economic divides, I tend to frame my adjustment as coming from a place of difference as opposed to deficiency. Though this personal connection may have generated certain perspectival assumptions and biases, it has also laid the general background knowledge necessary to deepen understanding into the nature of digital inclusion efforts in this rural community.

The town of Bingham, Maine sits on the 45th parallel, halfway between the North Pole and the Equator. It is about 40 miles from Waterville, a city of 15,722 that also contains two colleges (Colby College and Thomas College). Portland, Maine's biggest city of 66,881, is 115 miles away. When entering Bingham, you meet a sign stating such

facts and welcoming you to “God’s Country” (see Figure 2.1). In 2010, the population was 922, mostly Caucasian (97%), and the median family income was around $31,538 (U.S. Census), which is notably lower than the median U.S. family income. The town has one library, two convenience stores, three gas stations, one grocery supermarket, one post office, one town hall, and one church. Bingham was at one point a bustling town with two water-powered sawmills and two flour mills. Now, all mills are closed and the only gainful employment comes from employment in one of the small businesses, the post office, or within its three schools: Moscow Elementary, Quimby Elementary, or Valley High School. While the state of Maine average for enrolled students in an elementary class is 208, Moscow Elementary has a total of 70 students within its grades PK-4th. Quimby Elementary serves 43 students in grades 5-8 and maintains a student-to-teacher ratio of 6:1, which is half the state average of 12:1. Valley High School has 70 students in grades 9-12. For neighborhoods, Bingham has distinct neighborhoods of different socio-economic standing. The low-income area of Murray Hill is clearly defined from the wealthier Meadow Grove by the town’s highway and from the middle-income Concord by its river.

Figure 2.1. Bingham Welcome Sign

Preliminary Data Collection/Pilot Study

Given the large-scale ethnographic scope of this dissertation, it was critical that I first undertake a pilot study. This prior work and time in the field helped me to plan for a more rigorous, yet manageable research design in my follow-up dissertation. On the theoretical level, I was able to test and determine key components related to my dissertation's conceptual and analytical tools as well as refine my research questions. Concerning methodology, my pilot study helped to resolve data collections problems, identify research site particularities, specify participants, as well as evaluate the survey questionnaires. Because my pilot study was inspired from the Cooney Center's larger cross-institutional Families and Media study, many of its interview questionnaires were modified from those Cooney surveys tested/validated across multiple families over multiple home visits. Though many of the original pilot study questions and

questionnaires did not survive the refinement process and transfer over to my dissertation study, they served as the context for many of my final instruments.

Question-Specific Methodological Components

From this general research design, research site, and preliminary data collection, I present my research questions again followed by the data collection components (e.g., sample, instruments) and analytic procedures for addressing each one.

Research Question #1

How are digital learning opportunities and resources caught up with material space (Firstspace) and representations of space (Secondspace) in one rural community?

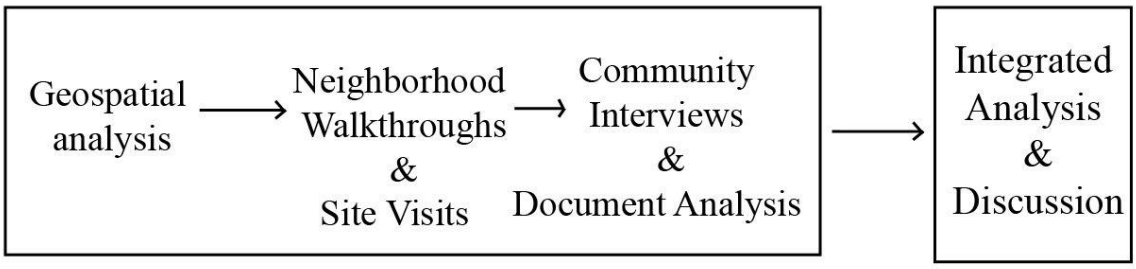


Figure 2.2. Specific Data Collection Methods for Firstspace and Secondspace Analysis

Data Collection

Geospatial analysis. While my first research question focused on the Bingham community, I conducted my geospatial analyses at both the state and community levels. Analyzing state level data was a useful means of mapping the overall distribution of digital learning opportunities in rural Maine and enabled me to locate Bingham in a larger sociopolitical context. For data, my Firstspace analysis considered the spatial arrangement of Bingham homes within various neighborhoods, its various road networks as well as the state's population density, income distribution by zip code, broadband availability, and density estimation of digital learning opportunities (i.e., the number of

schools, libraries, and museums within a confined geographic rural space). For the purposes of my study, digital learning opportunities did not include after school learning centers or Internet cafes. This was because schools, libraries, and museums are among the only publically accessible digital learning sites the U.S., wherein one can assure they demonstrate previously discussed characteristics supportive to digital literacy learning. Additionally, the U.S. Census tracks and geo-locates its publically funded schools, museums, and libraries. Thus, accessing the density/scarcity of rural community's digital learning opportunities as well as spatial arrangement of homes took place through freely available U.S. Census GIS data. These data are encoded through special-purpose shapefiles, which spatially describe cartographic and attribute information through vector features (ESRI, 1998). Within shapefiles, the attribute information (at the database level) describes qualities associated with the geographic features (at the map level) and vary depending on the source/database. At the model level, additional data can be calculated and added to the attribute tables to make visible the information considered more meaningful and specific to the researcher and audience needs (e.g., density of digital learning opportunities). Stated again, my state and local community attributes included Bingham homes, road networks, state income, broadband availability, state population density as well as the number, location, and density/scarcity of Maine's schools, libraries, and museums.

Neighborhood walkthroughs and site visits. To complement this GIS fieldwork and answer Secondspace-specific research questions, I also conducted neighborhood walkthroughs and site visits. This decision was based on the core principle that place matters. Specifically, this means that an individual's place of residential is a highly

influential factor shaping the likelihood of their access to educational learning opportunities (Duncan & Murnane, 2011; Nueman & Celano, 2012; Reardon, 2013). In fact, some argue that neighborhood is a more powerful predictor of later educational outcomes than individual characteristics, such as age, gender, and personality (Burdick-Will, et al., 2011). Because I wanted a broad understanding of neighborhood effects to permit comparisons between neighborhoods, I attended to possible social disorder (e.g., people arguing in the streets, children playing dangerously) and physical decay, such as peeling paint, littered streets, and/or illegible signage. Thus, the neighborhood walkthroughs helped to further establish the real-and-imagined local lay of the land, in terms of gathering descriptive differences/similarities in general living conditions, scenery, and general safety between neighborhoods. Next, to further investigate the significance of institution, technological infrastructures, and/or social networks in the town, I conducted observational visits to community-based learning sites, such as libraries, schools, museums, and afterschool programs, on three separate weekdays from the hours of 2-5pm. In these locations, I evaluated the availability of technology, its quality, as well as the activities performed with various technologies.

Community interviews and document analysis. Next, I interviewed key townsfolk and collected community documents, historic town artifacts, and relevant news media. Interviews helped to locate stories and interrogate historic and non-historic artifacts in a way that could elicit how various rural digital opportunities came to be articulated through networked actions and discursive practices across space and time. Other historic town artifacts and seminal community documents were accessed through

the town library's online archives or through the "Old Canada Road Historical Society" website.

Participants

The purposive sample of key townsfolk depended upon variety and quality, as I aimed to gather the information of greatest utility from the least amount of interviews (Maxwell, 2013). From the diverse stories of E. Smedberg (local mother), D. Hussey (Valley High School's IT director), L. Corson (local retired elderly woman), and S. Brochu (town librarian), I felt the rich historical complexity of the town could be better elucidated from key voices that shape or had shaped it. My pilot study identified various community insiders with the greatest knowledge of technology in the town. For example, the school district's IT specialist was especially proud of their 1-to-1 laptop program and believing "it has worked very well for our small school" (D. Hussey, personal communication, September, 9, 2015). Thus, this IT specialist along with the town librarian were examples of key townsfolk I was then interested in interviewing more in-depth in my subsequent dissertation study. Despite having six rural mothers in my study already, I chose yet another local rural mother in the interest for her incredible political/historical understandings of the town. I also opted to interview a retired elderly woman, because not only did she know all the town gossip (to cross-validate data from other key townsfolk), but she had keen critical insight into the positive and negative aspects of rural life.

Semi-structured interviews varied from formal to casual, such that interviewees could tell their story on their own terms. More informal extensions of the interview included follow-up via email, phone, or text message. Questions revolved around how

Bingham fit (or did not fit) their idea of a small town, what this vision of small town life meant for children's digital learning, as well as how technology may have changed the landscape in recent years. In addition to this specific focus on technology, the interview questions also sought a broader "typical" picture of this rural life to draw out implicit understandings or "country common sense." I developed this combination of interview questions to try to evoke their rich experiences in the small town amid today's changing times, and I shared various historic and non-historic images of the town to assist them in their storying process.

Table 2.1

Neighborhood Walkthrough, Site Visits, and Community Interview Data Collection Instruments

Instrument	Purpose	Example Statements
Neighborhood Walkthrough	Observational protocol to guide examination of neighborhood living conditions and scenery as well as safety of streets.	"Are the streets clean or is litter scattered about?" or "Are children playing together or are people shut in their houses or yards peering out suspiciously?"
Site Visit	Protocol for examining public learning sites with specific attention paid to comfort and use of space.	"Do people appear to know what they are doing on technology devices?" or "Are the technology devices modern and are there enough?"
Community Interview	Guided means of using questions and town photos to gather local accumulated geographical and storied knowledge about the community.	"What do you consider to be typical of a small town and how does this town fit that image?" or "In this town, what role does technology play in children's learning?"

Note. All instruments are included in Appendix A.

Analytic Procedures

To characterize Firstspace, or *perceived* surface appearances such as the material forms of social spatiality, I mapped the community. For the first component of this question, I addressed Firstspace material forms of social spatiality in terms of the

community's spatial density/scarcity of digital learning opportunities. In particular, the community attributes included road networks, population, population density as well as the number, location, and density/scarcity of homes, schools, libraries, afterschool learning centers. I displayed population density through the spatial arrangement of the homes. This was done via a simple visualization of distribution over space by means of dot maps providing an initial overview of information on the structure of the distribution among local families. Unfortunately, U.S. Census data on schools, museums, and libraries was not available for the Bingham zip code. For my own surface analysis, I then geo-located Bingham's four digital learning opportunities through the GIS by way of my neighborhood walkthroughs.

From this, I utilized GIS mapping and spatial analytics to combine a baseline map of road networks with the corresponding images and density of digital learning opportunities by neighborhood to better indicate how rural neighborhoods differed in terms of resources. I chose road networks as my baseline map, because roads could serve as quick location identifiers in rural areas with little for landmarks, while also leaving ample visual room for subsequent data layering and analysis. Thus, the geographic clustering (inclusive of location *and* accessibility of digital learning opportunities) within specific neighborhoods represented the micro-geographical unit of analysis and the across-neighborhood variation simultaneously afforded a broader macro-geographical analytical scope. And so, my Firstspace final analytical product was the ArcGIS density map of Bingham's digital learning opportunities.

Yet, given the abundance and complexity of data at the state-level, I relied upon more refined analytical instruments for more in depth spatial analysis. Briefly, my steps

involved merging different U.S. Census GIS data files on Maine's museums, schools, and libraries into one file to then calculating the density of digital learning opportunities. All state-level data was access through publically available U.S. Census GIS data, which are encoded through special-purpose shapefiles, which spatially describe cartographic and attribute information through vector features (ESRI, 1998). The attribute information, locked within shapefiles, describe qualities associated with the geographic features and vary depending on the source/database. Additional data can be added to the attribute tables to make visible information more meaningful specific to the researcher and audience needs. In my case, when I had my one merged shapefile, I needed a means to distinguish variation between digital learning opportunities and to identify clusters or regularity in the distribution and nature of digital learning opportunities. For example, for my previous density maps, I have had to create a new attribute field through the ArcMap function "Add Field" (see Figure 2.3). Next I calculated density of digital learning opportunities using the field calculator to divide the population by the number of digital learning opportunities present or "Tech_Site" via the Field Calculator (Figure 2.4). When representing this density of digital learning opportunities within a heat map, one can then program the varying density calculations that populate into your "Digital_Density" field to appear in terms of a color gradient or in terms of identifiable dots.

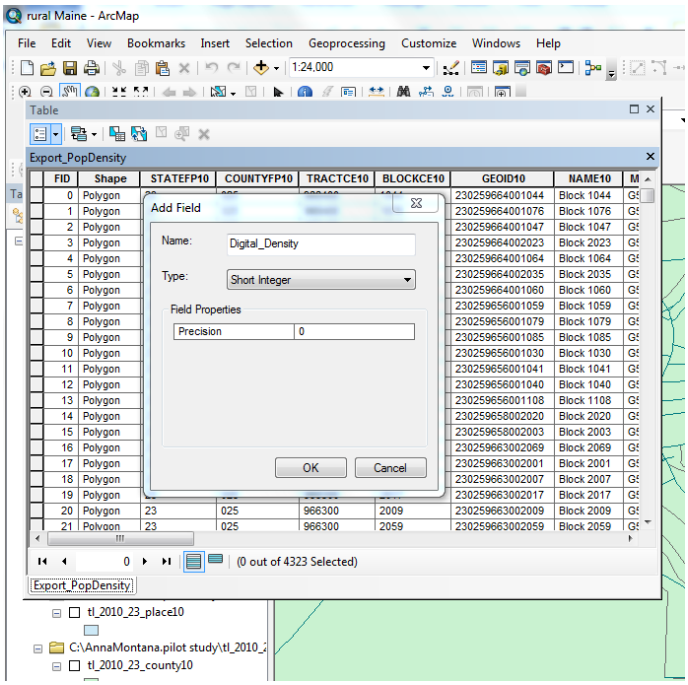


Figure 2.3. Adding New Attribute Field of "Density of Digital Learning"

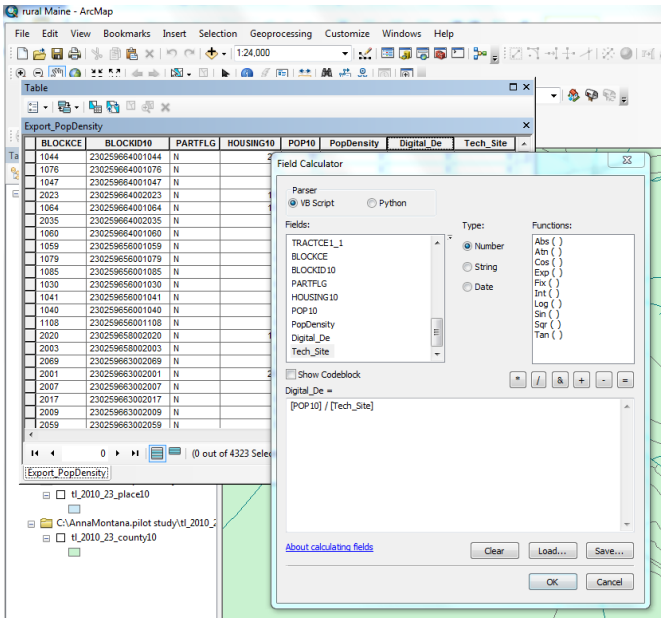


Figure 2.4. Using Field Calculator to calculate new field values for "Density"

Despite this more refined technique, my state-level analysis adhered to the conventional mapping processes of selecting labels and symbols, choosing the scale, and

layering. And from my one merged shapefile of Maine's digital learning opportunities, I created a dot density shapefile. In the end, I opted for dot density over color density, because I wished to distinguish between libraries, schools, and museums. Next I spatially analyzed the population density of Maine using the U.S. Census household income shapefile. I chose to portray population density in terms of a color gradient, such that I could overlay my digital learning point density shapefile to grasp possible spatial factors for the phenomena. I next spatially analyzed the distribution of income and broadband availability throughout the state of Maine and created heat maps. For a more nuanced look, I last computed the per-capita density of digital learning opportunities. Using the population density Census shapefile as an analysis mask, I divided the total digital learning opportunities in a given zip code by that area's population. This final map also showed density in terms of a color gradient. This helped me to more readily answer whether more learning opportunities were located in particular areas with less population. From this, my final analytical products were the state-level ArcGIS density map of digital learning opportunities (layered atop the population density map), the broadband penetration map, the income distribution map, and the per capita distribution of digital learning opportunities.

To deepen understandings of these differences and how they may be caught in the representations of space (Secondspace), particularly as they relate to digital media, I leveraged community documents, historic town artifacts, relevant news media, and interviews with key townsfolk. For example, the district high school has just been ranked number one in the state of Maine by Newsweek's "Beating the Odds" list, which ranks schools on the extent that they "do an excellent job of preparing their students for college

while also overcoming the obstacles posed by students at an economic disadvantage" (Ohm, 2015, para. 4).

Amid quantitative-qualitative paradigm wars and its related call for more sound mixed methods integration, techniques for methodological innovations have grown increasingly computerized. "Qualitative GIS" emerges as a new methodological synergy that uses technology to integrate qualitative research with quantitative geo-spatial analytics (Elwood & Cope, 2009). A possible methodological avenue proven useful for overlaying conceived Secondspace representations of space amid Firstspace surface appearances is through ArcGIS Story Maps (http://storymaps.arcgis.com/en/). Using digital technologies to represent spatial elements of qualitative data, the maps situate the non-cartographic qualitative data atop more authoritative baseline maps. Through the increasingly innovative GIS visualization capabilities (e.g., custom pop-ups, legends, and symbology), these interactive maps incorporate qualitative data in its more living form of narrative text, images, and multimedia content (ESRI, 2016) and open doors to several different modes of analysis at once (Jung & Elwood, 2010). Because these maps are interactive, informative (while respecting the limitations of our cognitive/visual system), and publically accessible, they are gaining importance in the field. Story Maps can include a simpler demonstration of what a place has to offer and will highlight the various stories each landmark tells. Most cities feature a storied tour of their popular destinations.

Given my active ASU student status, I gained access to a free organizational account to an already created online ArcGIS account. Further, though my ASU account came with 500 credits that I could exchange for "premium hosted services" such as the

Living Atlas's Demographic and Lifestyle Maps or certain key analytics, I considered it a more valuable learning experience to "make" my own data for my maps. Therefore, I accessed my Story Map data free through the Maine State Census TIGER files and cleaned them up to avoid using credits. Additionally, I didn't demand any special cost analytics because all essentials were provided zero cost through the Story Map app. And the publishing my final Story Map was enabled via a simple sharing of the public hyperlink to the Story Map (via the ESRI site…here's mine: http://arcg.is/1U5qsXN). Concerning issues of time, depending on how familiar one is with how everything works and whether or not one has access to the needed data elements, Story Maps via ArcGIS online can be created in a day or a day and a half.

Most time is spent gathering the data and content, as well as constructing the final narrative. Given there was much useful data and a story to be built, I turned to narrative analysis as an analytic tool for constructing narratives and/or story arcs from a variety of disorganized data elements. While the field of narrative research has been defined in various ways (Clandinin & Connelly, 2000; Kim, 2015; Reissman, 2008), Polkinghorne (1995) identifies narrative analysis as the process of organizing participant's oftentimes fragmented anecdotal material into a meaningful and representative narrative(s). Stemming from a research question such as how a certain phenomenon came about, researchers then identify salient data pieces and synthesize elements (which could be actions, events, objects, or happenings) into a coherent and storied puzzle. Most of the analytic action takes place in the iterative movement between data elements and story plot. Coherent story construction requires constant examination of logic and paradox, as the researcher moves from the minute details to the larger story arc (Kim, 2015;

Polkinghorne, 1995). Despite this narrative smoothing which rids narratives of contradictions so deeply embedded in human experience (Spence, 1986), a higher level of order and meaningfulness can be brought to the data through a well-crafted story.

With my Story Map, the particular question I asked when gathering data elements was "How have digital technology changed (or not changed) Secondspace conceptions of this small town?" In building my story, I drew heavily from the interviews from key townsfolk and particularly the topic of whether or how technology may have changed their particular vision of this rural landscape in recent years. In addition to their interview transcriptions, I relied on a narrative notebook that contained reflective field notes from the townsfolks' interviews-- each separated by tabbed dividers. Given the Story Map situates stories atop cartographic locations or town landmarks to design a chronicled tour of "Data Story Points" (ESRI, 2016), I also needed to survey the town from the "ground truth" (Prickles, 1995). Because this ground truth privileges information drawn from direct observation as opposed to that provided by inference (Prickles, 1995), neighborhood walkthrough data was collected and examined first. Each neighborhood's walkthrough field data was analyzed through narrative-type analysis first separately and then in juxtaposition with the other neighborhoods. This helped to draw out nuance and deepen any residents' emotional connection to the space. Both old and new photographs of those key locations and neighborhoods were leveraged to further illustrate and enhance key elements of the plot. This data assemblage supplied substantial material around which to review and construct a story arc.

Narrativizing the disjointed data demanded analytical thinking, synthesis, and reflection. Contrary to what Polkinghorne (1995) discusses in terms of narrative

configuration running counter to data reduction and deductive analysis in that it seeks to build data elements together into a cohesive and organized story, I found that my particular Story Map medium demanded significant story reduction. Despite initial efforts invested in story synthesis occurring across data via recursive movements (e.g., from interview #1's reflective field notes, to interview #1, then to interview #2, then to historical photograph #1, and then back to the reflective field notes), I reminded myself that most Story Maps are not intended to be complex. They are to be approached similar to how one would approach a short and simple story read in the course of one sitting. Configuring my narratives soon involved re-configuring them by shaving down the stories for fit and flow. In this way, the key elements of its plot could concisely caption each geo-located Data Story Point. And once I had my story arc, concerning changes in Secondspace conceptions of the community related to the introduction of digital technology, uploading data into the online Story Map was intuitive. But particularly the first time, as added insurance against things growing overwhelmingly unmanageable, I invested in the pre-planning and revision of each cartographic detail of the Story Map.

And so, My Secondspace final analytical product was the ArcGIS Story Map. As stated prior, to depict a Secondspace image of this changing rural space, this map coherently organized photographs and artifacts from the town chamber of commerce, local photographer websites, as well as historic town web pages. Herein, I used this Story Map as a data representation tool to revisit these juxtaposed old and newer utopian Secondspace rural visions sold to outsiders and insiders alike. I captioned these old and new photos with links to news media source articles or short tales, or notable "sound bytes" (B. Gee and K. Anderson, personal communication, April, 18, 2014), from

interviews with key townsfolks and my own reflective field notes. From this Secondspace representation of data, I toured the changing landscape across time to tell the story of rurality, late modernity (Giddens, 1991), and technology both before and after digital technologies entered the picture. In my case, merging ethnographic data with quantitative and cartographic variables via Story Maps helped to contextualize multi-scalar geographic information in novel and less uni-dimensional ways. Thus geovisualizing qualitative data, through mapping the simultaneity of macro *and* local foci, helped to unearth the richness and multifaceted nature of human and cultural experience in space, time, and place.

Research Question #2

What are rural families' everyday experiences (Thirdspace) with digital media in and across these spaces? How are these experiences similar and different for rural families from neighborhoods of different socioeconomic status (SES)?

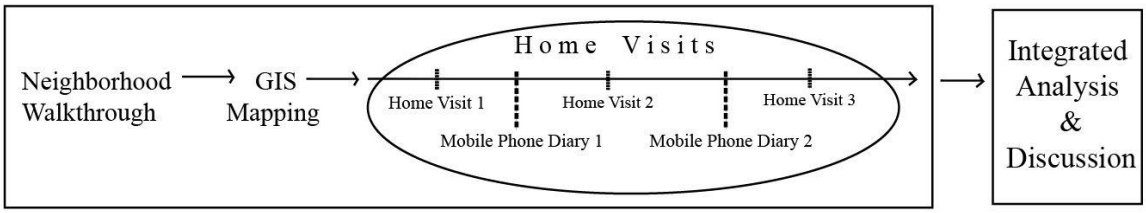


Figure 2.5. Specific Data Collection Methods for Thirdspace Analysis

Data Collection

Neighborhood walkthroughs. For the neighborhood observation, I used the neighborhood walkthrough data previously described in my narrative analyses for Research Question #1.

GIS mapping. After gaining an in-depth examination of the neighborhoods and learning sites, I sought a broader bird's eye view to render the rural area as more immediately understandable. For this, I used simple GIS mapping to ascertain the boundaries of the neighborhoods respective of certain identifiers (e.g., road networks, rivers, house clusters) and with particular attention paid to the spatial distribution of the town's digital learning opportunities. This data was borrowed and slightly modified from my GIS analysis in Research Question #1.

Home visits. To address the extent to which digital literacy tools and practices manifest across families of different SES, I compiled family and neighborhood case studies from a series of three home visits conducted over a period of several months[1] (see Figure 2.5). Via an ethnographically-grounded set of data collection instruments (see Table 2.2), the home visits aimed to capture the family's "typical day," overarching learning relationships between family members, as well as the digitally-mediated learning arrangements in the home and beyond. In simpler terms, this means I specifically chose semi-participant observation, semi-structured and unstructured interview methods and collection instruments which could best situate the data (fieldnotes, sound recordings, interview notes) within their everyday context of use in order to account for ethnographic components of "what goes on, on the ground, in living colour" (Agar, 2008, p. 10). Except for home visit 1, home visit 2 and 3 adhered to a structured two-hour semi-scripted protocol (see Appendix B) that included observations, a family timeline activity, and semi-structured individual and group interviews drawing out the rural families' storied experiences with digital media. The first and the most intensive home visit

[1] Data collection began with a pilot study initiated in 4/13/2015.

differed in that it included a "daily media round" (Taylor, Takeuchi & Stevens, in press), or a day-long observational protocol, for the purpose of uncovering families' lived experience with technology, the meaning of those experiences, and the potential dynamic of nonhuman agents/broader networks. In subsequent home visits 2 and 3, I then leveraged these primary observations as a springboard for discussing more general family practices and beliefs around technology in rural life.

Between home visits 1 and 2 and again between home visits 2 and 3, I also asked parents to use their mobile phones to send me combined picture and text messages to provide 'experience snapshots' of their focal child's activities six times on each of two separate days. The purpose of these mobile phone diaries was to provide an in-depth and cultural account (via the parents' purview) of the focal child's daily activities and gauge the extent of their everyday media use (Plowman & Stevenson, 2012, 2013). As a pragmatic response to some of the challenges of collecting in-depth and extensive family research, this strategy allowed me to know more about what happens when I am not there. Additionally, placing parents in charge of collecting and selecting data to send in on their own mobile phones may have circumvented some of the ethical challenges of researching the home environment while encouraging an empowered level of participation.

The mobile phone diary entries were sent to a secured Google Voice account (207.200.3162) and upon receipt of each combined photo and text message, I sent a confirmation text. Stated again, the mobile phone diaries took place on two separate days and lasted from 9am-5pm on each of those days. Each family's six photos were then chronologically arranged on a large 24" by 36" foam board entitled "Daily Storyboard."

Upon the second and third home visits, I brought the storyboard and discussed theses mobile phone photos with parents and their children to better understand the focal child's everyday activities. While this data collection strategy offered a useful window into families' Thirdspace experiences with media, attention was paid (in later data analysis) to the biases families may have lent to the story they constructed. This bias was checked through cross-validating the mobile phone diaries against other existing family data. That said, at the end of each of these home visits, families were gifted with their "Daily Storyboards" along with their monetary $30 compensation.

Participants

I drew a purposive sample, which included 6 families who live within the same rural area of central Maine, have a focal child between 4-6 years of age, at least one older sibling between 8-17 years of age, and own at least one technology device (e.g., mobile phone) with which they engage in joint media learning with their children. Most interesting is that though the six families live in the same small town, I expected them to experience the space quite differently, due to how SES may shape their daily routines and social rhythms. Three of my families were recruited through introductions facilitated via the three families participating in my previous pilot study. Prior to study launch, I informed all six recruited families of formal IRB-approved study protocol, timeframe, and participation guidelines. Interested families voiced minimal concerns and questions about the study protocol and the IRB-approved informed consent form (which I then addressed). Each family then agreed to dedicate several months to the study and allowed me to enter their home on three separate incentivized occasions (i.e., cash payment of $30 after each visit).

Though most families in rural Maine report low household incomes, I selected a range of six families capable of depicting the widest continuum of SES in Bingham (from lowest to highest) to provide a more nuanced description of class. In ordering the families in this way, I weighed all factors contributing to families' socially-ascribed status, including income, parental education level, lifestyle, domestic technology infrastructure, surrounding community, as well as how these are symbolically embedded in wider relations of power (Bourdieu, 1986). This purposive sampling strategy was used, because I wished to examine these particular dimensions of variation in the population of families and to maximize the diversity of this selected sample. In other words, I examined disparities across families to best represent the greater extremes of rural Maine families. Further, because all families reside in this same remote low-populated area, the benefit was that these six families could represent a realistic snapshot of the wide socio-economic variation across families given they constitute a sizeable portion percentage of the 54[2] total households living in the immediate town of Bingham.

Family 1 (Beane). Becky (age 32) has three children Lacie (age 6), Brianna (age 9), and Brayden (19 months) and rents a small apartment above a heating oil repair service in Murray Hill. Becky has a high school diploma and is a stay at home mother. Their annual income (around $7,500) comes from child support from the father of Becky's children. Outside of cash income, Becky also gets $700 a month in food stamps. Lacie is in first grade, has attention issues, and prefers watching YouTube and playing games on her grandmother's old phone or the family's shared laptop than reading books. Becky is considering medication to help Lacie to concentrate on her schoolwork. Becky

[2] The entire township has about 150 families residing along its Kennebec River.

has had addiction issues and considers herself to be in a "rut." She has no car and relies on her mother to drive her to the store or to the nearest larger town to go to Walmart. She watches TV talk shows or Judge Judy much of the day to escape.

Family 2 (Soren). The Soren family includes Sara (age 31) and her children Maya (age 6) and Sol (age 14). Sara has a high school diploma and some college experience. She is currently working as an educational technology support staff specialist at a local middle school. The family's reported annual income is around $12,000. The Sorens have a large family network and live in a house owned by Sara's mother in the low-income neighborhood of Murray Hill. Oftentimes family members, such as Maya and Sol's cousins, uncles, and aunts come out and take part in the raising of Maya and Sol. Implicit shared values communicate that family time and outdoors activities take precedence over technology use. Maya just entered her first year of kindergarten, and Sol just entered his first year at the high school. His favorite class is science, which is taught by Daniel Melcher (Family 6). He consistently gets on the honor roll and takes part in the school's gifted and talented program. And recently, when the home was burglarized of all Sol's video game equipment, Sara decided to not reinvest in the technologies. She prefers that Sol focus on his studies and extra-curricular activities like soccer and snowboarding.

Family 3 (Howell). Trina (age 44) and her family live in a small house she owns in the farm area of Concord further away from the center of Bingham. After dropping out of high school, she later returned to get her G.E.D.. She did not pursue college and now stays at home to watch over her two children, Giuseppe (age 7) and Aiden (age 8). Her boyfriend Ken (age 42) didn't graduate from high school and earns the family's annual income, which ranges from $15,000-$20,000. The nature of his work is blue collar and

involves lining dumps throughout Maine during summer. In winter, he is laid off. Ken has been struggling with addiction for several years and is now on Suboxenes to help with withdrawal from more volatile painkillers. The Howells often have trouble making bill payments; phones are often turned off or cars are left broken until money can be gathered for their repair. Trina will sometimes take part-time jobs to contribute to their income. But oftentimes, she must quit these jobs, as managing the home while working outside the home becomes too much of a burden. The boys play together frequently and also ask to borrow Trina's cell phone to connect with their father while he is away working during weekends. The Howell family is the only rural family that lives without Internet.

Family 4 (Stewarts). Monica (age 33) and her husband Mark (age 34) have two children Ayvah (age 5) and Isabella (age 8) and live comfortably in a two-story, 3-bedroom house. They built the house themselves, and it sits on the northern edge of the upper-income neighborhood of Meadow Grove. Both have only a high school diploma and work multiple jobs to bring in their combined income of around $25,000. Monica works part-time in Bingham's town bank and Mark works building roofs for local houses. They also own a food truck catering business and travel to horse shows and fairs in summer to sell hot dogs, burgers, and fries. Monica affords her girls a Leap Pad for educational gaming and a Playstation 4, on which the girls play Minecraft together. Yet, Monica strongly regulates their time with media, making sure their YouTube channel is child-friendly. Monica often uses media time to reward her children. Mark considers himself to be a gamer (playing more than 14 hours/week), but does not readily engage in

video gameplay with his children, because he prefers different more adult "hack-n-slash" games (e.g., League of Legends).

Family 5 (Spencer). Wendy and George (33) are married with two children. The youngest is Raig'n (age 5), and her older sister is Rylee (age 8). Wendy and George both have high school diplomas, but only George works outside the home. While Wendy stays home with the kids, he labors as a foreman for road repair crew on the backroads of Maine. He works long hours in summer and barely sees his children on weekdays. The combined income is about $30,000 and they rent a large 3-bedroom house in Meadow Grove. The family owns 1Wii, 1 tablet, and 2 TVs. None of the children are allowed to use their parent's smartphone and Wendy regulates the children's media use during weekdays. However, when George is home from work on weekends, rules are more relaxed. Raig'n and Rylee rarely paly games on the Wii, and Rylee is more interested in using the tablet to watch videos and play games. When Rylee is grounded from media, Wendy will store the tablet on her dresser.

Family 6 (Melcher). The Melchers live comfortably in a two-story, 5-bedroom house in the middle of Meadow Grove. Maureen (age 38) and her husband Daniel (age 39) have three children Levi (age 4), Lucy (age 7), and Logan (age 13). Maureen and Daniel both have a college degree and own their whitewater rafting business. Their family income is about $60,000. In summers, Maureen manages the business from her home office, while Daniel spends long hours away to ensure the trips run smooth on site upriver on the Penobscot. During winter months, Daniel works as Bingham's sole high school science, and Maureen stays at home with Levi. While the parents readily provide their children with the latest technology devices (e.g., Macbook laptop, desktop

computer, Wii, iPods, iPhones), they value the outdoors and harbor certain misgivings over the learning capabilities of media. As such, media use in the family is limited. Yet, Maureen is busy with work in summer and admits that it's hard to regulate their time with technology from behind the closed doors of her home office. But Maureen and Dan work to set a good example of responsible learning habits. Both Lucy and Logan are on the honor roll and involved in many extracurricular activities in the community.

Instrumentation

For my pilot study and dissertation, I collected qualitative and statistical data (e.g., number of technology devices in the home, family income) from a few Likert-type and open-ended questionnaires. These instruments, their purpose, and some examples of questions are shown in Table 2.2. Stated again, this dissertation was a refined extension of my pilot study and sought to draw out the most comprehensive, yet diverse and in-depth picture of everyday life in this small town. Because of this, I needed to collect a multitude of family data across a wide array of data instruments. In the end, I found information gleaned across all instruments to be valuable in that it enhanced my general understanding and indirectly illuminated my ultimate conclusions or story arcs. However, given a good portion of this data did not end up directly informing my actual findings, I found it unnecessary to separately analyze and report all of the data collected through these various methods. Thus, the findings sections in my chapters that follow will contain only a detailed description of the most relevant data obtained.

Table 2.2

Home Visit Data Collection Instruments

Instrument	Purpose	Example Statements

Daily Media Round (1st visit)	Day-long observational protocol to guide holistic look into families' lived experience with technology, the meaning of those experiences, and dynamic of nonhuman agents/networks	"How does technology and the use of technology shape/dictate the spaces the user inhabits throughout the day?" or "What is the most meaningful technology-centered practice of the day?"
Family Technology Inventory (1st visit)	Family interview to tally all devices in the home and device-specific technology practices	"What technologies do you have in your home?" or "Who owns this device?" or "What activities are done with this device?"
Mobile Phone Diaries (2nd & 3rd visit)	Combined picture and text messages to provide an in-depth account of the focal child's daily activities and gauge the extent of their everyday media use	**Samples are pictured in pp. 152-157**
Follow-up Mobile Phone Diary Discussion & Recap of Technology (2nd & 3rd visit)	Group interview to discuss mobile phone diaries and changes since last visit	"Could you describe what is going on in this picture?" or "Was this a typical day?" or "Has anyone made any new technology purchases since last visit?"
Technology in Rural Education (2nd visit)	Individual interview to ask about importance of technology in rural education	"What is the role of technology in your children's rural education?" or "How much digital competency do you expect your children to learn in school?" or "How much digital competency do you expect your children to learn at home or elsewhere?
Child's Map of Digital Access & Interview (2nd visit)	Interview to gauge how family members access local digital learning sites	"Has transportation or other issues of accessibility ever had negative consequences for their child's education? If so, for digital learning in particular?" **Sample Map is in Appendix B**
Family Timeline of Technology (3rd visit)	Family interview to understand how technologies entered the home within the larger context of important family events (e.g., birth of parent/child, first day of school, graduation, wedding etc.)	"When was each child born?" or "Let's list when you purchased the different technologies you currently have in your home"
House Blueprint of Technology (3rd visit)	Researcher walks through house to map the domestic infrastructure of technology	**Sample Blueprint is in Appendix B**

Note. All instruments are included in Appendix B. All questionnaires (except mobile phone diaries) were loosely developed from our previous funders' national surveys, which reported a psychometrically validated margin of error of +/- 2.1 percentage points (Rideout, 2014).

Analytic Procedures

Because qualitative methods are determined by the type of experience captured (Polkinghorne, 2005), I tailored a combination of the methods from narrative inquiry particular to the nature of this research question. Stated again, narrative inquiry leverages field texts (e.g., stories, field notes, letters, email communication, interviews, family stories, photos, historical artifacts) as the units of analysis to examine how individuals create meaning through viewing their lives as narratives. While a plethora of techniques abound, I chose *narrative-type* narrative inquiry *and paradigmatic-type* narrative inquiry, because I wished to produce coherent stories from a data corpus of disjointed actions, events, and happenings as well as draw paradigmatic themes from existing participants' narratives (Polkinghorne, 1995). Together, these techniques could best draw out and clarify families' social reality as it becomes practiced over time and manifested into awareness (Polkinghorne, 2005).

My primary analytical task came in ascribing meaning to families' assorted stories, mobile phone diaries, access maps, technology timelines, and house blueprints. Therefore, I turned to narrative analysis once more as an analytic tool for constructing coherent narratives from disjointed and diverse data elements. I first narratively configured the data by creating a case profile for each family using reflective field notes from the initial Daily Media Round and Technology Inventory interviews. Gathered

during the first home visit, these data comprised preliminary information on household make-up, domestic technology, family income, parental education, work rhythms, and surface-level daily media practices. Next, after the first mobile phone diary, I then dove into a within-family analysis to re-visit my initial case profile narrative. Because the mobile phone diary unearthed a sneak peek into ground-level everydayness of family life thru the length of an entire day (without threat of researcher's gaze), I could more accurately identify key beliefs about technology and draw out a richer discussion of family practices with technology than staged during the initial home visit. And after the second mobile phone diary and the third home visit (which took place more than 6 months after the first home visit), I then revisited and revised my case profile narratives once more to flesh out a description of how these practices may have changed over time, as well as the "stories" that families told about technology. The case profiles turned into evolving family biographies that helped to situate the rest of my analyses and meaning-making.

As my data corpus grew, I opted for data reduction and condensed my family profiles to include only basic demographics as well as the families' or focal child's notable media practices or daily rhythms, such that they provide context for the mobile phone diaries. I chose to seek a more holistic view of family life through the narrative vignettes. I began with one vignette per family, but as I began to story comparisons across families, I condensed my vignettes into four. And though there are many more stories to be told from the data, I sought the most spatial one. Or, put differently, I chose to situate the meaning of disjointed events and memories within a space that could be broken open and seen as dynamic, relational, and agentic. For example, space was not

portrayed as static in Sara's blue bedroom or before Becky's TV or within the outdoor male-coded arenas in the towns. Herein, space commanded power and form. Additionally, because the narratives are employed to dismantle deficit thinking, problematize new ruralism, and promote more just geographies, each centers on the lived experiences of the low SES families and/or marginalized rural mothers. By this, I mean that I selected these stories according to how deeply they reflected distinct ways of being and surviving in rural America in terms of a spatial process. Thus, the reader could not read the vignette without feeling they were walking through Sara or Sol or Becky or the town's rural space (real-and-imagined). Because I wanted to evoke this "ground truth" for the reader, I visited and revisited interviews to draw out themes where space had a unique "lived" role to play over technology and over equity. Accordingly, each vignette aligned with a particular paradigmatic Thirdspace theme. This paradigmatic analysis is described below.

Given the process of narrative configuration denotes one's ability to cohere perspectival happenings into a time/context-dependent whole (Polkinghorne, 1995), my focus for paradigmatic analysis was directed on understanding how the families, themselves, were *narratively* constructing experiential reality via events and objects in their lives. Storied narratives in conventional narrative inquiry most often flow from interviews (Kim, 2015; Polkinghorne, 1995). And because humans are cognitively wired to tell stories when answering the "how" and "why" of certain experiences, the interviewer is frequently left with a series of winding and disjointed narratives. This is especially true when the stories evolve over a series of interviews or home/site visits. Therefore, in employing paradigmatic analysis of narrative in my dissertation, I sought to

uncover common themes among a database consisting of several stories (rather than a single story). In my case, most of the themes I searched for derived from previous theory (i.e., Soja's Thirdspace).

Therefore, for my paradigmatic analysis, I reread and coded their evolving stories (compiled over three home visits) in order to identify key factors which were helping the families to gain perspective on events and objects in their lives. I borrowed themes from Soja's Thirdspace theory to further understand families' agency within their underlying "structuring structures" (Bourdieu, 1977, p. 90), and particularly to focus on how families were (or were not) creating opportunity out of their inequality. This lens helped me to understand families' various stories and digital media practices as embodied Thirdspace productions. Specific detail was also paid to how everyday lived experiences of the rural family may or may not have been shaped by the past to view challenges/opportunities as resulting from global digital channels as well as very specific histories or namesake lineages. Similar to my pilot study data, I was interested in paradigmatically analyzing and coding stories in terms of how potential differences in digital practices map onto modernity, agency, and identity as well as implications this bears for learning in our digital age. With my dissertation, however, my particular paradigmatic themes were more refined conceptually and fell under the Thirdspace lens of space as (1) dynamically produced through real-and-imagined lived processes, (2) relationally assembled via collision and contradiction, and (3) radically open for agentive re-authoring and ultimate mobilization. As the analysis unfolded concurrent with data collection, I created separate Word Documents of these running themes. Examples of themes included "How Women are Dividing Labor" or "Digital Learning through Thirdspace." And because this

approach allowed for a matrix analysis, I could uncover deeper dimensionality through to also analyze across families and the pre-determined themes. This helped me to examine possible covariance or contradiction among concepts (Polkinghorne, 1995), such as mother and child's contradictory account of daily media use or how one low-income family could provide more than a family with a higher income.

Moreover, this matrix analysis helped me to achieve the fourth step which was to story comparisons across families. At this point, neighborhood walkthrough data were integrated with this family data in an effort to complement families' individual stories and/or to move beyond them. To assist me in this task, I attempted my own map as a critical departure from the neighborhood GIS map, and the conventional Story Map. Herein, I geographically positioned all families amid their metaphorical spaces (e.g., neighborhoods, digital learning opportunities) and related narrative chunks (e.g., mobile phone diaries). In other words, from the various neighborhood walkthroughs and family interview data, my maps became "ethnocartographic" (Chapin & Threlkeld, 2001, p. 21), or constructed from accumulated local and storied geographical knowledge. This perspective could best weigh the extent of surface-level digital disparity across families and neighborhoods against how they were lived out in each family. Therefore, "to engage the full nuance and complexity of…original data" (Jung & Elwood, 2010, p. 70), I produced this ethnocartographic "Storied Map" or a "Stories-so-far Map" in justice to the "rich yet ambiguous and messy world of doing qualitative research" (Crang, 2005, p. 230) as my Thirdspace final analytical product. This more storied map was inspired from social network analysis to show mobile phone diaries and connecting nodes, longstanding

social ties, and knowledge mobilization as overlain across a less authoritative baseline map.

Research Question #3

What is the Thirdspace potential for re-imagining educational equity across rural spaces?

Data Sources

Scholars assert that geographic information systems (GIS) lie at the core of today's spatial turn (Bodenhamer, Corrigan & Harris, 2010). Believing that simply conceptualizing space in terms of metaphor (i.e., Thirdspace) restricts the spatial relevance of cultural phenomenon, researchers turn to powerful GIS software to integrate, pattern, and analyze voluminous quantities of social and cultural data via accurate geographic identifiers. Through GIS maps, researchers render the complex world as more immediately understandable. The GIS does this by visually detecting and organizing spatial patterns previously unseen in table or text. From this, we can discern distributional inequality of broadband or digital learning opportunities to contest the digital divide as a spatial issue of justice. Sophisticated and novel graphical maps enabled through powerful information systems, such as the GIS, can be valuable tools for enabling interdisciplinary scholars working at the edge of their field to think and communicate spatially. Implications speak to how well-designed graphical displays (e.g., GIS maps) can increase social and political utility of findings thus guaranteeing researchers' most pressing issues (equality and educational opportunity) reach across all paradigmatic divides to deeply resonate with policy makers, educators, and the voice-less/marginalized participants themselves. Hence, GIS maps are heralded as a vital authority when making geographic information visually and politically meaningful. Given this, one set of data are the State-

Level Maine GIS Maps, which were an analytical product from the first research question.

However, because many critique the ability of GIS to story the complexity of today's lived truth (Harley, 1988, 1989, 1990, 1992; Vermeylen, Davies & van der Horst, 2012), I juxtapose these more conventional maps with the more Storied Thirdspace Map of the local area (produced from my second research question). A variety of reasons support the use of this less conventional map as contrasting data source. For example, when understanding maps as another kind of "thick" text susceptible to all the human flaws of socially-constructed knowledge, certain narratives or stories emerge alongside their under-stated silences and omissions (Harley, 2001; Piper, 2002; Short, 2009). Oftentimes blind spots on a map result from silencing histories of the marginalized as well as their interconnections across the landscape (Harley, 2001). Maps influence political process by way of hidden agenda of what they include and what they exclude (Vermeylen, Davies & van der Horst, 2012). Seen this way, maps can no longer claim neutrality; they command power and are, likewise, caught up in power relations (Harley, 1988, 1989, 1990, 1992; Vermeylen, Davies & van der Horst, 2012). When engaging in mapping as a political act, the purpose then is to unravel the map's narrative in terms of truths and lies that have been tacitly incorporated (Short, 2009).

Conceptually, this type of more Storied map combines Thirdspace spatial theory and posthumanism to push against tendency of GIS to draw cartographic boundaries that may reify taken-for-granted and static interpretations of space. By troubling representations of dynamically lived space to imaginary lines drawn on the ground (Vermeylen, Davies & van der Horst, 2012), critical geographers also problematize

conventional mappings portrayal of distributional (in)equities as fixed and bounded through frames and borders. To fully discredit the deficit perspective, this Thirdspace map may help us to further unpack the spatial interplay among rural families' digital actions and constraints. And because ineffective and deficit-based models of understanding erupt from framing problems as solely human-centered (i.e., blaming those for their own self-made oppression), I draw in posthumanist conceptions of Thirdspace. As such, a posthumanist rendering of Thirdspace shows how inanimate objects, such as technology, can also exercise agency. This mapping, as a means of deconstructing the unspoken rhetoric of GIS maps, may yield new spatial meanings to more fully represent the rich and multifaceted nature of human and nonhuman experience across space, time, and place.

Analytic Procedures

According to Latour (2005), pre-existing theories and their accepted methods left out too many "things" or "facts" involved within the social domain. Refining theory and resultant methods therefore requires an examination the social state of affairs through new eyes. And only through new eyes can we begin to reassemble social life in new ways. Stated again, ineffective and deficit-based models of understanding erupt from framing problems as solely human-centered (i.e., blaming those for their own self-made oppression). And because Thirdspace analyses tend to place emphasis on human agency, I drew on approaches that decenter the human as the all knower. Accordingly, to reimagine digital equity across rural spaces in a way that disrupts this deficit perspective, I employed a posthumanist data analysis (Latour, 2005). I structured this posthumanist analysis around three successive Latourian tasks: (1) start from controversy, (2) trace

interplay of networked associations, and (3) find political leverage within the newly reconfigured socio-technical agency.

Primarily, I drew on examples from the families' lived experiences across space to identify promising ways of re-thinking rural educational equity. I used this opportunity to place my findings in the broader context and methodologically re-map and otherwise complicate taken-for-granted interpretations of social space. Through this critical lens and spatial posthumanist approach, I could more readily emphasize the importance of rural education in relation to the vibrant human/nonhuman performance of place. This shifted the focus from the individual actor to the intersection of social spaces that represent "a knot in a web of practices that stretch into complex systems beginning and ending outside the school" Nespor, 1997, p. xiii). In this way, families' entanglement with the nonhuman (e.g., material, nonmaterial) became more central to our exploration of how we make our world (and vice versa). In posthumanist inquiry, the main vehicle for addressing larger questions, such as how class is made or, more precisely, how class is reproduced in the home, is through interrogating the everyday, the understated, and the minute.

Here is where I describe these posthuman analytic tacks, while examplifying this process through my actual data. For Latour, we must start by bringing the social back to its source of perplexity and controversy. This perplexity and controversy comes when we refuse current understandings of the social not as a pre-given fixed structure, but as a fluid entity. Developing this sensitivity towards taken-for-granted social conventions then helps to locate and deploy the paradoxical social controversies. Herein, my socio-spatial strategy involved identifying potential contradictions in how rural educational

opportunity is conceived in popular discourse and how the families understood and/or experienced the promise of digital media in rural America. I illustrated this contention vis-a-vis certain participants in my study, who did not filter their identity through the group structure that society assigns to them. This phenomenon was reflected in the ways in which digital inequity was re-programmed through the rural space. Re-assembling the social as not structures, but moving network of human/nonhuman associations required me to trace human and nonhuman actors as well as their moving associations. In doing so, I ascribed nonhuman agents meaningful and purposeful action-- no matter how minor the detail or object. This tracing revealed a new understanding of the present state of things to show how rural lives are not led from human center, but along connecting paths and tangled voices. Finally, this re-assembling revealed how distributed paths of agency exist for possibly improving the issues. Thus, after tracing the interplay of human/nonhuman entities, I could more easily recast digital equity not in terms of the "haves and have nots" but as an account of mutually transformative socio-technical agency. This critical spatial framework then served as an appropriate means for rearticulating the potential of social change via newly imagined hybridized spaces as well as the multiple networks shaping them.

The final analytical product was an end-product per se, but a forward-looking inductive means to a juxta-positioning of all previous maps (including the ArcMap density map and my own more storied maps). In more concrete terms, I staged a "re-mapping" of the social space as an exercise in envisioning different community futures. Based on my work, I designed a socio-spatial strategy to promote digital equity—with attention paid to a post-Marxist views of equity which acknowledge more than material

essentialisms (i.e., inputs equally outputs and cause equaling effect). Because this dissertation aligns with the vein of research on lived 'everydayness' (de Certeau 1984; Highmore 2002; Horton & Kraftl 2006; Lefebvre 2004), I opted for this particular methodological tack because it allowed smaller and/or mundane details great weight in the construction of rural families' social reality. More specifically, I used these maps as key instruments in problematizing the Marxist (1859) notion that "the superstructure is built on infrastructure" to weigh other symbolic and socio-spatial considerations that factor in to reflexively (re)shape the superstructural forces of culture, institutions, and practices (Giddens, 1979). In this approach to re-imagine digital equity, I also acknowledged that superstructure cannot be so easily separated from infrastructural digital forces or relations of production. This research then explored the opposing notion that the key to understanding rural digital equity may exist not within the infrastructure or the superstructure alone but within the socio-spaces housing the human-nonhuman *relations* binding these structuring structures (Bourdieu, 1977; Latour, 2005).

Therefore, from cross-validating the aforementioned maps, I drew new inferences and underscored unseen links, flows, and intersections between schools, digital learning, and society. In doing so, I questioned taken-for-granted assumptions of a "stable" infrastructure and also challenged existing beliefs of what exactly the superstructure is being built upon, given our long-term Western trend to mask power (J. Gee, personal communication, September 9, 2015), so that it can be exercised unobserved with minimal effort (Foucault, 1977). Similar to Nespor's (1997) work, I sought a broad posthumanist view to tease out how community politics, rural digital infrastructure, and school bureaucracy, as well as family histories and class structures were tangled up in a socio-

spatial web of influences which enact certain expectations for a small town's social future. This future-forward re-imagining segued to the following dissertation products: a modest conclusion/implications and call for future research.

Limitations

There are a number of limitations for a study of this nature. The most notable limitation includes the small sample of six families, which introduces generalizability issues. Second, due to time constraints, family and neighborhood ethnographies are non-exhaustive. Lastly, I acknowledge inherent methodological issues when crossing competing units of analyses. All such limitations are discussed in the paragraphs that follow. After each, I then present various strategies employed to reconcile study limitations and establish a stronger level of trustworthiness via increased reliability and validity (Shenton, 2004).

Since all data is gathered *in situ*, I am cautious to extend my generalizations to other individuals, settings, times, or institutions than those directly studied. In fact, this study was not intended to present one truth about digital learning in the wild. Rather, it sought to make obvious the spatial nature of six rural families' diverse everyday experiences with digital media. In more concrete terms, my aim was to make explicit how digital media was taken up within the multiplicity of interconnected, mutually transformative, and spatially constituted social relations. I recruit six rural families of different SES and do not believe their typical media practices or their neighborhoods generalize to other rural families of a similar SES. Rural culture is far from monolithic and houses such a wide spectrum of variability. For example, rural schooling in Appalachia will significantly vary from that of educational practices in the Deep South,

the plain states, or New England (Jimerson, 2008). And within these pockets, families will take the liberty of practicing their particular local values to produce a rural space much different than their proximal neighbors. Therein, this study could never achieve generalizability in the traditional sense.

Therein, this study cannot achieve generalizability in the traditional sense. However, the redeeming quality may lie in its ability to represent a realistic and holistic family to which the reader can relate. Stake (1980) proposes the concept of naturalistic generalization, wherein findings from a small set of cases or individuals may resonate with the reader's experience and thus become the basis for a natural generalization. It is my hope that, because all families reside in this same remote area and that these six families represent a substantial percentage of total households, I may be able to provide a thick enough description of family life in this rural town to which the reader can vicariously recognize as "rural Maine." However, the context of people, situations, events, and interpretations represented herein, though familiar and identifiable to some readers via naturalistic generalizability, will likely not be even moderately comparable to other rural populations, settings, circumstances and events.

To achieve a naturalistic generalization, I invested several months into this examination of the six families and their neighborhoods. Understandably, the aim of most ethnographies is to unearth cultural phenomena, oftentimes evolved over the span of years. Yet, I balanced my time limitation by achieving a unique level of engagement in the field. So critical to establishing credibility, or a confidence in the "truth" of one's conclusions (Lincoln & Guba, 1985), is the needed amount of time to gauge the scope and depth of the cultural phenomenon under study. According to Lincoln and Guba

(1985), while prolonged engagement in various aspects of the setting helps to sensitize one to the broader scope, persistent observation helps to deepen the scope by zeroing in on elements most relevant to the issue under study. Lending a general background to facilitate this examination was my experience of growing up and being educated within this town. Throughout my many years in this rural community, I have come to recognize its implicit values and deeply appreciate its rural context, as well as have interacted with a range of it members and kept in touch with many of the families throughout the years. My ability blend in through various actions (e.g., slipping into the Maine accent when interviewing or active listening, paraphrasing participants' viewpoint while referencing accurate town identifiers, sharing insider town gossip) helped to establish trust and rapport with my study participants (Lincoln & Guba, 1985). This rapport allowed participants to more readily disclose information or answer follow-up questions/emails.

Though this personal connection may have helped to deepen insight into the nature of digital inclusion efforts in this rural community, it may have also generated certain assumptions and biases. Because this study involves much qualitative analysis, my process is inherently somewhat subjective. Data is filtered through a personal lens and situated in a specific sociopolitical and historical moment (Creswell, 1994); therefore, I cannot dodge the personal biases/expectations I lend to my analysis. For instance, the nature of my meta-inferences and narratives depend solely on the manner in which I interpret and articulate the words of participants' lived experiences. Moreover, as the sole author of this dissertation, I assign ultimate meaning and decide what counted as worthwhile data. To account for this, I must reflexively acknowledge my own unavoidable bias, which is, at the same time, part of the abductive process undergirding

interdependency between subject and object (Popa & Guillermin, 2017; Wheeldon & Ahlberg, 2011). My willingness to undergo the needed process of internal reflection was exemplified in constantly monitoring my developing knowledge constructions and maintaining a level of transparency through data interpretation. This audit trail, or transparent record of the steps and strategic decisions taken throughout the research process, was central to demonstrating trustworthiness (Shenton, 2004).

To further minimize validity threats that falsely assume causality/meaning, I will design for a variety of ways of interrogating data through member checking and peer debriefing. Given my participants' stories could never be complete, what I present instead is a partial rendering of spoken words and a limited articulation of the space in which the words were spoken. However, through member checking, I granted select participants authority in the authoring and re-authoring of their narrative. Though participants agreed that I would have final say on the ultimate dissemination of data, their input helped to both challenge my interpretations and generate a believable representation of what they aimed to communicate through interviews (Lincoln & Guba, 1985). If something didn't fit participant's understanding of the event, I asked for clarification to co-construct meanings and rework narratives based on their feedback. In the case of young participants (e.g., Sol), I asked the parent for feedback and clarification. Peer debriefing, which also helped to reveal and then challenge my taken-for-granted assumptions (Lincoln & Guba, 1985), was welcomed through repeated consultation with my advisor and members of my doctoral committee. Through these more knowledgeable, but disinterested others, I gained the opportunity to locate and defend my knowledge claims and constructions as they emerged over time. More specifically, these external audits

continuously assessed the accuracy of my preliminary findings to evaluate whether or not my claims were supported by the data. In these ways, member checking and peer debriefing helped me to establish more rigorous theoretical validity and resultant research inferences (Maxwell, 2013).

To further demonstrate credibility and a level of transferability, where findings could possibly apply to other contexts (Lincoln & Guba, 1985), I sought thick descriptions through triangulating ethnographic data with other qualitative and quantitative data sets. Thus, the use of a geo-ethnographic approach that mixed in-depth interviewing and observation with GIS technologies improved study validity and reliability by providing sufficient detail of the data in its fullest form. Methods of data collection bring their own flaws/biases to the research (Maxwell, 2013), and though not intended to confirm findings, triangulating interview and observation data as well as analytic products (my geo-ethnographic maps) helped to counterbalance, cross-check, and broaden each data set to deepen meaning. For example, though the powerful functionality and digitized accuracy of the GIS is seemingly unsurpassed, even this technology is flawed in its ambitions. Imperfect road network analyses (Mazhelis, 2010) are further complicated by somewhat arbitrary GIS zip codes. Here, Census Zip Code Tabulation Areas (ZCTA) are calculated by asking each household "What zip code are you in?" Based on this household self-report data, the GIS then draws a boundary line around each unique zip code, regardless of whether it matches zip code data derived from other non-Census sources.

However, certain challenges also surfaced when triangulating the data and mixing methods. Embedding ethnographies, which represent the 'soft' social sciences, within the

'hard' spatial science may have invalidated the various "ways of knowing" aligned with each unit of analysis (Jung & Adviser-Cope, 2007; Matthews, Detwiler, & Burton, 2005). Following the longstanding critique that mixed methods is simply post-positivism dressed in drag (Giddings, 2006), many researchers believe that the contribution of GIS in geography can only be positivistic and thus result in the quantification, abstraction, and compression of any unit that it subsumes (Jung & Adviser-Cope, 2007). Hodder (2000) indicates that within a text-based world, "culture is written by and carried on the shoulders of the privileged" (p. 275). It is no secret that dominant power/knowledge structures can keep information hidden. Therefore, collecting ethnographic field data from the ground source can evoke a varied situatedness to unearth, map, and make visible unforeseen "sites of silence." According to Denzin (1978), finding points where data refuse each other is a central means for gaining the richest insight. In sum, because researchers are often slow to acknowledge the knots in their laces, I seek to strengthen the trustworthiness of my findings through various strategic actions aimed at either untying or justifying these research knots.

CHAPTER 3
RURAL DIGITAL LEARNING CAUGHT UP WITH SPACE: LOCATING THE RURAL STRUGGLE OVER GEOGRAPHY AND DIGITAL EQUITY AMID THE 'RIGHT TO THE CITY' RHETORIC

Growing income inequality has led to wealth polarization between urban and rural areas (Dabla-Norris et al., 2015; Credit Suisse, 2013; Zhong et al., 2010). At first, the Internet and digital technologies were hailed as 'great equalizers' expected to diminish these socioeconomic and geographic disparities (Townsend et al., 2013). Their equalizing power, however, rests on equal material access to digital resources as well as equally distributed digital literacy, or the knowledge and skills to effectively use them (Hargittai & Walejko 2008). Currently a new technologically-mediated gap between the haves and have-nots, or digital divide, indicates that material access to digital technologies as well as digital literacy are unequally dispersed (Crang et al., 2007; Gilbert, 2010; Townsend et al., 2013). This means that technology disparities follow traditional fault lines in social stratification (Warschauer, 2004, 2008), wherein disadvantaged populations, such as racial minorities, low-income students, English language learners (ELLs), and rural populations, have less access to the expert tools and the instrumental guidance needed for full participation in the world of tomorrow (Hargittai & Walejko 2008; Steyaert, 2002). Because digital exclusion further segregates these marginalized populations into spatially distinct pockets of concentrated poverty (Castells, 2000; Malecki, 2003; Van Dijk & Hacker, 2003; Mariën & Prodnik, 2014), researchers now view Internet technologies as amplifying existing social and geographic divides (Toyama, 2015). Amid our digital divide and increasing economic inequities, the ability to connect to other resource-rich regions, either physically or digitally, becomes more essential for social and economic

development in today's globalized age. With rural areas increasingly falling short of this imperative, great concern arises as the chances for digital inclusion grow slimmer (Bosworth et al., 2015; Bock, 2016).

Against this backdrop, this study maps the flow of digital equity across perceived and conceived (i.e., real-and-imagined) spaces at the state and local levels. To do so, I first outline the challenges and opportunities that define the scope of rural digital learning practices. Next, I introduce the spatial turn and particularly the spatiality of injustice to then position this rural digital equity agenda against the 'Right to the City' rhetoric. In my purpose statement, I then present what needs to be examined specifically in terms of rural digital inequity to fill needed research gaps in spatial justice studies. My research question follows to further refine my focus on how digital learning opportunities and resources are caught up with rural space, both material Firstspace and conceived Secondspace. GIS analysis is next presented as a central means of uncovering how digital equity is locked into material space, while ArcGIS Story Maps and narrative inquiry will together story conceptions of digital spaces and technologies. Finally, my findings indicate a complex digital infrastructure emerging from tensions between state and local levels, reflective of dynamic, relational, and agentic spatial processes. Implications speak to the structural changes, both exogenous and endogenous, necessary for making more just rural geographies, which matter to the ultimate strengthening of American society (Cervone, 2014).

Rural Digital Learning Opportunities

Home and school access to digital technologies are proposed as the critical point of entry through which socially excluded populations can "take full economic, social, and

civic participation in society" (NIIAC, 1996, para. 11; see also Cuban, 2001; Warschauer, 2008) and counter what are perceived as the social and cultural limitations of impoverished environments (Graham, 2010). Furthermore, given the type and nature of Internet data being transmitted, access to quality broadband, or "high-speed" Internet access, is essential for students in the 21st century (Mossberger, Tolbert & McNeal, 2008; Stern, Adams & Elsasser, 2009; Whitacre, Gallardo & Strover, 2013, 2014a). As more and more resources become available via the Internet, studies have demonstrated through different modeling techniques that the diffusion (or lack thereof) of broadband into rural homes directly relates to the economic vitality and health of their community (Whitacre, Gallardo & Strover, 2013, 2014b). This may be due to the strong correlation between broadband access and higher digital literacy, with faster connections enabling users to practice more advanced applications (Mossberger, Tolbert & McNeal, 2008). In turn, it is often presumed that quality technology skills contributing to the development of human capital will boost economic growth (Hanushek & Wößmann, 2012).

However, in rural areas with insufficient broadband or low rates of broadband adoption, the "information superhighway" has become more of a mangled dirt road. Recently, the state of Maine has reported "worst-in-the-nation Internet speeds" (Fishell, 2015, para. 1). Roughly 129,000 Mainers are without access to a quality broadband connection able to transmit at least 25 megabits per second (mbps). Another 19,000 household residents in the most remote parts of Maine still have no Internet providers at all (Fishell, 2015). While promoting policies to increase the availability of quality broadband in rural areas is important, it is only one part of today's digital equity agenda (Clyburn, 2010). With availability not singularly predicting the rural individual's

likelihood of use, many rural broadband nonusers perceive the Internet as irrelevant to their way of life. For example, one study found that rural students' technology use was more due to school needs, and they were less likely to first learn to use technology out of personal interests (40% rural vs. urban 55%) (Whitacre, Gallardo & Strover, 2013). Amid the rush to compete and meet the accelerated demand for better-educated workers with technological expertise (Beaulieu et al., 2006; Reeves, 2012), this slight difference in interest coupled with low quality broadband may have lasting implications for the future of rural students' digital practices (Mossberger, Tolbert & McNeal, 2008). With over one third of all U.S. schools in small towns or rural places (IES, 2013), this is of urgent priority in today's information economy. Not only does the exclusion of rural issues from policy debates raise concern, but also the confusion over what to do about this vaguely defined and wrongly monolithic "rural problem" (Beeson & Strange, 2000, p. 63) of digital inequity. While stepping in line with progress and increasing digital skills may threaten the rural identity, rural communities are not opposed to modernization and growth, because without it, they will perish (Beeson & Strange, 2000).

Theoretical Framework

Much of today's digital divide rhetoric ignores structural inequalities undergirding pervasive inopportunity to then naturalize underrepresented youth as outsiders to technological advances (Everett, 2008). Henceforth, given much of this popular discourse is narrowly framed on changing people (and any attitudes of slight disinterest therein), most cast a shadow upon the influence of culture or structures. Unfortunately, this tendency to ignore underlying cultural and systemic forces provides a flawed analysis, which attributes too much significance to the personalities of the

individuals involved (Kohn, 2008). Attending to individuals rather than environments hampers our ability to understand, and these misunderstandings lead to enduring consequences-- both political and practical (Kohn, 2008). Specifically, the more time we spend faulting individuals for lacking self-discipline, all the while expending effort and funds to develop their ability to establish good study habits or better digital competencies/attitudes, the less likely we are to question the structures defining their opportunities to act. We are not compelled to work for social change, when we miss the forest for the trees and fault individuals for not trying harder (Carter, 2016). The singular focus on changing people will never instantiate the needed impact on the immediate social state of education (Bowles & Gintis, 1976, 2002; Korpi & Palme, 1998; Toyama, 2015), today's digital equity concern and its amplifying divides demand a wider lens of understanding.

Likewise, focusing on access to digital technologies or broadband, in themselves, as "great levelers" overlooks overarching cultural needs as well as the varying levels of a community's digital practices (de Castells & Luke, 1986; Warschauer, 2002, 2004). Within today's rural digital equity agenda, the most difficult task for increasing broadband adoption in remote areas may be not only ensuring that it's affordable, but also that it holds meaning for these communities. Lacking a critical eye to this social embeddedness of ICTs, we fail to recognize the powerful ways in which social structures and institutions within them shape everyday practice over time (Jocson & Thorne-Wallington, 2013). Leveraging such an opportunity to connect, learn, and make new meaning is predicated on the skills and supportive learning environment to use the broadband now readily accessible to rural areas. Only after ensuring rural folks have the

digital skills and supportive environments to benefit and derive meaning from broadband can we rest knowing all *can* take advantage of it (Clyburn, 2010). While rural schools are the most obvious environments equipped with the basic technologies and expert guidance to build digital skills, many digital learning opportunities may exist outside of school within libraries or museums (Jocson & Thorne-Wallington, 2013). Among the characteristics of digitally-rich community sites are sufficient high-quality technologies; access to guided expert instruction; curricular activities integrating a variety of digital skills; and an atmosphere that encourages digital learning and free experimentation (Neuman & Celano, 2012; see also Jocson & Thorne-Wallington, 2013). Given publically accessible digital learning sites are considered valuable assets to a community's opportunity for digital learning (Neuman & Celano, 2012), studying their equitable distribution as well as how they are viewed by residents may yield insight into the nature of digital opportunities in the wild.

Spatial Turn

To further remove the blame of faulting individuals from their own self-made digital inequities, process-oriented approaches move beyond outcome-dominated human-centered analyses to highlight the influence of seen and unseen underlying "structuring structures" within the environment (Bourdieu, 1977, p. 90). However, when considering the impact of these structures, most social researchers not surprisingly emphasize the sociological and historical processes over the spatial (Foucault, 1984; Soja, 2010). Rather than viewed as a major force shaping social life, space has more often been treated as a given or a fixed background with little agency in affecting the socio-historic world it contains (Soja, 2010). Paying primary attention to historically unfolding social processes

minimizes the spatial dimensions fundamental to our sociohistorical being. De-emphasizing the importance of the critical spatial perspective gives an off-balance view of our reality. This ontological distortion then renders nearly invisible the political and economic forces entangling the everyday spaces (both real and imagined) in which we live out our lives.

While the nature and significance of "space" has been conceptualized in various ways (Foucault, 1984; Harvey, 1973, 1992; Lefebvre, 1974), "spatiality," according to Soja (2010), considers space and society, to encompass the spatial processes, spatial development, and spatial consciousness affecting our sociohistorical reality. Herein, a mutually influential and productive relationship is assumed between the social and the spatial dimensions of human existence, with each dimension shaping the other across time. When encompassing process-oriented understandings through spatial theory, "space" is understood as housing social relationships of (re)production wherein power, knowledge, and resources are developed and distributed (Lefebvre, 1974). Individuals then act on this space and navigate abstract boundaries in particular ways reflective of their class, race, and sense of belonging. Not all theorists have explicitly taken a process-oriented spatial approach, but many have nonetheless highlighted spatial processes in terms of economics, language, social power, and technology. For example, Marx (1848) highlighted abstract spatial boundaries when discussing the historical and class divisions that helped maintain structures of ownership and privilege. In locating acceptable utterances to be produced, Bakhtin (1981) also delineated a time/space linguistic compendium. Theorizing how people relate to each other amid the "coincidence between habitat and habitus" (p. 147), Bourdieu (1989) proposed social space as an abstract

concept dictating the coordinates for various types of capital and social practices needed to build/maintain positioning within the space. Finally, de-centering new media in relation to the everyday, Moores (2012) acknowledges how communication pathways of technology are caught up with space and mobility such that they are not merely technological innovations, but continuous and contentious cultural and social spaces.

Underlying the sociohistorical struggle over space (and its economic, linguistic, political, and technological facets) is the drive for justice and fairness. Since Aristotle (n.d./1944) framed justice as embedded within the political actions of an organized *polis*, or a community of civil citizens, geography and social justice were thought of as mutually shaping. People, trusted to act and engage in a democratic discourse, decided how best to produce and maintain a space. Justice then became a shared understanding arrived at through political discourse and rational debate over the best life for those living together in the *polis*. Seen this way, justice is profoundly spatial as well as social, historical, and political. Unlike the Rawls (1971) model of impartial and unalienable justice veiled from all social, historical, or spatial factors, most social researchers consider justice as a malleable and socially-produced idea that adjusts to the context (Harvey & Braun, 1996; Honneth, 1996; Young, 1990). With justice and democracy so immersed in the geography, place of residence then serves as a key political framework for sharing a vision of social justice and mobilizing towards it, while (re)defining individual rights and responsibilities (Soja, 2010).

Spatiality of Injustice. Following the notion that justice has a geography, Soja's (2010) *spatiality of injustice* offers a valuable spatial lens for examining the powerful ways in which inequities are entrenched within the local conditions of people's everyday

lives. Given the organization of space is a critical feature of human action, in that it reflects historical consequences and influences social relations (Lefebvre, 1968, 1974), space reveals visible patterns of both justice and injustice. Distributional inequality instantiates the most pressing and noticeable of spatial injustices. Wrapped tightly within this distributional unfairness are spatially-bound budgetary needs, bureaucratic inefficiency, personal greed as well as historical patterns of income inequality, racial prejudice, cultural domination, and social power. This results in geographical bias or "discriminatory geographies of accessibility" (Soja, 2010, p. 47). To the same degree that the spatiality of injustice impacts social life, social processes likewise impact the spatiality of injustice. Thus, spatial justice, as a concept and methodology, operates under the belief that understanding and overcoming social injustices is predicated on the analysis of the mutual and ongoing interactions between space and society (Soja, 2010). In simpler terms, cultivating a critical spatial consciousness will, in turn, advance methods of combating injustice.

Central to spatial consciousness and spatial development are Soja's (1996) process-oriented understandings of how space is practiced via first, second, and third spaces of interaction. Given the scope of this analysis focuses more on the real-and-imagined geographies of power, I will only consider the first two important spaces of interaction. While both can overlap, Firstspace is associated with consequential processes occurring throughout "real" space, and Secondspace deals more with the consequential processes taking place across "imagined" space. In other words, Firstspace is the traditional *perceived* surface appearances or material outcomes (e.g., ASU's physical campus, buildings, parking lots, manicured lawns and hedges), while Secondspace

represents how the space is *conceived* (e.g., ASU as the number 1 in innovation "New American University," "the ivory tower," or as the "party school" or PAC 12 "Sun Devils" competitor). Firstspace is considered to reflect the interests of the dominant, or the top-down snapshot of gentrification measures of ASU's campus malls and streets. On the other hand, Secondspace houses utopian archetypes of artists, the media, or scientists (Bhabha, 1994; Lefebvre, 1974). Further extending the ASU example, the gentrified state of ASU's campuses would also be reflected through the Secondspace conceptions of artists or the media.

Dynamic, relational, and agentic spatial processes. Across all spaces of interaction, dynamic, relational, and agentic processes unfold (Gunderson, 2014). First and foremost, space is produced through lived and dynamic processes, both real and imagined. It follows that human spatiality is socially produced and reproduced over time, with geographies forming from the work of those who move within them. Furthermore, the processes contributing to our lived geographies or spatialities are at the same time objectively real (Firstspace) and subjectively imagined (Secondspace). Living in space also involves enacting pre-defined socio-historical patterns of production that are both invisible (e.g., power, values, knowledge) and visible (e.g., material resources). Because these spaces of interaction overlap to house inter-operating visible and invisible sets of relations, space becomes messy. Intersecting relations of knowledge, power, and subjectivity, which juxtapose tangible materialities with intangible mindsets, often yield unforeseen capacity for transformation. Taken together, these spaces of interaction forge a lived nexus of struggle and contention, wherein ideas, beliefs, principles *and* materialities can be shaped and reshaped in agentic ways.

From this view of space as dynamic, relational, and agentic, the production of unjust geography can be analyzed as stemming from both exogenus and endogenus geographies of power. Exogenous spatial discrimination develops from imposed external factors, such as political power, cultural domination and social control over individuals, groups, and the places they inhabit. This production of space describes a top-down structural perspective of power relations, which becomes manifest in colonial exploitation of lands, electoral district gerrymandering, private property rights and an accompanying increase towards the privatization of public and semi-public spaces (Soja, 2010). In contrast, endogenous geographical structure houses more bottom-up power relations via localized actions and decisions affecting the spatial reproduction of discriminatory geographies of accessibility. Stated again, these are not a natural given, but socially (re)constructed dynamically across time, with local inhabitants as not only users but also agentic (re)producers of their lived space.

'Right to the City' rhetoric. Soja's (2010) *spatiality of injustice* is fundamentally built on Lefebvre's (1968) concept of the "Right to the City" (p. 145). This urban-centric notion purports that only city dwellers are capable of developing the critical spatial consciousness needed to combat spatial injustice. Given this, many critical spatial theorists, including Soja and Lefebvre, discuss the importance of a spatial approach to the city but fail to consider the spatial injustice outside the city center. This narrow view overlooks the important spatial processes unfolding across our nation's most forgotten and vulnerable of geographies. Neoliberal economic policies, which have long exploited rural America, operate under the guise that rural America doesn't count. Gramsci (1926/1978), however, spoke out in defense of the rural peasants to note the attacks

coming not only from larger capitalist structures but also from urban elites preying on the "idiocy" of rural life. While hiding behind the imposed ideology that rural citizens are inferior and should look to the more enlightened and self-actualizing urban populace to rescue them from themselves (Eliasoph, 2017), outside forces have continued to abuse rural areas for land and labor exploitation (Van der Horst, 2007). Rural populations not only die at younger ages, but also report some of the highest rates of unemployment, drug addiction, and family disruption (Becker, 2017; Keyes et al., 2014; McBride & Kemper, 2009; see also Gee, 2016). There is no doubt that the state of rural America impacts the entire nation (Doering, 2013; Zwagerman, 2017). Yet, Lefebvre's defining assumption of social spatiality asserts that the survival of society depends on the social (re)production of urban space.

The rights of rural folk have clearly been overshadowed by Lefebvre's (1968) 'Right to the City' rhetoric and this persists throughout Soja's (2010) urban-centric spatial thinking. Soja acknowledges that the spatiality of injustice is fundamentally an urban issue in the following:

> Being political…was always to some degree a matter of being urban, being part of the "civilized" world of the city. Living in the city defined who were the politically active "citizens," as opposed to everyone else: slaves, most women, barbarians, and *idiotes,* those difficult to organize nonurban folk that Karl Marx described as immersed in the apolitical and supremely individualistic "idiocy" of rural life (Soja, 2010, p. 80).

This urban-generated notion of rural inferiority has marginalized rural citizens and rendered our entire nation more vulnerable and powerless to pervasive forces of

neoliberalism and globalization (sweeping through country *and* city). If anything, recent election events, so thundering the powerful voice of the rural "sleeping giant" (Halunen, 2016, para. 7), shook our nation's core to warn of the clear political and social ramifications of urban-centric thinking that marginalizes ideals of justice and fairness spreading "silently" through rural areas. With rural populations spreading out so thinly, they often render themselves "politically invisible" (Beeson & Strange, 2000, p. 63). At the same time, they can easily grow to become the political majority, as they are in the state of Maine (Beeson & Strange, 2000). Having now realized that rural folk may metaphorically hold up more than half of our skies, socio-spatial discussions of justice, agency, and digital equity can no longer ignore the rural struggle for geography. Following the call from Lefebvre and Soja, scholars took city space seriously to finally account for overlooked social phenomena. But perhaps our analytical lens too narrowly dictated our scope and permitted us to ignore those fundamentally important "real-and-imagined" rural spaces being marginalized in the urban-centric rhetoric dominating discussions of spatial inequality. Today's digital era demands a redirected focus towards the unseen and overlooked rural digital infrastructure emerging from consequentially important processes of rural spatial production.

Purpose and Research Question

Amid the 'Right to the City' rhetoric (Lefebvre, 1968, 1974), I propose a focused empirical analysis to unpack the highly spatial character of this overlooked inequality of rural digital opportunity. With the hope of stimulating new ways of thinking and acting that resist a master narrative of urban dominance, I position rural digital inequity as an important spatial issue of justice. Methodologically, I combine cartographic GIS tools to

map broad material inequities with more storied conceptions of rural space capturing the local perspective of the problem. By foregrounding important tensions between local, state, and global entities, this type of analysis sheds new light on deeper structures creating digital equity as well as the (re)production of spatial inequalities in the rural landscape. Further, in weighing both seen and unseen factors, generated from power within and across perceived and conceived spaces, this analysis fills gaps in the literature to reveal the meanings rural communities associate with digital spaces and technologies. This unique scope calls into question the spatial consequences and digital infrastructure emerging within real-and-imagined tensions between local and global. From this analytic example, I structure a spatial understanding of this uneven geography of digital equity, wherein rural spatial justice matters to the fabric of American society.

Thus, to examine undertheorized forms of rural spatial injustice and positively impact our ability to understand this spatially-distinct digital/social divide, I ask the following research question: *How are digital learning opportunities and resources caught up with material space (Firstspace) and representations of space (Secondspace) in one rural community?*

Methodology

Methods underlying the spatiality of injustice insist upon "foregrounding a critical spatial perspective and seeing the search for social justice as a struggle over geography" (Soja, 2010, p. 13). To capture this struggle for geography, my research design (see Figure 3.1) uses "qualitative geographies" (Fielding & Cisneros-Puebla, 2009, p. 352) to mix quantitative geospatial methods with qualitative narratives. This serves the larger purpose of representing both qualitative and quantitative data along with their spatial

information (Jung & Elwood, 2010). ‘‘Qualitative geography’’ marks a growing trend and recognized sub-discipline among mixed methods social scientists using GIS-based spatial analysis in concert with methodologies more familiar to qualitative researchers (i.e., focus groups, ethnography, interviewing or participatory action). Emerging from accusations of GIS as too authoritative in its masking of alternative social realities, qualitative geographers seek to enhance findings by bringing together different ways of knowing and researching (Cieri, 2003; Dennis 2006; Elwood & Cope, 2009; Pain et al., 2006; Weiner and Harris, 2003). The critique emphasizes maps as producing a particular knowledge that is subject to bias and social construction-- even in seemingly factual representations of space and place (Knigge & Cope, 2006, p. 2022). To qualitative geographers, mainstream GIS imposes a non-neutral script that assumes a ‘‘God’s eye view’’ (Haraway, 1991; Kwan, 2002). Too often, this limited script rejects multiple perspectives, qualitative context, nuanced subjectivity, and underlying power relations (inclusive of technologies, economies, epistemologies, and methodologies) (Kwan, 2002; Schuurman, 2006). In terms of the socioeconomic organization of human geographies, this “God’s eye view” also ignores spatial injustices from the lens of the marginalized and underprivileged (Fielding & Cisneros-Puebla, 2009).

Given this, my specific analytical field of play lay in the state-level broad material characteristics (e.g., point density patterns) of these spatial realities (Firstspace) relative to community members’ and families’ understood local conceptions of this rural space (Secondspace). Spatially situating local community attributes in relation to broader state-level data was an important step when representing ‘‘both ‘context’ and ‘content’ in a spatial dimension’’ (Skinner, Matthews, & Burton, 2005, p. 230). To accomplish this, my

methodology involved an analytical convergence of visualization techniques via quantitative GIS analyses at the state-level and narrative analysis derived from local qualitative fieldwork. In this state/local mixing of methodologies, no form of qualitative or quantitative data was given more precedence or weight, as the integration of their analysis could serve both research questions and strengthen the overall findings (Creswell & Clark, 2007).

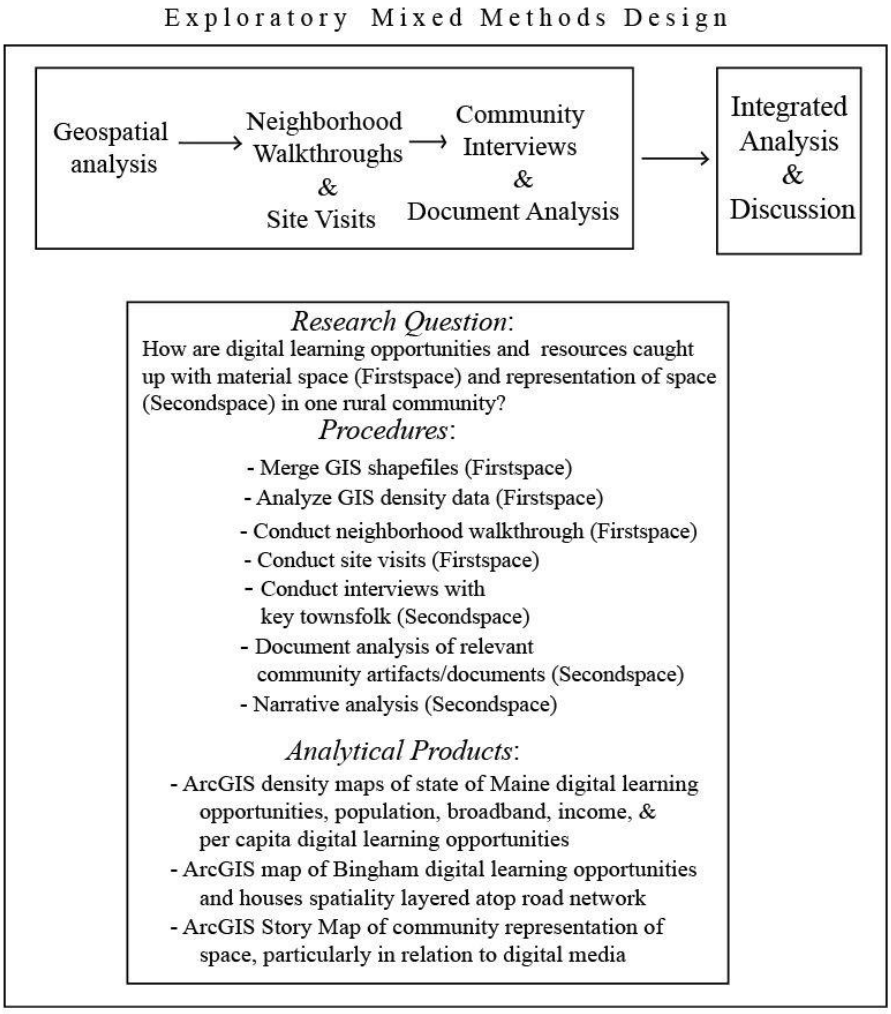


Figure 3.1. Research Design with Research Question, Data Collection Methods, and Analyses

Research Site

The town of Bingham, Maine sits on the 45th parallel, halfway between the North Pole and the Equator. It is about 40 miles from Waterville, a city of 15,722 that also contains two colleges (Colby College and Thomas College). Portland, Maine's biggest city of 66,881, is 115 miles away. When entering Bingham, you meet a sign stating such facts and welcoming you to "God's Country." In 2010, the population was 922, mostly Caucasian (97%), and the median family income was around $31,538 (U.S. Census, 2010), which is notably lower than the median U.S. family income. The town has one library, two convenience stores, three gas stations, one grocery supermarket, one post office, one town hall, and one church. Bingham was at one point a bustling town with two water-powered sawmills and two flour mills. Now, all mills are closed and the only gainful employment comes from employment in one of the small businesses, the post office, or within its three schools: Moscow Elementary, Quimby Elementary, or Valley High School. While the state of Maine average for enrolled students in an elementary class is 208, Moscow Elementary has a total of 70 students within its grades PK-4th. Quimby Elementary serves 43 students in grades 5-8 and maintains a student-to-teacher ratio of 6:1, which is half the state average of 12:1. Valley High School has 70 students in grades 9-12. For neighborhoods, Bingham has distinct neighborhoods of different socio-economic standing. The low-income area of Murray Hill is clearly defined from the wealthier Meadow Grove by the town's highway and from the middle-income Concord by its river.

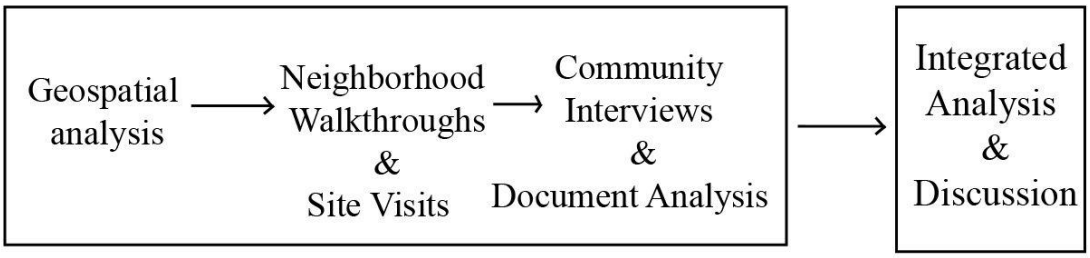


Figure 2.2. Specific Data Collection Methods for Firstspace and Secondspace Analysis

Data Collection

Geospatial analysis. While my first research question focused on the Bingham community, I conducted my geospatial analyses at both the state and community levels. Analyzing state level data was a useful means of mapping the overall distribution of digital learning opportunities in rural Maine and enabled me to locate Bingham in a larger sociopolitical context. For data, my Firstspace analysis considered the spatial arrangement of Bingham homes within various neighborhoods, its various road networks as well as the state's population density, income distribution by zip code, broadband availability, and density estimation of digital learning opportunities (i.e., the number of schools, libraries, and museums within a confined geographic rural space). For the purposes of my study, digital learning opportunities did not include after school learning centers or Internet cafes. This was because schools, libraries, and museums are among the only publically accessible digital learning sites the U.S., wherein one can assure they demonstrate previously discussed characteristics supportive to digital literacy learning. Additionally, the U.S. Census tracks and geo-locates its publically funded schools, museums, and libraries. Thus, accessing the density/scarcity of rural community's digital learning opportunities as well as spatial arrangement of homes took place through freely available U.S. Census GIS data. These data are encoded through special-purpose

shapefiles, which spatially describe cartographic and attribute information through vector features (ESRI, 1998). Within shapefiles, the attribute information (at the database level) describes qualities associated with the geographic features (at the map level) and vary depending on the source/database. At the model level, additional data can be calculated and added to the attribute tables to make visible the information considered more meaningful and specific to the researcher and audience needs (e.g., density of digital learning opportunities). Stated again, my state and local community attributes included Bingham homes, road networks, state income, broadband availability, state population density as well as the number, location, and density/scarcity of Maine's schools, libraries, and museums.

Neighborhood walkthroughs and site visits. To complement this GIS fieldwork and answer Secondspace-specific research questions, I also conducted neighborhood walkthroughs and site visits. This decision was based on the core principle that place matters. Specifically, this means that an individual's place of residential is a highly influential factor shaping the likelihood of their access to educational learning opportunities (Duncan & Murnane, 2011; Nueman & Celano, 2012; Reardon, 2013). In fact, some argue that neighborhood is a more powerful predictor of later educational outcomes than individual characteristics, such as age, gender, and personality (Burdick-Will, et al., 2011). Because I wanted a broad understanding of neighborhood effects to permit comparisons between neighborhoods, I attended to possible social disorder (e.g., people arguing in the streets, children playing dangerously) and physical decay, such as peeling paint, littered streets, and/or illegible signage. Thus, the neighborhood walkthroughs helped to further establish the real-and-imagined local lay of the land, in

terms of gathering descriptive differences/similarities in general living conditions, scenery, and general safety between neighborhoods. Next, to further investigate the significance of institution, technological infrastructures, and/or social networks in the town, I conducted observational visits to community-based learning sites, such as libraries, schools, museums, and afterschool programs, on three separate weekdays from the hours of 2-5pm. In these locations, I evaluated the availability of technology, its quality, as well as the activities performed with various technologies.

Community interviews and document analysis. Next, I interviewed key townsfolk and collected community documents, historic town artifacts, and relevant news media. Interviews helped to locate stories and interrogate historic and non-historic artifacts in a way that could elicit how various rural digital opportunities came to be articulated through networked actions and discursive practices across space and time. Other historic town artifacts and seminal community documents were accessed through the town library's online archives or through the "Old Canada Road Historical Society" website.

Participants

The purposive sample of key townsfolk depended upon variety and quality, as I aimed to gather the information of greatest utility from the least amount of interviews (Maxwell, 2013). From the diverse stories of E. Smedberg (local mother), D. Hussey (Valley High School's IT director), L. Corson (local retired elderly woman), and S. Brochu (town librarian), I felt the rich historical complexity of the town could be better elucidated from key voices that shape or had shaped it. My pilot study identified various community insiders with the greatest knowledge of technology in the town. For example,

the school district's IT specialist was especially proud of their 1-to-1 laptop program and believing "it has worked very well for our small school" (D. Hussey, personal communication, September, 9, 2015). Thus, this IT specialist along with the town librarian were examples of key townsfolk I was then interested in interviewing more in-depth in my subsequent dissertation study. Despite having six rural mothers in my study already, I chose yet another local rural mother in the interest for her incredible political/historical understandings of the town. I also opted to interview a retired elderly woman, because not only did she know all the town gossip (to cross-validate data from other key townsfolk), but she had keen critical insight into the positive and negative aspects of rural life.

Semi-structured interviews varied from formal to casual, such that interviewees could tell their story on their own terms. More informal extensions of the interview included follow-up via email, phone, or text message. Questions revolved around how Bingham fit (or did not fit) their idea of a small town, what this vision of small town life meant for children's digital learning, as well as how technology may have changed the landscape in recent years. In addition to this specific focus on technology, the interview questions also sought a broader "typical" picture of this rural life to draw out implicit understandings or "country common sense." I developed this combination of interview questions to try to evoke their rich experiences in the small town amid today's changing times, and I shared various historic and non-historic images of the town to assist them in their storying process.

Table 2.1

Neighborhood Walkthrough, Site Visits, and Community Interview Data Collection Instruments

Instrument	Purpose	Example Statements
Neighborhood Walkthrough	Observational protocol to guide examination of neighborhood living conditions and scenery as well as safety of streets.	"Are the streets clean or is litter scattered about?" or "Are children playing together or are people shut in their houses or yards peering out suspiciously?"
Site Visit	Protocol for examining public learning sites with specific attention paid to comfort and use of space.	"Do people appear to know what they are doing on technology devices?" or "Are the technology devices modern and are there enough?"
Community Interview	Guided means of using questions and town photos to gather local accumulated geographical and storied knowledge about the community.	"What do you consider to be typical of a small town and how does this town fit that image?" or "In this town, what role does technology play in children's learning?"

Note. All instruments are included in Appendix A.

Analytic Procedures

To characterize Firstspace, or *perceived* surface appearances such as the material forms of social spatiality, I mapped the community. For the first component of this question, I addressed Firstspace material forms of social spatiality in terms of the community's spatial density/scarcity of digital learning opportunities. In particular, the community attributes included road networks, population, population density as well as the number, location, and density/scarcity of homes, schools, libraries, afterschool learning centers. I displayed population density through the spatial arrangement of the homes. This was done via a simple visualization of distribution over space by means of dot maps providing an initial overview of information on the structure of the distribution among local families. Unfortunately, U.S. Census data on schools, museums, and libraries was not available for the Bingham zip code. For my own surface analysis, I then geo-located Bingham's four digital learning opportunities through the GIS by way of my neighborhood walkthroughs.

From this, I utilized GIS mapping and spatial analytics to combine a baseline map of road networks with the corresponding images and density of digital learning opportunities by neighborhood to better indicate how rural neighborhoods differed in terms of resources. I chose road networks as my baseline map, because roads could serve as quick location identifiers in rural areas with little for landmarks, while also leaving ample visual room for subsequent data layering and analysis. Thus, the geographic clustering (inclusive of location *and* accessibility of digital learning opportunities) within specific neighborhoods represented the micro-geographical unit of analysis and the across-neighborhood variation simultaneously afforded a broader macro-geographical analytical scope. And so, my Firstspace final analytical product was the ArcGIS density map of Bingham's digital learning opportunities.

Yet, given the abundance and complexity of data at the state-level, I relied upon more refined analytical instruments for more in depth spatial analysis. Briefly, my steps involved merging different U.S. Census GIS data files on Maine's museums, schools, and libraries into one file to then calculating the density of digital learning opportunities. All state-level data was access through publically available U.S. Census GIS data, which are encoded through special-purpose shapefiles, which spatially describe cartographic and attribute information through vector features (ESRI, 1998). The attribute information, locked within shapefiles, describe qualities associated with the geographic features and vary depending on the source/database. Additional data can be added to the attribute tables to make visible information more meaningful specific to the researcher and audience needs. In my case, when I had my one merged shapefile, I needed a means to distinguish variation between digital learning opportunities and to identify clusters or

regularity in the distribution and nature of digital learning opportunities. For example, for my previous density maps, I have had to create a new attribute field through the ArcMap function “Add Field” (see Figure 2.3). Next I calculated density of digital learning opportunities using the field calculator to divide the population by the number of digital learning opportunities present or “Tech_Site” via the Field Calculator (Figure 2.4). When representing this density of digital learning opportunities within a heat map, one can then program the varying density calculations that populate into your “Digital_Density” field to appear in terms of a color gradient or in terms of identifiable dots.

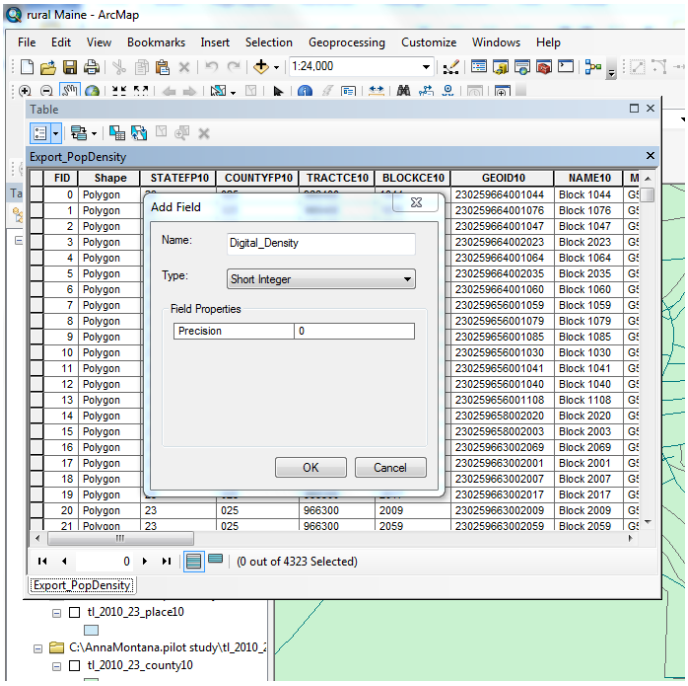


Figure 2.3. Adding New Attribute Field of “Density of Digital Learning”

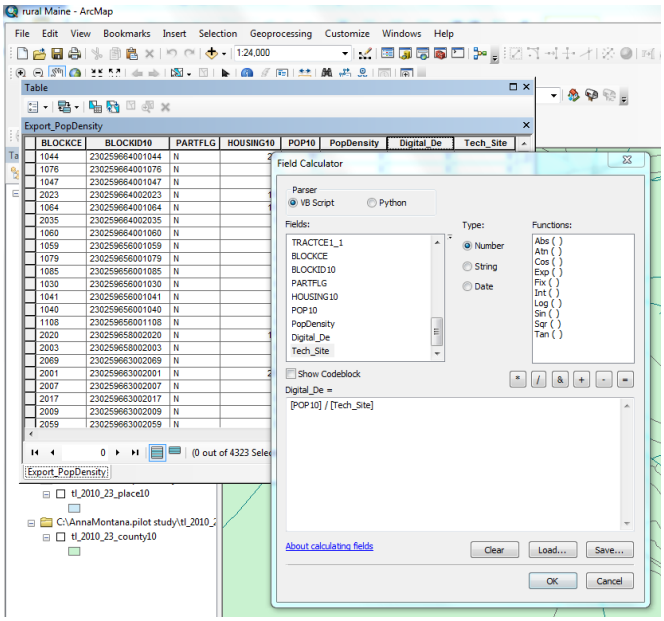


Figure 2.4. Using Field Calculator to calculate new field values for "Density"

Despite this more refined technique, my state-level analysis adhered to the conventional mapping processes of selecting labels and symbols, choosing the scale, and layering. And from my one merged shapefile of Maine's digital learning opportunities, I created a dot density shapefile. In the end, I opted for dot density over color density, because I wished to distinguish between libraries, schools, and museums. Next I spatially analyzed the population density of Maine using the U.S. Census household income shapefile. I chose to portray population density in terms of a color gradient, such that I could overlay my digital learning point density shapefile to grasp possible spatial factors for the phenomena. I next spatially analyzed the distribution of income and broadband availability throughout the state of Maine and created heat maps. For a more nuanced look, I last computed the per-capita density of digital learning opportunities. Using the population density Census shapefile as an analysis mask, I divided the total digital learning opportunities in a given zip code by that area's population. This final map also

showed density in terms of a color gradient. This helped me to more readily answer whether more learning opportunities were located in particular areas with less population. From this, my final analytical products were the state-level ArcGIS density map of digital learning opportunities (layered atop the population density map), the broadband penetration map, the income distribution map, and the per capita distribution of digital learning opportunities.

To deepen understandings of these differences and how they may be caught in the representations of space (Secondspace), particularly as they relate to digital media, I leveraged community documents, historic town artifacts, relevant news media, and interviews with key townsfolk. For example, the district high school has just been ranked number one in the state of Maine by Newsweek's "Beating the Odds" list, which ranks schools on the extent that they "do an excellent job of preparing their students for college while also overcoming the obstacles posed by students at an economic disadvantage" (Ohm, 2015, para. 4).

Amid quantitative-qualitative paradigm wars and its related call for more sound mixed methods integration, techniques for methodological innovations have grown increasingly computerized. "Qualitative GIS" emerges as a new methodological synergy that uses technology to integrate qualitative research with quantitative geo-spatial analytics (Elwood & Cope, 2009). A possible methodological avenue proven useful for overlaying conceived Secondspace representations of space amid Firstspace surface appearances is through ArcGIS Story Maps (http://storymaps.arcgis.com/en/). Using digital technologies to represent spatial elements of qualitative data, the maps situate the non-cartographic qualitative data atop more authoritative baseline maps. Through the

increasingly innovative GIS visualization capabilities (e.g., custom pop-ups, legends, and symbology), these interactive maps incorporate qualitative data in its more living form of narrative text, images, and multimedia content (ESRI, 2016) and open doors to several different modes of analysis at once (Jung & Elwood, 2010). Because these maps are interactive, informative (while respecting the limitations of our cognitive/visual system), and publically accessible, they are gaining importance in the field. Story Maps can include a simpler demonstration of what a place has to offer and will highlight the various stories each landmark tells. Most cities feature a storied tour of their popular destinations.

Given my active ASU student status, I gained access to a free organizational account to an already created online ArcGIS account. Further, though my ASU account came with 500 credits that I could exchange for "premium hosted services" such as the Living Atlas's Demographic and Lifestyle Maps or certain key analytics, I considered it a more valuable learning experience to "make" my own data for my maps. Therefore, I accessed my Story Map data free through the Maine State Census TIGER files and cleaned them up to avoid using credits. Additionally, I didn't demand any special cost analytics because all essentials were provided zero cost through the Story Map app. And the publishing my final Story Map was enabled via a simple sharing of the public hyperlink to the Story Map (via the ESRI site…here's mine: http://arcg.is/1U5qsXN). Concerning issues of time, depending on how familiar one is with how everything works and whether or not one has access to the needed data elements, Story Maps via ArcGIS online can be created in a day or a day and a half.

Most time is spent gathering the data and content, as well as constructing the final narrative. Given there was much useful data and a story to be built, I turned to narrative analysis as an analytic tool for constructing narratives and/or story arcs from a variety of disorganized data elements. While the field of narrative research has been defined in various ways (Clandinin & Connelly, 2000; Kim, 2015; Reissman, 2008), Polkinghorne (1995) identifies narrative analysis as the process of organizing participant's oftentimes fragmented anecdotal material into a meaningful and representative narrative(s). Stemming from a research question such as how a certain phenomenon came about, researchers then identify salient data pieces and synthesize elements (which could be actions, events, objects, or happenings) into a coherent and storied puzzle. Most of the analytic action takes place in the iterative movement between data elements and story plot. Coherent story construction requires constant examination of logic and paradox, as the researcher moves from the minute details to the larger story arc (Kim, 2015; Polkinghorne, 1995). Despite this narrative smoothing which rids narratives of contradictions so deeply embedded in human experience (Spence, 1986), a higher level of order and meaningfulness can be brought to the data through a well-crafted story.

With my Story Map, the particular question I asked when gathering data elements was "How have digital technology changed (or not changed) Secondspace conceptions of this small town?" In building my story, I drew heavily from the interviews from key townsfolk and particularly the topic of whether or how technology may have changed their particular vision of this rural landscape in recent years. In addition to their interview transcriptions, I relied on a narrative notebook that contained reflective field notes from the townsfolks' interviews-- each separated by tabbed dividers. Given the Story Map

situates stories atop cartographic locations or town landmarks to design a chronicled tour of "Data Story Points" (ESRI, 2016), I also needed to survey the town from the "ground truth" (Prickles, 1995). Because this ground truth privileges information drawn from direct observation as opposed to that provided by inference (Prickles, 1995), neighborhood walkthrough data was collected and examined first. Each neighborhood's walkthrough field data was analyzed through narrative-type analysis first separately and then in juxtaposition with the other neighborhoods. This helped to draw out nuance and deepen any residents' emotional connection to the space. Both old and new photographs of those key locations and neighborhoods were leveraged to further illustrate and enhance key elements of the plot. This data assemblage supplied substantial material around which to review and construct a story arc.

Narrativizing the disjointed data demanded analytical thinking, synthesis, and reflection. Contrary to what Polkinghorne (1995) discusses in terms of narrative configuration running counter to data reduction and deductive analysis in that it seeks to build data elements together into a cohesive and organized story, I found that my particular Story Map medium demanded significant story reduction. Despite initial efforts invested in story synthesis occurring across data via recursive movements (e.g., from interview #1's reflective field notes, to interview #1, then to interview #2, then to historical photograph #1, and then back to the reflective field notes), I reminded myself that most Story Maps are not intended to be complex. They are to be approached similar to how one would approach a short and simple story read in the course of one sitting. Configuring my narratives soon involved re-configuring them by shaving down the stories for fit and flow. In this way, the key elements of its plot could concisely caption

each geo-located Data Story Point. And once I had my story arc, concerning changes in Secondspace conceptions of the community related to the introduction of digital technology, uploading data into the online Story Map was intuitive. But particularly the first time, as added insurance against things growing overwhelmingly unmanageable, I invested in the pre-planning and revision of each cartographic detail of the Story Map.

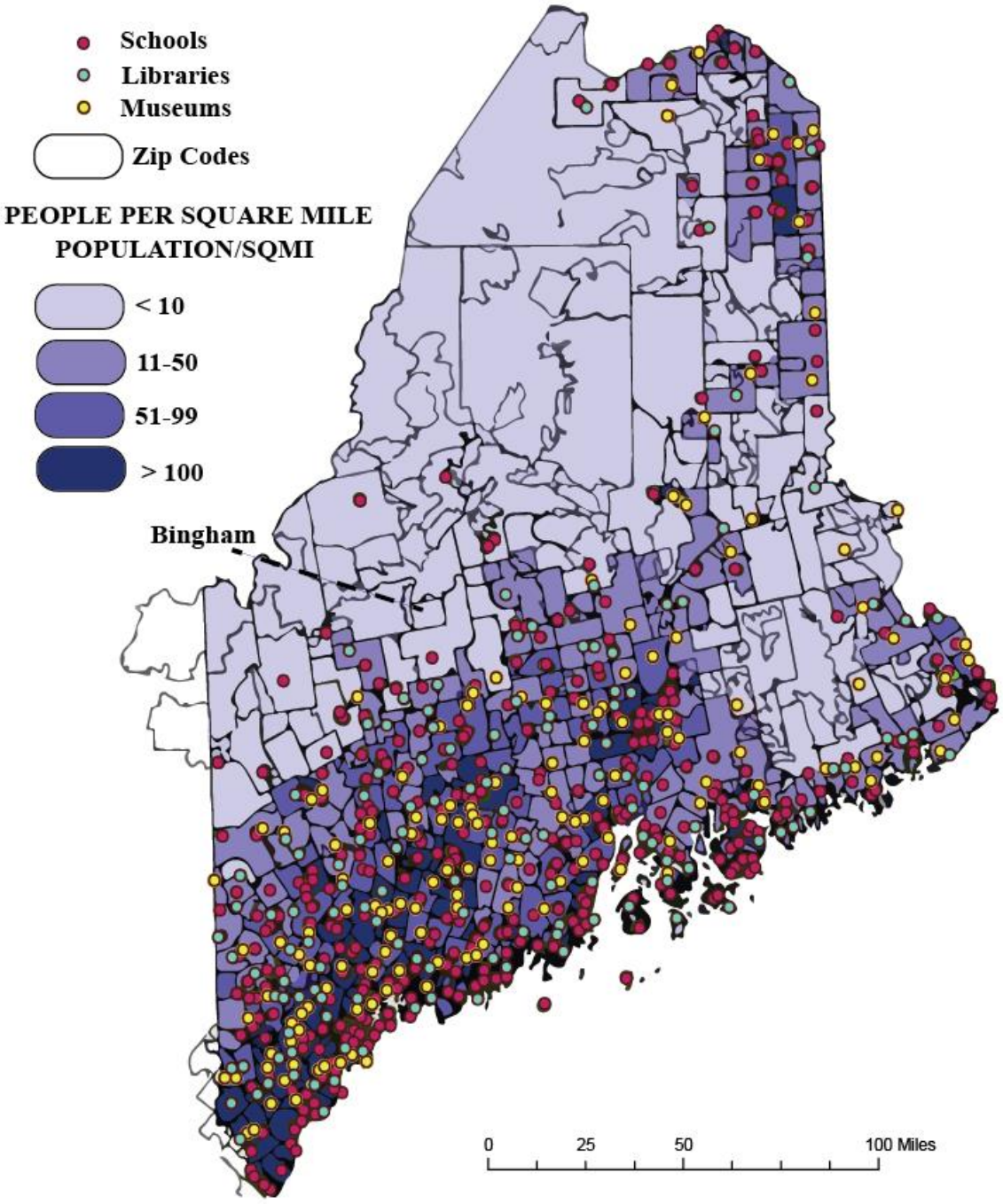
And so, My Secondspace final analytical product was the ArcGIS Story Map. As stated prior, to depict a Secondspace image of this changing rural space, this map coherently organized photographs and artifacts from the town chamber of commerce, local photographer websites, as well as historic town web pages. Herein, I used this Story Map as a data representation tool to revisit these juxtaposed old and newer utopian Secondspace rural visions sold to outsiders and insiders alike. I captioned these old and new photos with links to news media source articles or short tales, or notable "sound bytes" (B. Gee and K. Anderson, personal communication, April, 18, 2014), from interviews with key townsfolks and my own reflective field notes. From this Secondspace representation of data, I toured the changing landscape across time to tell the story of rurality, late modernity (Giddens, 1991), and technology both before and after digital technologies entered the picture. In my case, merging ethnographic data with quantitative and cartographic variables via Story Maps helped to contextualize multi-scalar geographic information in novel and less uni-dimensional ways. Thus geovisualizing qualitative data, through mapping the simultaneity of macro *and* local foci, helped to unearth the richness and multifaceted nature of human and cultural experience in space, time, and place.

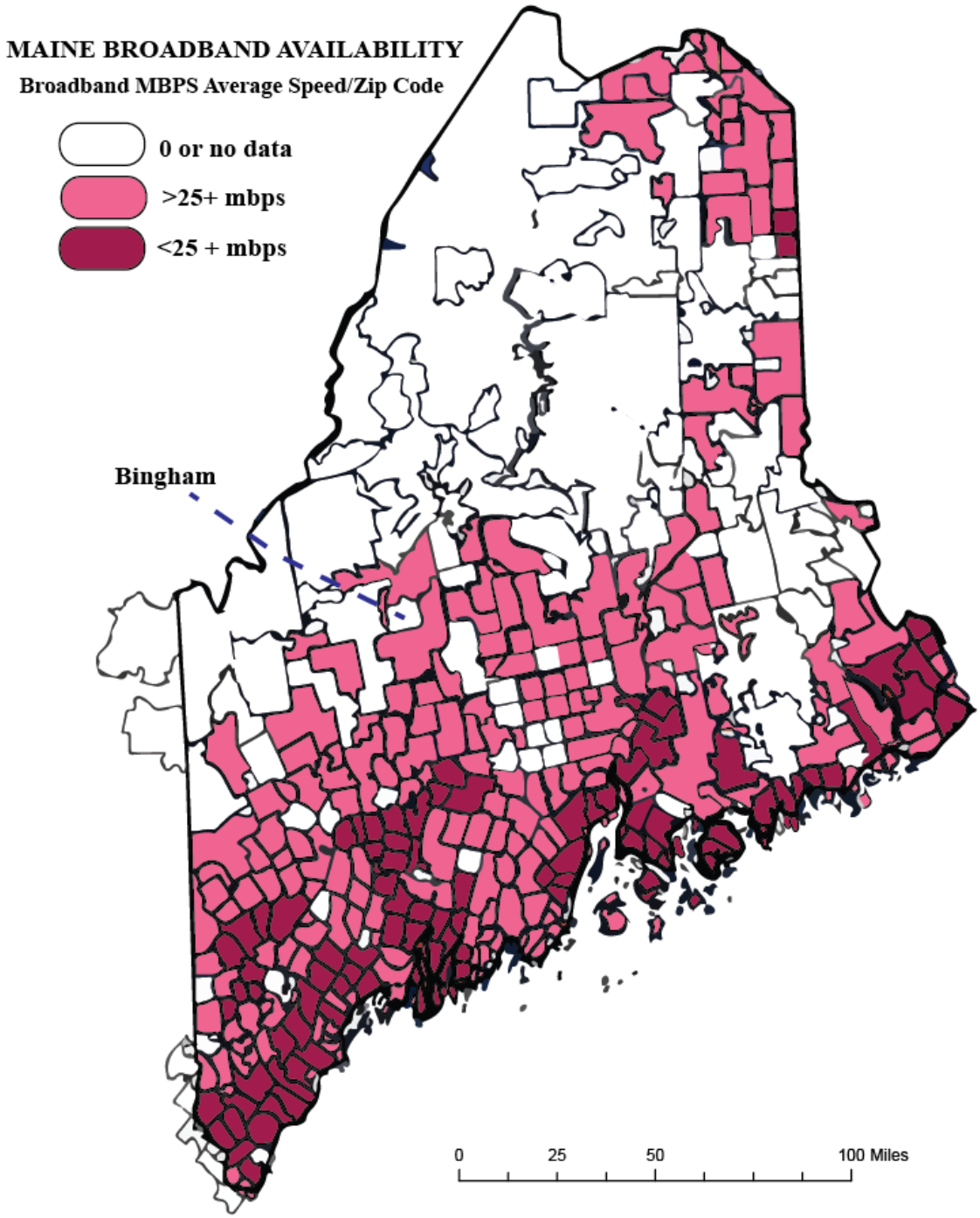
Findings

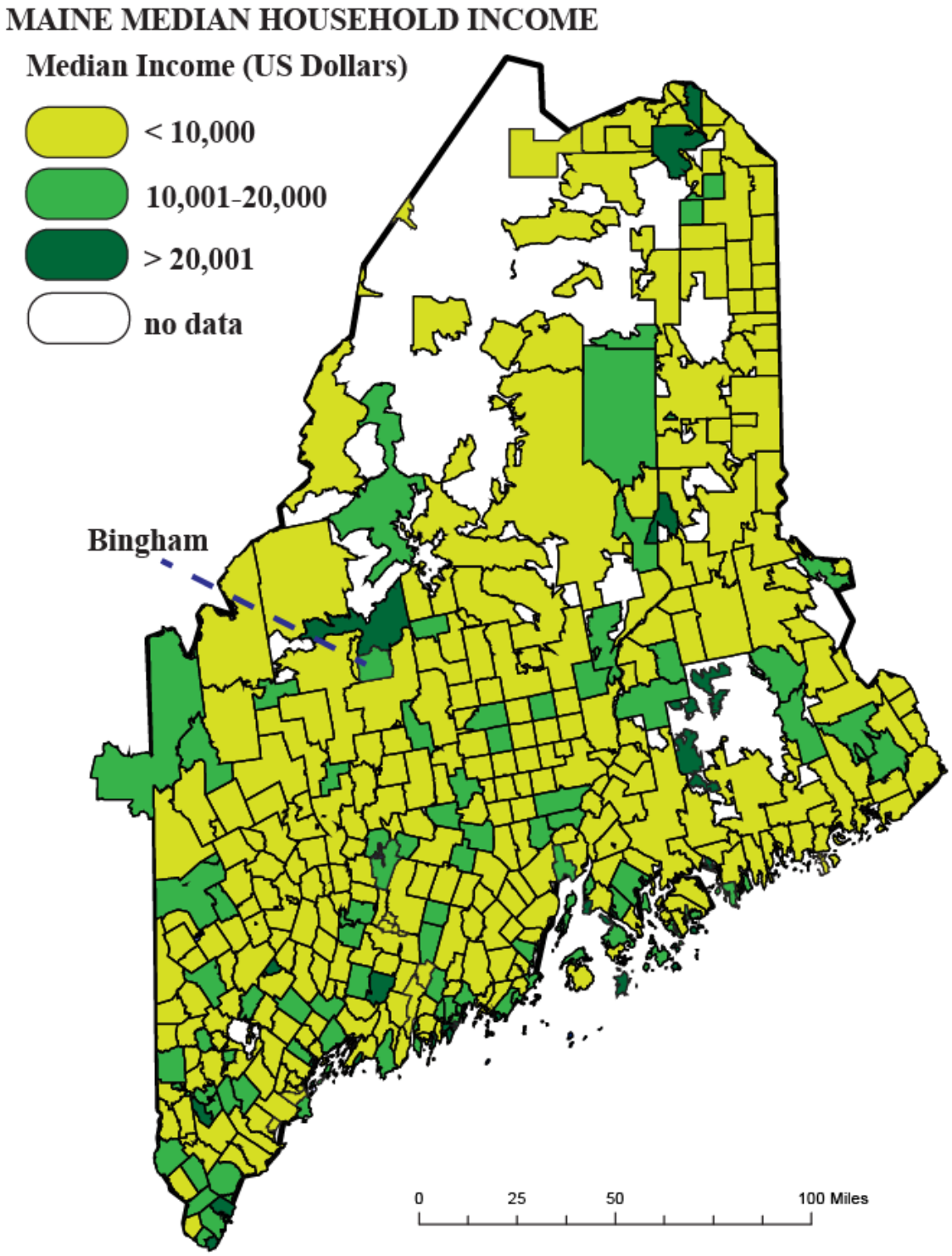
The purpose of this research was to spatially structure our understanding of digital equity across Maine's rural geography. Diverging from accepted claims of one monolithic driving force, such the political and economic consequential power of capitalistic material accumulation (Harvey, 2001), this analysis showed a combination of factors at play by mixing qualitative field notes and town artifacts with quantitative GIS techniques. My two analytical end products, including (1) GIS maps depicting the material Firstspace reality and (2) an online ArcGIS Story Map showing storied Secondspace conceptions of the area, revealed multiple other forces acting to shape poor rural geographies. More specifically, this production of space, and any discriminatory geographies therein, is driven by a complex combination of rural *and* urban forces at various broad and local levels (state, town, and neighborhood). These forces involved classism and digital exclusion, such as placing more digital learning opportunities within high tourist areas, the uneven distribution of schools/libraries/museums, and the failure to provide digital infrastructure needed to connect the most remote rural communities. This more nuanced analysis was needed because digital equity is often caught up with unseen forces outside of political or economic materialities. Further, because rural areas are often excluded from the 'Right to the City' rhetoric and its related capacity for critical spatial consciousness, also overlooked is the rural ability to mobilize against any spatial (in)justice. Thus, zeroing in on the unique and important orchestration of factors influencing the spatial production of rural digital (in)equities is timely not only in terms of our nation's unity, but in light of new pressures to remake more digitally inclusive rural geographies.

State-Level Findings

Briefly, my quantitative steps involved merging different U.S. Census GIS data on Maine's museums, schools, and libraries; calculating density of digital learning opportunities; analyzing both population density and income distribution across zip codes; and finally computing the per-capita density of digital learning opportunities. Key variables for analysis were overall state count/location of digital learning opportunities, zip code land area in square miles, the state population, broadband availability, and median household income. In addition, local variables included town count of digital learning opportunities, the spatial arrangement of homes, and road networks in Bingham. Thus, the geographic clustering (inclusive of density *and* accessibility of digital learning opportunities) within specific neighborhoods represented the micro-geographical unit of analysis and the across-neighborhood variation simultaneously afforded a broader macro-geographical analytical scope. From this, my final analytical products were the ArcGIS digital density map, the population density map, broadband availability, the income distribution map, and the per capita distribution of digital learning opportunities (see Figure 3.2).


Schools
Libraries
Museums
Zip Codes
PEOPLE PER SQUARE MILE
POPULATION/SQMI
< 10
11-50
51-99
> 100
Bingham
0
25
50
100 Miles


MAINE BROADBAND AVAILABILITY
Broadband MBPS Average Speed/Zip Code
0 or no data
>25+ mbps
<25 + mbps
Bingham
0
25
50
100 Miles


MAINE MEDIAN HOUSEHOLD INCOME
Median Income (US Dollars)
< 10,000
10,001-20,000
> 20,001
no data
Bingham
0
25
50
100 Miles

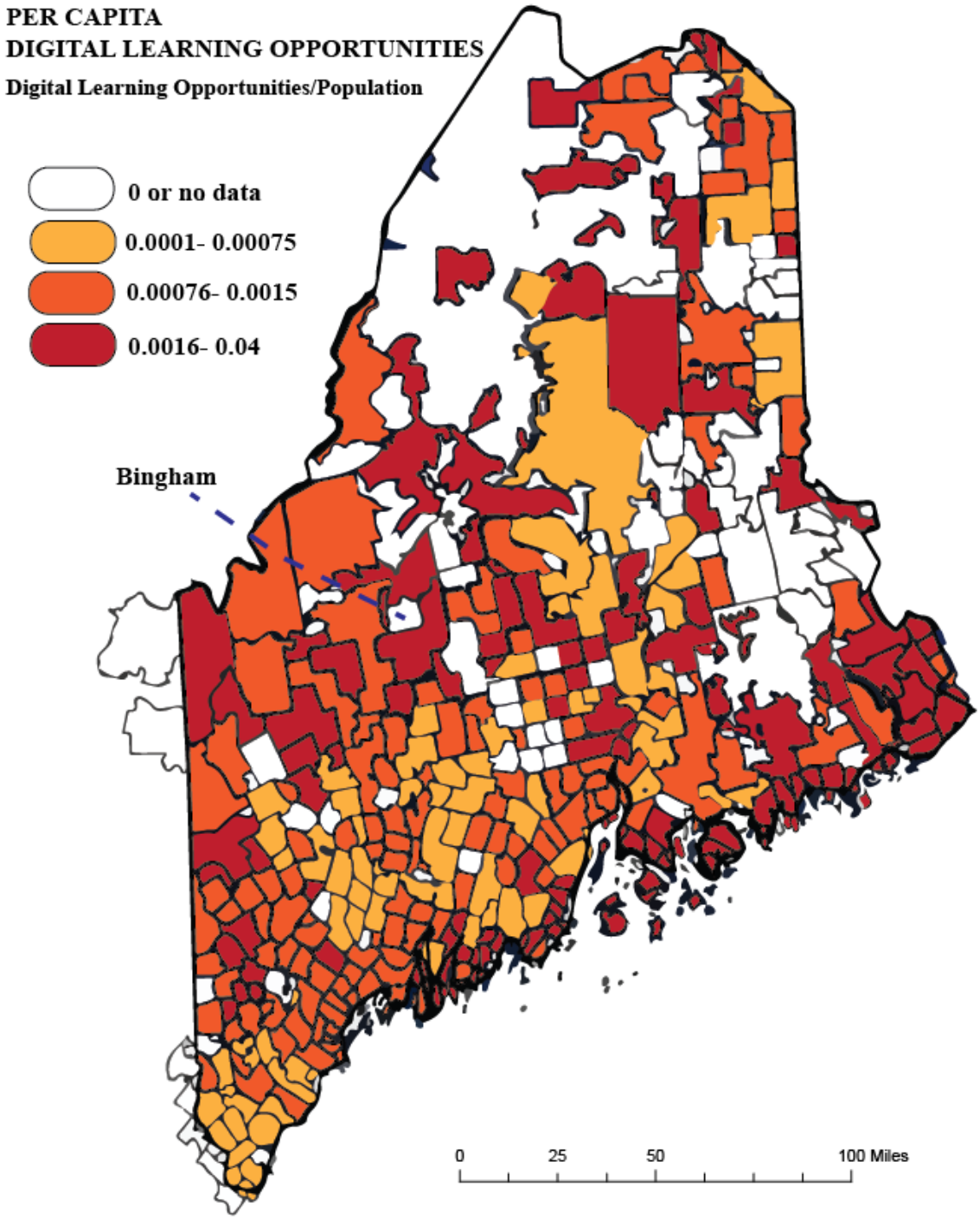


Figure 3.2. GIS Map of Digital Learning Opportunities by Population, Broadband, Income, & Per Capita

From this GIS analysis, we can quickly discern the uneven geography of digital equity across Maine. When looking at the first GIS map, we understand how greater

population equals greater number of digital learning opportunities. This trend also holds true with broadband connectivity, as broadband is more readily available in higher populated areas. The further one moves away from the more populated urban centers of Maine, the less is provided in educational opportunity (i.e., digital learning opportunities and broadband). However, the GIS maps showing per capita distribution and income afford greater nuance such that we discern that greater population does not necessarily warrant more digital learning opportunities. For example, in light of the GIS map of income, this per capita distribution of real digital resources appears to be in favor of the wealthy. Further, the GIS map of per capita distribution indicates that areas that aren't wealthy, but still retain higher per-capita learning opportunities are concentrated near the coastal and DownEast regions of Maine. These high-tourist areas include numerous "must see" lighthouses, National State Parks (Acadia), International Parks (Roosevelt Campobello), and Historic Sites (St. Croix Island). Given tourism is the largest industry in the state of Maine, these regions unlock the power of the Secondspace and net a substantial chunk of state revenue by selling a historically-rich, rugged, and sea-infused vision of Maine (http://www.meliving.com/mainetourism/). Patterns related to the variables of population density, income, and tourism emerge such that distribution of digital learning opportunities privileges higher income residents and wealthy non-resident tourists. Therefore, these patterns bring to light critical questions about the spatiality of injustice and the limited learning opportunities available in lower-income areas that do not fit the idyllic vision of rural Maine.

Town-Level Bingham Findings

At the town-level, to compare how Bingham neighborhoods differed in terms of resources, I mapped the town's distribution of digital learning opportunities[3]. Though all neighborhoods bordered each other, Firstspace, or geographic surface-level scenery (see Figure 3.3) and boundaries are distinct. The low-income area of Murray Hill is clearly defined from the wealthier Meadow Grove by the town's highway and from the middle-income Concord by its river. A Firstspace surface appraisal analysis shows the extreme scarcity of digital learning opportunities across all neighborhoods (see Figure 3.4). Secondspace conceptions of these neighborhoods depict Meadow Grove with an "idyllic small town feel," Concord as the "hard working farm area," and Murray Hill as the "struggling badlands" (E. Smedberg, personal communication September 15, 2015). These Firstspace perception and Secondspace conceptions are invoked further in the following paragraphs, which story my neighborhood walkthroughs.

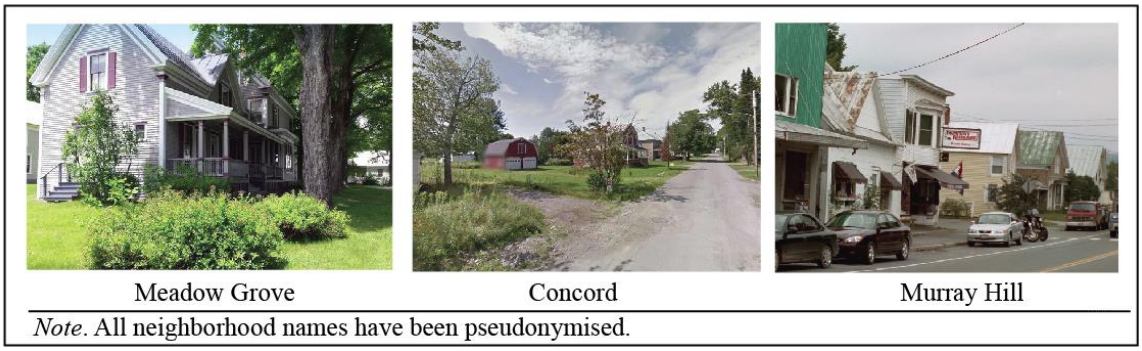


Figure 3.3. Typical Scenery Across Neighborhoods Gathered from Neighborhood Walkthroughs

[3] Unfortunately, the GIS map did not have Census data on schools, museums, and libraries in the Bingham zip code. From my own surface analysis, I then geo-located Bingham's digital learning opportunities in Figure 3.4.

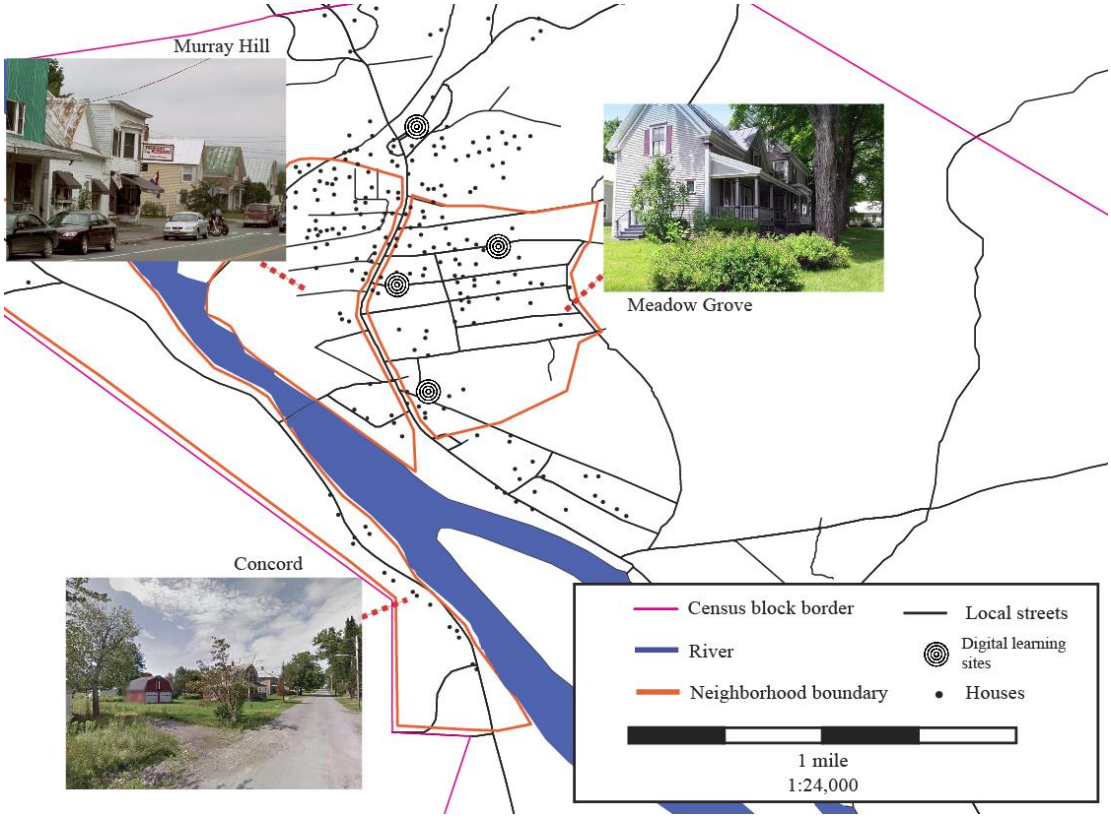


Figure 3.4. GIS Density Map of Bingham Neighborhood's Digital Learning Opportunities

Neighborhood walkthroughs. Despite the overall scarcity of digital learning opportunity, the Firstspace distribution across these neighborhoods was not equal. Meadow Grove, with its oak-lined streets, houses the town's only library and most of its schools. As a result, the Meadow Grove kids are in short walking distance to books, computers with Internet access, printers, and the Quimby Elementary schoolyard. At the playground, children have access to a jungle gym, a merry-go-round, 2 see-saws, a sandbox, high swings, and a metal slide that twists its way downward. Children and adults can gather for a game of basketball on the green basketball court, tennis within the red fenced-in courts, and soccer on the large athletic field with large white goals, as well

as simply chill and key into the school's free Wifi. Additionally, all the town's churches and bed-n-breakfast inns are also nestled within this serene neighborhood. Its back streets invite a slow stroll. They actually have sidewalks. At the foot of the large houses, colorful flowers poke out of their square beds. Most houses are freshly painted with expansive porches and manicured lawns. The old oaks lining the streets have full branches that cross overhead to the opposing oak, as if in close conversation. Full branches are so busy in their back-and-forth dialogue, that looking up you can't see the sky for the trees. The arch of leaves above lend a cozy and secure feel, like a rainforest canopy incubating the richest soil and most highly prized medicinal elixir in order to nourish the unrivaled activity and resources locked within Meadow Grove.

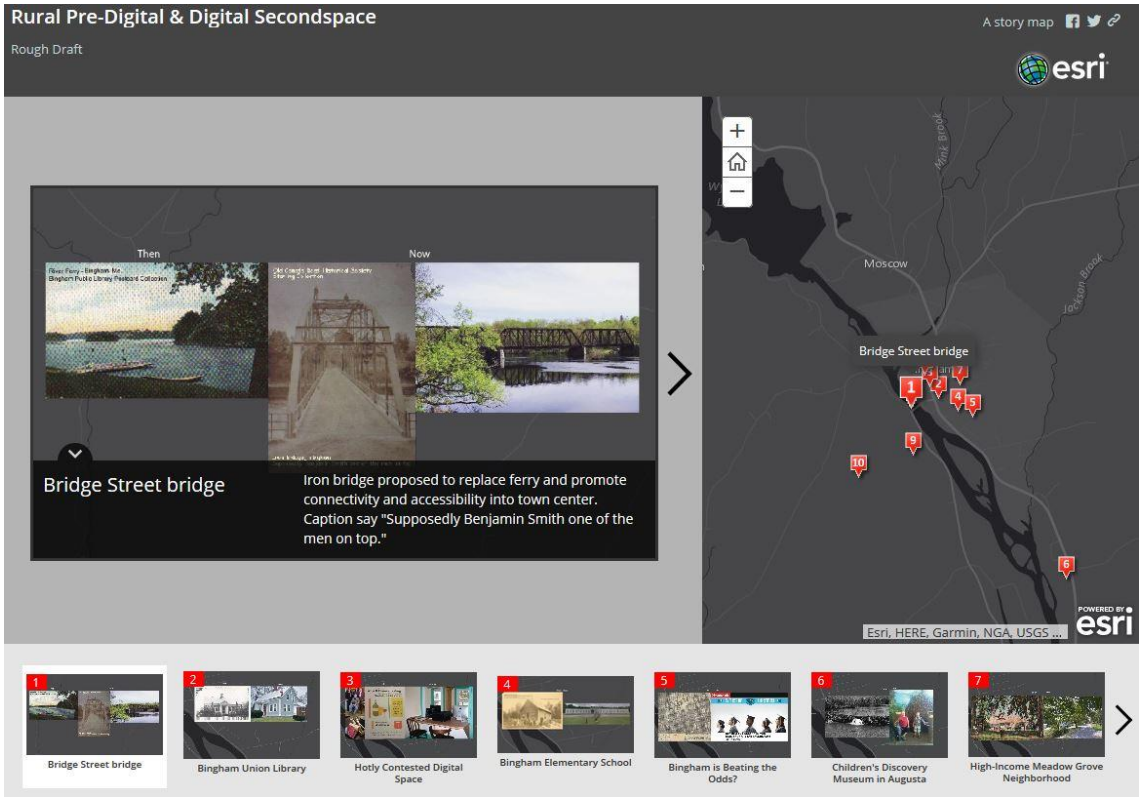
Crossing Route 201, the state's thruway to Canada, you come to Murray Hill. The neighborhood hosts the town's only drug store, bar, gas station, bank, as well as rotating stretch of short-lived tourist shops/thrift stores/hang outs. The drug store gets robbed roughly three times a year. The gas station used to have an ATM, but it was too much temptation, as residents kept busting out windows with bricks trying to loot it. The bank got held up once; the perpetrator was a man in his 40's, who threatened the tellers with a hammer. He was caught soon after getting his money, as he ran down Murray Hill's back streets with his hammer. It's no wonder. Walking its backstreets, there are no sidewalks: only worn footpaths that cut into the grass of dying lawns. Most residents opt to freely walk in the streets, but don't look up when cars pass. The neighborhood decay shows itself on the worn houses with paint peeling and on shops with no-longer-legible signage. Some houses even appear tilted, with slanted windows that look out on the road with suspicion. Other houses are tiny sheds with plywood walls. Barking dogs tethered to

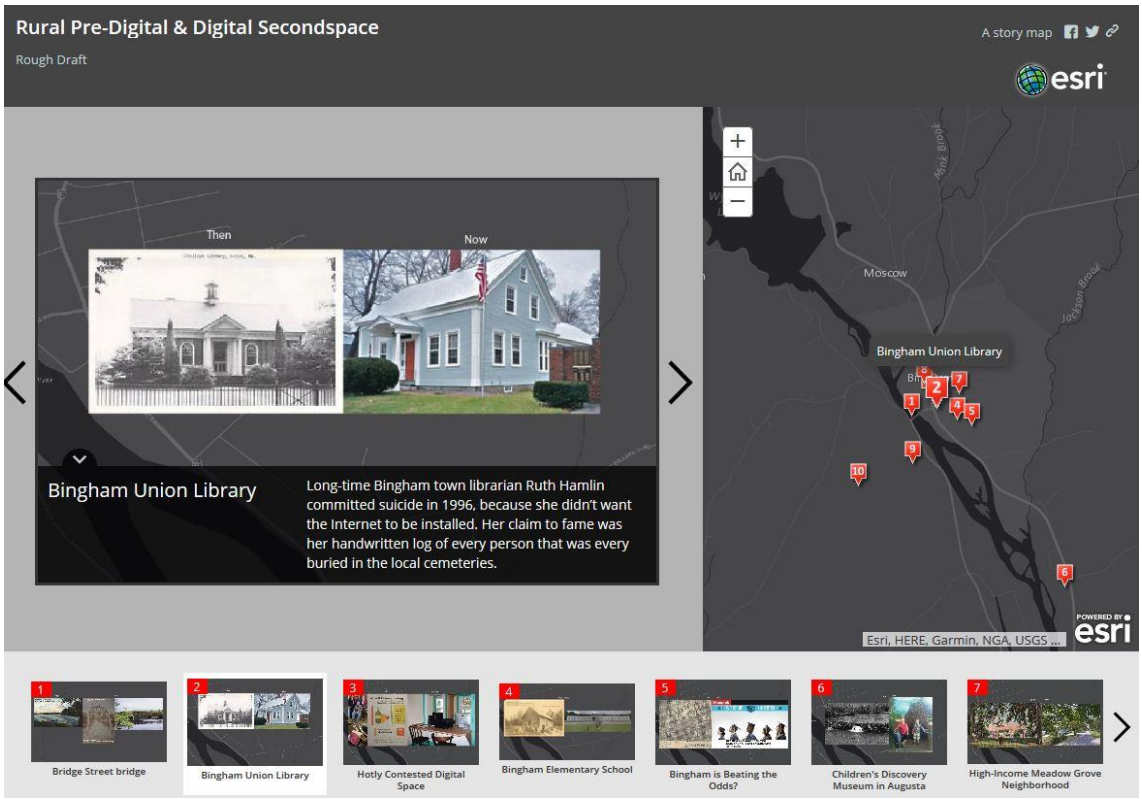
posts defend meager sheds with an awkward sense of misplaced pride. Most yards are littered with junk: faded plastic toys and rusted cars with hoods erupting all sorts of machinic assemblages. Camshafts. Engine blocks. Rear axles.

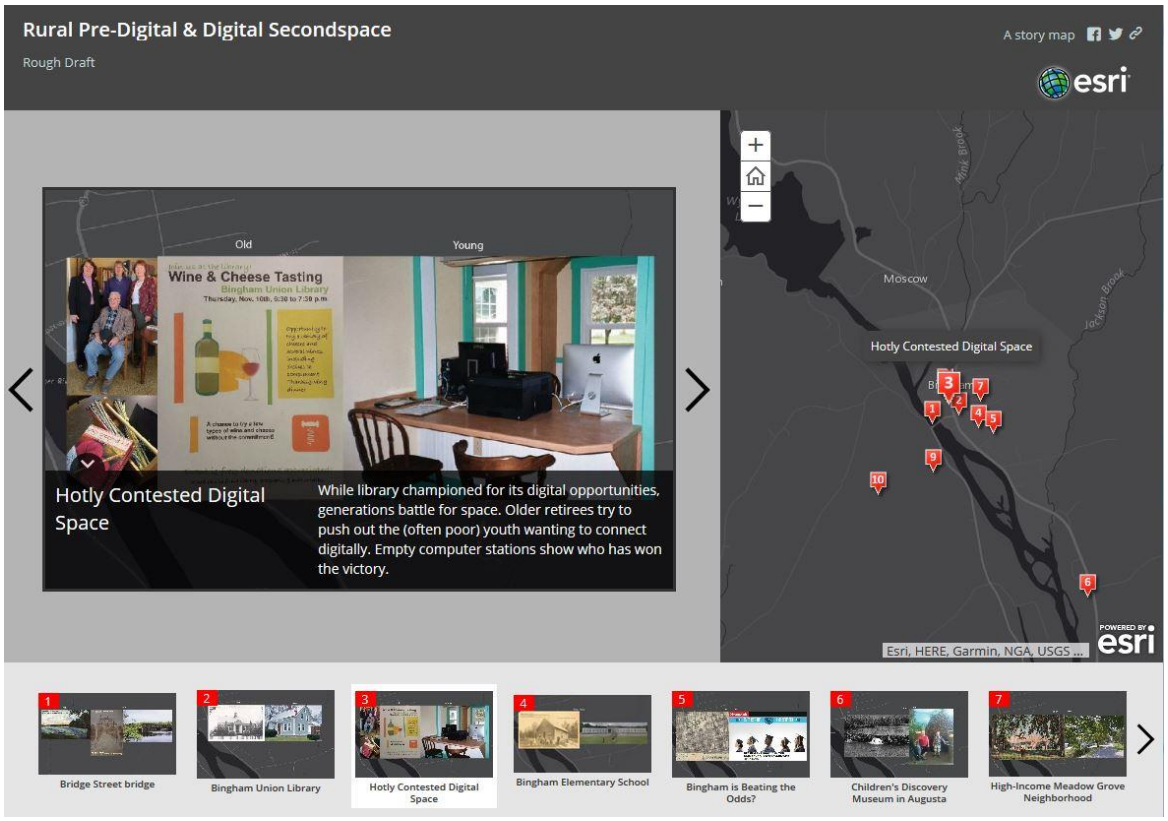
Concord is across the bridge. The houses are fewer and further apart. Most are giant drafty farm houses with barns and silos that reach out from sweeping pastures. Trucks and horse trailers are parked in long gravel driveways. Out back, clothes lines hang underwear and bras to let you know the exact size of whoever lives there. And in between most houses, there's not much else but an outpouring of sun-drenched pastures with cows and horses. Pastures stretch themselves lazily into meadows and then further into hills. Winding throughout these Concord hills are trails, which invite adventure and wild exploration whether on foot, all-terrain-vehicle (ATV), or snowmobile. Unless a "No Hunting" sign is posted, these rolling hills are ideal for hunting whitetail deer, black bear, moose, upland birds, and anything else moving (but not dressed in safety orange). Concord children also have creeks and ponds and mud bogs to thrash around in wrestling cattails. Here when going outside to play, one wears bright orange and boots, not shoes. And returning home, one's adventure is storied through scratches, thorn pricks, and two splinters (or maybe three). This is the kind of farm area where one gets attached to a pig and befriends a barn spider named Charlotte.

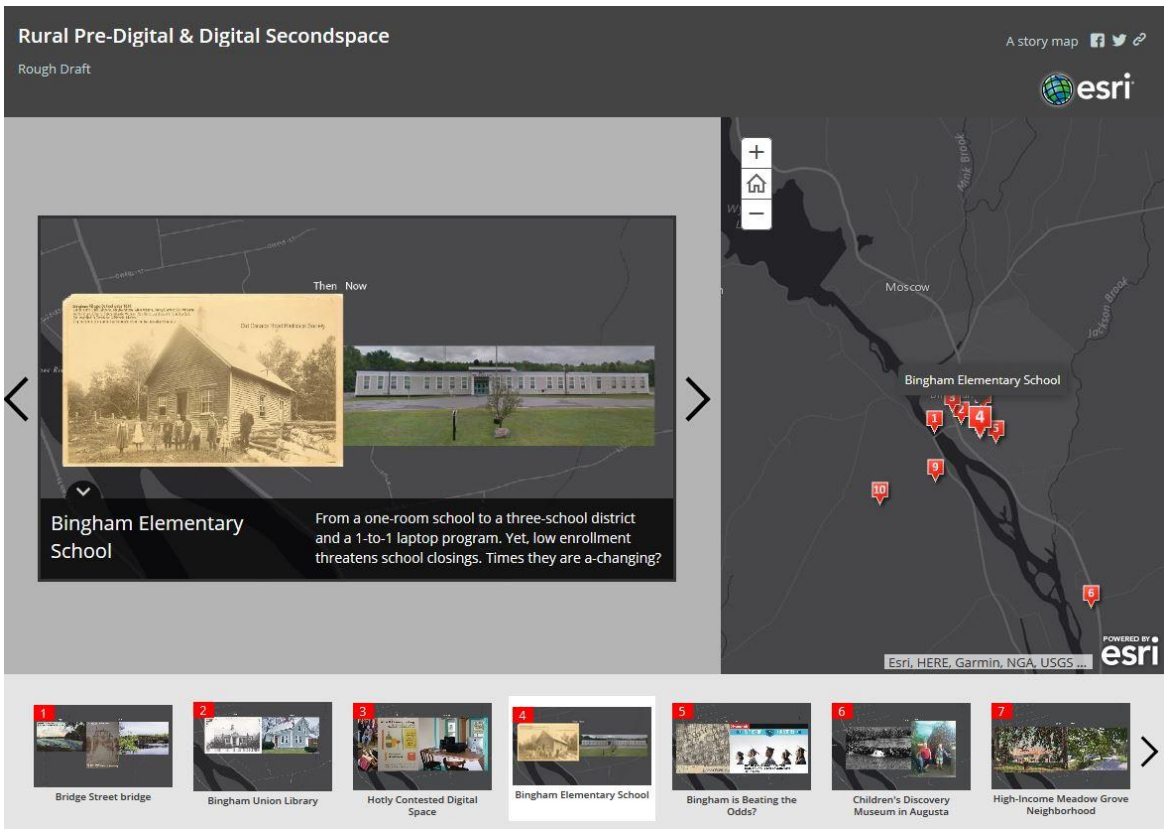
Story Map. Further juxtaposing conceived Secondspace representations of space amid Firstspace surface appearances in this small town, I present my Story Map via the ESRI ArcGIS online site: http://arcg.is/2gKqy6z.[4]

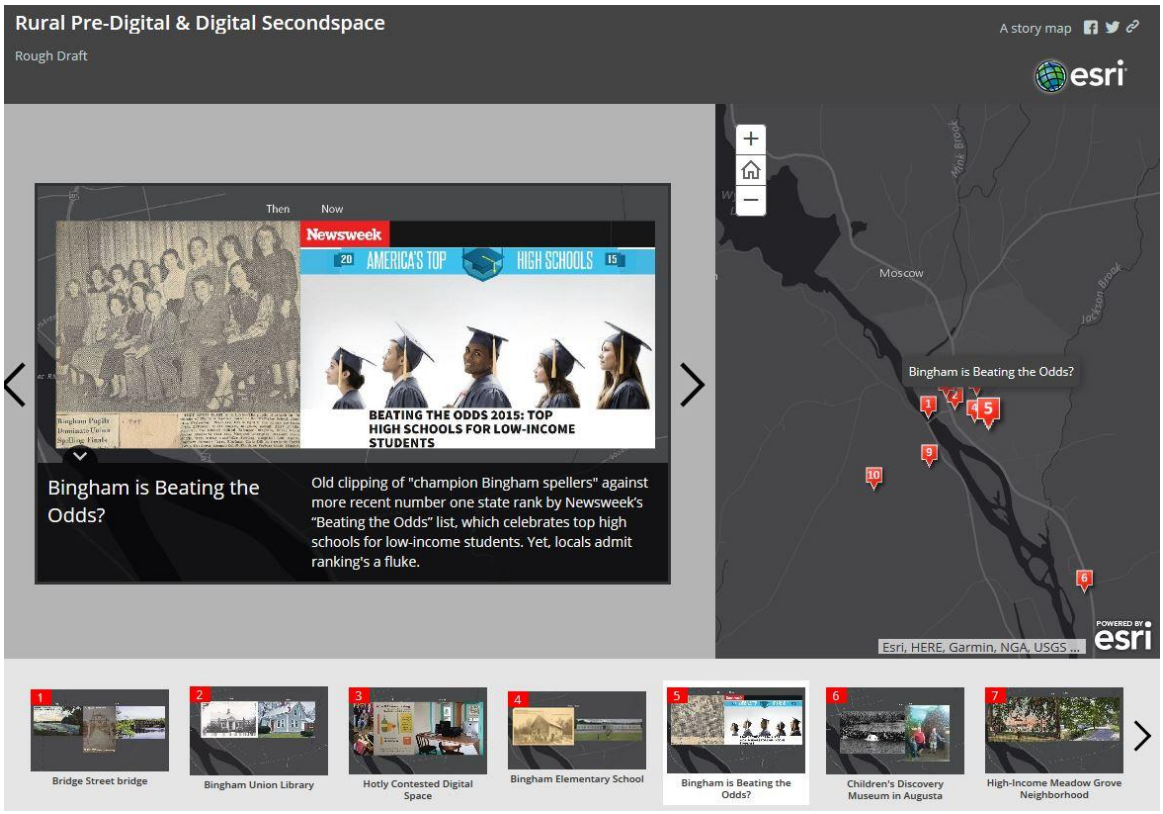
[4] While I have included the following images from my Story Map, readers are encouraged to view the map online as some text within the images is hard to read.

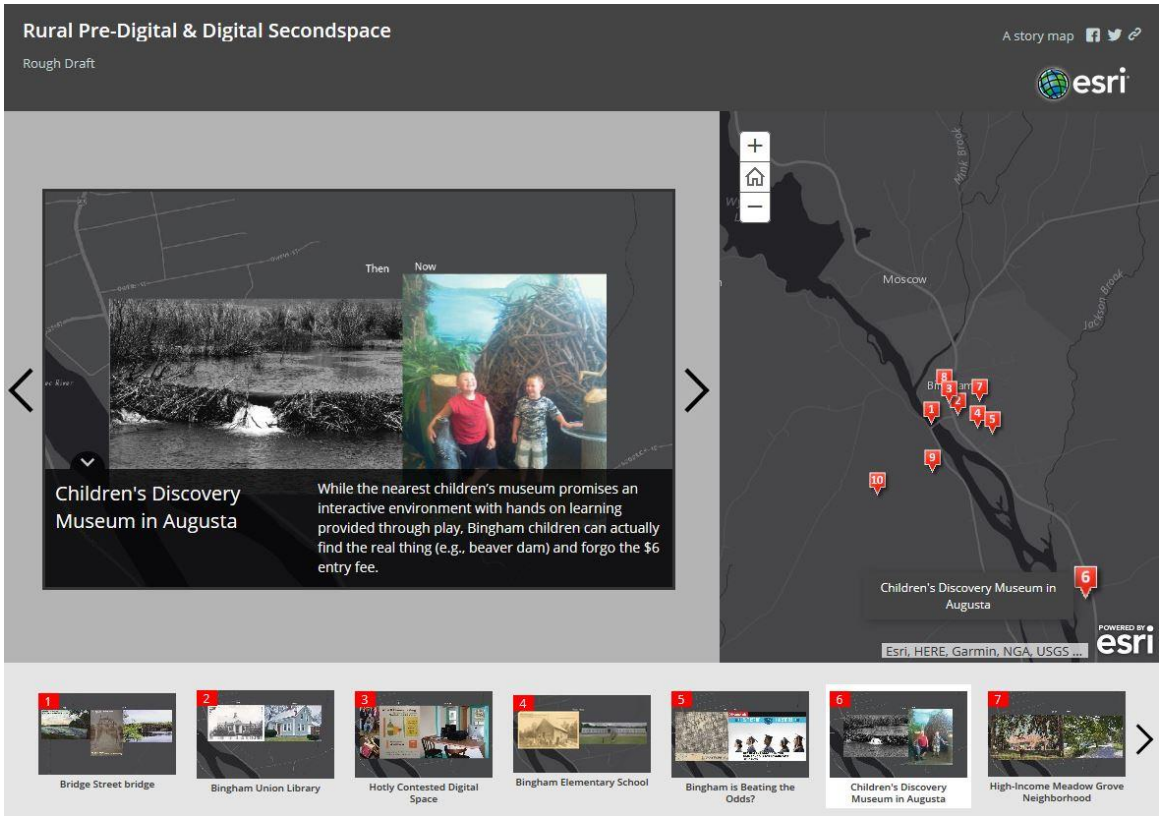

Rural Pre-Digital & Digital Secondspace
Rough Draft
A story map
esri
Then
Now
Bridge Street bridge
Iron bridge proposed to replace ferry and promote connectivity and accessibility into town center. Caption say "Supposedly Benjamin Smith one of the men on top."
Moscow
Bridge Street bridge
Esri, HERE, Garmin, NGA, USGS ...
Bridge Street bridge
Bingham Union Library
Hotly Contested Digital Space
Bingham Elementary School
Bingham is Beating the Odds?
Children's Discovery Museum in Augusta
High-Income Meadow Grove Neighborhood

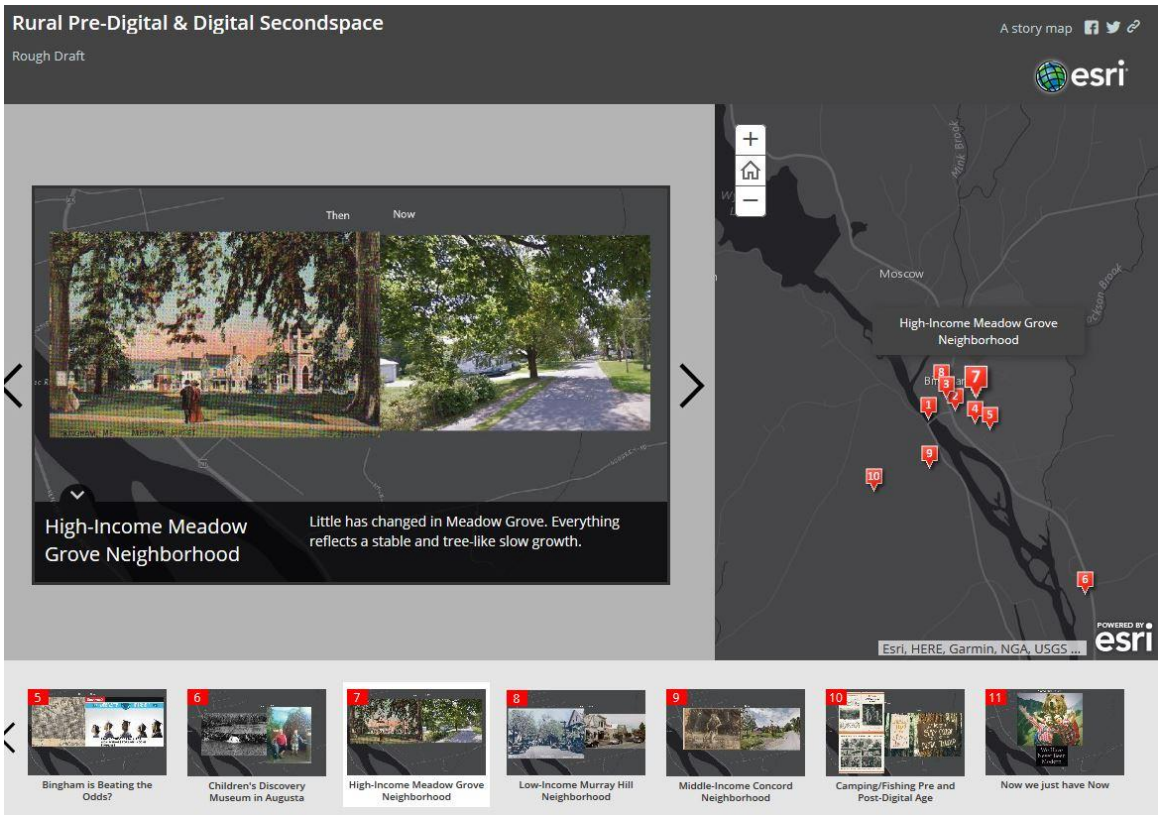

Rural Pre-Digital & Digital Secondspace
Rough Draft
A story map
esri
Then
Now
Bingham Union Library
Long-time Bingham town librarian Ruth Hamlin committed suicide in 1996, because she didn't want the Internet to be installed. Her claim to fame was her handwritten log of every person that was every buried in the local cemeteries.
Moscow
Bingham Union Library
Esri, HERE, Garmin, NGA, USGS ...
Bridge Street bridge
Bingham Union Library
Hotly Contested Digital Space
Bingham Elementary School
Bingham is Beating the Odds?
Children's Discovery Museum in Augusta
High-Income Meadow Grove Neighborhood

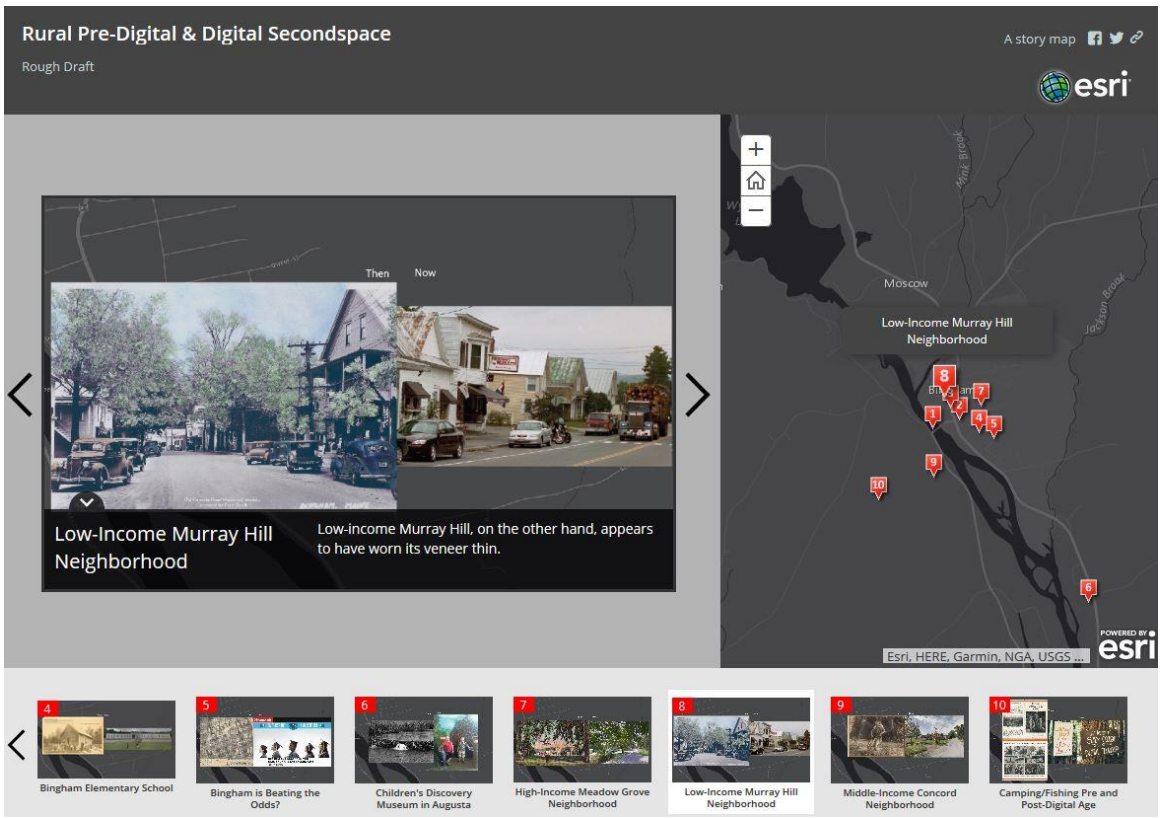

Rural Pre-Digital & Digital Secondspace
Rough Draft
A story map
esri
Old
Young
Wine & Cheese Tasting
Bingham Union Library
Hotly Contested Digital Space
While library championed for its digital opportunities, generations battle for space. Older retirees try to push out the (often poor) youth wanting to connect digitally. Empty computer stations show who has won the victory.
Moscow
Hotly Contested Digital Space
Esri, HERE, Garmin, NGA, USGS ...
Bridge Street bridge
Bingham Union Library
Hotly Contested Digital Space
Bingham Elementary School
Bingham is Beating the Odds?
Children's Discovery Museum in Augusta
High-Income Meadow Grove Neighborhood

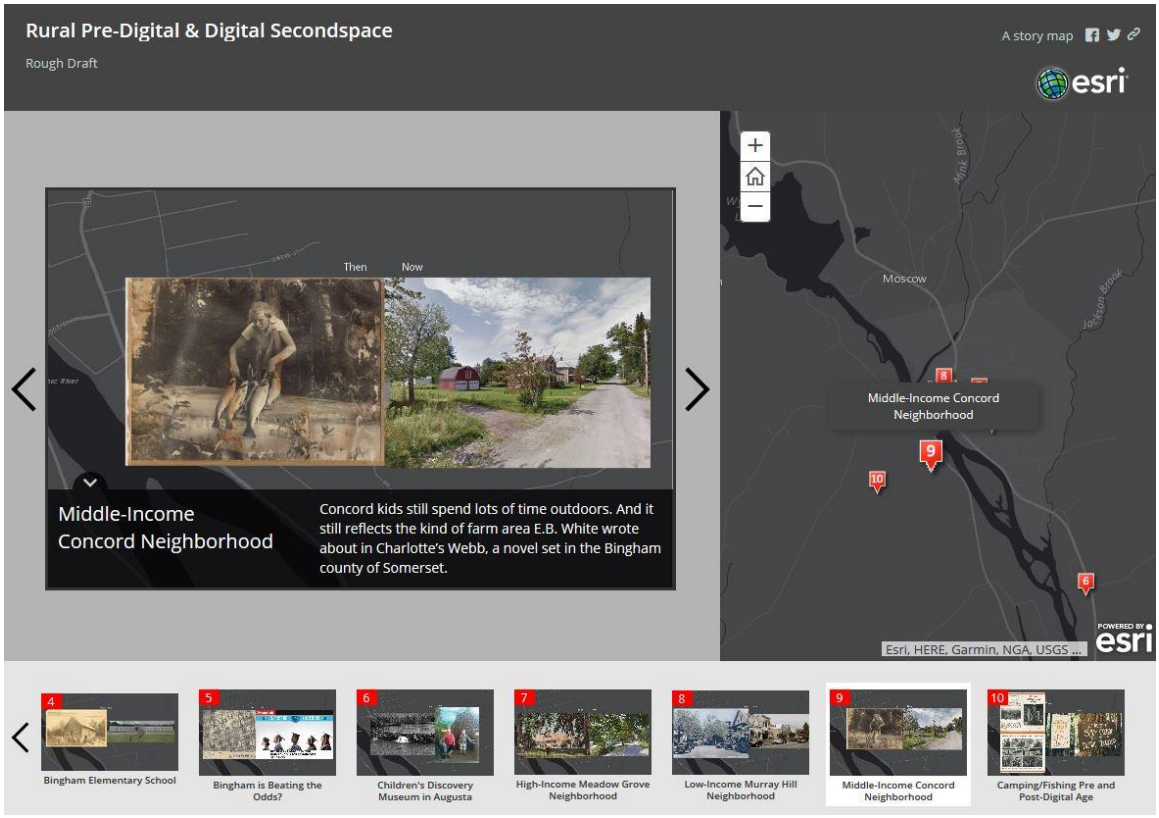

Rural Pre-Digital & Digital Secondspace
Rough Draft
A story map
esri
Then
Now
Bingham Elementary School
From a one-room school to a three-school district and a 1-to-1 laptop program. Yet, low enrollment threatens school closings. Times they are a-changing?
Moscow
Bingham Elementary School
Esri, HERE, Garmin, NGA, USGS ...
Bridge Street bridge
Bingham Union Library
Hotly Contested Digital Space
Bingham Elementary School
Bingham is Beating the Odds?
Children's Discovery Museum in Augusta
High-Income Meadow Grove Neighborhood

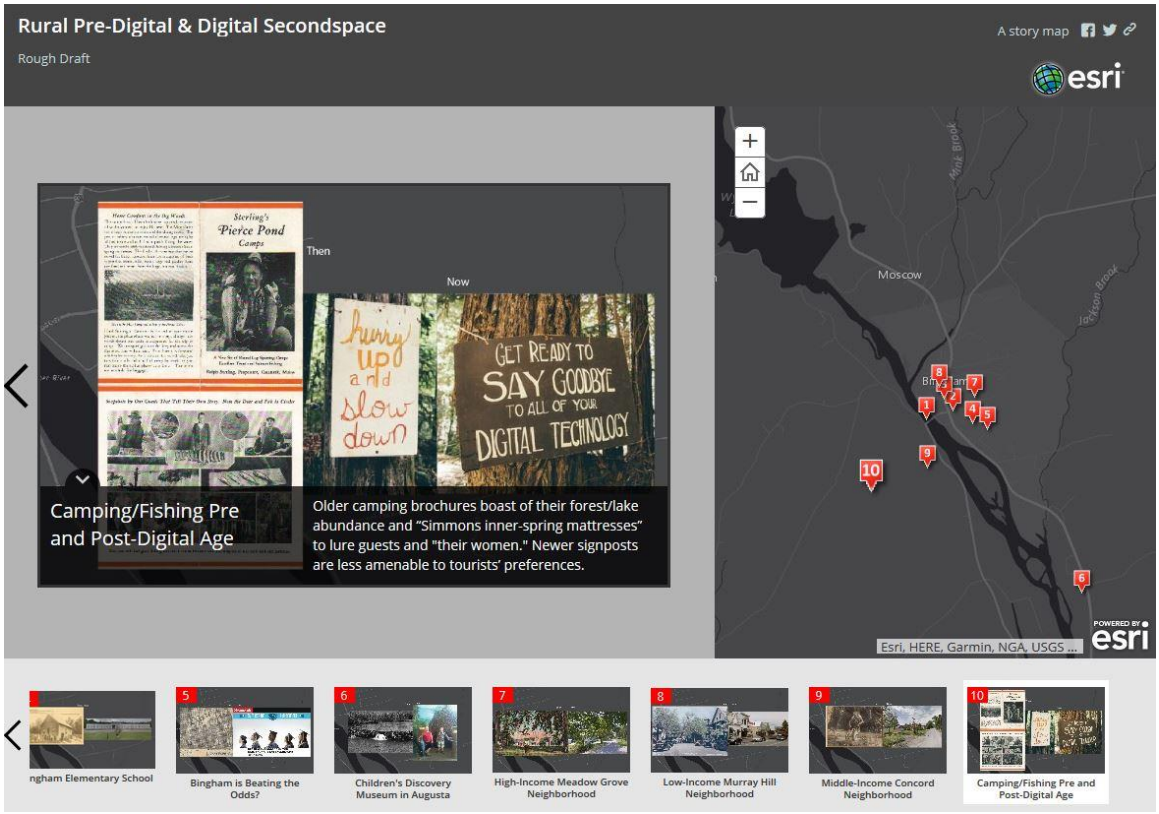

Rural Pre-Digital & Digital Secondspace
Rough Draft
A story map
esri
Then
Now
Newsweek
20 AMERICA'S TOP HIGH SCHOOLS 15
BEATING THE ODDS 2015: TOP HIGH SCHOOLS FOR LOW-INCOME STUDENTS
Bingham is Beating the Odds?
Old clipping of "champion Bingham spellers" against more recent number one state rank by Newsweek's "Beating the Odds" list, which celebrates top high schools for low-income students. Yet, locals admit ranking's a fluke.
Moscow
Bingham is Beating the Odds?
Esri, HERE, Garmin, NGA, USGS ...
POWERED BY esri
1 Bridge Street bridge
2 Bingham Union Library
3 Hotly Contested Digital Space
4 Bingham Elementary School
5 Bingham is Beating the Odds?
6 Children's Discovery Museum in Augusta
7 High-Income Meadow Grove Neighborhood


Rural Pre-Digital & Digital Secondspace
Rough Draft
A story map
esri
Then
Now
Children's Discovery Museum in Augusta
While the nearest children's museum promises an interactive environment with hands on learning provided through play, Bingham children can actually find the real thing (e.g., beaver dam) and forgo the $6 entry fee.
Moscow
Children's Discovery Museum in Augusta
Esri, HERE, Garmin, NGA, USGS ...
POWERED BY esri
1 Bridge Street bridge
2 Bingham Union Library
3 Hotly Contested Digital Space
4 Bingham Elementary School
5 Bingham is Beating the Odds?
6 Children's Discovery Museum in Augusta
7 High-Income Meadow Grove Neighborhood


Rural Pre-Digital & Digital Secondspace
Rough Draft
A story map
esri
Then
Now
High-Income Meadow Grove Neighborhood
Little has changed in Meadow Grove. Everything reflects a stable and tree-like slow growth.
Moscow
High-Income Meadow Grove Neighborhood
Esri, HERE, Garmin, NGA, USGS ...
5 Bingham is Beating the Odds?
6 Children's Discovery Museum in Augusta
7 High-Income Meadow Grove Neighborhood
8 Low-Income Murray Hill Neighborhood
9 Middle-Income Concord Neighborhood
10 Camping/Fishing Pre and Post-Digital Age
11 Now we just have Now


Rural Pre-Digital & Digital Secondspace
Rough Draft
A story map
esri
Then
Now
Low-Income Murray Hill Neighborhood
Low-income Murray Hill, on the other hand, appears to have worn its veneer thin.
Moscow
Low-Income Murray Hill Neighborhood
Esri, HERE, Garmin, NGA, USGS ...
4 Bingham Elementary School
5 Bingham is Beating the Odds?
6 Children's Discovery Museum in Augusta
7 High-Income Meadow Grove Neighborhood
8 Low-Income Murray Hill Neighborhood
9 Middle-Income Concord Neighborhood
10 Camping/Fishing Pre and Post-Digital Age


Rural Pre-Digital & Digital Secondspace
Rough Draft
A story map
esri
Then
Now
Middle-Income
Concord Neighborhood
Concord kids still spend lots of time outdoors. And it still reflects the kind of farm area E.B. White wrote about in Charlotte's Webb, a novel set in the Bingham county of Somerset.
Moscow
Middle-Income Concord Neighborhood
Esri, HERE, Garmin, NGA, USGS ...
Bingham Elementary School
Bingham is Beating the Odds?
Children's Discovery Museum in Augusta
High-Income Meadow Grove Neighborhood
Low-Income Murray Hill Neighborhood
Middle-Income Concord Neighborhood
Camping/Fishing Pre and Post-Digital Age


Rural Pre-Digital & Digital Secondspace
Rough Draft
A story map
esri
Then
Now
Sterling's Pierce Pond Camps
Camping/Fishing Pre and Post-Digital Age
Older camping brochures boast of their forest/lake abundance and "Simmons inner-spring mattresses" to lure guests and "their women." Newer signposts are less amenable to tourists' preferences.
Moscow
Esri, HERE, Garmin, NGA, USGS ...
Bingham is Beating the Odds?
Children's Discovery Museum in Augusta
High-Income Meadow Grove Neighborhood
Low-Income Murray Hill Neighborhood
Middle-Income Concord Neighborhood
Camping/Fishing Pre and Post-Digital Age

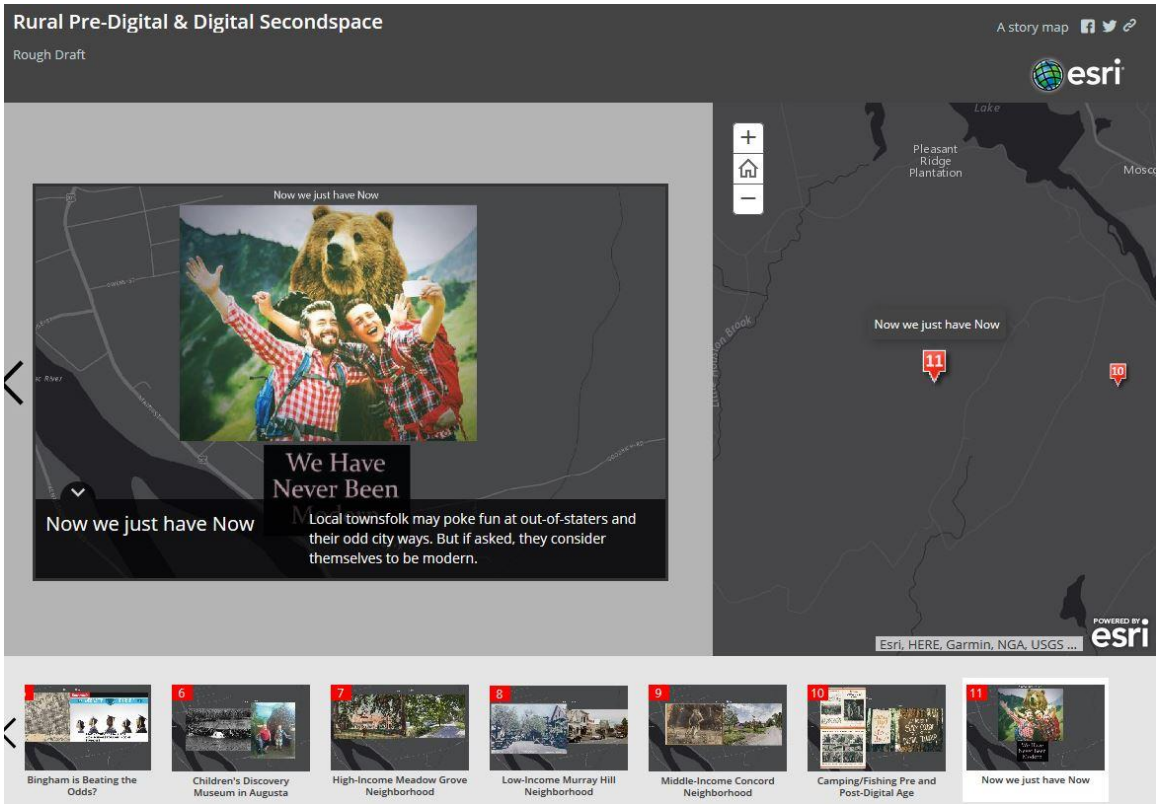


Figure 3.5. Data Story Points from Story Map Tour "Rural Pre-Digital & Digital Secondspace"

Highlighting the spatiality of this Secondspace analysis, ESRI Story Maps enable us to recover the many geographical themes hidden within the rural identity. Results from Story Map (inclusive of townsfolk "sound bytes," historic town artifacts, and media headlines) reflect storied conceptions of how digital access has (or has not) modernized the town (see Figure 3.5). By revealing a variety of paradoxes, the Story Map gives a more nuanced view of how digital practices and spaces are meaningfully weaved into the social fabric and everyday norms of rural life. For example, while public learning sites are typically considered valuable assets to rural digital learning, rural folk are still unsure of their fit and purpose within the town. In particular, concerns over preservation of rural identity are highlighted as powerful factors which reject high-tech digital values and thus

affect how locals make and remake their geographies. Yet the townsfolk are not against progress and view themselves and their practices as "modern." Because spatial processes contributing to rural geographies are at the same time objectively real (Firstspace) and subjectively imagined (Secondspace), Story Maps thus help us to unveil the dynamic and powerful influence of conceived space over rural folks' technologically-mediated actions and decisions.

For instance, despite how the library is championed for its digital opportunities by all rural families of all SES, it is hotly contested space among old versus young. While younger rural children (often poor) flock to the library to use the Internet their families can't afford, older rural retirees fight to preserve it as a lazy space for gathering, wine and cheese tastings, knitting, making crafts, and gossiping. This is reflected in its hours of operation, which serve the interests and schedules of the elderly more than the youth, who are in school during the majority of its business hours. And this contention runs deep. Some years ago, the school district attempted to partner with the town librarian to run a free lunch program out of the library during summer, when the school wished to close its doors and save funds (S. Brochu, personal communication, August 8, 2016). A similar efficient free summer lunch program had been organized successfully out of the public library in the neighboring town of Solon, 6 miles away. However, after realizing the library would not change its schedule to accommodate staying open beyond its 3-day-a-week minimum, the school district gave up.

Because of Bingham's 1-to-1 laptop program, all its middle and high school children have laptops they can bring home. However, while IT specialist considers the program to be advantageous and affordable (D. Hussey, personal communication,

September, 9, 2015), rural townsfolk view the school laptops to be poor quality junk rarely worth turning on (S. Brochu, personal communication, August 8, 2016). Further complicating matters is how the maximum speed for uploads in Bingham is estimated at less than 1.5 mbps. Given most phones have less sophisticated Wi-Fi antennae than larger laptop devices (Levi, 2013), smartphones in Bingham transmit the bare minimum. Most of its Internet-connected homes center their media practices around smartphones and monitors hooked up to Netflix, rather than laptops, desktop computers, or tablets (E. Smedberg, personal communication September 15, 2015). Left to the smartphone instead of the laptop, which is traditionally more conducive to skilled digital literacy, such as multi-media design and multi-site online navigation (Jenkins, et al., 2006), much opportunity for digital literacy learning is lost. Therefore, faced with insufficient broadband or low-quality laptops, homes with Internet access do not often capitalize on connectivity in traditionally educational ways.

Additionally, the Bingham high school is championed by the national media for its community efforts to come together "against all odds" and exceptionally educate its predominantly low-income students (Ohm, 2015). But in truth, Bingham residents were quite shocked at the news and recognized it as a chance fluke. Especially considering of the total 16 who graduated last year and happened to all enroll into college, few actually will graduate—and those who do will often transfer to 2-year vocational programs (L. Corson, personal communication August 21, 2016). Bingham graduates may make it into college at a remarkably high statistical rate. And with Bingham being such a poor town, with a median household income significantly lower than the U.S. median family income, it makes sense that nearly all its high school students would qualify for free or reduced

lunch. But the only reason the high school ranked so highly among Newsweek's "Beating the Odds" list was simply due to its small graduating class. Showing how often common sense human intuition cannot grasp basic understandings of sampling variation, Kahneman (2011) stresses how small samples yield wildly imprecise, unpredictable, and extreme results more often than large samples. Kahneman (2011) cites a similar error in human thinking vis-a-vis the Gates Foundation's $1.7 million investment for more successful schools, which simply divided larger schools into smaller ones (p. 117). This plan was based off the quick conclusion that all of the best schools shared one common factor-- small enrollment. Yet, Kahneman (2011) eagerly points out that the number one characteristic of the worst schools also happened to be their small enrollment—thus showing how often small samples keep to statistical extremes.

The nearby Children's Discovery Museum's mission (to provide hands-on learning through interactive play) seems to clash with what Bingham children would find meaningful for learning opportunities, digital or otherwise. While Bingham children from Concord found its beaver dam exhibit to be particularly interesting, they could muddy themselves more happily in one within their own backyard and wouldn't have to pay $6 to do so. More alarming is the museum's "Kids in the Woods" camp, which charges $125 for a week-long sessions teaching rural children, ages 7-11, to "Speak Your Mind" and exercise their "First amendment right to share [opinions]" ("Camps!," n.d., para. 12). In "Speak Your Mind," the camp's most digitally-focused session, children express their first Amendment opinions through arts, crafts, storytelling, songs, written stories, etc.. For about $18 dollars a day, rural elite youth are encouraged to put their money where

their mouth is and "[t]ake a stand for what you care about. We'll cap off the week's activities by publishing our own 'zine' " ("Camps!," n.d., para. 12).

Balancing this disregard for high-tech digital values are concerns over preservation of landscape and rural identity. Neighborhoods appear to have changed little over time; the only difference time has lent is captured through the changing quality of photography from black and white to color. This stability is reflected in rural identity. For example, it is common knowledge that Ruth Hamlin, long-time Bingham town librarian and proponent of print traditions and textual community artifacts, committed suicide in 1996 over her resistance to the Internet being installed (S. Brochu, personal communication August 8, 2016). After twenty years as a librarian, she was celebrated as the one who had painstakingly kept a handwritten log of every single town resident who had been buried in the Bingham cemetery. Dismayed that print and handwriting, in particular, may be threatened in this rapid infiltration of new media technologies, she took one of her husband's hunting guns and shot herself in the head. Residents, like Ruth Hamlin, who draw a more affirmative sense of identity from text-based town literacies or particular rural landscapes, are likely to resist developments they perceive to go against their simple way of life (Van der Horst, 2007; Wolsink, 2007). In this way, identity and material interest are collapsed together as a motivating force for residents' less sophisticated use of and humble take on digital technologies.

Against Firstspace digital infrastructure that gives preference to tourist-rich parts of Maine, what are the spatial consequences felt by those living in the remote center of Maine far from the coast and outside the urban centers, where life is "rural as...hell" (Schulte & Walker-Gibbs, 2016, p. 99)? Secondspace Story Map conceptions of rural

Maine as idyllic tourist get-a-away add much to this discussion. For instance, remote rural areas are urged to pitch their endogenous "grassroots" claim for digital resources by defining their investment value in terms of their tourist draw. Maine's digital initiatives may pay lip service to rural communities' digital needs, but only insofar as the investment can bring financial returns through tourism (Vail & Dickstein, 2015). This rhetoric is loaded with classist language where the most "economically distressed rural Maine"…"not prepared to compete" for or "afford broadband investment on their own" must do it for the more "discriminating, high-spending travelers" who, when traveling to most remote areas of Maine, actually do not want to "get away from it all" or even truly enjoy Maine's rural beauty (Vail & Dickstein, 2015, para. 4). In other words, "sophisticated, high-income, overnight visitors" (who paradoxically do not really care about your "backwards" rural way of life) demand a sophisticated digital network (para. 4). Further, for these people (who are much more valued than you), these digital resources and infrastructures are actually attractive "critical amenities" that will entice "mobile entrepreneurs, highly educated young people, and second home owners to rural Maine" (para. 3). Nicknamed "Vacationland," Maine has a long history of catering to the needs of those who momentarily flee their urban centers and escape to idyllic settings to vacation. Story Maps illustrate this history through Bingham's old fishing and camping brochures advertising both forest/lake abundance and "Simmons inner-spring mattresses" to lure guests and "their women" to the rugged remote area. Maine, therefore, cannot escape the elements of urbanity which impact its rural production of space. This highlights the particular ways in which endogenous rural digital efforts are deeply entangled with urban-minded elements.

Given the processes contributing to our lived geographies are at the same time objectively real (Firstspace) and subjectively imagined (Secondspace), looking deeper into Secondspace conceptions further emphasizes the rural struggle for "their" geography amid the dominant 'Right to the City' rhetoric. While rural digital initiatives emphasize the importance of the tourist dollar amid trends of "recent mill closings" (Vail & Dickstein, 2015, para. 1), every local broadcasts loudly their hatred for the tourist or "Masshole," or assholes from Massachusetts (L. Corson, personal communication August 21, 2016). Similar to the local's love for hunting season, demonstrated via the Concord neighborhood walkthrough, they openly wonder "if it's tourist season, why can't we shoot 'em…" (Gavin, 2015). Despite advertisements urging locals to be nicer to tourists and even "thank summer visitors" (Smith, 2015, para. 8), many locals will bemoan the presence of "sophisticated" and "discriminating" tourists on their local roads or campgrounds, as they get stuck in ditches, litter, start small forest fires from ill-maintained campfires, or generally treat Mainers like backwards degenerates (L. Corson, personal communication August 21, 2016). This hatred is captured in the Story Maps' through newer signposts, such as "Get Ready to Say goodbye to all your Digital Technology," which are less amenable to tourists' preferences. While tourists may laugh at stories of banks being held up by hammers or likewise ridicule the poverty of Murray Hill, locals believe the disdain paid to their "backwards" way of life is oddly placed. Originally published in 1942, L.L. Bean's *Hunting, fishing, and camping* guidebook expresses this belief through the following cautionary quote for out-of-state hunters:

> When on your hunting trips do not try to belittle the back woods folk even though you are a college man and your home is in a big city. While your education and

> personal appearance may be far superior to theirs, they may be getting just as much pleasure out of life as yourself and when it comes right down to country common sense, they probably have you beaten. (p. 80)

The final data point within the Story Map (Now we just have Now) helps to bring us around full circle to the question of how digital access has (or has not) modernized the town. The image of two city folk taking a selfie of themselves and a wild animal problematizes the current rural struggle over their geography and identity amid changing times. While all will define themselves and their rural ways against the "sophisticated" Masshole lacking "country common sense," they realize there is no going back to simpler times. Furthermore, few Bingham residents would wish to give up their cell phones and selfies for that. And when asked, all (not most) will grasp tightly to the belief that they are quite modern and doing everything they should to keep abreast of things. This calls to question whether we have ever been modern in the first place, with modernity not being any fixed state between nature and society, but rather a matter of faith (Latour, 1991).

Integrated Findings

Taken together, these analyses (of how digital learning opportunities and resources are caught up within the material and conceptual spaces between the local and state levels) reflect a deeper infrastructure of technology. According to Star and Ruhleder (1996), technological infrastructures are never fixed things, but complex sets of relationships which emerge dynamically over time through organized practice and use. Specifically, this means that digital infrastructures demonstrate relational properties through space, in that they have broad reach and scope spanning far past one single site (Star & Ruhleder, 1996). This broad relational scope is evidenced in how digital

resources in Bingham map onto a larger state-wide trend of digital inequity, wherein higher income areas command greater digital learning opportunities via higher concentrations of public learning sites. Similarly, the local and state-level digital infrastructure is caught up with a material and conceptual space that expands beyond the state lines to include the global influence of nonresident tourists. Also emphasized are the real-and-imagined factors limiting rural folks' critical spatial consciousness and thus hindering the needed agency for mobilizing more just geographies of digital equity. Maine's digital infrastructure, along with its dynamic, relational, and agentic spatial processes, are highlighted in what follows.

Particularly in rural areas, pre-defined patterns of spatial production (both real-and-imagined) over time yield better inroads for other infrastructures (e.g., digital technologies) to form in relation to them. Examples of these pre-defined patterns of spatial production are the stronger infrastructure, such as roadways, cell phone service, electric power grids, etc., existing in prized areas of Maine (with more tourist non-residents or higher income residents) with the interest and material investment to maintain it (Vail, 2010). Promising digital equity to its most rural and disadvantaged, Maine's $32-million-dollar Three Ring Binder project installed "geographically diverse" fiber optic routes linking colleges and government facilities across the most mountainous regions of Maine (Kittredge, 2013). However, needed to plug into the Binder was local infrastructure, costing $25,000 per mile for fiber installation and $1,000-$2,000 per connection (Kittredge, 2013). Given this, the project failed to account for the reality of the countryside it cut through. Two years later, small towns, with only outdated copper cables designed to withstand telephone and cable transmissions but never high-speed

Internet data, still cannot afford to plug in (Burns, 2014). This example highlights how technological infrastructures do not emerge from nothing, but instead grow out of a pre-existing, outdated, and oftentimes unfair base (Star & Ruhleder, 1996).

Of particular importance is also how the Maine's digital infrastructure becomes defined in terms of the ongoing tensions between local and global (Star & Ruhleder, 1996). The major corporate producers of rural telecommunications access, Time Warner Cable and FairPoint Communications, are the only entities with the funding power to build these optical fiber connections from the Binder to the rural people (Burns, 2014). Efforts towards more equitable distribution of digital resources throughout rural Maine are stalled by the fact that these corporate moguls see no profit in extending fiber optics to households and businesses within remote Maine (Vail & Dickstein, 2015). Time Warner Cable and FairPoint Communications act out their global powers when imposing a social control over rural folk and the places they inhabit, while placing little regard over the needs of those they dominate. Thus, digital infrastructure follows traditional fault lines in spatial production that may not be constructed under conditions of the state's choosing. This means that despite efforts to provide equitable state-wide digital infrastructures, little can be done to overcome historical limitations of previously established infrastructures. Unequal geographies of Maine's digital learning are dynamically produced and reproduced over time through "real-world contexts already shaped by socio-spatial processes in the past and the enveloping historically and socially constituted geographies of the present" (Soja, 2010, p. 103). This showcases how influential top-down exogenous geographies of power, coming from the outside, are being made and remade in the rural struggle over geography and digital equity.

The Story Maps add to these findings to illustrate the Secondspace local conceptions shaping the needs and accepted use of various local digital learning sites and technologies. For example, while public learning sites are typically considered valuable assets to rural digital learning, concerns over preservation of rural identity and "country common sense" problematize their fit and purpose within their rural landscape. Because endogenous geographical structure houses relations that are more bottom-up, understanding the meanings rural townsfolk assign to digital resources will have lasting implications for how to overcome challenges to digital equity, both real-and-imagined. Last, the fact that so many rural folk define themselves and their practices against the loathsome "sophisticated" tourist, but still believe they exemplify modernity shows how intersecting relations of knowledge, power, and subjectivity are caught up within Firstspace and Secondspace calls to question our modern human existence altogether (Latour, 1991).

Implications

In this article, I flesh out a strong argument for local inhabitants producing space and fighting for the right to use it. While my analysis is limited to one rural area of the Northeast, I use this to empirically illustrate and promote "spatial justice" in terms of rural America. Initial analysis into the nature of Maine's digital learning indicated that the higher the population, the higher the number of digital learning opportunities (e.g., schools, libraries, and museums). Looking deeper beyond population density, distribution of digital learning opportunities was also in favor of income and tourism (i.e., income of nonresident urban visitors, who come to spend money and consume). This means that the GIS map shows higher proportion of digital learning in areas with greater income and

greater tourism. Taken together, implications for policy support the notion that more equitable distribution of fixed digital learning sites to proffer greater digital equity will favor marginalized populations in Maine living outside of urban centers and away from the coastal areas.

Despite limitations including the challenges of respondent bias and inaccuracy in publically available GIS data and inherent methodological issues when crossing competing units of analyses, certain implications for practice and future research may be drawn. Not situated in the esoteric or abstract, the critical spatial perspective is a concrete and structured application of believable ideas to very real spatial justice problems confronting America today. The urgency of social problems and the invisible forces of power and greed steering them require not obscurantist theories, but visibly palpable methods grounded in the reality of our constantly changing landscape of social justice.

These findings may also yield significance for methodological researchers seeking to embed qualitative geographies in online environments, such as ArcGIS online Story Maps. Story Maps may help to elucidate a cartography of belonging in the Secondspace to inspire individual rural residents, through narrative and image, to resist both unjust geography and the capitalist outsiders (e.g., "sophisticated overnight travelers" and global telecommunications corporations) imposing it. Visual results therein indicate how distributional inequity of digital learning opportunities is caught up not only exogenous power relations, but also endogenous discriminatory structures of rural residents own making. This type of analysis may therefore educate and inspire local grassroots social organizations to enact bottom-up legislative change. Enough residents

demanding not only a more just rural space but the freedom to use it may empower other remote areas to exert similar pleas.

For added significance, I place my findings within the political context. Misrecognition and economic exploitation have long shaped the negative value accorded to rural America. Attacks from exploitative neoliberal global powers as well as the urban public shaming the "idiocy" of rural life furthers disempowers rural populations. Implications may speak to the 2016 electoral turnout, wherein rural America could neither align with a party aiming to exploit their communities, nor a party shaming them for their "self-made ignorance." Facing false promises of an all-encompassing cyberspace claiming to end geographical difference, we must never forget that digital inequities have a zip code, often large and sparsely populated "sleeping giants."

In turning our lens away from the city, I assert that we can derive new insights over a struggle for geography existing broadly (e.g. city *and* town). While Soja and Lefebvre's "Right to the City' purports that the only worthwhile spatial production takes place in the city, this analysis has shown otherwise. In fact, a narrow focus on the city fails to capture the true nature of how digital infrastructures are spatially produced—amid the contentious relations between local and global. No better way to elucidate these tensions than in rural America, which currently has the most to lose in terms of digital/social geographies of exclusion. Thus, when we make the search for spatial justice relevant to the rights of those living outside the city, we can better gauge larger phenomena and trends of social justice, and specifically digital equity, greatly impacting not only our rural towns, but also our cities, and all spaces in between. What's more is that missing the broad relational nature of how digital inequity evolves does little to

cultivate any critical spatial consciousness. Only when we reject an urban-centric focus to include powerful spatial production occurring in rural areas can we truly gain the critical spatial consciousness needed to remake more just geographies of digital equity. In turn, expanding the key political framework of place of residence may open avenues for understanding the different actions needed for achieving spatial justice for the few *and* for the many.

CHAPTER 4
EVERYDAY EXPERIENCES WITH DIGITAL MEDIA ACROSS SOCIO-ECONOMIC SPACES: STORYING RURAL SPATIAL JUSTICE THROUGH ETHNOCARTOGRAPHIES

"The universe is made of stories, not atoms"—Muriel Rukeyser

"A story should have a beginning, a middle, and an end-- but not necessarily in that order." -- Jean-Luc Godard

Deficit-based notions of the digital divide (i.e., the disadvantaged merely have less technologies and less developed capacities to use digital technologies in mainstream ways) define today's educational paradigm. Information and communications technologies (ICTs) are proposed as the silver bullet that can meet the needs of all and transform existing hegemonic hierarchies of knowledge production. Similarly, the Internet is packaged as a future alternative plane of existence (cyberspace) with unending possibilities for the betterment of our economy, communication, and society (Campbell-Kelly & Aspray, 1996). Seen this way, those outside the revolutionary cyberplane, without the motivation to connect or skills to actualize the universal "affordances" of technology, are judged as backwards and deficient.

Ignoring the powerful influence of underlying "structuring structures" (Bourdieu, 1977, p. 72), these immobilizing assumptions frame the problem as stemming from individual's self-made failings. Attending to individuals rather than broad environments hampers our ability to understand, and these misunderstandings lead to enduring consequences-- both political and practical (Kohn, 2008). Human-centered misconceptions become even more problematic in the liquid modernity of our ever-changing digital age. Against the backdrop of a fragmented world filled with endemic uncertainty, social norms and institutions still exert unseen influence, but can no longer

solidify long enough to provide secure frames of reference to orient paths, decisions, or behaviors (Bauman, 2000). With self-chosen paths so rapidly replacing institutionalized ones, technology and its self-teaching tools combine with hidden socio-political forces to widen knowledge and wealth gaps between rich and poor. In doing so, digital tools further isolate marginalized individuals from society (Bauman, 2000).

Sociocultural learning theorists view digital learning as situated (Lave & Wenger, 1991), wherein digital tools mediate practices and involve material as well as symbolic sociocultural elements (Cole, 1996). Given this, digital literacy, or the skilled and generative use of digital technology tools, is predicated on larger structural considerations concerning the social embeddedness of ICTs (Toyama, 2015; Warschauer, 2004). In other words, effective digital practices can only flourish with support from the broad digital learning environment—on the grounds that these practices and respective tools fulfill recurring and time-sensitive cultural and social needs (Katz, 2010). Thus, the tools available to a culture matter, but what that culture chooses to do with those tools matters more (Katz, 2010; Takeuchi, 2011; Neuman & Celano, 2012). Building digital literacy for greater learning and innovation then relies on attention to cultural and structural factors existing outside of the functionality of the technology and beyond the intellectual capabilities of the individual user.

Focusing on technology access or Internet freedom, in themselves, as "great levelers" overlooks overarching cultural needs as well as local community values and practices (de Castells & Luke, 1986; Warschauer, 2002, 2004). Lacking a critical eye to this social embeddedness of ICTs, quick fixes (e.g., cookie cutter 1-to-1 laptop programs), which perform well in middle-class societies with basic income, housing, and

educational opportunities, can quickly engender cruel and perverse consequences in impoverished communities. Scholars believe these outcomes are due to technology's role as an amplifying force (Toyama, 2010, 2015; Warschauer, 2004; Warschauer & Matuchniak, 2010). For example, these partial solutions and one-size-fits-all approaches frequently detract from an already limited school budget, but can never directly deposit gateway literacy skills into children or make up for the lack of quality teachers. Oftentimes, early experiences with technology not living up to its educational promise yields lasting consequences for children's future digital literacy learning. At the same time, within the hands of gifted children attending schools with skilled teachers and sufficient budgets, technology often will have a positive effect on student performance. Or, put differently, channeled through human intention, for better or worse, technology acts to either amplify effective solutions or further entrench inequalities.

Despite growing scholarly interest in technology as a force furthering intellectual and socio-economic divides (Toyama, 2015; Warschauer, 2004), few have explored how space interacts with socio-political forces of the digital divide. Most social theories build their epistemological assumptions around the social and historical ontologies, or socio-historical ways of being (Foucault, 1984; Soja, 2010). Though reality is fundamentally spatial, conceptions of space are virtually ignored. This engenders an ontological distortion, dominated by Western thought, wherein history is prized as dynamic and developing, while space is shunned to the shadows as fixed and dead (Soja, 2010). According to Foucault (1984), nothing validates the privileging of social and historical over our fundamental spatiality, yet nearly all strands of philosophical thought have locked into step with the socio-historical structure. For current paradigms to keep up with

the chaos and complexity within our fluid and shifting digital age, they require the radical openness of the spatial. “The present epoch will perhaps be above all the epoch of space. We are in the epoch of simultaneity: we are in the epoch of juxtaposition, the epoch of the near and far, of the side-by-side, of the dispersed” (Foucault, 1984, p. 46).

Amid this spatial turn (which is discussed more in-depth in later sections), this paper stages a radically open examination of the digital divide at the intersection of space, socio-political power relations, and knowledge. At this nexus, we can more easily unpack the dynamic interchange of the digital divide as it plays out through lived space, our shifting world, cultures, history, institutions, technologies, and humans. To do this, I first introduce and explain Soja’s concept of Thirdspace and its three defining characteristics. Next, I identify the need to focus on the often ignored rural space. Against this particular backdrop, I then present my purpose statement defining what will be covered to fill needed research gaps in Thirdspace studies of the rural digital divide. My two central research questions follow to further clarify my focus on rural families’ everyday experiences with digital media across differing socio-economic spaces. Narrative inquiry is next introduced as my central means of storying these experiences of the everyday to make meaning from neighborhood observations, home-based interviews, and family artifacts. Finally, my findings present the rural neighborhoods, the families, and particular narratives storying Thirdspace experiences within and across digital spaces. The narratives are meant to analytically model how Thirdspace theory can be

employed to re-imagine digital equity, such that it dismantles deficit thinking, advances new ruralism[5], and informs more just rural geographies.

Thirdspace Theoretical Perspective

As an analytic and theoretical tool to deconstruct the socio-spatial components of a family's learning environment and move beyond afore-mentioned deficit approach to the digital divide, I borrow from Soja's Thirdspace theory (1996, 2010). Soja's Thirdspace theory identifies first, second, and third spaces of interaction in a *trialectics of spatiality* (see Figure 1.1). Firstspace is the traditional *perceived* surface appearances or material outcomes (e.g., ASU's physical campus, buildings, parking lots, manicured lawns and hedges), while Secondspace represents how the space is *conceived* (e.g., ASU as the number 1 in innovation "New American University," "the ivory tower," or as the "party school" or PAC 12 "Sun Devils" competitor). Firstspace reflects the rational perspectives and interests of the dominant, or the top-down snapshot of gentrification measures of ASU's campus malls and streets. On the other hand, Secondspace houses utopian notions of artists, the media, or scientists (Bhabha, 1994; Lefebvre, 1974). For instance, when singing ASU's Sun Devil Fight Song at football games, students conceptualize a space slightly different from the mapped Firstpace. Last, Soja introduces Thirdspace as the "in between spaces" and *lived* experiences of the marginalized "Others" deemed out of place.

[5] This notion of "new ruralism" is defined earlier in Chapter 1 within the fourth paragraph of the "Theoretical Framework" section.

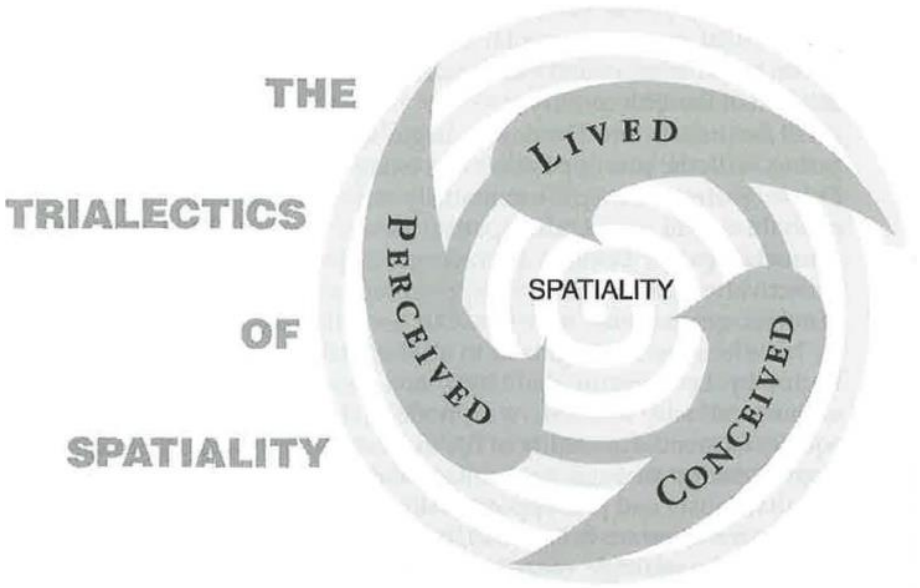


Figure 1.1. Edward Soja's Trialectics of Spatiality (1996, p. 74)

While Thirdspace can be applied to the lived experiences of anyone, because Thirdspace is a less hegemonic and radically open space with unforeseen opportunity for emancipation and empowerment (Bhabha, 1994; Soja, 1996, 2010), it holds particular importance for populations that have been historically marginalized. Extending the ASU example, Thirdspace is actualized through the working practices and beliefs of PhD students as they collectively mediate the Firstspace physical presence of ASU's campus through the Secondspace conceptions of graduate school. Herein, the Farmer 3rd floor "Grad Space" as a Thirdspace for ASU Teacher's College doctoral students would become much more than the First and Second space combined. Despite the original intentions under which the "Grad Space" was constructed, no doctoral student actually goes there to get work done; assigned graduate student study carrels in ASU's Hayden library exist solely for that purpose. Within the Farmer "Grad Space," students enact a radically open system of lived experience, or Thirdspace, where they collectively

negotiate First and Secondspace to achieve their specific goals. This means that the real work of the "Grad Space" takes place in the 15-20 minutes before class, as students gather to gossip, commiserate, and exchange short cuts for completing last minute assignments. Thus for the purpose of my study, Thirdspace theory offers a critical spatial lens for understanding actual lived experience within and across space as well as the possibilities families of low socio-economic status (SES) may create for re-imagining a space's meaning and potential.

Soja's Thirdspace Analytic

This spatial framework is an essential critical lens for mapping educational equity across differing socio-economic spaces. However, while Thirdspace has much to contribute in the area of education and digital inequity, empirical research has interpreted this spatial theory in various ways. Therefore, to spatially restructure our understanding of families' digital media practices, I must unpack then briefly explain a set of characteristics that will form the basis of this Thirdspace analysis. Under the lens of space as dynamic, relational, and agentive (Gunderson, 2014), Thirdspace is marked by the following three defining characteristics: (1) produced through lived processes, both real and imagined (2), presupposes an assemblage of contradiction and collision, and (3) radically open for reflexive re-authoring and ultimate mobilization.

Dynamic. First and foremost, Soja builds Thirdspace on Lefebvre's (1974) principle of human spatiality as socially produced and reproduced over time. Likewise, geographies are the work of those who move within them. We (re)produce space in much the same way we make our histories and societies. This means that human spatiality is not often constructed under conditions of our own choosing, "but in real-world contexts

already shaped by socio-spatial processes in the past and the enveloping historically and socially constituted geographies of the present" (p. 103). Furthermore, the processes contributing to our lived Thirdspace geographies or spatialities are at the same time objectively real (Firstspace) and subjectively imagined (Secondspace). Living in space means taking up pre-defined socio-historical patterns of production that are both invisible (e.g., power, values, knowledge) and visible (e.g., material resources). Seen this way, we can no longer understand space as a static entity resigned to the shadows or as a neutral stage for our socially-constructed and time-sensitive reality show. Spatiality is not handed down to us from the gods or nature; it is a complex system of our own consequences. Breaking open current paradigms to recast the digital divide against its local and lived spatial consequences in this way would hold valuable implications for the dynamic processes contributing to inequalities.

Relational. Second, Soja draws from Foucault (1984) to see Thirdspace as full of contradiction and collision. According to Foucault (1984), juxtaposed within a single real space are several spaces that are incompatible, isolated yet permeable. This collision provides the underlying foundation through which the Firstspace, Secondspace, and Thirdspace overlap and inter-operate. Given the visible and invisible sets of relations, lived space is simultaneously "real-and-imagined" or, in other words, juxtaposing tangible materialities with intangible mindsets and unforeseen human potentiality. So, while space is messy and ill-constituted, its intersecting relations of knowledge, power, and subjectivity often yield unforeseen capacity for transformation. Or, stated differently, Thirdspace becomes the lived nexus of struggle and contention, wherein ideas, beliefs, principles *and* materialities can be shaped and reshaped. Given the possibilities that could

erupt from living out these contradictions and power/knowledge collisions, Foucault fractured ways of understanding the consequential effects of space as both oppressive and potentially empowering.

Agentive. Last, Soja imparts the notion of the Thirdspace as radically open to change and mobilization. Given human spatialities are socially produced over time, Soja believes they can be changed-- with their changeability held as critical. Breathing life into our analytic framing, no longer do we simply stop at the offering of a new and valuable way to think (i.e., space matters!). Space opens up unforeseen opportunity for agency, or a means of exerting power and action. This agency then offers potential for resistance and empowerment. Left with only socio-historical understandings, the preservation of unjust geographies will likely persist unchallenged and unseen. However, through a critical spatial consciousness, we can we can contest the digital divide as a spatial issue of justice to then create agentic spaces of hope for the ultimate aim of mobilizing geo-political action. Central to this mobilization is a re-authoring of the self as well as a networked coalition of movements. Herein, Soja (2010) relies once more on the maximizing potential for space to balance the solidarity of social movements while preserving the integrity of heterogeneity, so as not to conform difference into sameness (which he believes would destroy the movement). The spatial, when added to collective movements of social or economic justice, acts like a glue, because all live united underneath a common unjust geography. From this strategic spatial consciousness, Soja hopes to show how the collective potential for a more just space already rests in within the hands of the many.

Soja's "many" signals city dwellers and implicitly excludes those living within remote rural areas. But as critical spatial scholars, our ethical responsibility is to position this equity-oriented ICT research agenda amid locales most often ignored. If anything, the 2016 election events shook our nation's core to warn of the powerful voice of the rural "sleeping giant" (Halunen, 2016, para. 7) and suggest new political divides being drawn between city and country (Bodenner, 2016; Brownstein, 2016; Kron, 2012). Though rural folk have long been misrecognized as inferior by urban elites (Gramsci, 1929) and larger capitalist forces (Marx, 1848), this presidential election shows clear political and social ramifications of urban-centric thinking that marginalizes ideals of justice and fairness within rural areas (Halunen, 2016). As such, the politics of space and its relationship to rural families' everyday digital learning remains understudied and undertheorized (Stern, Adams & Elsasser, 2009). Soja's framework holds particular value for challenging a longstanding deficit model of rural populations that cements their way of life to the ostracized, illiterate, backwards, and inferior (Corbett, 2016; Green, & Letts, 2007; Reid et al., 2010). Presently, a "new ruralism" movement (Resina, 2012, p. 15) looks to disrupt symbols of progress imposed on rural people and counter the push towards ideals of modernity, such as the idealized model of mobile knowledge workers who have little allegiance to local communities (Corbett, 2016; Donehower, Hogg, & Schell, 2011). Because the "new ruralism" movement counters ideals of modernity and the use of modern technologies (Resina, 2012), it masks the highly technical lived reality of rural folks. Hence, Thirdspace perspectives of rural families' digital learning are urgently needed to re-imagine this new ruralism shift and reposition rural places at the center of modernity's spatial production, rather than its periphery (Corbett, 2016). If

socio-spatial discussions of justice, equality, and agency continue to ignore digital learning in the wild, this will do little for digital inclusion in civic matters that may help to rebuild our political identity as Americans. Moreover, failing to understand rural politics of space may render our entire nation more vulnerable and powerless to pervasive forces of neoliberalism and globalization sweeping through country (*and* city) to extract labor and resources and further fragment individuals from their social frames of reference (Bauman, 2000).

Purpose and Research Questions

In confronting enduring rural challenges in today's digital age, this study suggests a productive lens for storying spatial (in)justices in an archetypal small town setting in Maine (e.g., small populations, geographical barriers, unique state-wide digital learning initiatives). Because few have viewed rural digital learning through a critical spatial lens, I employ Thirdspace theory to spatially structure our understanding of rural families' digital media practices across different socio-economic spaces. Through narrative, I story rural families' dynamic, relational, and agentive Thirdspace transformations at the intersection of digital media and rural space. In other words, this spatial study aims to capture a variety of significant and overlooked forces which conspire to enact a rural digital landscape practiced like no other, wherein all involved would look upon this production to be no less than central and worthwhile. Therefore, the larger purpose of this chapter is to spatialize understandings of rural life and pervasive "hard" problems therein, in order to rethink digital equity, such that it dismantles deficit thinking, problematizes new ruralism, and re-imagines more just rural geographies.

I ask the following research questions: *What are rural families' everyday experiences (Thirdspace) with digital media in and across these spaces? How are these experiences similar and different for rural families from neighborhoods of different socioeconomic status (SES)?*

Methods

The methodological design for this Thirdspace analysis (Figure 4.1) takes from a larger geo-ethnographic (Matthews, Detwiler & Burton, 2005) project that mixed quantitative geospatial methods with qualitative ethnographic fieldwork to examine the minutiae and daily rhythms of family media use in the home and beyond. Looking at digital learning in the wild through this lens of lived 'everydayness' (de Certeau, 1984; Highmore, 2002; Horton & Kraftl, 2006; Lefebvre, 2004) involved a constellation of years[6]-long data collection methods and analyses (e.g., a series of home-based family interviews/observations, mobile phone diaries, neighborhood walkthroughs, public learning site visits, GIS mapping). While an earlier stage of analysis relied on GIS to map the rural Firstspace materialities of digital inequities, the scope of this analysis and the nature of my research question necessitate a more "qualitative geography" (Cieri, 2003; Dennis 2006; Elwood & Cope, 2009; Pain et al., 2006; Weiner & Harris, 2003). Veering from the limited and conservative GIS script, qualitative geographers construct maps as "thick" texts depicting multiple perspectives, qualitative contexts, nuanced subjectivity, and underlying power relations (inclusive of technologies, epistemologies, and methodologies) (Kwan, 2002; Schuurman, 2006). In other words, from the various neighborhood walkthroughs and family interview data, my maps became

[6] Data collection began with a pilot study initiated in 4/13/2015.

"ethnocartographic" (Chapin & Threlkeld, 2001, p. 21), or constructed from accumulated local geographical knowledge. Freed from the paradigmatic constraints of the GIS, these ethnocartographies visualized space not as boxed in borders and boundaries, but through a more fluid lens in order to re-imagine how agency, networks, and structure interact within today's ever-changing and technologically mediated world (Harley, 2001; Piper, 2002; Short, 2009). After all, our present "epoch of space" (Foucault, 1984, p. 46) sees lives as ''not led inside places but through, around, to and from them, from and to places elsewhere'' (Ingold, 2000, p. 229). Therefore, through a more storied and human-centered mapping, ethnocartographies can more effectively recognize the full complexity of lived space, without distilling rich human experience to anonymous abstraction.

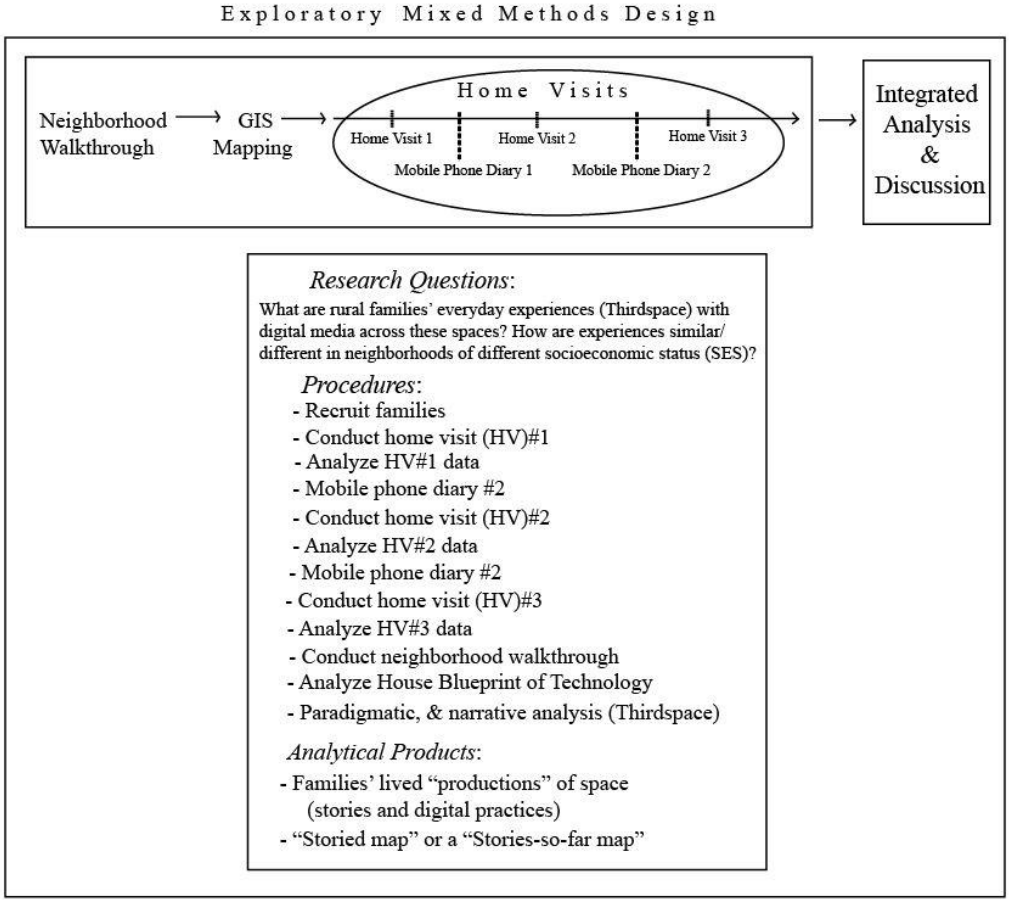


Figure 4.1. Research Design with Research Questions, Data Collection Methods, and Analyses

Research Site

I draw on Maine as the microcosm of remote rural American life. The only state in the Union bordered by only one other state, Maine's geography poses certain inescapable challenges of rural isolation when attempting to develop and implement an affordable and equitable statewide telecommunications infrastructure (ConnectME Authority, 2015). Since it first constructed a digital information network connecting its remote schools and libraries in 1996, Maine has stepped ahead of all states in the Union to position itself at the forefront of equitable Internet and technology access. For example, in 2003 it was the first in the U.S. to implement a state-wide 1-to-1 laptop program among middle schoolers and in 2004, the program was extended to all high school students (Warschauer, 2004). Recently, it was voted number one in its digital infrastructure efforts by the U.S. Chamber of Commerce (Wiley, 2014).

Within Maine, the small rural town of Bingham is a most ideal setting for studying diversity among families' technology practices in light of a changing social and economic context. Bingham sits on the 45th parallel, halfway between the North Pole and the Equator. When entering Bingham, you meet a sign stating such facts and welcoming you to "God's Country" (see Figure 2.1). Most recently, the district high school has just been ranked number one in the state of Maine by Newsweek's "Beating the Odds" list, which ranks schools on the extent that they "do an excellent job of preparing their students for college while also overcoming the obstacles posed by students at an economic disadvantage" (Ohm, 2015, para. 4).

Figure 2.1. Bingham Welcome Sign

Bingham's county of Somerset was the setting for E.B. White's *Charlotte's Web*. The town is about 40 miles from Waterville, a city of 15,722 that also contains two colleges (Colby College and Thomas College). Portland, Maine's biggest city of 66,881, is 115 miles away. In 2010, the population was 922, mostly Caucasian (97%), and the median family income was around $31,538 (U.S. Census, 2010), which is notably lower than the median U.S. family income. The town has one library, two convenience stores, three gas stations, one grocery supermarket, one post office, one town hall, and three churches. Bingham was at one point a bustling town with two water-powered sawmills and two flour mills. Now, all mills are closed and the only gainful employment comes from employment in one of the small businesses, the post office, or within its three schools: Moscow Elementary, Quimby Elementary, or Valley High School. While the state of Maine average for enrolled students in an elementary class is 208, Moscow

Elementary has a total of 70 students within its grades PK-4th. Quimby Elementary serves 43 students in grades 5-8 and maintains a student-to-teacher ratio of 6:1, which is half the state average of 12:1. Valley High School has 70 students in grades 9-12.

Researcher Positioning

Adding to this study was the insider knowledge I lent to this community. I grew up and went to school in this town. This helped me to recognize the implicit values of this rural community and understand the history of the school district. As a child, I also frequented the town library, and in my recent visits have seen how the Internet and computer stations have changed the library culture, but have, at the same time, not changed the informal communication channels of the town. I also know the history of many of its families and watched how small towns can work to level opportunity—inside and outside the classroom. Lastly, my life history is one where I have been/am being mobile across the class structure. And when reaching across social and economic divides, I tend to align with Thirdspace perspectives and frame my adjustment as coming from a place of difference as opposed to deficiency.

Though this personal connection may have generated certain perspectival assumptions and biases, it has also laid the general background knowledge necessary to deepen understanding into the nature of digital inclusion efforts in this rural community. Following Peshkin (1998), I chose to see my subjectivity as not an affliction to exorcise, but a strength founding the "basis for the story I am able to tell" (p. 20). According to Reissman (2008), my personal connection gave me the added advantage needed to achieve my purpose (i.e., storying families' experiences), as narrative analysis privileges subjectivity over objectivity. As such, this familiarity helped to locate stories and artifacts

that may have deepened understandings of how various digital opportunities came to be articulated through networked actions and discursive practices across space and time

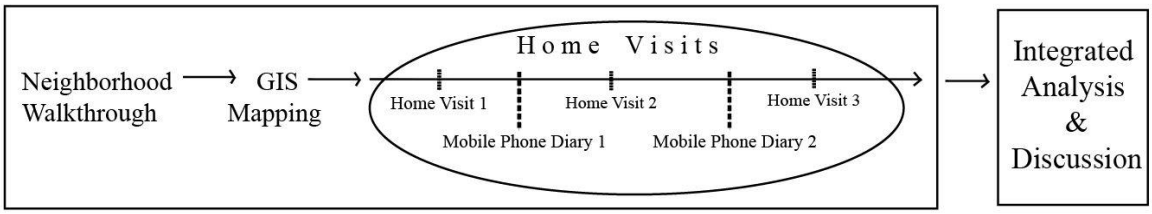


Figure 2.5. Specific Data Collection Methods for Thirdspace Analysis

Data Collection

Neighborhood walkthroughs. For the neighborhood observation, I used the neighborhood walkthrough data previously described in my narrative analyses for Research Question #1.

GIS mapping. After gaining an in-depth examination of the neighborhoods and learning sites, I sought a broader bird's eye view to render the rural area as more immediately understandable. For this, I used simple GIS mapping to ascertain the boundaries of the neighborhoods respective of certain identifiers (e.g., road networks, rivers, house clusters) and with particular attention paid to the spatial distribution of the town's digital learning opportunities. This data was borrowed and slightly modified from my GIS analysis in Research Question #1.

Home visits. To address the extent to which digital literacy tools and practices manifest across families of different SES, I compiled family and neighborhood case studies from a series of three home visits conducted over a period of several months (see Figure 2.5). Via an ethnographically-grounded set of data collection instruments (see Table 2.2), the home visits aimed to capture the family's "typical day," overarching

learning relationships between family members, as well as the digitally-mediated learning arrangements in the home and beyond. In simpler terms, this means I specifically chose semi-participant observation, semi-structured and unstructured interview methods and collection instruments which could best situate the data (fieldnotes, sound recordings, interview notes) within their everyday context of use in order to account for ethnographic components of "what goes on, on the ground, in living colour" (Agar, 2008, p. 10). Except for home visit 1, home visit 2 and 3 adhered to a structured two-hour semi-scripted protocol (see Appendix B) that included observations, a family timeline activity, and semi-structured individual and group interviews drawing out the rural families' storied experiences with digital media. The first and the most intensive home visit differed in that it included a "daily media round" (Taylor, Takeuchi & Stevens, in press), or a day-long observational protocol, for the purpose of uncovering families' lived experience with technology, the meaning of those experiences, and the potential dynamic of nonhuman agents/broader networks. In subsequent home visits 2 and 3, I then leveraged these primary observations as a springboard for discussing more general family practices and beliefs around technology in rural life.

Between home visits 1 and 2 and again between home visits 2 and 3, I also asked parents to use their mobile phones to send me combined picture and text messages to provide 'experience snapshots' of their focal child's activities six times on each of two separate days. The purpose of these mobile phone diaries was to provide an in-depth and cultural account (via the parents' purview) of the focal child's daily activities and gauge the extent of their everyday media use (Plowman & Stevenson, 2012, 2013). As a pragmatic response to some of the challenges of collecting in-depth and extensive family

research, this strategy allowed me to know more about what happens when I am not there. Additionally, placing parents in charge of collecting and selecting data to send in on their own mobile phones may have circumvented some of the ethical challenges of researching the home environment while encouraging an empowered level of participation.

The mobile phone diary entries were sent to a secured Google Voice account (207.200.3162) and upon receipt of each combined photo and text message, I sent a confirmation text. Stated again, the mobile phone diaries took place on two separate days and lasted from 9am-5pm on each of those days. Each family's six photos were then chronologically arranged on a large 24" by 36" foam board entitled "Daily Storyboard." Upon the second and third home visits, I brought the storyboard and discussed theses mobile phone photos with parents and their children to better understand the focal child's everyday activities. While this data collection strategy offered a useful window into families' Thirdspace experiences with media, attention was paid (in later data analysis) to the biases families may have lent to the story they constructed. This bias was checked through cross-validating the mobile phone diaries against other existing family data. That said, at the end of each of these home visits, families were gifted with their "Daily Storyboards" along with their monetary $30 compensation.

Participants

I drew a purposive sample, which included 6 families who live within the same rural area of central Maine, have a focal child between 4-6 years of age, at least one older sibling between 8-17 years of age, and own at least one technology device (e.g., mobile phone) with which they engage in joint media learning with their children. Most

interesting is that though the six families live in the same small town, I expected them to experience the space quite differently, due to how SES may shape their daily routines and social rhythms. Three of my families were recruited through introductions facilitated via the three families participating in my previous pilot study. Prior to study launch, I informed all six recruited families of formal IRB-approved study protocol, timeframe, and participation guidelines. Interested families voiced minimal concerns and questions about the study protocol and the IRB-approved informed consent form (which I then addressed). Each family then agreed to dedicate several months to the study and allowed me to enter their home on three separate incentivized occasions (i.e., cash payment of $30 after each visit).

Though most families in rural Maine report low household incomes, I selected a range of six families capable of depicting the widest continuum of SES in Bingham (from lowest to highest) to provide a more nuanced description of class. In ordering the families in this way, I weighed all factors contributing to families' socially-ascribed status, including income, parental education level, lifestyle, domestic technology infrastructure, surrounding community, as well as how these are symbolically embedded in wider relations of power (Bourdieu, 1986). This purposive sampling strategy was used, because I wished to examine these particular dimensions of variation in the population of families and to maximize the diversity of this selected sample. In other words, I examined disparities across families to best represent the greater extremes of rural Maine families. Further, because all families reside in this same remote low-populated area, the benefit was that these six families could represent a realistic snapshot of the wide socio-economic variation across families given they constitute a sizeable portion percentage of

the 54[7] total households living in the immediate town of Bingham.

Family 1 (Beane). Becky (age 32) has three children Lacie (age 6), Brianna (age 9), and Brayden (19 months) and rents a small apartment above a heating oil repair service in Murray Hill. Becky has a high school diploma and is a stay at home mother. Their annual income (around $7,500) comes from child support from the father of Becky's children. Outside of cash income, Becky also gets $700 a month in food stamps. Lacie is in first grade, has attention issues, and prefers watching YouTube and playing games on her grandmother's old phone or the family's shared laptop than reading books. Becky is considering medication to help Lacie to concentrate on her schoolwork. Becky has had addiction issues and considers herself to be in a "rut." She has no car and relies on her mother to drive her to the store or to the nearest larger town to go to Walmart. She watches TV talk shows or Judge Judy much of the day to escape.

Family 2 (Soren). The Soren family includes Sara (age 31) and her children Maya (age 6) and Sol (age 14). Sara has a high school diploma and some college experience. She is currently working as an educational technology support staff specialist at a local middle school. The family's reported annual income is around $12,000. The Sorens have a large family network and live in a house owned by Sara's mother in the low-income neighborhood of Murray Hill. Oftentimes family members, such as Maya and Sol's cousins, uncles, and aunts come out and take part in the raising of Maya and Sol. Implicit shared values communicate that family time and outdoors activities take precedence over technology use. Maya just entered her first year of kindergarten, and Sol just entered his first year at the high school. His favorite class is science, which is taught

[7] The entire township has about 150 families residing along its Kennebec River.

by Daniel Melcher (Family 6). He consistently gets on the honor roll and takes part in the school's gifted and talented program. And recently, when the home was burglarized of all Sol's video game equipment, Sara decided to not reinvest in the technologies. She prefers that Sol focus on his studies and extra-curricular activities like soccer and snowboarding.

Family 3 (Howell). Trina (age 44) and her family live in a small house she owns in the farm area of Concord further away from the center of Bingham. After dropping out of high school, she later returned to get her G.E.D.. She did not pursue college and now stays at home to watch over her two children, Giuseppe (age 7) and Aiden (age 8). Her boyfriend Ken (age 42) didn't graduate from high school and earns the family's annual income, which ranges from $15,000-$20,000. The nature of his work is blue collar and involves lining dumps throughout Maine during summer. In winter, he is laid off. Ken has been struggling with addiction for several years and is now on Suboxenes to help with withdrawal from more volatile painkillers. The Howells often have trouble making bill payments; phones are often turned off or cars are left broken until money can be gathered for their repair. Trina will sometimes take part-time jobs to contribute to their income. But oftentimes, she must quit these jobs, as managing the home while working outside the home becomes too much of a burden. The boys play together frequently and also ask to borrow Trina's cell phone to connect with their father while he is away working during weekends. The Howell family is the only rural family that lives without Internet.

Family 4 (Stewarts). Monica (age 33) and her husband Mark (age 34) have two children Ayvah (age 5) and Isabella (age 8) and live comfortably in a two-story, 3-bedroom house. They built the house themselves, and it sits on the northern edge of the

upper-income neighborhood of Meadow Grove. Both have only a high school diploma and work multiple jobs to bring in their combined income of around $25,000. Monica works part-time in Bingham's town bank and Mark works building roofs for local houses. They also own a food truck catering business and travel to horse shows and fairs in summer to sell hot dogs, burgers, and fries. Monica affords her girls a Leap Pad for educational gaming and a Playstation 4, on which the girls play Minecraft together. Yet, Monica strongly regulates their time with media, making sure their YouTube channel is child-friendly. Monica often uses media time to reward her children. Mark considers himself to be a gamer (playing more than 14 hours/week), but does not readily engage in video gameplay with his children, because he prefers different more adult "hack-n-slash" games (e.g., League of Legends).

Family 5 (Spencer). Wendy and George (33) are married with two children. The youngest is Raig'n (age 5), and her older sister is Rylee (age 8). Wendy and George both have high school diplomas, but only George works outside the home. While Wendy stays home with the kids, he labors as a foreman for road repair crew on the backroads of Maine. He works long hours in summer and barely sees his children on weekdays. The combined income is about $30,000 and they rent a large 3-bedroom house in Meadow Grove. The family owns 1Wii, 1 tablet, and 2 TVs. None of the children are allowed to use their parent's smartphone and Wendy regulates the children's media use during weekdays. However, when George is home from work on weekends, rules are more relaxed. Raig'n and Rylee rarely paly games on the Wii, and Rylee is more interested in using the tablet to watch videos and play games. When Rylee is grounded from media, Wendy will store the tablet on her dresser.

Family 6 (Melcher). The Melchers live comfortably in a two-story, 5-bedroom house in the middle of Meadow Grove. Maureen (age 38) and her husband Daniel (age 39) have three children Levi (age 4), Lucy (age 7), and Logan (age 13). Maureen and Daniel both have a college degree and own their whitewater rafting business. Their family income is about $60,000. In summers, Maureen manages the business from her home office, while Daniel spends long hours away to ensure the trips run smooth on site upriver on the Penobscot. During winter months, Daniel works as Bingham's sole high school science, and Maureen stays at home with Levi. While the parents readily provide their children with the latest technology devices (e.g., Macbook laptop, desktop computer, Wii, iPods, iPhones), they value the outdoors and harbor certain misgivings over the learning capabilities of media. As such, media use in the family is limited. Yet, Maureen is busy with work in summer and admits that it's hard to regulate their time with technology from behind the closed doors of her home office. But Maureen and Dan work to set a good example of responsible learning habits. Both Lucy and Logan are on the honor roll and involved in many extracurricular activities in the community.

Instrumentation

For my pilot study and dissertation, I collected qualitative and statistical data (e.g., number of technology devices in the home, family income) from a few Likert-type and open-ended questionnaires. These instruments, their purpose, and some examples of questions are shown in Table 2.2. Stated again, this dissertation was a refined extension of my pilot study and sought to draw out the most comprehensive, yet diverse and in-depth picture of everyday life in this small town. Because of this, I needed to collect a multitude of family data across a wide array of data instruments. In the end, I found

information gleaned across all instruments to be valuable in that it enhanced my general understanding and indirectly illuminated my ultimate conclusions or story arcs. However, given a good portion of this data did not end up directly informing my actual findings, I found it unnecessary to separately analyze and report all of the data collected through these various methods. Thus, the findings sections in my chapters that follow will contain only a detailed description of the most relevant data obtained.

Table 2.2

Home Visit Data Collection Instruments

Instrument	Purpose	Example Statements
Daily Media Round (1st visit)	Day-long observational protocol to guide holistic look into families' lived experience with technology, the meaning of those experiences, and dynamic of nonhuman agents/networks	"How does technology and the use of technology shape/dictate the spaces the user inhabits throughout the day?" or "What is the most meaningful technology-centered practice of the day?"
Family Technology Inventory (1st visit)	Family interview to tally all devices in the home and device-specific technology practices	"What technologies do you have in your home?" or "Who owns this device?" or "What activities are done with this device?"
Mobile Phone Diaries (2nd & 3rd visit)	Combined picture and text messages to provide an in-depth account of the focal child's daily activities and gauge the extent of their everyday media use	**Samples are pictured in pp. 152-157**
Follow-up Mobile Phone Diary Discussion & Recap of Technology (2nd & 3rd visit)	Group interview to discuss mobile phone diaries and changes since last visit	"Could you describe what is going on in this picture?" or "Was this a typical day?" or "Has anyone made any new technology purchases since last visit?"
Technology in Rural Education (2nd visit)	Individual interview to ask about importance of technology in rural education	"What is the role of technology in your children's rural education?" or "How much digital competency do you expect your children to learn in school?" or "How much digital competency do you expect your children to learn at home or elsewhere?

Child's Map of Digital Access & Interview (2nd visit)	Interview to gauge how family members access local digital learning sites	"Has transportation or other issues of accessibility ever had negative consequences for their child's education? If so, for digital learning in particular?" **Sample Map is in Appendix B**
Family Timeline of Technology (3rd visit)	Family interview to understand how technologies entered the home within the larger context of important family events (e.g., birth of parent/child, first day of school, graduation, wedding etc.)	"When was each child born?" or "Let's list when you purchased the different technologies you currently have in your home"
House Blueprint of Technology (3rd visit)	Researcher walks through house to map the domestic infrastructure of technology	**Sample Blueprint is in Appendix B**

Note. All instruments are included in Appendix B. All questionnaires (except mobile phone diaries) were loosely developed from our previous funders' national surveys, which reported a psychometrically validated margin of error of +/- 2.1 percentage points (Rideout, 2014).

Analytic Procedures

Because qualitative methods are determined by the type of experience captured (Polkinghorne, 2005), I tailored a combination of the methods from narrative inquiry particular to the nature of this research question. Stated again, narrative inquiry leverages field texts (e.g., stories, field notes, letters, email communication, interviews, family stories, photos, historical artifacts) as the units of analysis to examine how individuals create meaning through viewing their lives as narratives. While a plethora of techniques abound, I chose *narrative-type* narrative inquiry *and paradigmatic-type* narrative inquiry, because I wished to produce coherent stories from a data corpus of disjointed actions, events, and happenings as well as draw paradigmatic themes from existing participants' narratives (Polkinghorne, 1995). Together, these techniques could best draw out and

clarify families' social reality as it becomes practiced over time and manifested into awareness (Polkinghorne, 2005).

My primary analytical task came in ascribing meaning to families' assorted stories, mobile phone diaries, access maps, technology timelines, and house blueprints. Therefore, I turned to narrative analysis once more as an analytic tool for constructing coherent narratives from disjointed and diverse data elements. As there can be no narrative analysis without interpretation (Kim, 2015), a rigorous and guiding theory of data representation demands clear goals and strategies sensitive to the nuances of interpretation. My interpretive goals were twofold (1) to understand the everyday phenomenon of focus; and (2) to mediate the reader's understanding (Gracia, 2012). The central act of narrative analysis, narrative smoothing, renders participants' often messy, complex, and disjointed anecdotal material/artifacts into a relatively logical, coherent, and engaging account (Kim, 2015). This interpretive act is grounded in five strategies: focus, omission, addition, appropriation, and transposition (Gracia, 2012). Focus helps the researcher to selectively attend to an important aspect of the data (i.e., the signal), while avoiding other less consequential details (i.e., the noise). Closely related to focus are omission, or shaving off superfluous minutiae to sharpen focus on the signal, and addition, such as adding elements to enhance the signal and complete meanings. Transposition involves moving a theme or idea within story to an altogether different context in order to reveal something that may have not been readily grasped in its prior context. Appropriation is a more varied and subjective step-- beyond simple focus, omission, addition, or transposition. Herein, the researcher locates some aspect resonating

strongly with them (i.e., character, setting, feeling) and works to bring the story to life through them "making it their own" (Gracia, 2012, p. 225).

From these goals and interpretive strategies, I used data collected from the families via my 8 brief survey and observation instruments (see Table 2.1) as well as from information gleaned through follow-up phone calls and email communications. With this corpus, I first narratively configured the data by creating a case profile for each family using reflective field notes from the initial Daily Media Round and Technology Inventory interviews. Gathered during the first home visit, these data comprised preliminary information on household make-up, domestic technology, family income, parental education, work rhythms, and surface-level daily media practices. Next, after the first mobile phone diary, I then dove into a within-family analysis to re-visit my initial case profile narrative. Because the mobile phone diary unearthed a sneak peek into ground-level everydayness of family life thru the length of an entire day (without threat of researcher's gaze), I could more accurately identify key beliefs about technology and draw out a richer discussion of family practices with technology than staged during the initial home visit. And after the second mobile phone diary and the third home visit (which took place more than 6 months after the first home visit), I then revisited and revised my case profile narratives once more to flesh out a description of how these practices may have changed over time, as well as the "stories" that families told about technology. Given coherent story construction requires constant examination of logic and paradox, most of the five strategies were embedded within the iterative movement between the minute details to the larger story arc (Kim, 2015; Polkinghorne, 1995). From

this recursive analysis, my case profiles turned into evolving family biographies, or vignettes, which helped to situate the rest of my analyses and meaning-making.

As my data corpus grew, I opted for data reduction and condensed my family profiles to include only basic demographics as well as the families' or focal child's notable media practices or daily rhythms, such that they provide context for the mobile phone diaries. I chose to seek a more holistic view of family life through the narrative vignettes. I began with one vignette per family, but as I began to story comparisons across families, I condensed my vignettes into four. And though there are many more stories to be told from the data, I sought the most spatial one. Or, put differently, I chose to situate the meaning of disjointed events and memories within a space that could be broken open and seen as dynamic, relational, and agentic. For example, space was not portrayed as static in Sara's blue bedroom or before Becky's TV or within the outdoor male-coded arenas in the towns. Herein, space commanded power and form. Additionally, because the narratives are employed to dismantle deficit thinking, problematize new ruralism, and promote more just geographies, each centers on the lived experiences of the low SES families and/or marginalized rural mothers. By this, I mean that I selected these stories according to how deeply they reflected distinct ways of being and surviving in rural America in terms of a spatial process. Thus, the reader could not read the vignette without feeling they were walking through Sara or Sol or Becky or the town's rural space (real-and-imagined). Because I wanted to evoke this "ground truth" for the reader, I visited and revisited interviews to draw out themes where space had a unique "lived" role to play over technology and over equity. Accordingly, each vignette

aligned with a particular paradigmatic Thirdspace theme. This paradigmatic analysis is described below.

Given the process of narrative configuration denotes one's ability to cohere perspectival happenings into a time/context-dependent whole (Polkinghorne, 1995), my focus for paradigmatic analysis was directed on understanding how the families, themselves, were *narratively* constructing experiential reality via events and objects in their lives. Storied narratives in conventional narrative inquiry most often flow from interviews (Kim, 2015; Polkinghorne, 1995). And because humans are cognitively wired to tell stories when answering the "how" and "why" of certain experiences, the interviewer is frequently left with a series of winding and disjointed narratives. This is especially true when the stories evolve over a series of interviews or home/site visits. Therefore, in employing paradigmatic analysis of narrative in my dissertation, I sought to uncover common themes among a database consisting of several stories (rather than a single story). In my case, most of the themes I searched for derived from previous theory (i.e., Soja's Thirdspace).

Therefore, for my paradigmatic analysis, I reread and coded their evolving stories (compiled over three home visits) in order to identify key factors which were helping the families to gain perspective on events and objects in their lives. In addition to families' interview transcriptions, I relied on a Narrative Notebook that contained reflective field notes from the interviews-- each separated by tabbed dividers. I reread and thematically grouped aspects of their evolving narratives in order to identify key factors which were helping the families to gain perspective on events and objects in their lives. I borrowed themes from Soja's Thirdspace theory to further understand families' agency within their

underlying “structuring structures” (Bourdieu, 1977, p. 90), and particularly to focus on how families were (or were not) creating opportunity out of their inequality. This lens helped me to understand families’ various stories and digital media practices as embodied Thirdspace productions. Specific detail was also paid to how everyday lived experiences of the rural family may or may not have been shaped by the past to view challenges/opportunities as resulting from global digital channels as well as very specific histories or namesake lineages. Similar to my pilot study data, I was interested in paradigmatically analyzing and coding stories in terms of how potential differences in digital practices map onto modernity, agency, and identity as well as implications this bears for learning in our digital age. With my dissertation, however, my particular paradigmatic themes were more refined conceptually and fell under the Thirdspace lens of space as (1) dynamically produced through real-and-imagined lived processes, (2) relationally assembled via collision and contradiction, and (3) radically open for agentive re-authoring and ultimate mobilization. As the analysis unfolded concurrent with data collection, I created separate Word Documents of these running themes. Examples of themes included “How Women are Dividing Labor” or “Digital Learning through Thirdspace.” And because this approach allowed for a matrix analysis, I could uncover deeper dimensionality through to also analyze across families and the pre-determined themes. This helped me to examine possible covariance or contradiction among concepts (Polkinghorne, 1995), such as mother and child’s contradictory account of daily media use or how one low-income family could provide more than a family with a higher income.

Moreover, this matrix analysis helped me to achieve the fourth step which was to story comparisons across families. At this point, neighborhood walkthrough data were integrated with this family data in an effort to complement families' individual stories and/or to move beyond them. To assist me in this task, I attempted my own map as a critical departure from the neighborhood GIS map, and the conventional Story Map. Herein, I geographically positioned all families amid their metaphorical spaces (e.g., neighborhoods, digital learning opportunities) and related narrative chunks (e.g., mobile phone diaries). In other words, from the various neighborhood walkthroughs and family interview data, my maps became "ethnocartographic" (Chapin & Threlkeld, 2001, p. 21), or constructed from accumulated local and storied geographical knowledge. This perspective could best weigh the extent of surface-level digital disparity across families and neighborhoods against how they were lived out in each family. Therefore, "to engage the full nuance and complexity of…original data" (Jung & Elwood, 2010, p. 70), I produced this ethnocartographic "Storied Map" or a "Stories-so-far Map" in justice to the "rich yet ambiguous and messy world of doing qualitative research" (Crang, 2005, p. 230) as my Thirdspace final analytical product. This more storied map was inspired from social network analysis to show mobile phone diaries and connecting nodes, longstanding social ties, and knowledge mobilization as overlain across a less authoritative baseline map.

Findings

Following are key insights from the application of a Thirdspace framework. Particular attention is paid to its potential to foreground the various socio-spatial dimensions of rural families' digital practices at the intersection of Firstspace,

Secondspace, and Thirdspace. Neighborhood walkthroughs present the ground-level Firstspace assessment of the different neighborhoods, while also showcasing Secondspace conceptions of how townsfolk perceive them. Next, I present a Thirdspace consideration of my six rural families through snapshot profiles alongside their mobile phone diaries. The family profiles and mobile phone diaries together represent Thirdspace in the particular way they depict a space through which First and Secondspace combine to enact a working system of lived practices and shared worldviews. After these brief family profiles, I introduce four narratives to story Thirdspace experiences within and across digital spaces. Finally, as a grand narrative threading all vignettes, artifacts, and images together in a summative fashion, I present and explain my more Storied Map as my Thirdspace ethnocartography.

Neighborhood Walkthrough

For neighborhoods, Bingham has three distinct neighborhoods of different socio-economic standing. Though all neighborhoods bordered each other, Firstspace, or geographic surface-level scenery (see Figure 3.3) and boundaries are distinct. The low-income area of Murray Hill is clearly defined from the wealthier Meadow Grove by the town's highway and from the middle-income Concord by its river. Secondspace conceptions of these neighborhoods depict Meadow Grove with an "idyllic small town feel," Concord as the "hard working farm area," and Murray Hill as the "struggling badlands" (E. Smedberg, personal communication September 15, 2015). These Secondspace conceptions are invoked further in the following paragraphs.

Meadow Grove

Concord

Murray Hill

Note. All neighborhood names have been pseudonymised.

Figure 3.3. Typical Neighborhood Scenery Gathered from Neighborhood Walkthroughs

Within neighborhoods, a Firstspace surface appraisal analysis shows the extreme scarcity of digital learning opportunities in this rural community (see Figure 3.4). Yet, Meadow Grove, with its oak-lined streets, houses the town's only library and most of its schools. As a result, the Meadow Grove kids are in short walking distance to books, computers with Internet access, printers, and the Quimby Elementary schoolyard. At the playground, children have access to a jungle gym, a merry-go-round, 2 see-saws, a sandbox, high swings, and a metal slide that twists its way downward. Children and adults can gather for a game of basketball on the green basketball court, tennis within the red fenced-in courts, and soccer on the large athletic field with large white goals, as well as simply chill and key into the school's free Wifi. Additionally, all the town's churches and bed-n-breakfast inns are also nestled within this serene neighborhood. Its back streets invite a slow stroll. They actually have sidewalks. At the foot of the large houses, colorful flowers poke out of their square beds. Most houses are freshly painted with expansive porches and manicured lawns. The old oaks lining the streets have full branches that cross overhead to the opposing oak, as if in close conversation. Full branches are so busy in their back-and-forth dialogue, that looking up you can't see the sky for the trees. The arch of leaves above lend a cozy and secure feel, like a rainforest canopy incubating the

richest soil and most highly prized medicinal elixir in order to nourish the unrivaled activity and resources locked within Meadow Grove.

Crossing Route 201, the state's thruway to Canada, you come to Murray Hill. The neighborhood hosts the town's only drug store, bar, gas station, bank, as well as rotating stretch of short-lived tourist shops/thrift stores/hang outs. The drug store gets robbed roughly three times a year. The gas station used to have an ATM, but it was too much temptation, as residents kept busting out windows with bricks trying to loot it. The bank got held up once; the perpetrator was a man in his 40's, who threatened the tellers with a hammer. He was caught soon after getting his money, as he ran down Murray Hill's back streets with his hammer. It's no wonder. Walking its backstreets, there are no sidewalks: only worn footpaths that cut into the grass of dying lawns. Most residents opt to freely walk in the streets, but don't look up when cars pass. The neighborhood decay shows itself on the worn houses with paint peeling and on shops with no-longer-legible signage. Some houses even appear tilted, with slanted windows that look out on the road with suspicion. Other houses are tiny sheds with plywood walls. Barking dogs tethered to posts defend meager sheds with an awkward sense of misplaced pride. Most yards are littered with junk: faded plastic toys and rusted cars with hoods erupting all sorts of machinic assemblages. Camshafts. Engine blocks. Rear axles.

Concord is across the bridge. The houses are fewer and further apart. Most are giant drafty farm houses with barns and silos that reach out from sweeping pastures. Trucks and horse trailers are parked in long gravel driveways. Out back, clothes lines hang underwear and bras to let you know the exact size of whoever lives there. And in between most houses, there's not much else but an outpouring of sun-drenched pastures

with cows and horses. Pastures stretch themselves lazily into meadows and then further into hills. Winding throughout these Concord hills are trails, which invite adventure and wild exploration whether on foot, all-terrain-vehicle (ATV), or snowmobile. Unless a "No Hunting" sign is posted, these rolling hills are ideal for hunting whitetail deer, black bear, moose, upland birds, and anything else moving (but not dressed in safety orange). Concord children also have creeks and ponds and mud bogs to thrash around in wrestling cattails. Here when going outside to play, one wears bright orange and boots, not shoes. And returning home, one's adventure is storied through scratches, thorn pricks, and two splinters (or maybe three). This is the kind of farm area where one gets attached to a pig and befriends a barn spider named Charlotte.

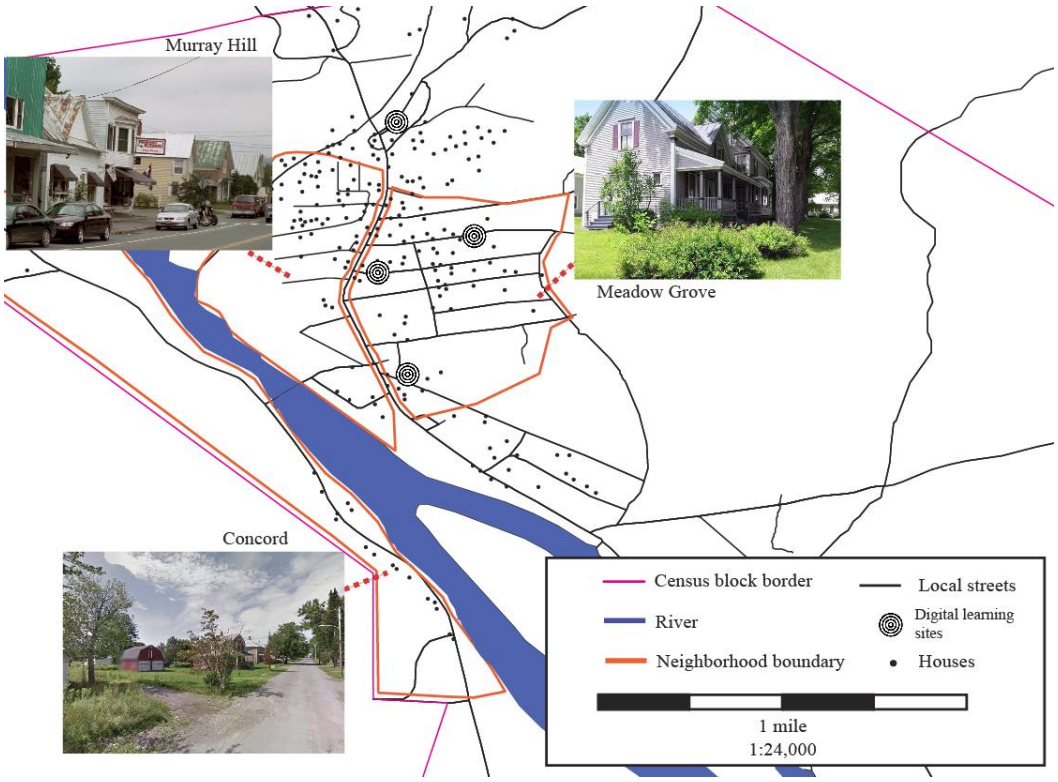


Figure 3.4. GIS Map of Neighborhood's Digital Learning Opportunities

The Focal Families Described

Here I introduce and briefly describe the six focal families within my study. For organizational purposes, each family is numbered 1 through 6 and presented in order from lowest to highest SES. Each family's paragraph gives a summary that includes the name and age of each member of the household, their neighborhood location, family income, parent or parents' occupation, and other distinguishing information regarding their digital practices. Given my study focused on the media activities of children between 4-6 years of age (i.e., the focal child), the paragraph and mobile phone diary describing each family centers around this focal child.

Family 1 (Beane). Becky (age 32) has three children Lacie (age 6), Brianna (age 9), and Brayden (19 months) and rents a small apartment above a heating oil repair service in the low-income neighborhood of Murray Hill. Becky has a high school diploma and is a stay at home mother.

Their annual income (around $7,500) comes from child support from the father of Becky's children. Outside of cash income, Becky also gets $700 a month in food stamps. Lacie is in first grade and prefers watching YouTube and playing games on her grandmother's hand-me-down phone or the family's shared laptop than reading books. Her teachers have noted that Lacie has trouble paying attention in class and are currently exploring a psychoeducational evaluation for a possible ADHD diagnosis. As such,

Becky is considering medication to help Lacie to concentrate on her schoolwork. Becky has struggled with addiction to prescription pills and considers herself to be in a "rut." She has no car and must rely on her mother to drive her family to the local Wyman Lake for swimming or to the nearest larger town to go to Walmart. She watches TV talk shows or "Judge Judy" much of the day to escape.

Family 2 (Soren). The Soren family includes Sara (age 34) and her children Maya (age 6) and Sol (age 14). Sara has a college degree.

At the beginning of this study, she was working as an educational technology support staff specialist at a local middle school outside the Bingham school district. The family's reported annual income then was around $12,000. This fall, she landed a job as a PK-8th grade art teacher within the Bingham schools that pays $20,000. For years, Sara has been saving to buy her dream house, which is located in Meadow Grove right on the edge of Quimby schoolyard. For now, the Sorens live in a house owned by Sara's mother in Murray Hill. They have a large family network and oftentimes family members, such as Maya and Sol's cousins, uncles, and aunts come out and take part in the raising of Maya and Sol. Implicit shared values communicate that family time and outdoors activities take precedence over technology use. And Sara rarely buys technology for her children, as most of their digital technologies were gifts or hand-me-downs from others. Maya just

entered her first year of kindergarten, and Sol just entered his first year at the high school. His favorite class is science, which is taught by Daniel Melcher (Family 6). He consistently gets on the honor roll and takes part in the school's gifted and talented program.

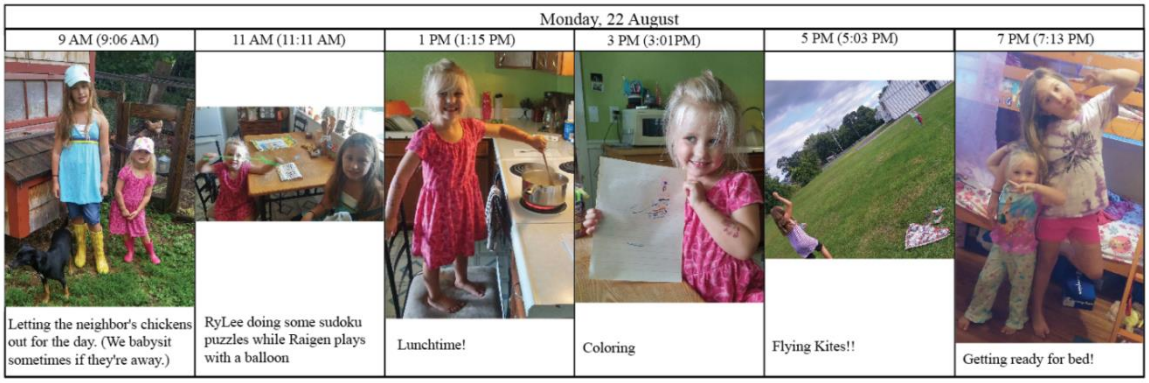
Family 3 (Howell). Trina (age 44) and her family live in a small house she owns in the farm area of Concord further away from the town center of Bingham.

After dropping out of high school, she later returned to get her G.E.D.. She did not pursue college and now stays at home to watch over her two children, Giuseppe (age 7) and Aiden (age 8). Her boyfriend Ken (age 42) didn't graduate from high school and earns the family's annual income, which ranges from $15,000-$20,000. The nature of his work is blue collar and involves lining dumps throughout Maine throughout the summer. In winter, he is laid off. Ken has been struggling with addiction for several years and is now on Suboxenes to help with withdrawal from more volatile painkillers. The Howells often have trouble making bill payments; phones are often turned off or cars are left broken until money can be gathered for their repair. Trina will sometimes take part-time jobs to contribute to their income. But oftentimes, she must quit these jobs, as managing the home while working outside the home becomes too much of a burden. The boys play together frequently and also ask to borrow Trina's cell phone to connect with their father,

while he is away working during weekends. The Howell family is the only rural family that lives without Internet.

Family 4 (Stewarts). Monica (age 33) and her husband Mark (age 34) have two children Ayvah (age 5) and Isabella (age 8) and live comfortably in a two-story, 3-bedroom house. They built the house themselves, and it sits on the northern edge of the upper-income neighborhood of Meadow Grove. Both have only a high school diploma and work multiple jobs to bring in their combined income of around $25,000. Monica works part-time in Bingham's town bank and Mark works long hours building roofs for local houses. They also own a food truck catering business and travel to horse shows and fairs in summer to sell hot dogs, burgers, and fries. Monica affords her girls a Leap Pad for educational gaming and a Playstation 4, on which the girls play Minecraft together. Yet, Monica strongly regulates their time with media, making sure their YouTube channel is child-friendly. Monica often uses media time to reward her children. Mark considers himself to be a gamer (playing more than 14 hours/week), but does not readily engage in video gameplay with his children, because he prefers different more adult "hack-n-slash" games (e.g., League of Legends).

Family 5 (Spencer). Wendy and George (33) are married with two children. The youngest is Raigen (age 5), and her older sister is Rylee (age 8). Wendy and George both have high school diplomas, but only George works outside the home. While Wendy stays home with the kids, he labors as a foreman for road repair crew on the backroads of Maine. He works 14-hour days in summer and barely sees his children on weekdays. The household income is about $30,000 and they rent a large 3-bedroom house in Meadow Grove. The family owns 1Wii, 1 tablet, and 2 TVs. None of the children are allowed to use their parent's smartphone and Wendy regulates the children's media use during weekdays. However, when George is home from work on weekends, rules are more relaxed. Raigen and Rylee rarely play games on the Wii, and Rylee is more interested in using the tablet to watch videos and play games. When Rylee is grounded from media, Wendy will store the tablet on her dresser.



Family 6 (Melcher). The Melchers live comfortably in a two-story, 5-bedroom house in the middle of Meadow Grove. Maureen (age 38) and her husband Daniel (age 39) have three children, Levi (age 4), Lucy (age 7), and Logan (age 13). Maureen and Daniel both have a college degree and own a whitewater rafting business. Their family income is about $60,000. In summers, Maureen manages the business from her home

office, while Daniel spends long hours away to ensure the trips run smooth on site upriver on the Penobscot. During winter months, Daniel works as Bingham's sole high school science, and Maureen stays at home with Levi. While the parents readily provide their children with the latest technology devices (e.g., Macbook laptop, desktop computer, Wii, iPods, iPhones), they value the outdoors and harbor certain misgivings over the learning capabilities of media. As such, the daughters are not allowed to have their own Facebook profile and technology use in the home is kept to a minimum. Yet, Maureen is busy with work in summer and admits that it's hard to regulate their time with technology from behind the closed doors of her home office. But Maureen and Dan work to set a good example of responsible learning habits. Both Lucy and Logan are on the honor roll and involved in many extracurricular activities in the community.

Discussion of Narratives

Following from these brief family case profiles are my narrative vignettes. Each vignette aligns with a particular paradigmatic theme, such as Technology Practices Reshaping the Rural Space, Socio-Technical Transformations, and Women Dividing Labor across Socio-Economic Spaces. While the brief family profiles and mobile phone diaries centered on the focal child, the following vignettes take a more holistic view of

the families. Because the narratives are employed to dismantle deficit thinking, each centers on the lived experiences of the low SES families. Each is also followed by what I describe as a paradigmatic Thirdspace analysis to critically spatialize our understandings. This means that through visiting and re-visiting participants' interviews, I drew themes that fell under the Thirdspace lens of space as (1) dynamically produced through real-and-imagined lived processes, (2) relationally assembled via collision and contradiction, and (3) radically open for agentive re-authoring and ultimate mobilization.

All narrative vignettes adhered closely to my previously discussed theory of interpretation. Herein, I performed narrative analysis through specific interpretive strategies centered around finding coherence across a disjointed data corpus of actions, events, and happenings. Stated again, these strategies included focus, omission, addition, transposition, and appropriation. Any interpretive liberties taken were necessary to the final analytical product and specifically guided by appropriation (Gracia, 2012), or my efforts to put myself into the characters shoes and thus story their life through my own experiences in this small town. However, in upholding meaningful and representative narrative(s), all participants' statements in the ensuing narratives have been relayed to me through interview, or over email or text message. Moreover, participants' talk of other participants' meanings/sayings is hearsay (i.e., town gossip) and not privy to my interpretation. Last, all objects, surroundings, and mundane occurrences were taken from observations, neighborhood walkthroughs, mobile phone diaries, and/or home visits.

Technology Practices Reshaping the Rural Space: Part 1

The following vignette will discuss Sol Soren, the 14-year-old son of Sara. Particular life events are explained as context for his personality and social influences.

Also discussed are his literacy and digital literacy practices as well as how they combine and transfer to the classroom. The narrative ends with a most telling instantiation of Sol's creativity and unique spirit.

Song of Sol.[8] Sol's father's locked up in county. For his 8th grade graduation, he was given two roses. One for his mother and one for his father. He chucked one and walked to give the other to his mother. He tried not to notice the other young graduates and the hands that took their roses. Flowers are stupid, anyway. His mother Sara said so. Sol's small and thin like her. And he's got Sara's brown eyes, which usually hold the look of boredom, unless filled with wild mischief. He's agile like a cat climbing up trees and kitchen cupboards, because no one stops him.

When his video game equipment got stolen, he remembers being so confused. He had never done anything mean to anyone ever. Why him? When Sara got home she yelled and quickly departed to her room. Then without word or warning, she emerged, got in the car, and drove away. She didn't call the cops, because she knew who did it. The day's morning papers informed all that Sunny, the town thief, had just been released from county jail. Also, word on the street was that the town's new up-and-coming thief, high school senior Kayo, had been out sick that day. Sara put the details together to assume that the Sunny had coerced the minor into committing the theft, while he remained in the getaway car. She knocked and entered Sunny's hideaway asking for the PlayStation 4 back. Sunny's reply: I would never steal from you, honey. Sara surveyed the rooms,

[8] Title is inspired from *Song of Solomon*, a Toni Morrison novel about becoming, where a man's search for his own personhood, independent from his family, brings him to question his very existence and way of life.

returned to deliver a more creative term of endearment, and left. Sol never got his PlayStation back and Sara had not the money or the interest in replacing it. She figured he was soon to enter his freshman year and could simply focus on his studies from now on.

Sol's in the gifted and talented program at school and, like most children, takes an interest in digital technologies. Sol's favorite class is science. He enjoys his freshman physical science class, because they do "cool lab experiments, where they determine four unknown substances." The teacher created the website https://heatishot.org/, with links to posted online articles the students must read and critically respond to within their class's forum. Sol is first to post his comments to the threads and uses the handle "SKULLCRUSHER1121." He wishes the site could have been used more, but he doesn't call himself a nerd. He does, however, admit that he and his best friend Able argue over who gets higher math grades. Able and Sol are also Facebook friends. In addition to commenting on each other's posts, they make and exchange funny memes. He's got 160 Facebook followers that comment on his wacky creations.

Sooner or later, you get to wondering how a poor rural kid, who spent much of his life in high-crime low-income housing with no father, comes to find himself as a digital learner at the top of his class. In listening to ruralness, or the metaphorical song of Sol, you'll first notice his large vocabulary. When he was three years old, he responded to his mother's help in tying his sneakers with "Thanks, I appreciate it." He enunciated every syllable then as he does now. It was as if he was trying on the word to see if it fit. He still chooses his words carefully and speaks without the Maine accent that marks many of his peers. It's not like he thinks lesser of those with Maine accents, because that would be

"discriminative." With his mother always speaking textbook English, he just doesn't feel right using nonstandard verb forms in typical sayings such as, *you ain't either* or *he done brung them*. And you won't catch him saying *ayuh* or *nossuh* or *feedahgoddamah*.

Though Sara prefers he spend more time outdoors, she does not regulate Sol's time with media and rarely spends time co-viewing with her children. When Sol was younger, Sara would watch Spongebob Squarepants with him. Yet, she missed all the jokes, while he laughed wildly. She was left wondering *what's wrong with my child*. Lucky for Sol, Able also shares his odd sense of humor. And after building confidence sharing their creative wit online, they decided to try and capitalize on their skills in real time at an outdoor summer music festival in Starks. When repeatedly sent away for begging the food booths for scraps, they opted to venture out on their own and make their own capital. They pooled their money together and walked to the nearby store. They bought up all the popsicles they could afford to stuff in a borrowed Styrofoam cooler and ran back to the festival. When they quickly exhausted their good humor bars, the boys were more than thrilled. So in the throes of a deep pre-teen sugar rush, they figured they would simply peddle jokes. By the time the sugar had worn off and the day's sun had set, they had earned $50 selling their own good humor!

Thirdspace within Sol's Facebook Practices

This narrative applies a Thirdspace lens to illustrate how Sol used technologies to construct a hybrid space, between virtual and material worlds, that allowed him to re-author his identity. To first outline the ways in which Sol leverages opportunity out of his present inequities, I will discuss Facebook as an ideal space for "leveling the playing field." Next, I will contrast Facebook, as a digital literacy learning tool, against his

science class's website "Heat is Hot." I then discuss Sol's novel use of Facebook, in terms of how he leveraged the dynamic, relational, and agentive aspects of Thirdspace to reshape his home environment and his personhood within it. Close attention to his everyday use of media uncovers the degree to which his digital inequities are embedded across social and technical infrastructures, while also showcasing how skilled digital literacies are learned as part of a relational network (Star & Ruhleder, 1996). Thus, we identify potential contradictions among what Sol possesses in terms of resources (e.g., parent's education, family income, neighborhood inequities), how these resources are often conceived (i.e., outcome-oriented deficit perspective), and how Sol himself leverages them. Rather than dismiss inconsistencies, Thirdspace allows a framework for clearly identifying these contradictions as opportunities for understanding the *processes* that produce inequities (see Artiles, 2003, 2011) as well as potentially offer means of overcoming inequities. Thirdspace theory is last employed to spatialize our understandings of Sol's media practices in a way that problematizes the deficit "culture of poverty" (Lewis, 1959) view.

Facebook is an ideal space for conventional literacy learning as well as multimodal and digital literacy learning (Barden, 2014; Hunter-Carsch, 2001; Veater, Plester, & Wood, 2011). Despite being a rich and multi-semiotic media space where users communicate with text, links, photos, videos, and sound to chat, send messages, and post status updates (Valtysson, 2012), Facebook is driven by reading and writing (Barden, 2014). Facebook encourages users to post 'status updates,' or short text-based announcements of their current activities, moods, or thoughts. While users can opt to update their status by simply posting a photograph, video, or hyperlink, often this content

will be accompanied with text (Barden, 2014). Friends see this post through their news feed and can also respond by writing text. Typically, news feeds' comment threads grow as various others read and respond through text. Users can also chat in real time through email-like messages sent to one another. On average, users communicate with roughly 130 Facebook 'friends' and spend nearly an hour everyday viewing content on the site (Kirkpatrick, 2011). Facebook, therefore, motivates users to invest a unique amount of time into practicing literacy basics of decoding, writing, and reading comprehension. Similarly, Facebook also supports multimodal approaches to literacy, which encourage young adults to produce and interpret a variety of text and video, drawing on the multiple modes of expression and communication (e.g., visual, gestural, auditory), wherein each compensates for the others' limitations (Kress, 2000). Last, Facebook can be an enriching space to develop digital literacies, in terms of both tools and design literacy (Jenkins, 2006). Here, tools literacy is marked by lower-order computing skills, such as word processing, searching, Web browsing, and multimodal communication across multiple platforms (Martin, 2008). At the other end of the continuum, higher-order computing skills, or design literacies require the effective and context-appropriate use of information and tools to create or remix multimodal content—Web pages, video, memes, blogs, documents, and games.

Despite the inroads rural education may be taking towards developing critical digital literacy through class websites (e.g., "Heat is Hot"), Sol and Able were dismayed that the site was underutilized by the class and the teacher. Technology has transformed the way young people learn and live their lives (Gee, 2007, 2012; Gee & Hayes, 2011). Many millennials view learning as a process of empowerment, where they exercise

agency and choice (Prensky, 2005). But in schools, millennials must still "eat what they are served. And what they are being served is, for the most part, stale, bland, and almost entirely stuff from the past. Yesterday's education for tomorrow's kids" (Prensky, 2005, p. 64; see also Billah, 2015). Their rural school, while providing access to 1-to-1 laptops, does little to diverge from the paradigm that teacher holds the knowledge. Their science teacher, Daniel Melcher, while surpassing all other Bingham teachers in technology use through his custom-built class website, still harbors a personal dislike for young people's preference for communication technology. Owner of his own whitewater rafting company, he puts his faith in science learning that happens outside away from technology. He neglected the site and pushed the belief on his students that they should spend more time outdoors away from technology. Therefore, the class website was not intended to foster that same potential as Facebook for Thirdspace through dynamic identity re-authoring, relational networking, or agentive knowledge co-constructing.

Sol, like most children his age, was born curious. Humans are naturally driven to learn, and it takes a profoundly unique educational system to crush this learning potential (J. Gee, personal communication, September 16, 2015). Until and unless this natural curiosity is blunted by their experience in unsafe impoverished neighborhoods and/or "skill and drill" educational systems, most children will self-initiate learning and discovery through free play (Kwon, 2002). Stated again, this playful learning happens readily in multimodal digital spaces, such as Facebook. Though many may not view Facebook as a neutral space (Valtysson, 2012), Sol appeared to leverage Facebook as a Thirdspace freed from the constraints of pre-defined patterns of class (re)production. Here, he aligned himself with a new form of worldmaking that-- while less objectively

real-- was more within conditions of Sol's own choosing. Through relational links with other users, he exercised his knowledge, values, and creativity in unrestricted ways to open unforeseen potential. For example, the frequent back-and-forth newsfeed with his 160 Facebook friends motivated him to build conventional, multimodal, and digital literacy skills. Through navigating the social media sites and clicking through various embedded links, Sol developed tools literacy. Moreover, working with Able, they developed their design literacies by leveraging digital tools to meaningfully sample and rework digital content into memes. Not simply amusing themselves online by watching videos or chatting with friends, they were creating novel content and working together to do so. Figure 4.2 provides one example of such a meme.

Figure 4.2. Meme Created by Sol and Able that Generated 22 Likes

Though spatially convenient to buy into the notion of a culture or "mindset of poverty" (Payne, 1996, p. 47), we are egregiously misguided in assuming anything culturally cohesive about poor children's values and behaviors. While students of low SES have many things in common (e.g., impoverished unsafe neighborhoods, poor access to healthcare, low income, and parents with low educational attainment), these are actually social conditions working against them, rather than cultural or mental traits (Gorski, 2013). Sol was born into a family living in Murray Hill. He lives on a street where most of the houses are abandoned with paint peeling off their wood siding. Every day, he wakes up and looks to the neighborhood beyond his window, and must resituate himself within the space that defines him. As a preteen, he's old enough to feel the shame of what the town thinks of people who live in Murray Hill. Pre-defined Murray Hill patterns of identity production (which Sol takes up unknowingly) became visible on breakdown, when his video game equipment got stolen. At that point, he realized that even when victim to Murray Hill crime, the town doesn't necessarily consider it their burden. Thus, these processes which make and remake Sol's Murray Hill (Thirdspace) are simultaneously real (Firstspace) and subjectively imagined (Secondspace).

At the same time, this narrative exposes the inconsistencies in the space in which Sol lives and the spatial processes he himself enacts. For example, Sol forged a new kind of rural identity through his zany brand of humor and engagement in interesting offhand pursuits with Able. Sol's Facebook use helped him to critically learn literacy as well as leverage the radical openness of the Thirdspace to make room for a more "hybridized" identity. Through creating and sending memes among his relational network, he could expand and reshape his selfhood online with friends from his school district (who know

where he stands socially) and beyond. While his science website constricted the kind of expressions to be made and his neighborhood reminded him of his "promise," Sol found solace through social media. His social media use helped to attenuate class tensions in a way that helped Sol to dodge requirements of the social order. By interacting and asserting his identity beyond his school district, he also learned that he is much more than a 9th-grader. This seemed to resolve many issues for Sol—namely freeing him from the pressures of fitting himself into prescribed pre-teen social categories or trends. If he didn't know (or didn't like) where he fit, he would simply make it up. Hence, in this world of pre-packaged identity, Sol took the liberty in constructing his own. Seen this way, through various digital tools and multimodal design literacies, he opened agentive Thirdspace "spaces for authoring" (Leander, 1999, p. 49) to (re)make his own meanings in the re-writing of his world.

Technology Practices Reshaping the Rural Space: Part 2

The next vignette will discuss Sol's mother, Sara Soren, the single low SES mother from Murray Hill. To do justice and breathe life into the complexity of Sara's unique nature, her identity is juxtaposed against other rural women characters in various novels mentioned below. These brief but literary metaphors are meant to provide an added layer of richness to Sara's world of endless challenges. Emphasis is paid to the ways in which she approaches the need to develop and leverage requisite digital literacy skills for college. To showcase her drive and perseverance, the narrative ends with Sara reflecting on the hardship of her next challenge.

Sara (so far from) Plain and Tall[9]. Sara sleeps under the sea. Instead of lamps in her bedroom, she opts for strands of blue Christmas lights that run the length of the walls. This makes her mattress appear as if underwater and her posters float on an ocean of blue walls. Her running sneakers are the other thing you'd notice. They're bright pink-turned-violet when below sea level. Sara gets ready for her run by performing a ritual slow bow-tying of pink-violet laces and a quiet moment of worship tucked underneath the hamstring stretch. As she ties her ponytail high and slick, she transforms into a small town girl gang heroine from Oates's *Foxfire*[10]. Too short to be Legs, but just as athletic and provocative, Sara is far from plain and tall. You are waiting for her to get out the container of Vaseline. *Foxfire* warns you about girls with their hair slicked back, no jewelry, and Vaseline on their faces. This signals a fight. Not unlike an unbreakably bold protagonist, Sara treats life like a full contact sport.

Someone once told her that intellectual pursuits took physical stamina. She never forgot it. Single with two kids, she decided to return to school for an undergraduate degree in education. This meant filling out multiple merit and need-based scholarships. Once accepted, she also had to then apply for low-income housing near the university, move her family there, enroll her kids in school, and hit the books. Most importantly, she needed to learn to navigate the latest digital technologies. This was no easy task, as she considered herself totally digitally illiterate. In the first months of her undergraduate program, she had to ask the people at the computer lab for everything. This was so

[9] *Sara, Plain and Tall* is a young adult novel about a mail-order bride from Maine, who describes herself as plain and tall. The novel is very boring and enforces gender normative roles, but was required reading in our rural Maine school district.

[10] *Foxfire* is a novel about a gang of teenage girls set within an industrial rural New England town in the 1950s.

frustrating for her. And to further complicate matters, the workers would get super impatient with her. But there was no giving up. If she couldn't figure this out, what else was she gonna do with her life? There was no going back to her former life of relying on an abusive man to financially provide. Achieving legitimacy meant changing her path, leaving Bingham, and creating a new space free from her old life.

She grew up poor and felt shame in using foodstamps. But she didn't realize she was backwards and poor until high school. Surpassing all other in sports coming in first so often had helped her to internalize feelings of success. In her home, there are photos of Sara's high school soccer years. In each photo, she has her mouth open and she's yelling at someone on the field. She remembers riding in a car to a soccer game with friends and a richer mother from Meadow Grove. She doesn't remember what they all talked about or for how long, but somehow later on she overheard the mother commenting about her to another Meadow Grove mother. The mother told how by the looks of her, you never would have thought she was smart and able to talk about such intelligent things. So that was how Sara discovered the poverty that seemed to hang over her.

Perhaps because of her fight, competitive drive, and unapologetic lack of sweetness, people listened to her. And when it comes to her children, she's all grit. The custody battle for Sol was first waged outside the trailer of his biological father's house with a baseball bat and a verbal demand for her child's return. The father promptly returned Sol (one week late); she got the courts involved soon after. When the father stopped arriving to pick Sol up, they deduced he had been sent back to prison. The father of her youngest Maya has long been out of the picture. And speaking to her inability to

understand her young daughter's fixation on ballerinas, Sara surmises that fathers are a lot like ballerinas—unneeded and overpopulated.

Years later, she was set to graduate summa cum laude, or with highest honors, when complaints were filed against her on the grounds that she didn't exemplify her English Language Arts Education program. At the time, she was student teaching and thought her mentor teachers weak and boring. Further, she didn't think they could handle the kids. So she stopped paying attention to them. Then one day, her professors took her aside after a roleplaying activity to ask if her heart was really in it. They remarked how she looked really good on paper, but her demeanor wasn't professional. Sara was very confused by this feedback; she dressed in khakis while student teaching, but assumed her animal print stretch pants, sneakers, and brightly colored hoodie were appropriate for the college classroom. But something about her didn't fit the cookie cutter standard, and this unnerved the program gatekeepers. They invited her into their office for counsel. She arrived with hair up and slick back, no jewelry, and running shoes. They tried to talk her out of finishing the program, because she didn't seem happy "here." In between long direct stares, Sara stated her wish to continue, as she was only one semester away from finishing. She waited for them to explain what they really meant (i.e., fight back). But they didn't, so Sara kept showing up and, in doing so, opened the gatekeeper's gate little by little.

In the four years since graduating, she has applied to and got denied from over 30 jobs. When asked whether she has any theories why when looking so good on paper she would struggle to get a job, she mentions her college professors' recommendation letters. They had given her a low approval rating, and she knew this evaluation was tied to their

letters. Despite this, she has since landed a new job as a half-time art teacher. Now she is granted (via funds for professional development) free enrollment to 4.5 credits (roughly one graduate course a year) at the nearest university, 60 miles away. This demands her attendance within three separate face-to-face meetings at the university, Saturdays from 10am-3pm. However, powered by a $100 used MacBook that capitalizes on open source word processing softwares, Sara feels confident entering her first semester in graduate school. As a working single mother, she must extend her workdays late into the night to tackle her studies. At the same time, she knows that this takes away from her children, because they need her to be well-rested in the morning. Sara is not sure the trade-off is worth it, at this point.

Thirdspace within Sara's Technology Practices

This narrative showcases another way in which digital practices can reshape the rural space to leverage upward economic mobility. Once self-ascribed as "digitally illiterate," Sara now faces her first semester in graduate school prepared, since having learned to navigate digital technologies and capitalize on open source software. At first, this outcome suggests nothing about Sara re-inventing norms, but simply reflects the deficit perspective (i.e., the disadvantaged merely have less technologies and less developed capacities to use digital technologies in mainstream ways). Included in her process, however, is the reflexivity practiced in rejecting socially-imposed stereotypes of impoverished single working mothers as helpless and "unfit." The following will model this enactment of Thirdspace by unpacking the dynamic, relational, and agentic ways in which Sara re-imagines the meaning and potential of her lived inequities. The section ends by using Sara's case as a means for rethinking new ruralism, while spatially

restructuring our deficit-oriented understandings of low-income single mothers through the Thirdspace.

Motherhood, as a historically-situated identity, is shaped through regulatory discourses defining what constitutes the good mother (McDermott & Graham, 2005; Phoenix & Woollett 1991; Smart 1996). Similarly, it also produces certain "deviancy discourses of mothering" (Arendell, 2000, p. 1192), such as working mothers, lone parenting, lesbian mothers, teen moms, and other alternatives (e.g., co-parenting, communal parenting). Despite increasing need for women working outside the home, working mothers are still viewed negatively when measured against ideals of the stay-at-home middle class mother, who places children's development at the center of her world (Gorman & Fritzsche, 2002). Having rejected fathers and the two-parent household, single mothers are likewise presumed to opt out of the best environment for their children's proper socialization (McDermott & Graham, 2005; Silva 1996; Wallbank 2001). In the case of Sara, her everyday practices continued to be significantly shaped by these larger spatial processes of class, gender, and social power. Similar to Bourdieu's (1977) "habitus" being both generative and determining, Sara was free to make her own choices, but not exactly in circumstances of her own choosing. For example, she could decide to return to college, but she needed scholarships and financial aid to do so. She could persevere in her studies and earn the highest GPA, but still continue to confront discrimination from the gatekeepers in her program. Or, put differently, while "unfit" mothers can reflexively re-author their narrative into a female-headed hero's journey, the choices available for remaking their biographies are limited by real-and-imagined structural and spatial inequalities.

Given Sara's experience of inequities (and its consequences) were embedded across structures (social, spatial, and technological), remaking her life involved negotiating new relational reconfigurations—both tangible and intangible. Once she moved away to start her undergraduate degree, there was no going back to her old home, her social circles, or her former identity. Making up for lost time meant carving out a new lived space of belonging before the library computers and navigating new relations of power/knowledge with what she described as "unhelpful" library staff, mentor teachers, and program gatekeepers. Soon, though, after realizing the need for "naturalized familiarity" with digital tools to gain full membership (Star & Ruhleder, 1996, p. 113), she bought a used MacBook from a school auction, where she was student teaching. Further complicating her adjustment was how digital learning tools were linked, or sunk into other socio-technical systems (e.g., Blackboard). Navigating one device, therefore involved mastering a set of other networked technologies, while confronting the strengths and limitations absorbed from each technology (Star & Ruhleder, 1996). When setting learning standards high and sacrificing so much in the process, Sara said she felt a slave to a conflicted goal. She shared that as a low-income single mother with zero digital skills, socializing herself to the university space, and its embedded upper-class norms and sophisticated socio-technical systems, was like "falling backwards into the unknown." In this lived nexus of struggle and contention, wherein knowledge, beliefs, subjectivities, and materialities bubbled together to be shaped and reshaped, she didn't even know how much she didn't know, nor when she would hit solid ground. Thirdspace theory may then suggest new meanings that highlight the seemingly asymmetrical duality of Sara's

learning inequities, as "both oppressive *and* potentially empowering" (Artiles, 2011, p. 441; see also hooks, 1990).

Deviant discourses of motherhood are often blamed for the deterioration of modern society (McDermott & Graham, 2005). At the same time, conditions of a changing modernity, namely reflexivity, fragmentation of social conventions, and individualism (Bauman, 2000; Giddens, 1991), have paradoxically become the key features of resilient mothering practices. For example, in response to a liquid modernity circulating uncertainty and instability as the raw building blocks of identity (Bauman, 2000), mothers find it increasingly improbable to fashion a durable sense of self that can be validated and affirmed against the dissolving structure of tradition. Resilient mothering practices more readily flourish within these circumstances, as they are born on flexibly reorienting women's work around precarity (McDermott & Graham, 2005). Further considering power, knowledge, and the reflexive construction of Sara's identity, Foucault (1978) identifies strategies of resistance in "reverse discourses" (p. 101), whereby marginalized individuals co-opt dominant discourses to then refashion them for liberatory potential. Sara constructed her own selfhood by reverse discoursing ideals of motherhood. For example, "good" mothering was not a byproduct of the dominant social class, but achieved through what Sara deemed as "good enough" mothering practices suited to her children's needs and her personal telos (Phoenix & Woollett 1991; Lawler 2000; Wallbank 2001). Sara's subversion of negative single, working motherhood discourses can be seen as a form of positive identity work carved out through the Thirdspace. Sara's positive self-concept and strong level of self-efficacy came across through pride in her high GPA and her new job, which she believed was "my reward for

working so hard." She also reflected on the fact that the job was in Bingham, as this was ultimate validation that the town-- "her hometown"-- accepted her. In sum, this self-reflexive construction of her own biography comprised Sara's agentic strategy of resilience, from which she was able to maintain a positive sense of self within impoverished social spaces, transform into a skilled 21st-century learner, get a job, and then return to college for her graduate degree.

Lewis, the anthropologist who coined the term "culture of poverty" in 1959, blamed poor people's lack of participation and integration into the major enriching institutions, such as college, on their cultural traits. However, Sara's narrative highlights factors (visible and invisible) contributing to their exclusion from these enriching spaces rather than their inability to participate. Moving beyond an immobilizing deficit-oriented lens, this narrative shows how inequalities exist, but are not taken up equally across cultures. Further, people of low SES are diverse and do not fit into one monolithic culture (Abell & Lyon, 1979; Gorski, 2015). By carving out a Thirdspace hybridized identity that refused social conventions of good mothering and bolstered her to enroll in college, Sara acted as an individualized and self-reflexive agent seeking to make new sense of her lived space. Stated more concretely, within Sara's specific socio-economic spaces, acquiring digital skills was not always conducive to being a good mother. While other rural mothers of low SES (e.g., Becky and Trina) found redemption and promise in conventional ideals of good mothering, Sara actively refused these ideals to engage in sacrifices others would deem as "unsuitable" for mothers. Thus, her story is one that challenges the "new ruralism" move against ideals of modernity seemingly imposed upon rural folk as backwards and resistant to digital technology. After all, symbols of progress

within a changing modernity, which ran counter to her small town's rural traditions, helped Sara to forge a new identity and recompose the cultural logic regulating low-income single motherhood.

Socio-Technical Transformations

This next vignette will discuss Becky Beane and her household within the confines of their Murray Hill apartment. In particular, this narrative focuses less on life events and more upon how everyday objects (e.g., technologies) wield influence over family practices. To make explicit how technologies, humans, and networks act to mutually transform the family's social reality, a narrative polyvocality is expressed through three voices. Italics within brackets are the voice of the researcher staging the scene. CAPS indicate where technology is talking through Becky and her family. All other text in this narrative is the voice of Becky.

Can I Sleep in Your Arms.[11] [*Becky Beane's mattress hasn't any sheets, just a mountain of covers. Different sized legs stick out from it. It fills most of the living room to form Becky's hybrid bed-room-living-room. The only adjacent bedroom is for putting the children down for the night. But Becky would have it no other way.]*

Nossuh. Nothing tops everyone sitting up here on the big bed with mumma. I got my old babies and my new babies right up here with mumma. If there's one thing I know, it's how to manage a family and a household. When all actions hum around the big bed, mumma, and the TV, everything's a HOW TO TRAIN YOUR DRAGON feel-good cartoon of harmony and togetherness.

[11] "Can I Sleep in Your Arms" is a country song released by Willie Nelson in 1975.

[*Atop the lumpy mattress, bodies and machines interact in a semi-quiet dream-like space. The TV flicks colors across the dimly lit room, while the other technologies in smaller hands give off a more steady ambient glow. The middle baby Lacie sits up and pops out of the mound of covers. She's in first grade and holds her grandmother's old phone so close to her face you can almost read the screen's words reflected across her pale cheek. She yawns. Her tiny teeth open up. After coming up for air, she sinks back against the plywood wall. The row of raised knees vanishes her from sight.]*

Lacie's got attention issues. Soon she'll be put on medication, just like I was. And I know I should read to my babies more. But we have no books and no car to get to the library. We got to hoof it on down the road apiece and use baby Brayden's stroller for hauling. Plus, I don't have much to say when reading children's books. I struggled in school and almost dropped out. I was living out of my man's pick-up at the time. I did graduate from high school, but lord knows how much of a shitshow it is for me to read aloud. And with Lacie's attention problems, she would sooner have phones and games and such. She loves her Hatchamals pets. They say FEED ME! BATHE ME! NOW! Technology's got its hooks in her for sure. It's got her glued to the screen. Lacie doesn't even hear me when I holler out her name. But I just have to trust technology will teach Lacie things I can't.

I love my shows. Everything's better on TV. Remember when Oprah used to give out all those cars to her audience? AND YOU GET A CAR! AND YOU GET A CAR! But with Oprah gone, I got Ellen DeGeneres. Such a big heart. Just like me. We are just two peas in a pod. Ellen's like, WHAT REALLY MAKES ME HAPPY IS MAKING OTHER PEOPLE HAPPY. And every show, she gives out prizes. Like real money! If I

would win that money, I'd give it away too. Every penny! Say I won $1000, I'd hand it over to my mumma so she could pay off her trailer. Then after that, I would probably get my man a new truck with what was left over. Then I would most likely buy my babies newer phones. That's what I would do with $1000. Just like Ellen, I got a wicked big heart.

[*But Becky Beane's in a "rut." She tells this right away and bores into you with fox-colored eyes framed by flaming red hair and what used to be a full smile.]*

Right now I'm waiting for my man to marry me already. Sure, he doesn't live with us anymore and has got five other children with two other women. But soon he'll come to his senses. Now, he's being a goddurncocksuckinlittlesonsahoo. No matter. At least he pays child support. And me, I've got my hands full with trying to stay off drugs. I used to be a sub-whore. And if I didn't get my suboxenes, I would be all dope sick and goose poopin'. But my babies can't be having no pill head for a mumma. I've got to teach them to do different from what I did. I know it means pushing them to want more than I provide for them now. So I get well-to-do friends in town to take my babies to stuff outside the school like soccer, school-on-skis, and Girl Scouts. This way, they'll have better role models. Like Dr. Phil says, IF THERE IS SOMEONE IN THIS AUDIENCE WHO THINKS THIS IS WRONG, THEN SOMEWHERE THERE IS A VILLAGE MISSING ITS IDIOT.

But other than that, nothing's working out and money's tight. Sure, I pay rent with child support. Then there's $700/month in grubstubs that I always make last. But the state is constantly threatening to cut this. I really don't know what I'd do then…How would I feed my babies? At the moment, I'm only scrapin' by. And as far as I'm

concerned, this town is dead. No jobs and no future. It's dead. Best I can do is go online and fill out those penny pincher surveys. You know, those online surveys that ask your "scale of 1-to-10" on a whole bunch of stuff. Some of it's interesting. But that's what my laptop's for. I just go online and fill out as many as I can. After a while, the work is downright mind-numbing, but I just friggin' wail on it. One after the other. A penny a pop.

When all is downright rotten, I got my shows. Numbs me right out. Makes me feel like I don't live in this goddamn town. Makes me feel that things will work themselves out and the world will put things right. Like how Judge Judy locks all those shitheads away and puts bad folks in their place. YOU DON'T HAVE THE IMPORTANT DOCUMENTS, WHERE DID YOU THINK YOU WERE COMING TODAY…THE BEACH??

[*But her fire burns quick, as Becky's fox-colored eyes soften and begin to stir compassion. She ends channeling Jerry Springer's "final thoughts."]*

I know as a mumma I'm supposed to want more and do more for my babies. But then one day big dreams fix them to shame and scrap what we all worked so hard to build together!? The one thing I'm so good at making is the one thing I must break for my babies to become something more. That seems like bullshit to me. The hardest pill for me to swallow. But as Jerry would say, WE'RE ALL DOING THE BEST WE CAN. YOU CAN TRY TO PROTECT YOURSELF FROM ALL HURT, BUT THAT'S AN EMPTY LIFE. I don't know. When all is lost, my shows give me hope. At night on my empty mattress, they are the arms that hold me.

Thirdspace within Socio-Technical Transformations

While the previous narratives exemplify the various ways in which the Soren family leverages digital technology tools to create opportunity out of their present inequities, Becky's narrative highlights factors influencing other families of similar SES to enact entirely different, but no less worthwhile, technology agendas. In situations where one-day-at-a-time stability takes precedence over college enrollment or maintaining Facebook friendships, technology answers to a different hierarchy of needs. To situate these different needs, I first discuss the various constraints acting on Becky's spatiality, such that it's socially (re)produced over time, but not under conditions of her own choosing. To next outline the ways in which Thirdspace socio-technical transformations[12] offer possibility for Becky Beane and her household, I discuss how technology practices are mediated through humans. While still holding Becky as the central author of her story, I propose new ways in which the Thirdspace can yield a human spatiality that is *socio-technically* produced and reproduced over time. I next weigh her drug addiction struggles against her relational need to integrate her subjectivity with that of media chat shows. To then emphasize the transformational role socio-technical arrangements played in stabilizing the family's daily routine to supply a steady dose of good feeling, I will explain the negative consequences of drug addiction on family life.

In terms of spatial constraints, Becky demonstrates extreme strength and resolve in steering her children towards college and away from repeating her path, yet cannot

[12] Socio-technical transformations involve mutually-transformative practices between humans and technology. These technology-mediated practices are marked by an agency that resides in neither technical nor social dimensions alone, but in the synergistic socio-technical encounters being enacted across dimensions.

change the quotidian forces acting on the given situation, which seem plain and mundane enough. We begin from this contention because Becky did not so easily filter her identity through that of the helpless low-income mother. For example, despite an impossibly low income and a fear of arithmetic, Becky effortlessly commanded her math skills to always pay rent on time and stretch her foodstamps through the month. Further, she had no car but could regularly coerce her son's stroller into a makeshift wagon for hauling her household's groceries the 8-mile roundtrip to the grocery store. By enthusiastically involving her daughters in various extra-curricular activities in the town "School on Skis," summer soccer program, and Girl Scouts, Becky challenged and redefined the drawn boundaries of where she fit socio-economically among the other townsfolk. Similar to Sara, Becky also identified strategies of resistance in "reverse discourses" (Foucault, 1978, p. 101). Thus, this narrative further disrupts deficit perspectives by suggesting ways in which Becky re-invented norms and rejected monolithic "culture of poverty" (Lewis, 1959) stereotypes of the lazy, ignorant, uninvolved, and impoverished single mother.

At the same time, Becky's actions within the community and within her household suggest an agency that cannot so readily combine with other forces to overtake the current state of affairs. For her children to make it in this world, Becky felt they must "do things different." But the day-to-day meaning of this was left undefined. What was defined, however, was how Becky never enjoyed school and couldn't wait to leave it. Having left high school to live in her boyfriend's pick-up truck, she only forced herself to return, because of her mother's consistent pleading. When it came to teaching her children literacy, which functions as the entry point for learning in any content area and

especially digital literacy (Neuman & Celano, 2012; Reardon, 2013; Watkins, 2011), Becky was very in support of others—be it technology or teachers—taking over. Due to her years-long lack of confidence in her own reading skills, she firmly believed that these technology tools and teachers could perform better. This compels her to rely on her rural school district to supply technology and literacy programs to prepare Lacie for the socially agreed upon demands of 21st century "college and career ready" skills. However, rural districts' technology programs are grossly underfunded (Bosworth et al., 2015; Bock, 2016; Warschauer, 2008) and tend to lack programs that successfully prepare students like Lacie for what social convention considers appropriate skills for 21st century professions (Reeves, 2012). Similarly, Becky was unsure how to foster "sophisticated" educational aspirations within her children, while still honoring the powerful, yet mundane familial connections and country values she had fought so hard to build. Thus, given the objective was clearly defined, but the means towards it was not, Becky's actions couldn't always support her goals. Yet, pursuing these contradictions through a Thirdspace analysis, any unintended consequences can be positioned as a natural result of the multitude of inter-operating spaces and forces acting upon and through Becky's one-day-at-a-time stability. Thus, searching out various inconsistencies being articulated through networked actions distributed between humans and technologies across space and time helps to expose a multi-dimensionality that strengthens our subsequent understanding (Latour, 2005).

Exploring how human practices are mediated through technology calls for an analysis of socio-technical entanglements. From "mumma's big bed," the television commanded a unique presence in the room. Oftentimes, the assumption that technology is

a neutral tool carries the stipulation of "it's how you *use* it." However, each technology emerges with a purpose and bias already inscribed to its use (Latour, 1999). Becky's television, for example, was more predisposed for entertainment than a smartphone, given its larger screen, higher quality graphics, and more powerful sound system. Analytically unpacked, the meaning this technology lent to the living room elevated its status to "happy object" (Ahmed, 2010, p. 32). These happy objects, when reduced to the contingency space fostered between bodies and object, exercise emotive value through the body. The closer their proximity, the bigger the anticipation of happiness, and we often turn our bodies to these objects, because they command happiness. For example, the TV's placement, directly at the foot of Becky's bed, facilitated happiness through appropriate distance and elevation such that viewing was as natural and easy on her eyes/body as possible. Similarly, when obtained, happy objects hold not only the memory of happiness, but the promise of it (Ahmed, 2010). Becky's desperation for happiness chained her to her television (and the talk shows within), as it wielded a sentimental value articulating the history *and* the expectation of good feelings. This exemplifies how her human spatiality was *socio-technically* produced and reproduced daily.

Consequentially, Becky's technologically-mediated practice also reshaped the relational configuration of other bodies and objects in the room. Here, I further unpack how relational assemblages linking humans, technologies, and space in Becky's house acted socio-economically and the consequences of these interactions. Possibly due to insufficient funds, Becky Beane's house, despite being above a heating oil repair service, was not kept at a comfortable indoor temperature for most of the year. This locked all bodies underneath covers and/or inside jackets nearly all day long. To keep warm, her

children sat “up on the big bed with mumma” and leaned against the wall. Doing so, they had a less optimal view of the television and henceforth busied themselves with their own technologies. With the noise from the TV, talk (so crucial to young children’s vocabulary development) was kept to a minimum. The constant TV noise combined with the dimly lit room discouraged book reading. Further, print books (even if thought of as a happy object) could never rival the TV’s promise of happiness, particularly due to Becky’s shame over her literacy skills and Lacie’s attention issues. One happy object thus took significant time and attention from the happiness potential of another object (e.g., print books). Central to these socio-technical considerations is the threat of her children struggling with conventional standards of literacy learning and falling even further behind in critical digital literacy skills.

A final analysis of Becky’s Thirdspace socio-technical transformation will further examine the phenomenon under study. Her struggles with addiction were bathed in inconsistency. Internally, her want to remain clean collided with her cravings for an escape. Externally, her behaviors likewise followed a labile course of uncontrollable extremes attempting to right themselves haphazardly onto a straight path. Add to this the constant stress of motherhood, poverty, an irregular co-parent, and exclusion from the rural inner social circle. Much of the time, Becky attests to an overwhelming sense of shame and failure. Attending to these feelings in combination to the insurmountable lack of control in her life ate away at her daily. Thus, media became Becky’s new drug that could impart emotional consistency and a steady supply of good feeling. It did this through reshaping her subjectivity to carve out desperately needed transformational Thirdspaces of hope.

According to Latour (1999), "To conceive of humanity and technology as polar opposites is, in effect, to wish away humanity: we are socio-technical animals, and each human interaction is socio-technical" (p. 249). Given we are thus embedded in socio-technical systems, humans readily use technologies as constructions and extensions of the self (Haraway, 1991). And in times of incredible uncertainty, people unprepared for the challenge of self-reflexivity, reconcile their subjectivity through media (Bauman, 2000). In Becky Beane's case, technology acted as a radically open and workable smokescreen for reality. Because she momentarily lacked the internal direction and/or external supports necessary for doing the identity work herself, Becky turned to chat shows to provide an endless cycle of people "like me" to think and feel through (Bauman, 2000). Capitalizing on our voyeuristic tendencies, chat shows help to produce an engaging "true-to-life" example for resolving difficult problems and acting out one's life in socially scripted ways. In showcasing their stories, the anonymous and ordinary storyteller shares a likely situation-- along with its trials and tribulations-- in publicly legible ways which affirm and subsequently command the viewer's own experiences.

Accordingly, media narrows the viewer's solution scope to the necessary few. Our changing modernity, increasingly built around the Synopticon model (Bauman, 2000, p. 85), where the many watch the few, find the ubiquity of digital technologies advantageous. These vital few, who can be accessed anywhere and anytime, become one's law of truth through which identity is acceptably lived out. According to Bauman:

> Numerous studies show that personal narratives are merely rehearsals of public rhetoric designed by the public media to 'represent subjective truths'...Ostensibly, the spectacles [of the vital few] are meant to give vent to the stirrings of the 'inner

> selves' striving to be let out; in fact, they are the vehicles of the consumer society version of a sentimental education': they display and stamp with public acceptability the yarn of emotive states and their expressions from which the 'thoroughly personal identities' are to be woven. (2000, p. 86)

This is not to dismiss the worthwhile socio-technical transformations enabled by Becky and her household. Addiction can negatively impact a household. When obtaining and using drugs becomes the main priority, the family lives the enduring consequences of being placed second. Becky Beane's past drug use has distanced her own mother as a source of support in childrearing. Without many critical human connections outside the home, Becky must consistently work at remaking a lived space that rehabituates herself against erratic behavior and inconsistent moods. Henceforth, the household finds personal meaning in the regular airings of TV chat shows and cartoons. This socio-technical arrangement carved daily spaces of hope which imparted a needed structure to the household's everyday routine, as they planned meal, bath, and bedtimes around their daily ritual of TV shows. To say more about this schedule, Ellen is on at 3pm and Judge Judy after that. Then Becky gets the kids showered, and they all converge once more to eat dinner in front of the TV. At this point, they watch movies, sitcoms, cartoons, or click back-and-forth amongst them, as Becky implied it's not about a specific show; they simply want to extend their TV time until bedtime. Thus, their TV ritual can fluctuate from the primary activity to more of a secondary activity—or background for facilitating other more central goals, such as social bonding (Kubey & Csikszentmihalyi, 2013). In this way, her children enjoyed TV watching as a social act shared with their mother on her bed, knowing it was a stable and fixed time/space to share in her happiness. For low-

income rural single mothers dealing with an inconsistent co-parents and unsupportive extended family, drug addiction is often too much to bear. Stuck in "dead" towns with no gainful employment, many rural drug users don't know how to ask or where to look for help. Practically speaking, the social ritual constructed around TV watching provides the most immediate and cost-effective form of consistent therapy.

Women Dividing Labor across Socio-Economic Spaces: How Social Media Takes up this Reality

This last vignette will describe how the rural women in my study used social media to organize labor and move across the town's socio-economic spaces. In bringing this particular phenomena to life, I call upon the metaphor of women leaving the home to join the workforce during World War II. Last, the narrative discusses how socially-mediated digital practices emerged without blueprint or formal leadership commandeer the work of the town and enrich the women's identity, both individually and collectively.

Children of (no) Men[13]. Ever wonder where the real men are in rural America? Well, in Bingham, the real men are off lining dumps. Up to their elbows in noxious refuse, most simply take drugs and/or drink to make it through the workday. And for most of the weekdays and nearly all of the weekends, lives of women in this rural town go on without them. With the town stewardship in their hands, a small army of rural women discovered themselves. Similar to ant colonies, these newly-banded rural women co-produced complex structures with parallel familial levels connected by a rudimentary and technology-mediated network of embedded practices and unstated beliefs. Though all their individual action was goal-oriented and coordinated via chemical cues and subtle

[13] *Children of Men* is a dystopian science fiction novel about societal collapse in the midst of mass infertility and political tyranny.

signals, unique patterns of self-organizing behaviors emerged without blueprint or formal leadership.

Of course this isn't to say that the rural women had no leader. Amid a kind of shifting gang hierarchy, they all found themselves becoming their own indestructible heroine. These rural women formed their gang for all the same reasons anyone would join one: for mutual support and protection, to demand respect, and acquire power. Under their shield of loyalty, they relieved themselves from the pressures of motherhood through redefining what it meant to mother in this rural space. After all, the town's vibrancy (and their children's quality of life) was predicated on them stepping out from their indoors veil of invisibility to fulfill the demand for outdoor labors formerly performed by men.

These rural women felt it a civic duty to replace the males in the outdoor arena of sport and took a principal role in coaching their children's athletic teams. Sara was the first to take control of both the "School on Skis" program at the local ski mountain and the kid's summer soccer program. Maureen, dismayed at how much her own children were staying inside with their quality technology tools, opted to help with soccer coaching. Wendy was soon dragged into the mix, even though she was also busy leading the town's Girl Scout troop. Monica did her part to coach softball. As each mother's children shuffled back and forth between other mothers in the entanglement of social activities, communal parenting became the implicit central theme of this social arrangement. Whereby "it takes a village to raise a child," the children received a healthy mix of values and beliefs from the motherhood collective.

In taking up the work of absent men, (re)shaping their processes of 'doing' gender became a necessary step in enacting their own wartime workforce. With all able-bodied men missing, this was not unlike the total war of WW II. Needing as many reliable hands on deck, they networked through Facebook to recruit other mothers, plan and schedule events, remember deadlines, arrange childcare, and pose questions through direct messaging. Not unlike the government advertisements sent out asking Rosie the Riveters: "Can you use an electric mixer? If so, you can learn to operate a drill" (Lee, 1985), these rural women had to "man up." Further, beyond skills with an electric mixer (let alone a drill) the inner gang had to be relatively intentional about potential mothers to enlist. Any sign of instability was a red flag. While opening Facebook communication to provide transportation when Becky or Trina had not the car to get their kids soccer practice or Girl Scouts, addiction issues in these families excluded them from the innermost social media network.

Analogous to this emergent process model of ants, many of the rural mothers could not predict how their individual actions and interactions would impact the larger pattern of activity at the town level. Yet, the families grew stronger from these local and seemingly haphazard efforts, despite some of the more traditional townsfolk looking down upon these "unfit" mothers, doubting whether their outlaw energy and liberatory freedom would burn too hot to last. Over time, when they could engage in leadership at higher levels (such as through Facebook), the mothers developed a greater awareness and purpose regarding their individual goal-oriented actions, which in turn increased through sheer stimulation of interactivity. Thus, with interactivity being closely linked to

technology, the empowered digital participation of these women signals the importance of local culture, inclusive of *and* beyond the technology.

Thirdspace Across Socio-Economic Spaces

This final narrative exemplifies how rural mothers of low and high SES used digital technologies to re-invent their subordinate status and divide labor in the absence of men. Analyzing this through Thirdspace theory, I discuss the real-and-imagined socio-historical processes influencing the rural women's spatial reality. Their remaking of space is impacted by the social view that social media and ICT use was "women's" work as well as the fact Bingham men went elsewhere to find work. I next discuss how overcoming these obstacles involved the need to elevate Facebook use from consumption (e.g., watching videos and reading online content) to participation (e.g., the glue of self-organizing women's co-parenting and event management). I highlight how this change reflected a reconfiguring of standards at the nexus of overlapping social and technical spaces. Following from this, I examine the unique ways in which Facebook forged social connections across socioeconomic spaces, while also excluding unfit others to reinforce desirable real-and-imagined rural forms of personhood. A discussion that problematizes new ruralism ends this section by showcasing rural mothers' untapped and often misrecognized technological expertise.

Both real and imagined socio-historical processes influence the ways in which rural practices and values (shaped by gender norms and class) map onto digital and non-digital spaces. Following from longheld gendered divisions of labor and related stereotypes of pink-collar ICT work during early industrial era (e.g., female crank telephone operators and stenographer-typists), the rural men viewed ICT, and particularly

social media, as lowly women's work. Despite the leveled status of low-skilled industries, rural men preferred heavy machinery over smart digital technology and prided themselves on their blue-collar identity. Working tough physical jobs to heroically battle against the wilds of the great outdoors was their primary means of proving masculinity. Herein, emerges the concept of "rural masculinity" that codes the outdoors as masculine territory and the indoors as the women's arena (Brandth & Haugen, 2016). Relatedly, this rural masculinity also works to reinforce the invisibility of women's work (Brandth & Haugen, 2016). Yet as techno-globalization and neoliberalism cause more traditional physical industries to decline and send rural men farther from their homes to find work, avenues open for rural women's identity renegotiation. As depicted in this study, the reality of changing rural economies and institutional frameworks has, in men's absence, allowed these women to re-imagine motherhood and likewise (re)shape their processes of 'doing' gender (Shortall, 2016). Masculine spaces, formerly closed to women (e.g., sports and leisure), are now owned and dynamically operated by this small army of strong and independent rural women. Taking pride in tackling the formerly male outdoor arena of sport, the rural women paid particular care to their dividing of labor, such that it could flourish and extend beyond simply mothering their children (invisibly) within their own home.

Central to this division of labor was how social media became the relational nexus taking up and enabling this re-authoring of male space. Perhaps because social media was stigmatized as women's work, the women's orientation to Facebook needed to change in order to meet the importance of their newly negotiated role and perform "men's work" in the absence of men. Through its treatment as a serious and productive social organizing

tool and resource with "distributed memory" (Sparrow, Liu, and Wegner, 2011) for storing deadlines, conversations, and events, Facebook use was elevated and justified. To maintain its civic-mindedness, self-regulation of social media was a central concern for these mothers. Not only would "being on Facebook all day" reflect poorly upon ideals of child-centered motherhood, but it clearly misaligned with their rural values and underlying identity. These mothers, after all, invested much of themselves in their rural communities' outdoor activities. And without their efforts, children would be subject to the indoors all day with little but social media to interact through. It would be paradoxical for them not to regulate their own media use. Seen this way, mothers' critical digital literacy was exercised in constantly prioritizing intentional participation (e.g., the glue of self-organizing women's co-parenting and event management) over consumption, such as watching videos and reading online content (Valtysson, 2012; see also Habermas, 1989). This self-regulation reflected a reconfiguring of standards at the nexus of overlapping social and technical spaces; and it was not without sacrifice. This shift both enabled and diminished the mothers' positive sense of rural identity (connection to themselves) and community (connection to others). One of the benefits of online spaces, such as Facebook, lies in its capacity to facilitate a multiplicity of identities and discourses (Gee, 2007), which then permit escapes from everyday pressures and local responsibilities (Valtysson, 2012). Without the freedom to play, rural women were less able to leverage alternative identities and (re)construct acceptable displays of motherhood outside of the influence of their rural town.

Similarly, social media, as the glue of the self-organizing women's co-parenting, operated more inclusively than real life communication channels. A unique feature of

social media is how these self-regulating digital platforms highlight the mangle of social connections that would otherwise escape invisibly (Boyd and Ellison 2007). Facebook is a pre-programmed environment that pushes specific power-saturated agendas by permitting certain interactions, certain behaviors and semiotic expressions over others (Valtysson, 2012). So, though the rural women could and did use social media to communicate and divide labor across socio-economic spaces, certain practices and forms of personhood were celebrated over others. With the safety of their and the town's children at stake, the women became highly sensitive to whom they included and excluded others on the grounds that they appeared inconsistent, reckless, or disorganized. While more difficult to avoid random social interactions with questionable others in real time, through networked adaptation, their social networking practices tailored to a specific public and those that couldn't match the standards were quickly and easily excluded (i.e., unfriended). This practice was enabled through forming the exclusive Facebook group, Bingham Area Moms. Moreover, when reassembling the social, Facebook then acted as an extension of the social order to imprint lower classes as inconsistencies that couldn't make the grade. For lower SES women in this study, entrée into the women's inner social media hub demanded the maturity of having your life together (such was the case with Sara). Inconsistencies most often signaled addiction issues, as with Becky and Trina. Though Trina was of a higher SES than Sara, drug addiction in her household, which manifested in her not accessing Facebook for long periods, kept her outside the rural mother's inner circle. A similar phenomenon occurred with mobile phones, as Trina and Becky's limited funds and/or related drug issues resulted in changing telephone numbers regularly. This kept them from matching the

consistent mobile phone-mediated communication and related well-developed social networks of Sara.

In these ways, social media opened unique opportunities to renegotiate gender and blur boundaries between different socio-economic spaces. Social hierarchy was restructured in real and imagined ways through the Thirdspace. For example, Sara did not suffer from drug addiction and could more easily manage her budget and time to maintain the same mobile phone number and consistent Facebook use. These more robust socio-technical arrangements could more readily translate to consistency beyond the technology to leverage durable ties with rural mothers of higher SES. Sara showed that class differences can be overcome and socio-economic spaces could be traversed through consistency and maturity demonstrated online and off. Consequentially, much growth took place within the rural women's inner transformational space (whether digitally or in vivo). Without the ability to interact often or effectively within these extended dual social circles and gain exposure to different practices, ample opportunities to grow may have been lost. Given this technologically-mediated Thirdspace showcases rural mothers' untapped and often misrecognized technological expertise, new ruralism would be remiss in disregarding how these rural women, as agentic symbols of progress, rebuild and strengthen the rural space. In fact, the rural women's restructuring of space does more to situate rural places at the center of modernity's spatial production, rather than its periphery.

Thirdspace Mapping

Situated within one model rural setting in Maine, this study sought to story families' everyday experiences with digital media across socio-economic spaces.

Exploring the nuances and inconsistencies of how spaces are differently experienced by families as well as how digital practices travel (and do not travel) across neighborhoods of varying SES yields a productive Thirdspace lens for understanding the rural digital divide. At the town, neighborhood, and family levels, my analysis illustrates how Thirdspace understandings of lived practices provide more multifaceted and less hegemonic insights into the nature of digital inequity. Results structure Thirdspace understandings of spatial justice, wherein a multiplicity of forces conspire to enact a rural space practiced like no other. The ways in which forces interact to shape this rural space are revisited in a grand narrative threading all vignettes, artifacts, and images together in a summative fashion. Reflective of this grand narrative, I present my Thirdspace ethnocartography (in Figure 4.3), as a more Storied Map enabling an at-a-glance understanding of the messy lived experience of the technology use within the rural Thirdspace.

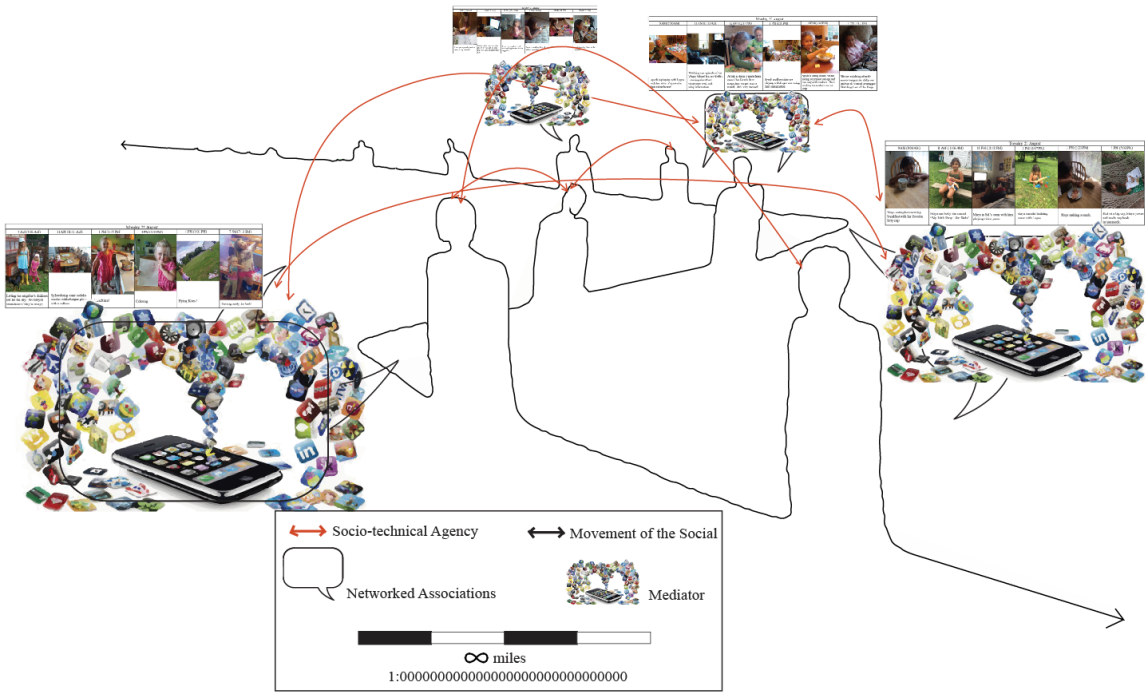


Figure 4.3. Thirdspace Map of Digital Equity Across Socioeconomic Spaces

How does this ethnocartography meet the three criteria for Thirdspace in a way that other kinds of maps cannot? Overall, it helps us to re-imagine space such that it is not a fixed object or subject, but rather a production of a lived social reality with embedded relations and imagined conceptions entangling material forms (Lefebvre, 1974). My Thirdspace map applies the Secondspace senses (broadly conceived) to the micro perceived Firstspace. Specifically, the mobile phone diaries provide a storied Secondspace feel for everyday life. On the other hand, these mobile phone diaries are positioned in reference to one person, indicating the reality of how space originates-- as an "extension of the body" (Lefebvre, 1974, p. 98). Further, I illustrate bodies as connected in one moving line with arrows on each end to show lived processes of space as not led within boundaries but through them.

Asking "how many maps, in the descriptive or geographical sense, might be needed to deal exhaustively with a given space, to code and decode all its meanings and contents?" (p. 85), Lefebvre hinted at the difficulty in capturing the full polyvocal complexity of space through only one rendering. He called for an immediate infinity, wherein the map's legend, or focal point for decoding and map-reading, can be modified at a moment's notice. Though I present one monolithic ethnocartography, I layer it in such a way to invoke the polyvalence of lived space. Through incorporating ethnocartographic diaries and opting for the infinite over the measured, my Thirdspace map complicates time and space in contradictory and radically open assemblage. In this way, this Thirdspace map becomes a meshwork of textures rather than a text.

At the spatial intersection of literacy, learning and technology, my ethnocartography attempts to depict Thirdspace agency within social space. Through concrete symbols and the choice of who this map foregrounds and who it diminishes, I highlight how some rural individuals have opened wider spaces of hope and empowerment than others. The red bidirectional arrow indicates socio-technical agency of those who have leveraged digital technologies, in this case mobile phones, to support their upward mobility when creating opportunity out of inequity. Sara is foregrounded in this map, because she is the rural mother of low SES who could master the socio-technical systems needed for consistent "border crossing" and ultimate entrée into the women's inner social circle (online and in person). Further, by mapping the movement of the social in bidirectional arrows as well, I indicate how the social hierarchy can continue to be restructured through the Thirdspace. This further stresses how "to change life,… we must first change space" (Lefebvre, 1974, p. 190).

Scholarly Significance

For significance of digital literacy findings, I situate Maine as a microcosm of remote American life. The only state in the Union, bordered by only one other state, Maine's geography poses certain inescapable challenges of rural isolation when attempting to develop an equitable statewide telecommunications infrastructure (ConnectME Authority, 2015). From first constructing a digital information network connecting remote schools and libraries in 1996 and then initiating a statewide 1-to-1 laptop program in 2004 (Warschauer, 2006), Maine has stepped ahead of all states and was recently voted number one in digital infrastructure efforts by the U.S. Chamber of Commerce (Wiley, 2014). Further, this small town's number one state ranking by

Newsweek's "Beating the Odds" list (i.e., its unsurpassed ability prepare economically-disadvantaged rural students for college) deems this a special case worthy of examining (Ohm, 2015).

Given its focus on re-imagining spaces and the possibilities within, Soja's (1996) Thirdspace provides a useful frame through which we can prefigure our world as well as our agency and differing socioeconomic spaces within it. In this paper, I suggest some of the many ways disadvantaged families may facilitate Thirdspace transformations, wherein existing inequities are turned into digital opportunities. For example, Sol's novel uses of social media helped to level the playing field, re-invent his identity, and enhance his digital skills. Sara also leveraged the Thirdspace to re-invent ideals of "good" mothering to positively fuel her through the struggle of acquiring needed digital skills, graduate from college, and land her dream job. Sharing these vignettes and ethnocartographies may not only "teach for openings" (Greene, 1994), but also highlight how this unique orchestration of social spaces can overcome analytical limitations of previous equity research. This novel critical spatial lens may then re-mediate understandings of the rural context surrounding family's constrained access to needed infrastructural digital tools/related practices and potentially mobilize a future vision of equity and empowerment.

Additionally, I suggest Thirdspace as a valuable opening for re-imagining new ruralism. In carving out empowering spaces for self-authoring, rural families' Thirdspace became a critical force for resisting metaphors of urban dominance and deficit-based notions of rurality as modernity's other. Given modernity's deep-rooted and overlapping social changes (increasing reflexivity, post-traditional order, and individualism) and their

impact on transforming social structures, relationships, practices, and identities, I showcase how rural peoples' lived experiences are shaped less by the authoritative certainty of traditions and social institutions, and more by the self-reflexive construction of personal biographies (Giddens, 1991). This changing reality was manifest in how rural women took up social media to commandeer and "man" formerly male arenas in the men's absence. Despite this, social norms continue to mediate the impact of individualization and self-reflexivity. Instead of dismantling longstanding and historically situated discriminations, existing inequities are simply being reconfigured spatially in new lived ways with very different meanings and outcomes. Examples of this reflect how social media largely acted as an extension of the social order to exclude lower SES mothers (e.g., Trina and Becky) virtually as well as in real time. Similarly, Becky's wish to foster "sophisticated" educational aspirations within her children was complicated by her desire to honor the powerful, yet mundane, familial connections and country values she had fought so hard to build. I apply Thirdspace theory to more clearly identify how these tensions are caught up/networked (rather than dismiss them), facilitate understandings of the historically-situated *processes* underlying inequities (Artiles, 2003, 2011), as well as potentially offer agentic ways of overcoming them.

While there is a substantial body of literature on the role of technology in social practice, Thirdspace perspectives of technology are rare in current scholarship. Through narratively mapping one community's lived (re)production of rural space (inclusive of technologically-mediated sites of embodied practices), we can exemplify the more nuanced and powerful rural "identity kits" (Gee, 1990) well-grounded in the families' place-based digital practices. With ample research on the role of technology in shaping

the urban landscape (Elden, 2004), the role of technology in influencing the everyday of the rural landscape remains understudied and undertheorized (Stern, Adams & Elsasser, 2009). Needed is a trenchant analysis on the role of technology as an agent in assembling the everyday of the rural landscape (and its production of space therein). Thus, in explicitly incorporating a Thirdspace lens (Soja, 1996, 2010) that destabilizes geography to understand space as dynamic, relational and agentic, we may meaningfully contribute to the literature through better examining the complexity of how rural families, their technology, as well as their technology practices *flow together* to fashion the world forward. In terms of implications, this study proposes multiple spatial considerations (i.e., dynamic, relational, and agentic) for turning inequities into digital opportunities, re-imagining new ruralism, and revealing how tensions surrounding digital learning are caught up in historically-situated processes of inequity. These implications speak urgently to today's challenges of equal educational opportunity, with particular attention to shifting demographics and emerging digital technologies, as well as the new demands this combination places on more equal access to tomorrow's requisite levels of expertise.

CHAPTER 5
RE-IMAGINING EDUCATIONAL EQUITY ACROSS RURAL SPACES: RE-MAPPING DIGITAL EQUITY AS SCOI-TECHNICAL AGENCY

As today's information and communications technology (ICT) becomes increasingly instrumental to learning in formal and informal contexts, digital literacy, or the skilled and generative use of digital technology tools, is now considered the new fluency for the twenty-first century (CCSS, 2012; Organization for Economic Co-operation and Development [OECD], 2015). But central to this discussion of twenty-first century competencies are popular conceptions of the *digital divide*, which marks the new gap between the information haves and the have-nots (Steyaert, 2002). Deficit-based notions of the digital divide (i.e., the disadvantaged merely have less technologies and less developed capacities to use digital technologies in mainstream ways) define today's educational paradigm. How a society misunderstands its social problems will yield lasting misguided consequences for the various practical and political solutions proposed and enacted (Pierce, 2004). In other words, this deficit-based perspective is problematic in its tendency to generate ineffective and/or narrow solutions.

Deconstructing the dominant ideology surrounding the digital divide first necessitates a brief discussion of deficit-based thinking. A *deficit perspective* results from framing differing levels of access and opportunity across underprivileged groups as deficits (i.e., have-nots) stemming from their cultures and behaviors (Rank, 2004). Disconnected from a larger structural analysis of complex and competing systems shaping levels of access and opportunity, the deficit perspective instead draws on stereotypes to blame the unprivileged people for their own self-made oppression (Rank, 2004; Tozer, 2000). This restricts the scope of our digital equity agenda by reducing the

cause of the digital divide to individual inadequacies separated from the consequences of household, community, or broader lived space. To this end, arguing away the impact of broader "structuring structures" (Bourdieu, 1977, p. 72), public consciousness and related educational policy debates can more easily dismiss educational inequity as resulting from individual faults.

Hence, reviving political action and inspiring an agenda of social justice takes dismantling this misconception to "story" a new truth (Gee, 2017). This is particularly pressing in today's socio-political climate, whereby income inequality is historically higher than ever (Dabla-Norris, Kochhar, Suphaphiphat, Ricka, & Tsounta, 2015; Gee, 2017). Similarly, knowledge gaps between rich and poor are growing wider, with no foreseeable end to this trend (Paul, 2014). While many proposed technology and its self-teaching tools as the silver bullet that could serve the needs of all and subsequently level the playing field, scholars now view digital tools as an amplifying force that further entrenches inequalities (Toyama, 2015). These disparities, when pooled together and channeled through powerful digital learning tools, heighten traditional fault lines in social stratification to carve out "opportunity gaps" (Neuman & Celano, 2012, p. 59; see also Gorski, 2015). The current nature of rising income inequality, its drivers, as well as its relation to educational opportunity have come to shatter our most deeply-held belief: if you work hard, you will earn an equal shot at success. And in today's "crisis of humanity" (Bauman, 2016), where we can no longer explain the monstrous through the familiar, we must provoke an analytical path that breathes new life into taken-for-granted concepts and practices within social justice research. This is because inherited ways of thinking and doing research expire under the current political state (Arendt, 1968). Seen

this way, honoring the paradoxical complexities of our digital age urgently calls for new approaches to "story a truth" (Gee, 2017, p. 3) effectively capturing the issues.

Given this, I seek to re-imagine digital equity. This chapter is organized as follows. First, I discuss spatial perspectives as a lens for rethinking digital equity issues across rural families. In particular, I build my spatial framework around the metaphorical concept of the Thirdspace. Following this, my next section introduces controversies associated with common ways of applying spatial perspectives. I then propose a way of reconciling these controversies through counter-mapping. This counter-mapping is discussed as it relates to posthumanism and de-centering the human as the all-knowing actor. I introduce posthumanism as a central means to dismantling the deficit perspective when understanding the agency of hidden and oftentimes over-looked socio-political factors acting upon the digital divide. I then situate posthumanist counter-mapping within digital equity issues by presenting the concept of socio-technical agency. Finally, I counter-map traditional maps of digital equity across Maine with more posthuman tracings of socio-technical agency. This is meant to analytically illustrate how counter-mapping and posthumanist tracings can be used to rethink digital equity, such that it dismantles the deficit perspective and, in turn, informs more effective political action.

Spatial Perspectives

A worthwhile approach to storying new conceptions and revitalizing scholarship lies in today's spatial turn. While researchers understand the importance of place (i.e., lived space), most social thought has limited itself to the social and historical and quickly locked into step with socio-historical epistemologies, or ways of knowing (Foucault, 1984; Soja, 2010). Here, researchers prize the social and history as dynamic and

developing. Despite reality being fundamentally spatial, conceptions of space are virtually ignored and given to the realm of fixed and dead. Yet, nothing validates the privileging of social and historical over our fundamental spatiality (Foucault, 1984). Underscoring our fundamental spatiality is the fact that people have been constructing maps to understand their geographies long before the invention of writing (Moore & Garzón, 2010). Furthermore, overlooking the powerful influence of physical or geographical space on human behavior and cultural processes leads to a distortion of our lived reality (Soja, 2010). According to Foucault (1984), for current paradigms to keep up with the chaos and complexity within our fluid and shifting age, they require the radical openness of the spatial.

As an analytic and theoretical tool to deconstruct the socio-spatial components of a rural family's media environment and move beyond afore-mentioned deficit approach to the digital divide, I borrow from Soja's Thirdspace theory (1996, 2010). In spatial theory, "space" houses social relationships of production wherein power, knowledge, and resources are developed and distributed (Lefebvre, 1974; Soja, 1996, 2010). Soja's Thirdspace theory further articulates process-oriented understandings of these power/knowledge distributions through his symbolic identification of first, second, and third spaces of interaction. Firstspace are the traditional surface appearances or material outcomes, while Secondspace represent how the space is conceived. Because spatial theorists consider the Firstspace to reflect the interests of the dominant and Secondspace to house oftentimes pure ideals of the artists or scientists (Bhabha, 1994; Lefebvre , 1974), Soja (1996) introduces Thirdspace as the in between spaces and lived experiences of the marginalized "Others" deemed out of place. As not the opposite of either points of

view, but rather a way of mediating the surface experience of the Firstspace through the expectations of the Secondspace, a Thirdspace vision serves as a more holistic vehicle for understanding actual lived experience within/across a space as well as the possibilities rural families of low SES created for re-imagining a space's meaning and potential. In this way, Thirdspace theory suggests new meanings that move beyond an immobilizing deficit-oriented lens to highlight the seemingly asymmetrical duality of families' digital inequities, as "both oppressive *and* potentially empowering" (Artiles, 2011, p. 441; see also hooks, 1990).

Controversies in Mapping the Spatial Turn

Scholars assert that GIS lie at the core of today's spatial turn (Bodenhamer, Corrigan & Harris, 2010). Believing that simply conceptualizing space in terms of metaphor (i.e., Thirdspace) restricts the spatial relevance of cultural phenomenon, researchers turn to powerful GIS software to integrate, pattern, and analyze voluminous quantities of social and cultural data via accurate geographic identifiers. Through GIS maps, researchers render the complex world as more immediately understandable. The GIS does this by visually detecting and organizing spatial patterns previously unseen in table or text. From this, we can discern distributional inequality of broadband or digital learning opportunities[14] to contest the digital divide as a spatial issue of justice. Sophisticated and novel graphical maps enabled through powerful information systems, such as the GIS, can be valuable tools for enabling interdisciplinary scholars working at the edge of their field to think and communicate spatially. Implications speak to how

[14] In this study, I define "digital learning opportunities" as public spaces which provide opportunities for developing digital skills through access to digital tools, resources, and more knowledgeable others. For this study, these public spaces include schools, museums, and libraries only. This is because they can be located through Census data.

well-designed graphical displays (e.g., GIS maps) can increase social and political utility of findings thus guaranteeing researchers' most pressing issues (equality and educational opportunity) reach across all paradigmatic divides to deeply resonate with policy makers, educators, and the voice-less/marginalized participants themselves. Hence, GIS maps are heralded as a vital authority when making geographic information visually and politically meaningful.

However, others critique the ability of GIS to story the complexity of today's lived truth (Harley, 1988, 1989, 1990, 1992; Vermeylen, Davies & van der Horst, 2012). GIS maps tend to draw cartographic boundaries that may reify taken-for-granted and static interpretations of space by restricting representations of dynamically lived space to imaginary lines drawn on the ground (Vermeylen, Davies & van der Horst, 2012). When understanding maps as another kind of "thick" text susceptible to all the human flaws of socially-constructed knowledge, certain narratives or stories emerge alongside their under-stated silences and omissions (Harley, 2001; Piper, 2002; Short, 2009). Oftentimes blind spots on a map result from silencing histories of the marginalized as well as their interconnections across the landscape (Harley, 2001). Maps influence political process by way of hidden agenda of what they include and what they exclude (Vermeylen, Davies & van der Horst, 2012). Seen this way, maps can no longer claim neutrality; they command power and are, likewise, caught up in power relations (Harley, 1988, 1989, 1990, 1992; Vermeylen, Davies & van der Horst, 2012). When engaging in mapping as a political act, the purpose then is to unravel the map's narrative in terms of truths and lies that have been tacitly incorporated (Short, 2009). Deconstructing the unspoken rhetoric of GIS maps, in this way, may yield new spatial meanings to more fully represent the rich and

multifaceted nature of human and cultural experience across space, time, and place. In sum, our ability to improve the accuracy, storied meaningfulness, and ultimate utility of interpretations of our cultural data will hinge, to a large part, on our capacity to improve the quality of our visual displays.

Pulling from Thirdspace spatial theory, critical geographers problematize the tendency of conventional mappings to portray distributional (in)equities as fixed and bounded through frames and borders. Lefebvre (1972) conceptualizes "space" as a complex and relational co-production of power, knowledge, and resources; in other words, "space is political" (p. 59). Working from this definition, space is produced through many complex interconnected seen and unseen socio-political factors, which are essential to the construction, functioning, reproduction and change of societies as a whole. Neither space nor societal inequities can be understood independently of the other (Lefebvre, 1972; Soja, 1996, 2010). For example, when most envision a house, they perceive a separate and enclosed entity grounded in certain location. A spatial understanding, however, offers a radically different perspective, such that we see the house as broken open and "permeated from every direction by streams of energy which run in and out of it by every imaginable route: water, gas, electricity, telephone lines, radio and television signals"…where in place of a fixed rational space emerges…"a nexus of in and out conduits" (Lefebvre, 1974, p. 92-93).

Yet, to fully discredit the deficit perspective, we must further unpack the spatial interplay among rural families' digital actions and constraints. Because ineffective and deficit-based models of understanding erupt from framing problems as solely human-centered (i.e., blaming those for their own self-made oppression), I draw in posthumanist

conceptions of Thirdspace. Though often understood differently by various scholars, from a humanist lens, agency is the human ability to act on or be a central actor in the world (Jackson & Mazzei, 2011). On the other hand, posthumanists and social cartographers, such as Bruno Latour, map in such a way that decenters the human to also ascribe purposeful action to nonhuman agents. Moreover, in de-centering human agency, scholars begin to acknowledge the reciprocal and rhizomatic[15] mangle configuring and reconfiguring this complex nexus of agents (Deleuze & Guatarri, 1988). Seen this way, human and nonhuman actors can only exercise agency when bouncing off and/or working within a networked constellation of other actors. Latourian social cartographers see no fixed field but only an ongoing proliferation and movement of individual entities, connecting, disconnecting, and re-assembling. Herein, for example, this permits the argument that space is not only socially constructed by humans/nonhumans, but also that the social is not structure, but movement being spatially configured.

In my case, this posthumanist rendering of space shows how inanimate objects, such as technology, can also exercise agency. This approach also assigns the smaller details, mundane occurrences, and nonhuman material and nonmaterial entities other than technology (e.g., circulating beliefs and/or unseen power structures) greater prominence in the dynamic interchange of the digital divide as it plays out through lived space (Latour, 1999, 2005). Because it privileges the agency of hidden and oftentimes over-looked socio-political factors acting upon digital equity, posthumanism then becomes a central way to dismantle the human-centered deficit perspectives of the digital divide.

[15] Rhizomatic here is defined as the nonhierarchical relationality between humans and the nonhuman.

Counter-Mapping the Spatial Turn

Given mapping has historically been a technology of power leveraged by the dominant (e.g., colonizer, governmental agency, international financial corporations) for surveillance, control, and potential resource extraction (McCarthy, 2007), researchers and community members work against this through counter-mapping. By counter-mapping, or "mapping against the dominant power structures" (Hodgson & Schroeder, 2002, p. 79; see also Vermeylen, Davies & van der Horst, 2012), individuals can produce counter-hegemonic maps that ask questions about power, ideology, and surveillance (Harley, 2001). Re-appropriating cartographic tools to counter accepted truths about geographies aims to empower the disempowered. Through counter-mapping, the dispossessed can more readily contest dispossession, unify community visions, visualize/strengthen social ties, and mobilize socially-just actions (Rundstrom, 2009). In other words, counter-mapping's transformative power lies in its visual capacity for political utility when achieving social justice.

Because counter-mapping could never succeed without full recognition of the rhizomatic nature of the relational ties linking human and nonhumans within and across geographies (Vermeylen, Davies & van der Horst, 2012), these counter-hegemonic maps are inherently posthuman. Counter-mapping is especially well-suited to examine the politics of space as a socially (re)produced and dynamically practiced nexus of in-and-out conduits. In this way, counter-mapping follows the Latourian manner of mapping, with the end objective of multiplying perspectives (Rogers, Sánchez-Querubín & Kil, 2015). Latour (2005) asks how in our "reality multiple," one version of a map emerged as ultimately dominant. Fundamentally political, this Latourian mapping understands the

difficulty in tracing the social, which, stated again, is not structure but contentious movement. After deploying or leveraging the broad range of controversies by tracing back stable entities to when they were still contentious and new associations, this process of mapping reveals new realities and alternative truths that did not "win" the "fight" (Aradau, Huysmans, Neal & Voelkner, 2014). Similar to counter-mapping, Latour's (2005) rigorous social cartography achieves three different tasks: the deployment of social controversies, stabilizing those controversies through tracing associations, and the hunt for political leverage within the new reassembled state of affairs.

Despite growing scholarly interest in technology as a force furthering intellectual and socio-economic divides (Toyama, 2015; Warschauer, 2004), few have explored the spatial interplay of socio-political forces acting within the digital divide. Re-imagining how agency and networks interact within today's ever-changing and technologically-mediated world hinges on research that visualizes space through a more fluid lens. Likewise, spatially representing posthuman factors would consider *socio-technical agency* as a distinct entity at play within the digital divide. Defined briefly, socio-technical systems encompass the complex co-production of interrelating social and technical dimensions (Latour, 1999). The complexity emerges from socio-technical interactions, which are partly linear (i.e., inputs directing causal outputs) and partly non-linear (i.e., unexpected/unknown variables act to disrupt clear causal relationships). Socio-technical agency, more specifically, underscores how the social and technical were inseparable from the outset, with each encounter formed from a fundamentally socio-technical transformation of agency (Latour, 1999). Socio-technical agency then holds that technology is not an external force acting on humans, but emerges as a uniquely

synergistic agency when mediated through humans. Thus this agency is not seen as residing only within humans or only within technologies, but in the synergistic encounters enacted in the spaces between. Reconceptualizing the digital divide as not as human-centered "haves/have-nots" but fluid and "lived through" may better account for and address the various situational elements and socio-technical transformations that may contribute to the digital divide. Thus, in explicitly incorporating a posthumanist Latourian lens that destabilizes the human, I may meaningfully contribute to the literature through more fluidly mapping the complexity of how rural families, their technology, as well as their technologically-mediated practices *flow together* to fashion the world forward.

Purpose

My purpose is to explore the Thirdspace potential for re-imagining educational equity across rural spaces. Given my ethnographic research aims to understand the lived experiences and day-to-day digital practices from the perspective of the rural families, maps should reflect this lived experience. Hence, through Thirdspace maps and, particularly, via a Latourian-inspired counter-mapping, I seek not another idealized and simplistic definition of the digital divide. In other words, I use counter-mapping not as a "magic bullet applied uncritically" (Fox, Suryanata & Hershock, 2005) to simply re-draw alternative boundaries (which perpetuates the counterproductive and fixed notion of who belongs and who does not). Rather, I propose a new socio-spatial strategy for breaking open alternative perspectives into the multidimensionality of lived *processes* (played out across space and time) influencing the digital divide. Through geovisualizing the lived production of rural space, this project seeks to move beyond reclaiming the map as something truly human to instead reassemble the vibrant performance of place as shared

between humans and nonhumans alike. In more concrete terms, I showcase a new cartography that recasts digital equity as a co-constitutive account of socio-technical agency. In these ways, I highlight the possibilities of rigorous, interdisciplinary scholarship and analytical innovations that re-think how humans and nonhumans co-produce technologies and place, as well as the transformations this might enable.

Re-Mapping Digital Equity as Socio-Technical Agency: An Analytical Example

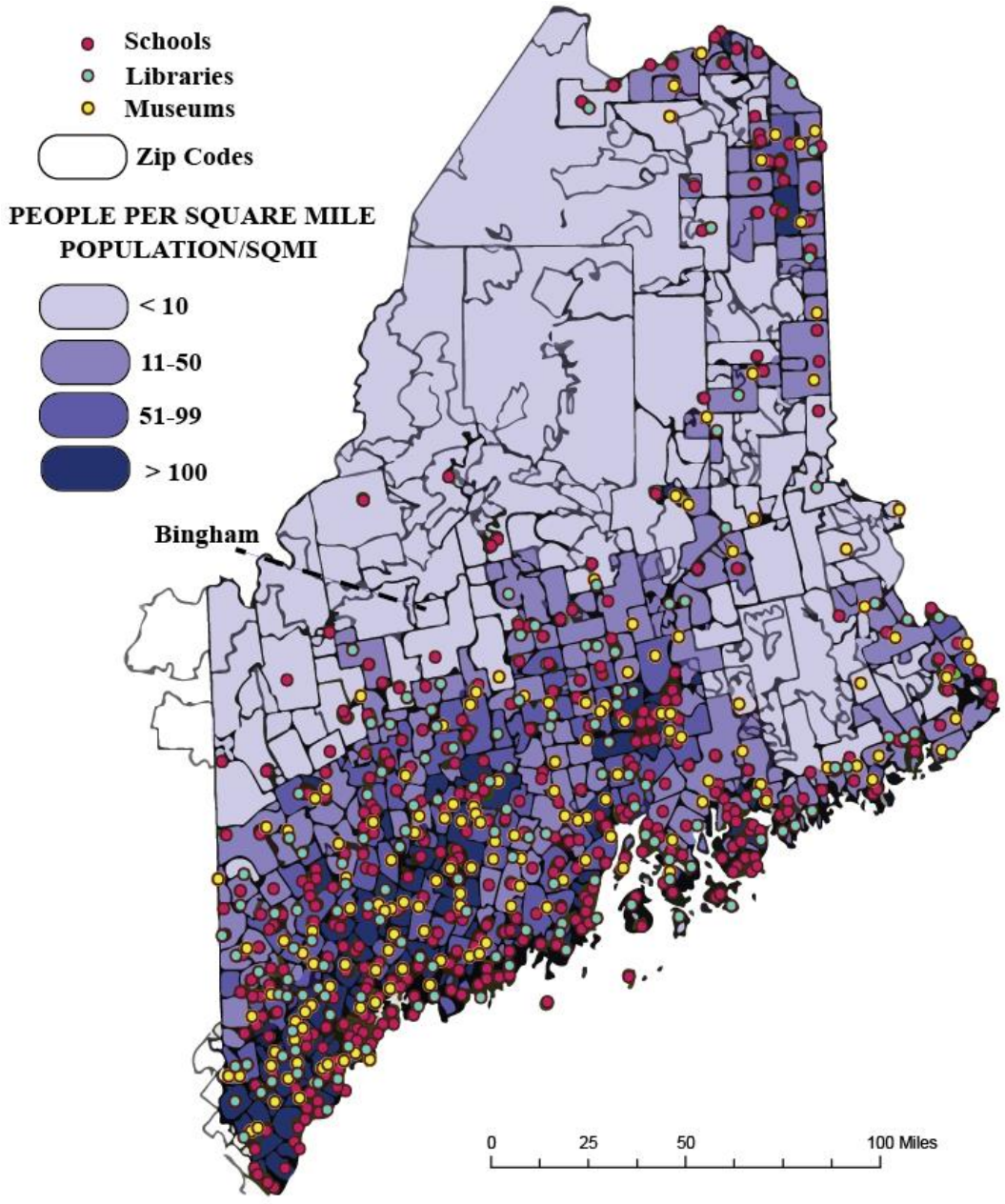
Here, I situate an empirical example, where a Latourian manner of counter-mapping has been employed as an analytical backdrop. To make explicit the contrast, I then juxtapose a fluid, open, lived and relational map against a conventional flat and fixed GIS map of the rural digital infrastructure. This is meant to showcase how alternatives to conventional mapping, as discussed previously, can be used to reveal hidden spatial patterns of contested and/or empowered everyday digital learning practices. Through this counter-mapping, I empirically illustrate Latour's (2005) three successive analytical tasks within his social cartography: staging the social as a controversy, tracing associations, finding political leverage within the re-drawn collective agency of human and nonhuman actors. Specifically, my goal is in foregrounding socio-technical agency via the interconnectedness of humans and technology tools in one rural town. This untangling and reassembling helps us to then better account for who (in terms of human and nonhuman actors) is doing what, when, and how. In this way, I break open our analytical lens and problematize seemingly practical political measures by considering the complexity of the social, not as a structure that can be tamed through simple quick-fix technological intervention but as an ongoing fluid proliferation of multiple entities, connecting, disconnecting, and re-assembling. Lastly, in re-mapping

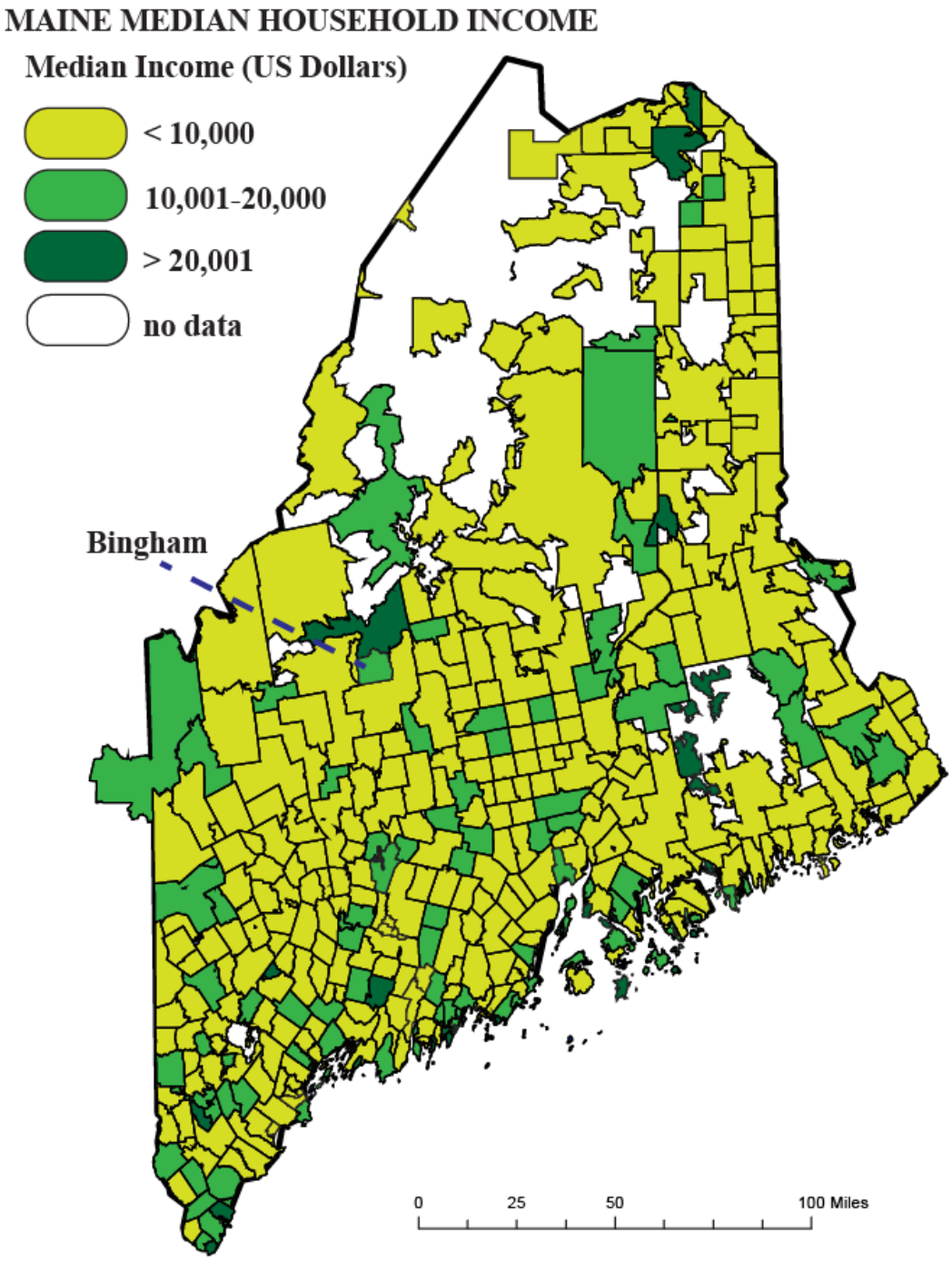
digital equity as socio-technical agency, I highlight the potential for representing undertheorized aspects of Thirdspace theory within rural education and the digital divide.

GIS "God's Eye View" of Digital Equity

To effectively assess the overall access to neighborhood digital learning opportunities across Maine's remote geography, I utilized Environmental Systems Research Institute's (ESRI) GIS mapping software ArcMap 10.2 Desktop software in combination with quantitative U.S. Census data sets. All accuracy was maintained through the powerful functionality of the shapefile format, which spatially defines vectors such that all topographical linework (i.e., points, lines and polygons), as well as attribute features (i.e., numeric usage data) remain digitally aligned. My analysis adhered to the conventional mapping processes of selecting labels and symbols, choosing the scale, and layering. Briefly, my steps involved merging different U.S. Census GIS data on Maine's museums, schools, and libraries; calculating density of digital learning opportunities; spatially analyzing population density as well as the distribution of income; and finally computing the per-capita density of digital learning opportunities. The first pass density analysis indicated that the higher population the higher the distribution digital learning opportunities in a given area. Needing a more nuanced look, I decided to then consider learning opportunities per capita, because Neuman and Celano (2012) found that more people sharing a digital resource decreases opportunities for its empowered use. Using the population density Census shapefile as an analysis mask, I divided the total digital learning opportunities in a given zip code by that area's population. This helped me to more readily answer whether more learning opportunities were located in particular areas with less population. Then, I could overlay this point density output over a more

authoritarian baseline map of Maine and look for causal factors explaining higher per-capita learning opportunities, such as higher income, or proximity to high-tourist coastal areas and/or universities. From this, my final analytical product was the ArcGIS density map (layered atop the population density map), the income distribution map, and the per capita distribution of digital learning opportunities (see Figure 3.2).




MAINE MEDIAN HOUSEHOLD INCOME
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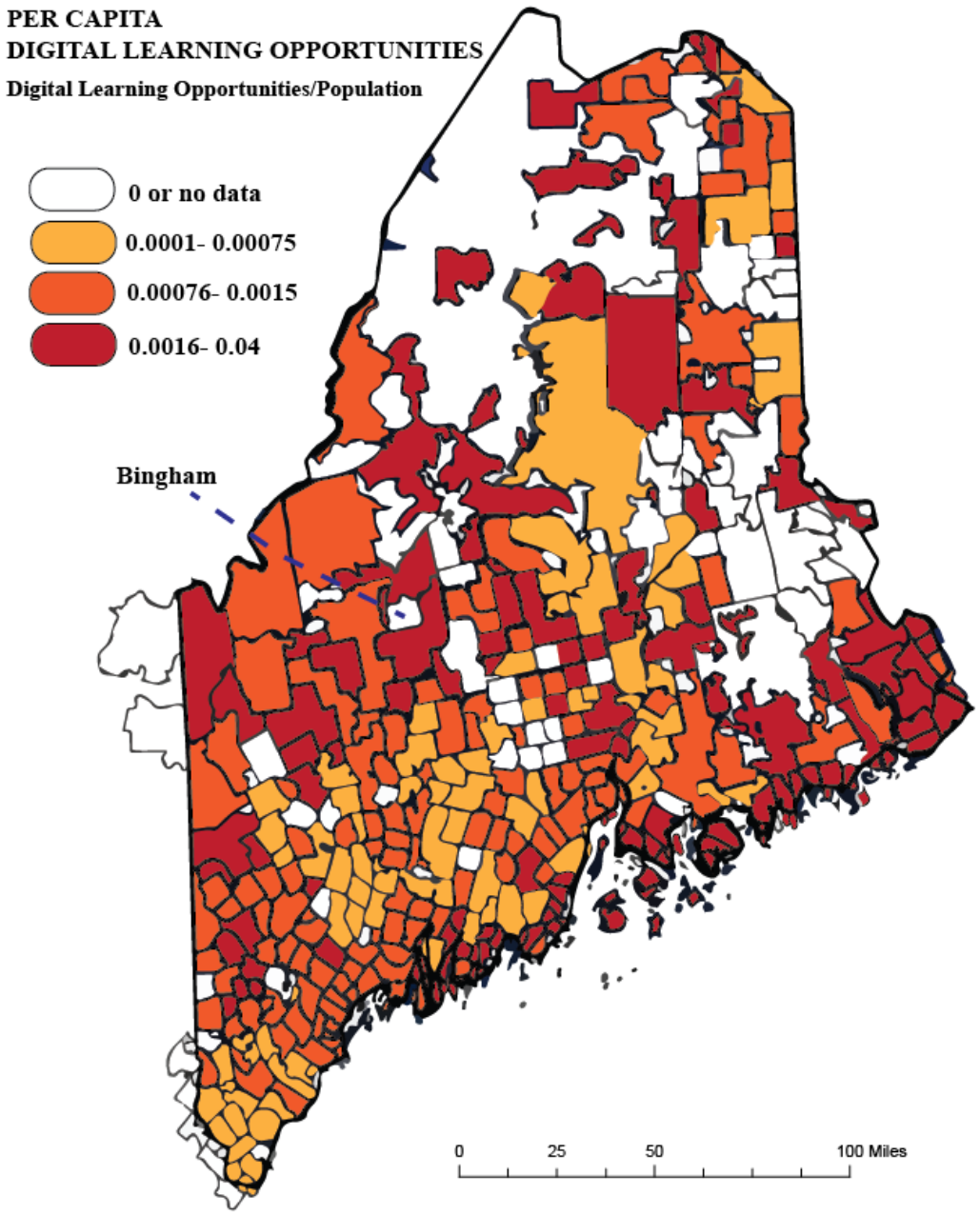

Figure 3.2. GIS Map of Maine Digital Learning Opportunities, Income, & Per Capita Distribution

From this GIS analysis, we can quickly discern the uneven geography of digital equity across Maine. When looking at the first GIS map, we understand how greater population equals greater number of digital learning opportunities. In the third GIS map

showing per capita distribution, we can see that greater population does not necessarily warrant more digital learning opportunities. In light of the second GIS map of income, this per capita distribution of real digital resources appears to be in favor of the wealthy. And areas that aren't wealthy, but still retain higher per-capita learning opportunities are concentrated near the coastal and DownEast regions of Maine. These high-tourist areas include numerous "must see" lighthouses, National State Parks (Acadia), International Parks (Roosevelt Campobello), and Historic Sites (St. Croix Island). Given tourism is the largest industry in the state of Maine, these regions net a substantial chunk of state revenue through selling a historically-rich, rugged, and sea-infused vision of Maine (http://www.meliving.com/mainetourism/). Patterns related to the variables of population density, income, and tourism emerge such that distribution of digital learning opportunities privileges higher income residents and wealthy non-resident tourists. Therefore, these patterns bring to light critical questions about the spatiality of injustice and the limited learning opportunities available in lower-income areas that do not fit the idyllic vision of rural Maine. Taken together, implications for policy support the notion that more equitable distribution of fixed digital learning sites will better serve the marginalized and proffer greater digital equity.

Next I needed to more closely map out the distributional spread of digital learning opportunities in the specific rural town of Bingham, Maine. Unfortunately, the GIS maps in Figure 3.2 did not have Census data on schools, museums, and libraries in the Bingham zip code. From my own surface analysis (i.e., neighborhood walkthroughs), I then geo-located Bingham's digital learning opportunities through the GIS. Figure 3.4 shows the extreme scarcity of digital learning opportunities in this rural community.

Despite this, the distribution across neighborhoods of different SES was not equal. The wealthier neighborhood of Meadow Grove houses the town's only library and most of its schools. While the lower-income areas of Murray Hill and Concord have little for digital learning.

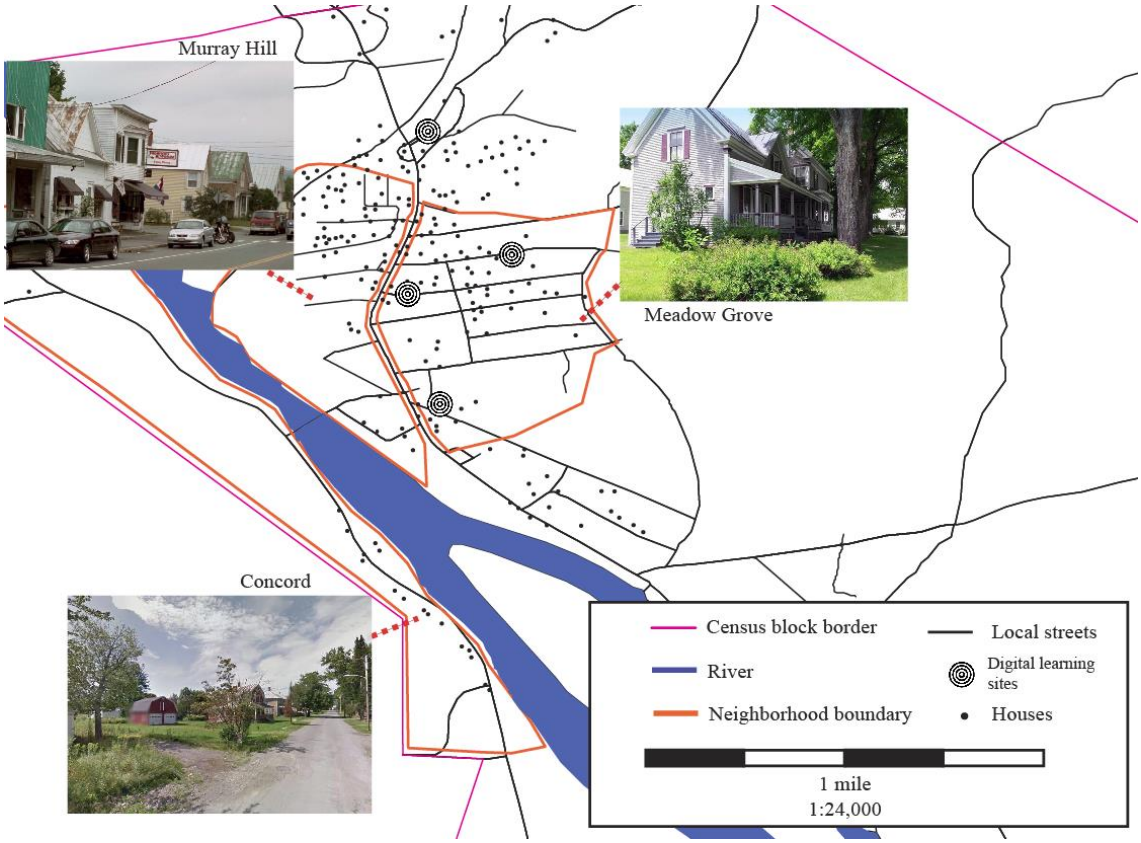

Figure 3.4. GIS Density Map of Bingham Neighborhood's Digital Learning Opportunities

Thirdspace Considerations of Digital Equity

As discussed previously, counter-mapping cannot accomplish its goal without addressing the rhizomatic and relational ties interconnecting human and nonhumans (Vermeylen, Davies & van der Horst, 2012). Given this, I next unraveled conventional GIS mapping within the fluid context of a rapidly changing modernity, whereby people

do not live out their identities within fixed boundaries or structures. In our liquid modernity, Bauman (2000) asserts that social structures, such family, neighborhoods, the economy, and political institutions, change so rapidly that they can no longer be thought of as solid social frames of reference. To show how rural individuals and their mobile technology tools can enable greater flexibility and more versatile social connections across neighborhoods of different SES (i.e., the kind of socio-technical transformations that can endure in our liquid modernity), I turned to more fluid and lived Thirdspace maps. To story lived experience, I created a more layered and annotated cartographical map (see Figure 4.3) that could re-draw taken-for-granted spatial conventions, while highlighting the presence of key technological factors (Rundstrom, 2009). This more storied map was overlain across a less authoritative baseline map in order to depict families' mobile phone diaries, connecting nodes, durable social associations, and knowledge mobilization as fluid and networked beyond confines of space/time. Therefore, I produced this "Storied Map" or a "Stories-so-far Map" as my Thirdspace final analytical product.

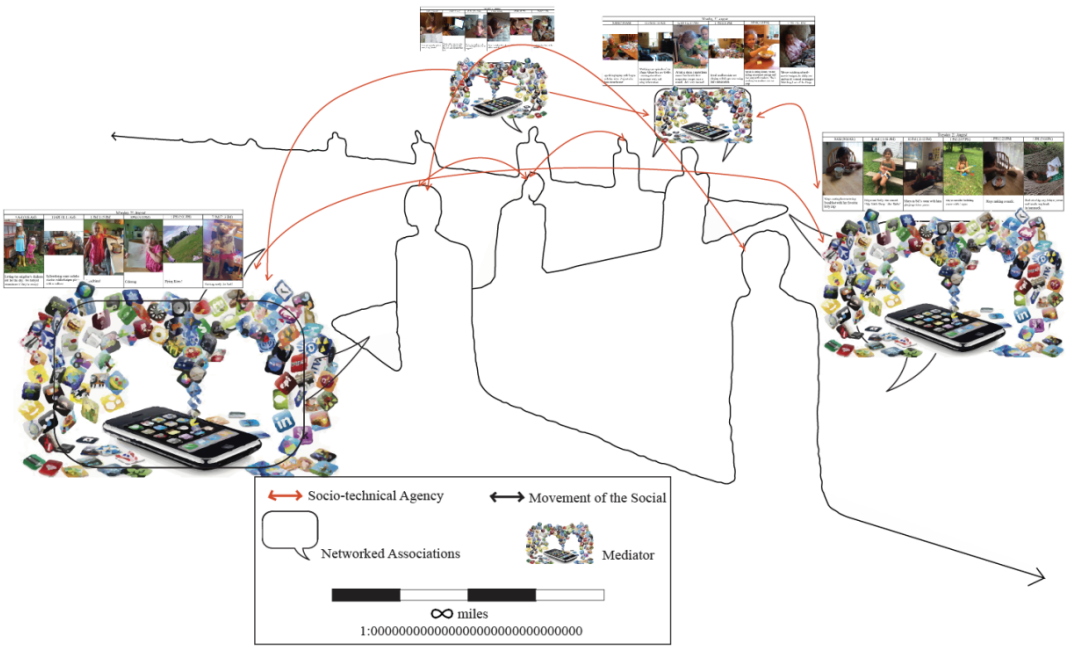

Figure 4.3. Thirdspace Map of Digital Equity Across Socioeconomic Spaces

How does this more storied Thirdspace map re-draw taken-for-granted spatial conventions in a way that other kinds of maps cannot? Overall, it helps us to re-imagine space such that it is not a fixed object or subject, but rather a production of a lived social reality with embedded relations and imagined conceptions entangling material forms (Lefebvre, 1974). Thus, my map represents the radical openness of the Thirdspace, while applying the Secondspace senses (broadly conceived) to the micro perceived Firstspace. Specifically, the mobile phone diaries provide a storied Secondspace feel for everyday life. On the other hand, these mobile phone diaries are positioned in reference to one person, indicating the Firstspace reality of how space originates-- as an "extension of the body" (Lefebvre, 1974, p. 98). Further, I illustrate bodies as connected in one moving line with arrows on each end to show lived processes of space as not led within boundaries but through them.

Asking "how many maps, in the descriptive or geographical sense, might be needed to deal exhaustively with a given space, to code and decode all its meanings and contents?" (p. 85), Lefebvre hinted at the difficulty in capturing the full polyvocal complexity of space through only one rendering. He called for an immediate infinity, wherein the map's legend, or focal point for decoding and map-reading, can be modified at a moment's notice. Though I present one monolithic cartography, I layer it in such a way to invoke the polyvalence of lived space. Through incorporating mobile phone diaries and opting for the infinite over the measured, my Thirdspace map complicates time and space in contradictory and radically open assemblage. In this way, this Thirdspace map becomes a meshwork of textures rather than a text.

At the spatial intersection of literacy, learning and technology, this social cartography attempts to depict Thirdspace agency within social space. Through concrete symbols and the choice of who this map foregrounds and who it diminishes, I highlight how some rural individuals have opened wider spaces of hope and empowerment than others. The red bidirectional arrow indicates socio-technical agency of those who have leveraged digital technologies, in this case mobile phones, to support their upward mobility when creating opportunity out of inequity. Sara is foregrounded in this map, because she is the rural mother of low SES who could leverage the socio-technical systems needed for consistent "border crossing" and ultimate entrée into the women's inner social circle (online and in person). Further, by mapping the movement of the social in bidirectional arrows as well, I indicate how the social hierarchy can continue to be restructured through the Thirdspace. This further stresses how "to change life,… we must first change space" (Lefebvre, 1974, p. 190).

Counter-Mapping as a Re-imagining of Digital Equity

Here, I flesh out Latour's three analytical tasks of staging the social as a controversy, tracing associations, and finding political leverage within the re-drawn collective agency of human and nonhuman actors. From cross-validating the two types of maps and differentiating the socio-technical arrangements of three rural families of low SES, I draw new inferences and highlight unseen links, flows, and intersections between families, technologically-mediated practices, and their community. In this way, I counter known spatial conventions by untangling narratives previously hidden in the GIS maps. Themes generated from depicting rural families' digital practices as fluid and spatially networked are the following: digital inequity re-programmed through the rural space, tracing networks of technology-mediated practices, and rural digital equity as human-nonhuman agency. These themes, along with their Latourian analytical framing, are described below.

Digital inequity re-programmed through rural space. Latourian mapping starts from the understanding that the social world is not a pre-given or pre-ordered structure. This means that these maps do not study the social by locating and following the social infrastructures of the dominant. Here, the social is not magical super glue for legitimizing extraneous factors by forcing them into known conventions to "fix everything including what other glues cannot fix" (Latour, 2005, p. 5). Instead, this approach maps the social not as structure but as the contentious movement of actors constantly dissenting, re-associating, and reassembling. When we do not treat the social as a glue to quickly make patchwork sense of the present state of an issue, we can focus on mapping the continual

performance of the social being acted out by various interconnecting and oftentimes disjointed elements.

To examine the social's moving target, we first feed off controversies. For Latour (2005), "it's always the paradoxical presence of something at once invisible yet tangible, taken for granted yet surprising, mundane but of baffling subtlety that triggers a passionate attempt to tame the wild beast of the social" (p. 21). And for the journey to even begin, the researcher must get off the well-traversed highway, with its regulated speeds and standardized road signs giving direction to routine questions and their known answers. Starting from controversy takes the mangled dirt road less-traveled that more often will find its winding way alongside the more winding creek. With the social as movement, we are perpetually in the act of re-examining what we are made of and redefining shifting boundaries. This is especially the case if we want to portend the *what*, *when*, and *how* of not-yet-composed assemblages. Bringing the social back to its source of perplexity is predicated upon surprising oneself with phenomena found puzzling again as well as developing sensitivity towards emergent associations and taken-for-granted assemblages. Among Latour's (2005) sources of controversy are the contradictory nature of groups, actions, and objects. Finding contention in groups can revolve around mismatch between group formation and the given identity of individual actors. With actions, a full range of agents unpredictably push others aside to hijack the original program of action. Likewise, objects are contentious in that each exercises a different type of agency that when interacting with other agencies opens a wide range of possibility. From these sources, we let controversies unfold all the way. Here is the guiding motto: "We won't try to discipline you, to make you fit into our categories; we

will let you deploy your own worlds, and only later will we ask you to explain how you came about settling them" (Latour, 2005, p. 23).

As an example, following the controversy of rural digital inequity from its source means examining a central paradox: An invisible thing (e.g., digital inequity) presses upon this rural landscape such that it is more solid than steel, but easily malleable to fit the needs of some. I begin from this contention to trail the study's group of three rural mothers of low SES: Trina, Becky, and Sara. Among this group formation, Sara did not so easily filter her identity through that of the low-SES-mother collective. Sara actively re-invented norms through reflexivity practiced in rejecting negative stereotypes of impoverished and helpless single working mothers. Unlike Becky and Trina, who found redemption and promise in conventional ideals of good mothering, Sara refused these ideals to engage in sacrifices others would deem as "unsuitable" for mothers. Sara did this through raising her children alone. She also uprooted them from their known surroundings to temporarily move to a new town to finish her college degree-- a pursuit that sacrificed time away from her children. In doing so, she called upon various digital tools and practices to challenge and redefine the drawn boundaries of where she fit (as a group member). Sara's actions and use of digital tools within the community also suggest an agency that could combine with other rural women (outside of her neighborhood of Murray Hill) to overtake the current state of affairs. With the rural men gone[16], Sara was the first to reject the tacit notion that women's place is inside to "man up" and take over both the local ski mountain's "School on Skis" program and the community's summer

[16] As stated in a previous chapter, the decline of traditional physical industries (e.g., the closing of Bingham's lumber mills and fisheries) sent rural men farther from their homes to find work. They would often be gone from dawn to dusk and sometimes entire weekends.

soccer program. Soon, other mothers of higher SES followed her lead. In terms of objects, Sara's use of digital tools (e.g., mobile phones and laptops) and social media networks (e.g., Facebook) further allowed her to develop greater awareness and purpose within the community. Steering this larger path through technology-mediated practices then maximized the likelihood of greater interaction across neighborhoods, when ascertaining community needs and factors relevant to these needs.

From this controversy, I unpack "blind spots" in the previous GIS maps and discover silences (e.g., omitted stories) or contradictions that challenge the honesty of the issue under focus (i.e., rural digital inequity). I emphasize, through Sara's omitted story, how GIS spatial constructions of the digital divide are storied in terms of the deficit-based "haves and have-nots." Reading between the lines and outside the boxes, I deploy "blind spots" which worked to silence Sara's lived experience and mask her connections across neighborhood boundaries. The GIS map hides stories of those who produce a space that is not inhabited, but moved through, ruptured and networked in Sara's "no space ventured, no space gained" mode of being. This means that the blind spots fail to account for her physical movement, her networked social connections, and her labor across neighborhoods of different SES. All of which give her greater agency and more access to digital learning opportunities, actualized not through proximity to schools or libraries but through connections to people and practices. In more concrete terms, mapping out controversies over space and agency (e.g., the ways in which Sara re-programmed digital equity through the rural space) reveals the hidden fragility of rural inequity, as its precarity becomes visible only upon accidental breakdown (Star & Ruhleder, 1996). By tracing the storied strategy of those who are actively "seeking spatial

justice" (Soja, 2010, p. 1) via more rhizomatic maps, we can better reflect the lived Thirdspace of the marginalized. In this fashion, I can support critical geographers' claim that authoritarian GIS mapping "stories" Firstspace social misconceptions of space as inhabited and fixed (Harley, 1998, 2001). Herein, counter-mapping becomes a political act as I unravel hidden narratives that destabilize accepted truths.

Tracing networks of technology-mediated practices. As previously discussed, the social is but an instant suspended in a historical maze of moving assemblages (Latour, 2005). Though it is active, performing, and perpetually redesigning itself, society is what is produced within and across these connections. This shift from given structures to movement is a key insight for Latourian mapping and foregrounds the need for tracing. No longer framed as some monolithic and omnipresent infrastructure, the social is "visible only by the traces it leaves (under trials) when a new association is being produced between elements which themselves are in no way 'social'" (Latour, 2005, p. 8). In other words, the associations are not necessarily determined by only social ties or social actors. To then locate how the social comes into existence, the researcher traces these new and oftentimes non-social associations to the moment when they are mashing the assemblage together.

Taking controversy as a beginning thread, the principle goal of tracing is to shadow the actors as they themselves define and (re)order the social. And the best tactic towards achieving this comes from not interrupting or explaining away controversies, but in abandoning all *a priori* fixed frames of reference. No longer weighed down with our imposing structures of how the social world is made, we float freely upon the muck of contentious data. This free float also allows us to redirect our tracing to include all

entities that social convention thought practical to leave aside. Far from sticking to a list of invited social actors, we never eliminate those (and their data) that don't fit, but allow many others to crash the party, even the non-social. We then can more readily dismiss assumptions of a group's presence and likewise the futile categorization of its invited actors. Instead, we focus on the important movement as it struggles forth and redefines its boundaries and group associations. With "no society to begin with, no reservoir of ties, no big reassuring pot of glue to keep all those groups together" (Latour, 2005, p. 37), we reassemble by putting to work the inner logic of things.

Because actors can only act in combination with others, the extent to which these connections shape, fit, and complement each other becomes central to discerning how the system functions. Tracing the trail of connections, we then ask how agents make particular moves, and why certain associations are longer or extend farther than others. To best answer our question, we must concentrate our mapping on the more robust connections and render their patterns. But once a sturdy connection is found, we do not isolate its links from more unstable and shifting frames of reference. Only from the larger context can we differentiate connections and connectors in terms of what meaning or purpose they can impart to others. For example, Latour (2005) distinguishes the *mediator* from the *intermediary*. While an intermediary's outputs are predictable in that it channels force or meaning without transformation, mediators transform and modify all they transport to bring forth largely unpredictable consequences. Given the mediator's tendency to move action in multiple directions, defining them from the intermediary will not only reveal how individual actors deviate from their groups, but also the source of possible future irregularity. Analytical consequences result from not properly

distinguishing mediators from intermediaries. For instance, it changes the nature of the group, when the tools (which define that group) are treated as intermediaries rather than mediators. Whereas intermediaries count as one, mediators are ripe with transformative potency and can, therefore, work as one entity or do the work of several. Thus, it is only through tracing all connections and actions being performed between actors (inclusive of mediators and intermediaries) that we can stabilize controversies and reassemble the social into the current state affairs.

To trace the network of technology-mediated practices in this rural town, I return to the controversy led by Sara, the low SES mother who challenges and re-orders the socio-economic structure she is given. Forming sturdy and unique associations to various key mediators and intermediaries, Sara separates herself from the other lower SES mothers, Trina and Becky. Similar to the higher SES mothers, Sara has kept the same phone number. This followed from Sara's practice of prioritizing her limited finances. Due to erratic nature of Trina's husband's drug addiction, little money is left over from his paycheck. Consequentially, because Trina must depend on this paycheck, her mobile phone bill goes unpaid and is turned off for several months at a time. Further, given she starts and stops accounts, beginning a new plan results in a switch to a new phone and cell phone number. She did so at least once in the span of this six-month study. Becky, on the other hand, qualifies for Lifeline, a government-subsidized phone service for low-income residents. Within this service, Lifeline's restrictions permit only limited mobile phone functionality (e.g., limited data usage as well as texting but no voice plan). Thus, though Becky has kept the same phone number, Lifeline limitations force her to use a

variety of other phone lines (e.g., her mother's cell phone, her neighbor's landline phone) to call and connect with others in real time.

Here, I include a mundane and overlooked nonsocial entity (e.g., stable cell phone number) as intermediary to argue this seemingly small consistency not only strengthened Sara's network, but when transformed through particular mediators (e.g., mobile phone and Facebook) multiplied her possibility for connection and subsequent action. With durable ties to others more readily maintained and leveraged through her intermediary and vital mediators, Sara could key into the pulse of the community and ascertain how to meet its larger needs. As discussed previously, Sara was the first of the rural women to step out of her neighborhood and into the community to transform programs of action (via mediators) and initiate a steady flow of child-centered activities. Expecting Sara's technologically-mediated practices to remain consistent, other rural mothers of higher SES formed bonds through the years and acted in combination with Sara to pool together shared goals (e.g., get community children outside and active). Even though the transmission of information through her community network was not always straightforward, with unstable links transforming inputs into unpredictable outputs, Sara could call on her wider knowledge network and more well-developed social ties to make sense of the state of affairs. As an example, when her son's video game technology was stolen, Sara demonstrated great skill in navigating local knowledge circuits and inner social networks. This empowered her to act on the issue and pay the suspected thieves a house visit. In sum, a variety of consistencies and resultant sturdy associations, comprised and strengthened Sara's networks, digital tools, and organizational routine.

Stated again, only in moments of controversy, ripe with stark formations, accidental breakdowns, and new associations, can we trigger the social and therein render it visible for tracing. And only after deploying the broad range of controversies within this rural town and tracing back stable entities to when they were still contentious and new associations, can we map new realities and alternative truths to those depicted within the GIS maps. By letting the actors lead, I show how lives ‘‘are not led inside places but through, around, to and from them, from and to places elsewhere’’ (Ingold, 2000, p. 229). Tracing how life unfolds not within fixed neighborhoods but along connected paths, shifts personal narratives and renders each lived experience as tangled up in others (Ingold, 2011). Re-imagining static boundaries as fluid presents the social domain as practiced and highlights how the actors, themselves, can shape and reshape their identity across space. Through eliminating cartographic “blind spots” and replacing them with connecting lines and paths, the map is no longer devoid of agency and becomes a tool for identity-building and action.

Rural digital equity as human-nonhuman agency. From a network where associations of human-nonhuman action are traced, the researcher’s final task is to map out agency. This approach more readily accounts for the causes of configured action and any transformation therein. Via a Latourian (2005) mapping, one finds agency or distributed paths of agency by untangling how issues are constituted into matters of concern and then proposing plans to improve these issues. Central to this task is the afore-mentioned posthuman understanding that actors, regardless of status as a human or nonhuman, are the source of an action. Thus, objects too have agency that, when mediated through human intention, significantly changes the state of affairs. Given this,

Latour emphasizes the necessity to map not merely human-to-human interconnections or object-to-object ones, but the crisscrossing from one to the other. Inherent in this crossover is the rejection of a clean "symmetry between humans and nonhumans" (Latour, 1999, p. 182). Ultimately, quality social cartography describes the state of affairs as a reassembling of human and nonhuman actors in a way that makes sense of the reciprocal actions (and subsequent combined agency) of things making up the collective.

Given the increasing focus on how humanity is being transformed in our technological era (Dorrestijn, 2012; Verbeek, 2005), the concept of socio-technical agency emerges. Fully unpacking the forces at play within socio-technical agency hinges on Latour's (1999) concept of technical mediation. Briefly re-summarizing the posthuman, an actant is a functional entity that only exists in relation to the network that incorporates it. By definition, an actant can be anything of which the network consists. This definition encompasses every technology or artifact, as well as the human actor constituting the traced network. Placing this in the broader networked context helps to reassemble the role of technology in mediating actions, as well as reposition the social as the outcome of networked programs of action between the human and nonhuman. First, I will explain Latour's (1999) technical mediation through the example of guns and then apply this lens to rural families' mediators (e.g., mobile phones and Facebook).

According to Latour (1999), two opposing views of guns are often juxtaposed. "Guns kill people" is then countered with "Guns don't kill people; *people* kill people." The first assumes that technology is the central actor and will act by way of its inherent material conditions—under no influence of the human holding it. The second takes a more sociological view to pose that guns do nothing in themselves and must be *acted*

upon by the gunman[17]. If the gunman is rational and elects to kill in only appropriate instances (e.g., self-defense), then the killing will occur regardless of the gun. The gun is a "neutral carrier of will that adds nothing to the action, playing the role of a passive conductor, through which good and evil are equally able to flow" (Latour, 1999, p. 177). Efficiency is then the only thing the gun imparts to the program of action.

However, Latour (1999) then combines these two views to provide a more varied understanding of the persuasive role that technology can lend in indirectly configuring the subjectivity of its possessor. In this way, technology acts on the human mind to influence decisions and escalate less directive programs of actions (e.g., "get revenge") to the more definitive (e.g., "shoot him/her/all"). Herein, when tangled up in associations with nonhuman actants (e.g., gun), goals are redefined. These technological nudges and resultant transformed programs of actions are then carried out through the single entity of human-with-the-gun via networked socio-technical actions, such as bodily gestures and the gun's trigger functioning. From this socio-technical view, our qualities as humans, from our competencies to our will to our desires, are then predicated on what we carry in our hands.

When applied to rural families' mediators, I present a structured understanding of the socio-technical transformations enabled through programs of action. Oftentimes, the assumption that technology is a neutral tool carries the stipulation of "it's how you *use* it." Similar to the gun, each technology emerges with a purpose inscribed to its use. For example, when holding a mobile phone, one can walk freely while leveraging all its bundled functionalities, inclusive of Facebook. Next, the mobile phone, in light of its

[17] Or gunwoman.

functionalities, lends itself more readily to certain biases, such as communication. With the development of smart phones and mobile Internet, one can propose that another bias is to entertain. But the television, with its larger screen, quality graphics, and more powerful sound system, is more predisposed for entertainment. Hence, for rural mothers in my study, mobile phones' inscribed intention for communication and mobile versatility helped to transform their end program of action. In particular, the three families of low SES varied in their mobile phone usage. Both Becky and Trina, due to previously disclosed circumstances, could not follow consistent mobile phone communication patterns, which would allow connection to the outside world. Kept hidden within the home with their television's central and commanding presence, these mothers would more easily be enveloped in the end goal of entertaining themselves and their children. This is not to dismiss the worthwhile socio-technical transformations enabled by the rural-mother-with-the-TV. As stated prior, Trina dealt with her husband's addiction issues. Becky, meanwhile, was fighting her own addiction to prescription opiates, Suboxenes. Addiction often manifests through erratic behavior and inconsistent moods, which can negatively impact a household. Henceforth, regular airings of TV chat shows and cartoons imparted a needed structure to their household's daily routine as well as a steady supply of good feeling.

Yet, Sara, as rural-mother-with-the-mobile-phone could become more productive within the community, more flexible, more self-organizing, and more able to achieve her end goal of traversing and communicating across socioeconomic spaces. Sara, despite her low-income, could exercise a unique socio-technical agency (i.e., rural-mother-with-the-mobile-phone) to become central to the rural women's division of labor. Further, the

increased flexible functionality of mobile phones allowed select rural mothers to leave the home, initiate further communication with others face-to-face, manage work outside (an area formerly coded as male territory), and bring their children along with them. In Sara's case, her highly adaptive sense of belonging (as depicted through consistent "border crossing") was influenced and facilitated through the use of mobile communication technologies. This use is important for Sara, because as social structures and knowable fixed frames of reference dissolve in our post-capitalist society (Bauman, 2000), flexibility emerges as critical to stability (Rizvanoglu & Çetin, 2014). Mobile phones, when leveraged for ultimate socio-technical agency, could foster more durable social networks than other technologies (i.e., landline phone, television). The multi-functional nature of mobile phones surpassed other technologies, because it helped rural mothers to flexibly adapt to changing situations and blend work/life paradigms, such that their mobile device became more deeply embedded in their daily lives than ever before. Positioning this once more within today's fragmented and liquid modernity (Bauman, 2000), mobile phone-mediated communication, because of its flexible management of social networks and frames of reference, could paradoxically strengthen and stabilize relationships across socioeconomic spaces (Rizvanoglu & Çetin, 2014). Accordingly, mobile phone mediated communication reinforces relationships, as it extends face-to-face communication in the present. At the same time, simply having the mobile close (even if it's not in use) provides comfort, as it also reinforces the memory of face-to-face communication in the past and the expectation of it in the future (Ahmed, 2010). From these more enduring socio-technical transformations, we can then rethink how humans

and nonhumans co-produce technologies, as well as the lived sense of space these transformations might enable.

Discussion & Findings in Context

With our lived state of affairs newly reassembled through a Latourian counter-mapping, we trace rural digital inequity for what it is: a politically-textured confluence of fluid and stable entities. It is important to note that when the issues are raised, such that the nuanced complexity is no longer masked, there are no easy answers. Even so, reflecting a Thirdspace framework, this approach highlights agency, networks, and potential contradictions as opportunities for understanding the *processes* that produce inequities. Here is where I illustrate the transformational possibility of this equity-oriented research agenda. And to avoid applications of counter-mapping as an ad hoc "magic bullet" (Fox, Suryanata & Hershock, 2005), in this section, I explicitly state how the aforementioned themes lend new insight into educational equity (rather than just reflecting a different view of space). Rethinking digital equity in this way may then dismantle the deficit perspective and inform more effective political action.

My GIS maps support the notion that equal distribution of fixed digital learning sites will proffer greater digital equity. In an aggressively anti-welfare political climate and its highly unequal society, it is important to note that equalizing resources will benefit both the rich and poor (Rank, 2004). Given this, my claim is not to oppose this needed resource redistribution, but only to provide a more nuanced view to initiate a discussion on how this may be better enacted across spaces. In other words, while quick-fix applications of a Marxist (1859) redistribution of wealth can infuse under-served areas with material goods, these interventions often ignore the symbolic and socio-spatial

human-nonhuman considerations. This analysis has shown that movement must circulate through the much-needed local digital infrastructures to supply their powerful life blood and trigger the work of the social. GIS maps, which understand the social in terms of fixed structures, too easily hide the true force of relational ties/networks which can leverage and build the socio-technical agency of rural families of low SES. By highlighting the workings of socio-technical agency and the social, my Thirdspace maps help to story this alternative truth. They reflect how the maximizing potential of digital equity may hinge upon enabling greater movement across spaces of different SES. When recasting digital as the social, by another name (Braidotti, 2013), this conceives of digital equity as connecting lines and renders various ways in which we can strengthen and bond them.

When we address socio-technical agency as constituted in a more dynamic and subtle system of relations, then political solutions to digital equity must likewise be constituted in more complex and subtle ways. Thus, simple intervention, material redistribution, and corrective regulation may not hold. Real lasting change and societal growth may come from investing in digital infrastructures that can modify how technologically-mediated practices and all related socio-technical agency flow together to make and remake our world. In more concrete terms, sinking money into stable fixtures in under-served communities is, at most, a temporary fix. Before long, more money is needed to repair eroding structures or a worse-case and anti-welfare cost-benefit analysis deems the re-investment futile. From this Latourian counter-mapping, we learn to instead look to reassemble and subsequently strengthen the networks which are already enabling powerful socio-technical transformations.

In re-mapping the rural space such that it grows, expands, and travels (Bratton, 2000), I show that the rural families of low SES are not devoid of agency. Not living within bounded space, but through it, I present their identities as not locked within space/time. Many of the rural families could not predict how their individual actions and interactions would impact the larger pattern of activity as it emerged at the town level. Yet, intrinsic to human behavior, few trusted inconsistency. When Sara could leverage her socio-technical agency and exercise the greatest movement across spaces (i.e., reaching outermost levels of neighborhood and school), she developed greater awareness and purpose regarding her individual actions. These actions in turn increased through sheer stimulation of interactivity. Her consistent movement (across networks of people, tools, and organizational routines) provided predictability to others, and increased her credibility as a social actor. Inferences infer that it is the high interactivity and emergent co-construction of socio-technical practices across a networked space that leads to the highest growth and sense of efficacy among rural actors. Following Sara's lead and all related mediators and intermediaries, we thus trace and stabilize contentious issues of digital equity in rural areas.

Conclusion & Implications

To achieve my research objective, I drew on examples from the families' experiences and posthumanist cartographic tools to identify promising ways of re-thinking rural educational equity. Herein, I placed my findings in the broader context to methodologically re-map and otherwise complicate taken-for-granted interpretations of social space as a critical lens for re-imagining the Thirdspace potential for digital equity. In more concrete terms, I staged a "re-mapping" of the social space as an exercise in

envisioning different community futures. I designed a socio-spatial strategy to promote digital equity—with critical attention directed towards views of equity which consider more than material essentialisms (i.e., inputs equally outputs and cause equaling effect). Hence, I used more storied and lived maps as key instruments in problematizing the Marxist (1859) notion that "the superstructure is built on infrastructure." These maps weighed other symbolic and socio-spatial human/nonhuman considerations that factor in to reflexively (re)shape the superstructural forces of culture, institutions, and practices (Giddens, 1979). In this approach to re-imagining digital equity, I foregrounded socio-technical agency to contest that the superstructure cannot be so easily separated from infrastructural digital forces or relations of production. This helps us to explore the opposing notion that the key to understanding rural digital equity may exist not within the infrastructure or the superstructure alone but within the socio-spaces housing the human-nonhuman *relations* binding these "structuring structures" (Bourdieu, 1977, p. 72).

The final analytical product is not an end-product per se, but a forward-looking inductive means to a juxta-positioning of all previous maps (including the ArcMap GIS density map and my own more storied maps). Therefore, from cross-validating the aforementioned maps, I drew new inferences and underscored unseen links, flows, and intersections between rural families, digital learning, and society. In doing so, I questioned taken-for-granted assumptions of a "stable" infrastructure and also challenged existing beliefs of what exactly the superstructure is being built upon, given our deficit-based tendency to mask the empowering stories of the marginalized. I sought a broad posthumanist view to tease out how social ties, politics, rural digital tools, identity, and class structure are complex and dynamic entities tangled up in a socio-spatial web of

influences which enact certain expectations for a small town's fate. My socio-spatial strategy involved identifying potential contradictions in how digital inequity is conceived in popular discourse and how families understood and/or experienced it. This critical spatial framework then served as an appropriate means of rearticulating the potential for social change via newly imagined hybridized spaces as well as the multiple networks shaping them.

While there is a push to simplify reality into tiny fixed boxes that can be managed and improved, the consequences of this framing masks powerful nuances that characterize the fluid and heterogeneous complexity of our world. Thus, my work seeks to empower the disempowered by showcasing their often ignored socio-technical agency. Finer analytical articulation of phenomena may improve the stories we render through maps. In turn, better visual displays, such as maps, help to improve the ultimate social and political utility of our interpretations to ensure our storied cartographies resonate strongly with policy practitioners, teachers, researchers, and the disempowered themselves. Left with only socio-historical understandings, the preservation of unjust geographies will likely persist unchallenged and unseen, but a spatial perspective opens up unforeseen opportunity for visualizing action, resistance, and enablement. Therefore, this cultural mapping of ICT offers the field one incremental methodological innovation that may better promote digital equity and therein help to forge positive socio-technical futures. Helping families to share their lived stories of empowerment through counter-mapping may not only "teach for openings" (Greene, 1994), but also highlight how this unique orchestration of social spaces can overcome limitations of previous equity research. In this way, my work may help to dismantle limiting and deficit-based notions

of the digital divide. For if revolutions happen when things are getting better (Brinton, 1938), then our ultimate aim is to spark momentum for change by examining and calling attention to the transformational spaces, through which rural families are enacting opportunity out of inequity.

CHAPTER 6
DIGITAL LEARNING IN THE WILD: CONCLUSIONS/IMPLICATIONS

"Professors, if they want to be more than cheerleaders, need to offer possible solutions to the problems they decry. If you don't like textbooks, don't just engage in critique, tell us how to get them out of the classroom. Otherwise you get a merit increase for your publication and praise for your political wisdom, but children in school still get the stupid textbook. Ditto for any problem."

— James Gee

"The price of criticism is a constructive alternative."

--Saul Alinksy

"Best time to plant a tree was 20 years ago. The second best time is now."

— Jakob Cirell, as quoted from a Chinese proverb

Once upon a time, specifically between 1947 and 1977, economic growth could support the American Dream and its fantasy land of opportunity (Duncan & Murnane, 2011). During these years, the incomes of the poorest families doubled alongside the nation's per capita gross domestic product (GDP). Critical to this twofold wage growth and related standard of living were the rapid jump in school attainment and subsequent labor force quality (Hanushek & Kimko, 2000). In 1900, less than five percent of young Americans graduated from college. Seventy-five years later, that amount had risen to 23 percent (US Department of Education, 2009; see also Goldin & Katz, 2008). While most of this educational investment and associated wage growth occurred within higher-income families, higher education was nonetheless hailed as a viable means of upward mobility (Duncan & Murnane, 2011). For instance, between 1950 and 1970 new and unforeseen opportunities for higher education increased first generation college students'

graduation rates by over 20 percent (Hout & Janus, 2011). The rising tide lifting all boats was harboring its promise: *If you work hard, you too will earn an equal shot at success*.

Decades later, the GDP has doubled again (Duncan & Murnane, 2011). This time, however, only those at the top were to gain. From 1970 to 2007, the combined salary of those families at the 80th income percentile has increased nearly 5 times more than underprivileged families' income. Adjusting for inflation, wage growth of college graduates from 1970 to 2007 was 25 percent, while high school graduates experienced no increase (Hout & Janus, 2011). In light of this, the financial return of a college degree has never been greater. However, college graduation gaps between rich and poor have grown nearly twice as wide as fifty years ago. Seen this way, fewer and fewer impoverished households can afford the path towards higher education, inclusive of preschool, quality K-12 public schooling, and the requisite 4 years of post-secondary education (Duncan & Murnane, 2011). Falling behind, at this point, has drastic consequences for upward mobility, as Reardon (2011) graphed a striking spike in the class-based test score gap among students born since the 1950s.

What's even more striking is how presenting "the numbers" above implicitly draws focus on who is losing and how much (Rank, Yoon, Hirschl, 2003). Practical questions follow: *How can we get these people to stop losing? Aren't these people aware of the consequences of falling behind? How can we get these people to buckle down and finish college already, before it's too late?* No longer do we view the current state of affairs in terms of a loser's game. All we see is the loser. Here are better questions: *What is the game that is producing losers? How can understanding the game help to better*

interpret its losers? How can this improved understanding inform more effective political action (on behalf of and on the part of the marginalized)?

In the liquid modernity of our digital age, with its rapidly changing and highly unstable social structures (Bauman, 2000), the nature of educational inequality has shifted from race to class (Duncan & Murnane, 2011; Reardon, 2011). Further, while many proposed technology and its self-teaching tools as the silver bullet that could serve the needs of all and subsequently level the playing field, scholars now view digital tools as an amplifying force that further entrenches these class-based inequities (Toyama, 2015). For example, broadband penetration is lower and Internet costs are higher than in comparable developed nations (Coplan, 2015; Porter, 2014). In other words, technologically-mediated disparities are, in turn, heightening traditional fault lines in social stratification to carve out "opportunity gaps" (Neuman & Celano, 2012, p. 59; see also Gorski, 2015). In light of these trends, making a positive difference in poor children's schooling means expanding our focus to what goes on outside schools (Altonji & Mansfield, 2011). Therefore, spatial perspectives are needed to map how this ever-shifting landscape of educational inequality is being manifested across geographies.

This dissertation project took a spatial Thirdspace perspective to re-imagine new ruralism, digital equity, and deficit discourse. From this analytical and theoretical backdrop, I added to the scholarship in the following ways: (1) examined how rural digital learning is caught up with space, (2) compared everyday experiences with digital media across socio-economic spaces, and (3) re-imagined educational equity through counter-mapping the rural space. The first objective mapped out the state and local geographic distribution of digital learning opportunities to contest the rural digital divide

as a spatial issue of justice. My second objective situated this rural digital divide against its local and lived spatial consequences to yield valuable implications for the *processes* contributing to inequalities. The third objective used counter-mapping as a posthumanist socio-spatial strategy to recast digital equity not in terms of the "haves and have nots" but as a co-constitutive account of socio-technical agency. In what follows, I discuss these broad objectives and their nuanced findings/themes more in-depth.

After this comprehensive summary, I will then align my conclusions with three potential frameworks for political action. I explain my conclusions prior to any solutions proposed, for several reasons. First and foremost, solutions must follow closely from and be informed by evidential findings (B. Gee, personal communication, February 12 & February 16, 2017). Otherwise, proposed solutions may do more harm than good. Second, once we arrive at a critical understanding, it becomes even more central to ask: *What can we do now?* As critical scholars, our task is to balance the need for comprehensive political thought in scholarship with critical action "in the field." For scholarship to have a real impact on community and further connections from research to practice, we must present clear implications for informed action. If we don't act against or offer possible solutions to any social ill we unmask, then we confine our role to mere cheerleaders in a loser's game (Gee, 2017). Third, hesitating to intervene (or suggest ways of interfering at the political level) fuels the deficit perspective by not only placing the burden for action, but also the blame for any inaction on the disempowered for their own self-made oppression. This means that while we may publish scholarship that professes otherwise, our broken system will endure as a deus ex machina spurning social degradation without human interference (Rank, 2004). Fourth, beyond divine

intervention, both Aristotle (2016) and Foucault (2006) assume being political is what it means to exist as human. While our society positions it as a matter of choice to act politically, power and politics are written into our genes, practices, and systems. As political actors, we share a commitment to change the world and engage in ethical work that makes a positive difference.

Discussion

Prior to this discussion, I must briefly explain the significance of the rural area from which my findings sprung. Focusing on the small rural town of Bingham, Maine was key to my project. First and foremost, growing up in Bingham has lent the general background knowledge necessary to deepen understanding into the nature of its digital inclusion efforts. Over the years, I have learned the history and implicit values of many of its families and observed how small towns work to level opportunity—inside and outside the classroom. Further, Bingham's district high school has just been ranked number one in the state of Maine by Newsweek's "Beating the Odds" list, which ranks schools on the extent that they "do an excellent job of preparing their students for college while also overcoming the obstacles posed by students at an economic disadvantage" (Ohm, 2015, para. 4). At the broader level, I drew on Maine as the microcosm of remote rural American life. The only state in the Union, bordered by only one other state, Maine's geography poses certain inescapable challenges of rural isolation when attempting to develop and implement an affordable and equitable statewide telecommunications infrastructure (ConnectME Authority, 2015). Since it first constructed a digital information network connecting its remote schools and libraries in 1996, Maine has stepped ahead of all states in the Union and tried to position itself at the

forefront of equitable Internet and technology access. For example, in 2003 it was the first state to implement a 1-to-1 laptop program among its middle schoolers and in 2004, the program was extended to all high school students (Warscahuer, 2004). Possibly because of this, the U.S. Chamber of Commerce voted Maine number one in its digital infrastructure efforts (Wiley, 2014). Thus for significance of digital literacy findings, Bingham's high rank by Newsweek in terms of its economically-disadvantaged high school students' high college-attending rates and Maine's unique efforts to promote rural digital equity deems this a special case worthy of examining.

Chapter 3 Claims

My purpose in Chapter 3 was to contest digital inequity as a spatial issue of justice in rural areas. Methodologically, I employed a focused empirical analysis to unpack the highly spatial character of digital inopportunity. I used the GIS to spatially analyze and map how digital learning opportunities (e.g., schools, museums, and libraries) were distributed unequally across space. In this way, I visually detected and organized spatial patterns not readily grasped through text or table to render the complex world as more immediately understandable. I then combined GIS tools with more storied conceptions of rural space capturing the local perspective of the problem. Through GIS mapping, I found that across Maine, the per capita distribution of real digital resources appears to be in favor of the wealthy. This pattern held in the small town of Bingham, as wealthier neighborhoods housed the town's only library and most of its schools. Across the state of Maine, I also found that areas that aren't wealthy, but still retain higher per-capita learning opportunities are concentrated near the high-tourist coastal and DownEast regions of Maine. Patterns related to the variables of population density, income, and

tourism emerged such that distribution of digital learning opportunities privileges higher income residents and wealthy non-resident tourists. Therefore, these patterns combine with more storied conceptions of space to critically question the spatiality of injustice and digital inequity present in lower-income areas that do not fit the idyllic vision of rural Maine. Taken together, implications for policy support the notion that more equitable distribution of fixed digital learning sites will better serve the marginalized and proffer greater digital equity.

Chapter 4 Claims

After exploring the spatial distribution of digital access (i.e., how digital learning opportunities are distributed across space), I looked closer into digital use, or how families living in neighborhoods of different socio-economic status (SES) were utilizing digital tools. Methodologically, I employed an ethnographically-grounded research design and compiled family and neighborhood case studies from a series of three home visits conducted over a period of six months. To gather a more nuanced understanding of the role of digital technologies in rural families' lives, I also implemented mobile phone diaries. From these combined data collection techniques, I could more readily dispel the myth that families of low SES are monolithic in their educational practices as well as contest deficit-based perspectives of rural families as inferior, illiterate, and backwards.

For example, I discovered how novel uses of media helped to level the playing field in rural areas. Sol, a 14-year-old student of low SES, re-invented and elevated his identity through making and sharing comical memes through Facebook. Through social media and his zany brand of humor, Sol forged a new kind of rural identity that freed him from the pressures of fitting into popular trends or class-based pre-teen social categories.

In facilitating Thirdspace openings, if he didn't know where he fit, he would simply make it up. Facebook built his confidence and also proved to be a rich learning tool for developing literacies. Sol's 160 Facebook friends posting regularly on his newsfeed motivated him to build conventional literacy skills in decoding, writing, and reading comprehension. Through navigating the social media sites and clicking through various embedded links, Sol also developed tools literacy, or the capacity to utilize digital tools to follow the flow of stories and information across multiple modalities (Jenkins, 2006). Moreover, using digital tools to meaningfully sample and rework digital content into memes helped to develop his design literacies (Jenkins, 2006). These combined literacies, though developed at home, translated into the classroom. In terms of grades, Sol excelled in language skills and was invited into the gifted and talented program at his school. In terms of digital literacy, he was also first to post answers within his science class's course website.

Sara, a rural mother of low SES, also showcased how digital practices can reshape the rural space to leverage upward economic mobility. Once self-ascribed as "digitally illiterate," she now faces her first semester in graduate school prepared, since having learned to navigate digital technologies and capitalize on open source software. At first, this outcome suggests nothing about Sara re-inventing norms, but simply subscribing to the deficit perspective (i.e., the disadvantaged merely have less technologies and less developed capacities to use digital technologies in mainstream ways). Included in her process, however, is the reflexivity practiced in rejecting negative stereotypes of impoverished and helpless single working mothers as not applicable. Unlike Trina and Becky, the other rural mothers of low SES in my study, who found redemption and

promise in conventional ideals of good mothering, Sara carved out a Thirdspace hybridized identity that refused these ideals. Her hybridized identity bolstered her when engaging in sacrifices others would deem as "unsuitable" for mothers, such as raising her children alone and taking time away from them to finish her college degree.

To further showcase rural families' untapped and often misrecognized technological expertise, I examined how rural mothers of low and high SES used digital technologies to re-invent their subordinate status and divide labor in the absence of men. Rural men generally value hard labor over "women's work" indoors. This meant two things: (1) women's use of digital communication technology and social media (which often occurred indoors) was considered below the men and (2) the closing of Bingham's lumber mills and fisheries sent able-bodied rural men farther from their homes to find validating blue collar work. Central to this division of labor was how social media took up this changing reality. With the men gone from dawn to dusk and sometimes entire weekends, rural women "manned" the steering of formerly male arenas within the town and used Facebook to do so. For this to work, the rural mothers felt they needed to elevate Facebook use from consumption (e.g., watching videos and reading online content) to participation. Consumption and over-consumption of media, or "being on Facebook all day," was viewed negatively because it meant time spent away from attending to children. Participation, on the other hand, signaled Facebook as a more acceptable social tool for moving outdoors into male territory to organize events, childcare, and schedules in the community.

Likewise, in socially-connected rural areas, "where it takes a village to raise a child," I found that drugs divide more social class. Facebook, as the glue of the self-

organizing women's co-parenting and event management, operated more inclusively than real life communication channels. Through forming exclusive Facebook groups, such as "Bingham Area Moms," social media could help rural mothers to ostracize other mothers deemed unfit due to drug addiction issues. With the safety of their and the town's children at stake, the women became highly sensitive to whom they included and excluded. Addiction often manifests through erratic behavior and inconsistent moods, which can negatively impact a household. Families could learn through either informal channels or tell through highly inconsistent social media patterns (e.g., late night use or vanishing for extended periods) exactly who was staying clean and who was still struggling with drugs. For example, Trina was of a higher SES than Sara, but drug addiction in her household, which manifested in her not accessing Facebook for long periods, kept her outside the rural mother's inner circle. A similar phenomenon occurred with mobile phones, as Trina and Becky's limited funds and/or related drug issues resulted in changing telephone numbers. This kept them from matching the consistent mobile phone-mediated communication of Sara. Meanwhile, Sara, through her more robust socio-technical arrangement of rural-mother-with-the-mobile-phone, could more readily maintain and leverage durable ties with rural mothers of higher SES. For lower SES women in this study, entrée into the women's inner social media hub demanded the maturity of having your life together (such was the case with Sara). Sara showed that class differences can be overcome and socio-economic spaces could be traversed through consistency and maturity demonstrated online and off. Consequentially, much growth took place in the rural women's civic engagement (whether digitally or in vivo). Without

the ability to interact often or effectively within these extended social circles, ample opportunities for growth and stability may have been lost.

Chapter 5 Claims

My final task was to identify promising ways of re-thinking rural educational equity. Methodologically, I staged a "re-mapping" of the social space as a critical lens for re-imagining the Thirdspace potential for digital equity. This involved counter-mapping and/or cross-validating my previous GIS maps with more posthumanist tracings of social movement and its production of Thirdspace. My findings suggested a more posthumanist socio-spatial strategy to promote digital equity—with critical attention directed towards views of equity which consider more than material essentialisms (i.e., inputs equally outputs and cause equaling effect). I used my posthumanist tracings and its related Thirdspace map as key instruments to weigh other symbolic and socio-spatial human/nonhuman considerations (outside of material essentialisms). From this re-imagining of digital equity, I differentiated the socio-technical arrangements of three rural families of low SES to specifically foreground socio-technical agency via the interconnectedness of humans and technology tools in one rural town. This untangling and reassembling helped to then better account for who (in terms of human and nonhuman actors) is doing what, when, and how. This supported the opposing notion that the key to understanding rural digital equity may exist not within the digital infrastructure or the superstructure (i.e., culture, norms, power relations) alone but within the socio-spaces housing the human-nonhuman *relations* binding these "structuring structures" (Bourdieu, 1977, p. 72). In this way, I problematized seemingly practical political measures by considering the complexity of the social, not as a structure that can be tamed

through simple quick-fix technological intervention but as an ongoing fluid proliferation of multiple entities, connecting, disconnecting, and re-assembling.

For example, my GIS maps supported the notion that equal distribution of fixed digital learning sites will proffer greater digital equity. In an aggressively anti-welfare political climate and its highly unequal society, it is important to note that equalizing resources will benefit both the rich and poor (Rank, 2004). Given this, my claim is not to oppose this needed resource redistribution, but only to provide a more nuanced view to initiate a discussion on how this may be better enacted across spaces. In other words, while quick-fix applications of a Marxist (1859) redistribution of wealth can infuse under-served areas with material goods, these interventions often ignore the symbolic and socio-spatial human-nonhuman considerations. This counter-mapping indicated that movement must circulate through the much-needed local digital infrastructures to supply its powerful life blood and trigger the work of the social. GIS maps, which understand the social in terms of fixed structures, too easily hide the true force of relational ties/networks which can leverage and build the socio-technical agency of rural families of low SES.

When we address socio-technical agency as constituted in a more dynamic and subtle system of relations, then political solutions to digital equity must likewise be constituted in more complex and subtle ways. Thus, simple intervention, material redistribution, and corrective regulation may not hold. Real lasting change and societal growth may come from investing in digital infrastructures that can modify how technologically-mediated practices and all related socio-technical agency flow together to make and remake our world. In more concrete terms, sinking money into stable fixtures in under-served communities is, at most, a temporary fix. Before long, more money is

needed to repair eroding structures or a worse-case and anti-welfare cost-benefit analysis deems the re-investment futile. Socio-technical agency reflects how the maximizing potential of digital equity may hinge upon enabling greater movement across spaces of different SES. From my counter-mapping, we learn to instead look to reassemble and subsequently strengthen the networks which are already enabling powerful socio-technical transformations.

In re-mapping the rural space such that it grows, expands, and travels (Bratton, 2000), I showed that the rural families of low SES are not devoid of agency. Not living within bounded space, but through it, I presented their identities as not locked within space/time/class. Many of the rural families could not predict how their individual actions and interactions would impact the larger pattern of activity as it emerged at the town level. Yet, intrinsic to human behavior, few trusted inconsistency. When Sara, as rural-mother-with-the-cellphone, could consistently leverage her socio-technical agency to exercise the greatest movement across spaces (i.e., reaching outermost levels of neighborhood and school), she developed greater awareness and purpose regarding her individual actions. These actions in turn increased through sheer stimulation of interactivity. Her consistent movement (across networks of people, tools, and organizational routines) provided predictability to others, and increased her credibility as a social actor. Rethinking digital equity as socio-technical agency may then empower the disempowered, dismantle the deficit perspective, and inform more effective political action.

Implications from Findings

How a society misunderstands its social problems will yield lasting misguided consequences for the various practical and political solutions proposed and enacted (Pierce, 2004). Deficit-based notions defining today's educational paradigm is problematic in its tendency to generate ineffective and/or narrow solutions. The afore-mentioned findings indicate my attempt to push against this trend and "story" a new truth (Gee, 2017). Only in dismantling this misconception can we revive political action and inspire an agenda of social justice. But my work doesn't stop at a re-interpretation of the digital inequity issues. Stated again, for scholarship to have a real impact on community and further connections from research to practice, we must do more. Hence, I use my specific spatial lens to propose possible actions and solutions to the social ills I denounce.

Solution 1: It Takes a Village…

Widening the digital divide lens to account for influential value-laden social ideologies, the idea of "haves and have not" has evolved into a structural issue dividing those connected individuals who "have much" and "have little" (Hilbert, 2014, p. 821). A focus on social equality addresses how some groups are able to benefit more from these technologies than others. While a considerable body of interdisciplinary and empirical research has suggested that ICTs lead to social, economic and political empowerment, collaboration and convergence (Allagui & Kuebler, 2011; Hilbert, 2011; Klein, 2012; Peres & Hilbert, 2010; Rosenblat & Mobius, 2004), as well as decentralized ownership and equity (Kelly, 1999), other critiques view these technologies as "weapons of total war," mass deception, and Orwellian social control (Waples, 1942, p. 907; see also Brecht, 1932; Enzensberger, 1970; Horkheimer & Adorno, 2002).

Thus, in this view, cultural participation takes primacy over interactivity. Interactivity is an affordance of the technology, while participation is an affordance of culture. Everyday technology practices of children and families as well as their consequences are considered reflections of the broader cultural and community values and practices (Weisner, Coots, & Berheimer, 2005; Weisner, 1997). Weisner (2014) describes the salient features, including material resources, norms and scripts, values and goals, emotions and motives, people, and their differing degrees of predictability, which organize and instantiate these cultural beliefs and practices within various cultural learning environments.

Within this framing, Warschauer's (2002, 2004) notion of social inclusion adequately reflects the demands of today's digital landscape. Incorporating the notion of class, but not bound by it (as certain impoverished societies may instantiate high levels of inclusivity), social inclusion encompasses issues of identity, language, social participation, community, and civil society (de Castells, 1997; Warschauer, 2002, 2004). Given the expanding access to new technologies, scholars believe that sharing of diverse talents and ideas can only occur if the cultivation of skills and cultural knowledge necessary for empowered and generative use are placed in the hands of all, regardless of background or creed (Warschauer, 2004; Gee, 2012). While the deficit-based perspective focuses on changing people through improving skills, views acknowledging the *social embeddedness of ICTs* address the larger societal changes and global development challenges confronted in the effective integration of technology into communities, institutions, and societies (Toyama, 2015; Warschauer, 2004).

A society's network-enabled capability rests in its people and, in turn, the culture and values shared by those people (Toyama, 2015). "Packaged interventions" which implement "any technology, idea, policy, or other easily replicable partial solution" through a one-size-fits-all approach ignore these human-centered cultural contexts and individual capacities (Toyama, 2015, p. 57). Focusing on scientific evidence, hard data, rigorous research, and evaluation to design, generalize and eventually scale up interventions neglects the importance of tacit cultural knowledge (Behar, 2012). However, effective social integration of technology demands cultural know-how of the target environment and its people (Barrera-Osorio & Linden, 2009). Despite the seductive "myth of scale," technocrats soon discover that it is substantially less painful to buy a thousand laptops than to foster an effective learning environment for a thousand illiterate children (Toyama, 2011, p. 4).While many can replicate the design of an intervention, considerable difficulty lies in replicating the qualities of the people and environment necessary for successful tech integration (Warschauer, 2004).

Therefore, critics view these failures and the general rhetoric behind them—technology will eradicate educational inopportunity and reduce poverty-- as a societal level of confusion over correlation and causation (Warschauer, 2004). Quick fixes which perform well in middle-class societies with basic income, housing and educational opportunities, can quickly engender cruel and perverse consequences in the developing world. Scholars believe these outcomes are due to technology's role as an amplifying force (Toyama, 2010, 2015; Warschauer, 2004; Warschauer & Matuchniak, 2010). In other words, channeled through human intention, for better or worse, technology can either amplify effective solutions or entrenched inequalities. When various scholars are

moved to explore why packaged interventions—many of them involving new digital technologies-- falter when scaled to under-performing schools, they discover quick fix digital solutions can never compensate for lack of adequate sociotechnical and human-centered infrastructure (Barrera-Osorio & Linden, 2009; Behar, 2012). Technology, when coupled with a lack of adequately trained teachers, engaged administrators, and tech support, not only provides no lasting gains, but it quickly becomes a burden that exacerbates existing problems and disadvantages. As is often the case, societies with the greatest need, are also unfortunately least equipped to take advantage of packaged interventions (Toyama, 2015).

The solution to improving the social embeddedness of ICTs then depends on a complex set of deep-rooted and human-centered factors. Enacting this human element of social change calls for individual and societal intrinsic growth towards higher levels of Maslovian development (Toyama, 2015). Callahan (2007) recognizes the growing gap between the life that many Americans crave and the reality they can afford-- a concern among even those with everything. Accordingly, individuals no longer invest promise in cultural values, such as belief in community, social obligation, or compassion for the less fortunate (Brooks, 2007). As such, heightened aspirations extend beyond the self-actualized and self-satisfying pursuit of higher intelligence towards other-oriented self-transcendent goals (Maslow, 1996; Toyama, 2015). To counteract rising inequality and social dissonance and foster a more "compassionate world," Toyama (2015) calls for a "compassionate class" guided by the following three critical qualities: positive aspiration to improve things (heart), discernment and judgment to identify appropriate strategies and

opportunities (mind), and discipline to put off present day comfort for future gain (will) (p. 189).

Within this heart, mind, and will "framework of internal human betterment" is the need for societal intrinsic development (Toyama, 2015, p. 169). Rather than separate them, he views that individual intrinsic growth and societal intrinsic development as mutually reinforcing—with socioeconomic growth affecting Maslovian development and vice versa. And his recommendation, to more fully develop and validate a paradigm of mentorship, also recognizes the place of packaged interventions in development-- so long as they "amplify the right human forces" (Toyama, 2015, p. 204). In this way, mentorship guides those handling the technology and redirects focus towards building the human capacity and intrinsic motivation of the communities where they are delivered to thus modify and unpackage the one-size-fits-all approach from its former externally imposed digital solution (Cohen & Levinthal,1990; Pawson, 2004; Zachary, 2011). Herein, the technology will amplify a self-propelled and localized desire for progress. Reaching the most digitally excluded then requires sequential investment in intrinsic growth before technology.

The strengths of this framework hold that a strong foundation of human and societal growth will yield a strong and enduring socio-technical infrastructure that can take full advantage of its technology. For example, when applied to rural folk, these heart, mind, and will qualities manifest a new kind of rural modernity that bravely pushes past new ruralism. Research showcasing flourishing rural technology practices can unravel the myth of the wilderness as backwards and illiterate. Rural intrinsic growth may pressure policymakers to re-envision the rural space such that it is no longer

"understood or misunderstood as a simpler more natural place left behind by the advance of modern capitalism" (Corbet, 2016, p. 154). This combined individual intrinsic growth and societal intrinsic development may then invite rural residents into dialogue with those oftentimes corporate service providers handling any local digital initiatives.

However, the limitations of this view are that there is no clear and measureable path towards what critics have labeled as a "lofty ideal" (Means, 2015). In circumstances where it takes expertise to make expertise (Bransford & Schwartz, 2009), quality mentorship is difficult to secure. Furthermore, funders rarely dismiss the raw power of clear and measureable results—especially if they evidence the quick success of a techno-centric solution (Means, 2015). Therefore, newly minted educational programs will struggle to both attract and keep funding unless they provide strong evidence of change (societal or human-centered). All the same, implications call for comprehensive technology integration strategies which design context-appropriate technology, adhere to sociocultural norms, account for existing dysfunctional physical infrastructure (e.g., poor electrical services, insufficient transportation system), build relationships with local entities (e.g., government, community leaders), invite community support and participation, provide services that meet local needs, instill a sustainable financial model, and offer incentives for all stakeholders (Toyama, 2010).

Solution 2: But, What if It Doesn't Take a Village?

While my focus on families may lend insight into the broad reassembled state of affairs, proposing family-based solutions may not always yield promising educational results. Research suggests that families have a strong influence on children's success in school (Altonji & Mansfield, 2011; Dahl & Lochner 2008; Duncan, Ludwig &

Magnuson, 2010) and home access to and use of technology yield greater digital skills than when technology is only accessed and used in school (Cirell, Pivovarova & Ambroso, 2016). Others, however, problematize the family-school connection. Furstenburg (2011) has found only weak causal links between family characteristics and their children's school achievement. From the literature, he first outlines the following six mechanisms through which families can impact their children's school success: (1) cognitive training, such as literacy learning and educational practices; (2) cultural values contributing to education and social status; (3) parental practices, including disciplinary, socio-emotional, and school advocacy; (4) structural factors, such as parental resources affecting family organization; and (5) social networks, which may afford the child more privileged social standing. Furstenburg (2011) next documents the disappointing results of a variety of programs attempting to enhance parental skills and resources across these mechanisms. From these programs' minimal impact on improving children's school readiness, he concludes a weak causal link between families and school success.

When noting competing perspectives that potentially trouble any proposed solutions I suggest, it is important to critically balance Furstenburg's logic with the understanding that preventing problems is more efficient and cost-effective than remedying their effects through patchwork programs. This is especially true if these programs are ill-developed, such that they only focus on one or two mechanisms rather than integrating all. Moreover, these solutions may have been poorly implemented in a one-size-fits-all manner that implicitly misrecognizes the incredible diversity across families of low SES. Additionally, before explaining away the influence of families on school success, we might then similarly examine the causal link between wealthier

families' investments and their children's success. Abundant literature points to the sizeable difference between poor and affluent families' financial investments in educationally-enriching activities outside the classroom, such as private tutoring, summer robotics camps, visits to historical sites or science museums (Anyon, 2005; Ito et al., 2009; Lareau, 2003). Further, wealthier parents often have more time to personally engage with and support their child's learning (Duncan, Ludwig & Magnuson, 2010; Lareau, 2003). Given this, we then must ask whether family-based interventions have done enough to truly offset the structural factors affecting these differences.

Those skeptical of family-based solutions put faith in schools as the great equalizer mediating the negative effects of the digital divide or class inequity on children's educational futures. Even though early childhood interventions such as Perry Preschool, Head Start, the Nurse- Family Partnership, and the Milwaukee Project may have increased kindergarten readiness, improvements often do not last past kindergarten (Curto, Fryer & Howard, 2011; Puma et al. 2010). Over the past 25 years, nearly every state in the nation has sought to improve schools through standards-based educational reforms (Murnane, 2007). Most of these school improvement changes address the following three components: improving curricular content standards and their assessments, providing students and teachers with incentives to meet the standards, building the capacity to deliver standards-based instruction to students. While the first two components are often easy to adopt, they do nothing to improve education, in themselves. Implementing them requires the third, which most schools cannot fulfil (Murnane, 2007).

A variety of strategies for improving school's capacity to deliver quality instruction to students has been proposed. These include smaller schools and classrooms (Jepsen & Rivkin, 2002; Krueger, 1999); extending the school day (Fashola, 1998, 2013); mandatory summer school (Jacob & Lefgren, 2004); afterschool programs (Lauer et al., 2006); ending social promotion (Jacob & Lefgren, 2009); and policies lowering the barrier to teaching via alternative paths to accreditation (Decker, Mayer & Glazerman, 2004; Kane, Rockoff & Staiger, 2008). While many of these proposed changes may be costly, Jacob and Ludwig (2008) found that targeted investment in either early childhood education, smaller class sizes, or bonuses for teachers in hard-to-staff schools separately pass a cost-benefit analysis. Among their proposed low-cost changes were changes to school organization and classroom instruction improvements (Jacob & Ludwig, 2008). After justifying these changes, Jacob and Ludwig (2008) then asked why these changes were not implemented more widely. Their conclusion: "…presumably the answer is some combination of lack of information, political resistance, bureaucratic inertia, or other factors" (p. 58).

Here is where I discuss the "other factors." While no one will argue over the importance of improving schools, many of these measures may not sufficiently address the link between poverty and education (Gorski, 2013). In particular, school choice was proposed as a means of improving education through subjecting schools to market competition (Howe, 2008). The idea was that choice was empowering for disempowered parents and students in struggling schools. Given the opportunity to choose, wouldn't everyone choose to improve their child's chances for academic success and therein exit from the lower quality school? The low-performing school is now forced to compete for

needed attendance, and school choice is hailed as the catalyst for state-wide school improvement. With the low-performing school now responding to parents' signals, all would be better off, including the child who left and the child who stayed (Howe, 2008). This way, the parents no longer put up with poverty and segregation, which they now could interpret as "excuses" wielded by weak teachers and their unions to reason away poor performance (Thernstrom & Thernstrom, 2004).

In the 1950s and 1960s, school choice was viewed very differently and stamped with the stigma of "white flight" from school segregation to mostly private all-white prep schools (Ravitch, 2010). Now is no different as wealthier parents hijack school choice to further advantage their children and remove them from their more diverse public school. Also readily apparent is the inability for school choice to benefit those without the opportunity to exit. These inopportunities for choice manifest most when no better schools are accessible to parents of low SES (Howe, 2008). Moreover, the more the public views education as a household consumer choice, the less willing they will be to fund education for others' children (Ravitch, 2010). This means that the sense of communal responsibility (i.e., It takes a village…) becomes fragmented.

What's more is that substantial evidence on school choice, drawn largely from charter schools, indicates a minimal effect on raising achievement. If anything, Howe (2008) reviewed the evidence to find that charter schools, by exacerbating racial segregation, may actually increase the achievement gap. A number of high-poverty charter schools can provide evidence that they perform well, but often this evidence is weak or short-lived. After the Education Trust identified 1,320 high-flying high-poverty schools, Harris re-analyzed these improvements while applying more stringent criteria

(e.g., having to do well in both reading and math, in more than one grade, for two years running). With these criteria applied, only 7 percent of these high-poverty schools could pass as successful.

Among this small percentage of successful schools are Knowledge is Power Program (KIPP), Harlem Children's Zone, and the Broader Bolder Approach charter schools (Curto, Fryer & Howard, 2011). KIPP promotes a no excuses disciplinary code and requires parents to sign contracts pledging to follow strict KIPP rules. All KIPP students attend 8-9 hour days and mandatory summer school (Curto, Fryer & Howard, 2011). Strict discipline codes and related parental contracts suggest KIPP schools may cater to a different demographic than traditional high poverty public schools. Harlem Children's Zone also implements an extended school day, an 11-month calendar, and small class sizes (Otterman, 2010). These NYC charter schools also provide incentives to students for high performance, namely trips to Galápagos Islands or Disney World. The Broader Bolder Approach (BBA) charter schools focus on an external comprehensive community-based models to mediate the effects of poverty in the community. BBA extends the traditional school day, but also provides on-site access to early childhood education, mental health, and other social supports (Curto, Fryer & Howard, 2011).

Yet, common to these successful charter schools is their sizeable per-student financial investment. Contrary to their guiding market-based logic, these charter schools are not doing more with less, as they spend considerably more per-student than public schools. For example, KIPP spends roughly 35 percent more, and sometimes up to 50 percent more than public schools (Howe, 2008). Harlem charter schools cost around $16,000 per student in the classroom each year, as well as thousands of dollars in out-of-

class spending. Public schools in New York City, on the other hand, annually spend around $7,000 per general education student in the classroom and $7,000 for out-of-classroom spending (Otterman, 2010). Likewise, KIPP and Harlem charters cannot exist (or expand) without ample private donations. This is not to say that we shouldn't increase spending on education, but that this philanthropic model may be difficult to scale up and prove practical for other public schools, particularly for rural schools worlds away from Manhattan's many corporate donors. Finally, most interesting is how proponents of school-based solutions are so quick to question whether it takes a village. Meanwhile, most of their winning schools are trying to replace/become the village.

Solution 3: What if, Instead, It Takes a Nation??

Placing my findings within the context of today's "America Dream" fuels the false fantasy of opportunity for all. Amid the nightmare of our aggressively anti-welfare political climate and its highly unequal society, scholars acknowledge that equalizing resources will benefit both the rich and poor (Rank, 2004; Reardon, 2011). Positioning education as a consumer choice gives taxpayers an excuse for not funding education for all (Ravitch, 2010). And with increasing globalization, as affluent individuals expand their influence and derive more affirmation and belonging from comparable elites across the world, they are less likely to feel responsible for non-elites in their own country (Gee, 2014). However, the improvement of our nation's workforce as well as the related economic gain that often follows depends upon all children's access to high-quality public education (Hanushek & Kimko, 2000). This goes for rural areas as well. Cirell, Pivovarova, and Ambroso (2016) found that the higher the inequality in a country, the wider the urban/rural gap in digital literacy scores (r= 0.53). From the 2009 Programme

for International Student Assessment's (PISA's) sample of 107,394 high school students in 3,628 schools across 16 countries, they estimated urban students, on average, outperformed rural students in digital literacy by a quarter of standard deviation, or roughly 25 points. This digital gap remained significant after accounting for potential socio-economic differences between urban and rural. Because consequences have their own consequences, technology's impact on amplifying class divides may have spilled over to widen spatial divides. Needed investments at improving the life chances of children born into low-income families, and especially low-income rural families, will fortify the country's frayed social fabric, boost morale, and likewise fuel conditions for economic growth (Duncan & Murnane, 2011).

Duncan and Murnane (2011) propose three ways to equalize resources and life chances. These include funneling more policy funds into early childhood education for low SES areas, continuing investments in low-income children's education every grade thereafter, and opening a nation-wide policy debate over the economic consequences of laissez-faire policies on family income inequality. This last proposal would hinge on the evidence that public policy efforts strengthening families will make a difference in their children's schooling. Reardon (2011) showed a strong relationship between raising the Earned Income Tax Credit for low-income families and test score gains among young children. Kaushal, Magnuson, and Waldfogel (2011) explained evidence suggesting that supplementing low-income families with greater resources can spurn a related increase of funds invested in their children's learning-centered enrichment items and activities.

From this evidence and a national policy debate, similar federal solutions could be proposed. These include family tax relief that doubles the Child Tax Credit to $2,000 for

young children. Raising the minimum wage would also benefit working-class families' ability to invest in their child's education. More specific to rural areas, federal subsidies to offset Internet costs could promote rural Internet adoption (Trujillo, 2016). To combat rural decay, the government can create rural jobs focused on rebuilding infrastructure, such as highways and bridges. Other means of rural employment that could push rurality past new ruralism would generate "green jobs" which help industries or areas use fewer natural resources and achieve greater environmental sustainability (Kamenetz, 2009). These jobs include installing solar panels, retro-fitting old buildings for maximum energy efficiency (e.g., painting roofs white, inserting storm windows), and recycling and repurposing e-waste, such as antiquated computers, consumer electronics, or fridges (Kamenetz, 2009).

Here is where I specifically state what the spatial perspective can lend to these federal solutions. Our growing income inequality has led to wealth polarization between geographic regions. Rural areas are cut off from urban centers, and the inner-city is clearly disconnected from suburbia. In light of increasing spatial and economic segregation, high school and elementary students of low SES are two to four times more likely than their affluent peers to interact with other students who demonstrate low skills and behavior issues (Rowan, 2011). In particularly high-poverty areas, due to the high-turnover of students and staff in high-poverty schools, three consecutive years of attendance leaves the average student nearly three months behind (Raudenbush, Marshall & Art, 2011). For Chicago-based students, simply residing in its most destitute neighborhoods reduces one's verbal test scores by an extent "roughly equivalent to missing one or two years of schooling" (Burdick-Will et al., 2011, p. 261). When provided with the opportunity to reside in and attend school in low-poverty neighborhoods, low-income high

school students from Chicago were four times less likely to drop out and seven times as likely to enroll in a four-year university, when compared against those remaining in high-poverty Chicago neighborhoods (Burdick-Will et al., 2011). Further, students in high-poverty schools cannot make the kind of professional connections that more affluent students foster to fuel them forward throughout college and the labor market. This phenomenon may clarify why, even after accounting for school attainment, graduates from high-poverty schools have lower earnings than their peers graduating from wealthier schools/areas (Raudenbush, Marshall & Art, 2011). This research indicates a robust and enduring connection between the spatial location of a student's family and their leveled opportunity for upward mobility in American society.

Though largely ignored by federal policymakers, addressing spatial divides could have an enormous impact on student outcomes (Burdick-Will et al., 2011; Rowan, 2011). Our growing income inequality has led to wealth polarization between geographic regions. Rural areas are cut off from urban centers, and the inner-city is clearly disconnected from suburbia. And my work has suggested that equity efforts consider more than material essentialisms (i.e., inputs equally outputs and cause equaling effect) to include less-linear and more complex symbolic considerations. This complex spatial lens helps understand that the impact of concentrated poverty is nonlinear (Burdick-Will et al., 2011; South & Crowder, 1999). This means that leaving the most destitute areas has a curvilinear positive effect, as more disadvantaged students, without extensive educational and social supports at home, are more influenced by improved schooling opportunities (South & Crowder, 1999). Fears that diversifying neighborhoods and schools will harm affluent students are quickly squashed by the evidence that racial desegregation decreased

black dropout rates but did not increase white dropout rates (Duncan & Murnane, 2011). Amid our digital divide and increasing economic inequities, the ability to connect to other resource-rich regions, either physically or digitally, becomes more essential for social and economic development. With so many low-income areas falling short of this imperative, great concern arises as the chances for educational opportunity and digital inclusion grow slimmer.

Call for Future Research

This dissertation re-imagined the digital divide by examining how humans and nonhumans co-produce technologies, as well as the lived space these socio-technical transformations might enable. Mapping families' inequities in this way may clarify the complex and dynamic ways in which social class is caught up in space. Scholars discuss poverty as evidence of a structural failing, not an individual one (Rank, Yoon, Hirschl, 2003). Hence, from a Thirdspace perspective that explains inequity as a spatial failing, I can support and further the scholarship. Yet, my findings only scrape the surface and therefore invite the need for more research in the area of digital inequity, rurality, and human geography. Needless to say, there are many opportunities for extending this work. Also, as new questions emerge and continue to challenge us, sophisticated tools and innovative approaches are needed to provide potential answers. Future research could apply different data collection strategies to more thoroughly examine nonphysical factors, such as broadband rates or virtual environments. Researchers may also elect to study virtual environments through online/virtual ethnography or through shadowing students' digital practices in rural schools. This future research would help to add insight into digital use in new and unexplored ways and possibly make connections from digital use

to academic test scores. The small rural town in Maine is by no means representative of the diversity of rural America. Other studies of rural digital practices are needed in Appalachia, the Deep South, the plain states, other parts of New England. In terms of methods, alternative approaches, such as phenomenology, could build from and complement my spatial findings. A phenomenological approach, which oppose the narrative view of ordering daily events as coherent and meaningful, would instead unveil how the rural folk, themselves, are conceiving of their subjective experiences with digital media. A more focused historical analysis could examine the intersection of rural families' namesake lineage, digital skills, agency, and social class.

But now is the finish line. Stop all ticking clocks! This final chapter and its larger dissertation have a due date. Thus, the saga must end.

REFERENCES

Agar, M. (2008). *Speaking of ethnography* (Vol. 2). Thousand Oaks, CA: Sage.

Ahmed, S. (2010). *The promise of happiness*. Duke University Press.

Allen, J. (2007). Creating Welcoming Schools: A Practical Guide to Home-School Partnerships with Diverse Families. *International Reading Association (NJ3)*.

Altonji, J. G., & Mansfield, R. K. (2011). The role of family, school, and community characteristics in inequality in education and labor market outcomes. In Duncan, G. J., & Murnane, R. J. (Eds.). *Whither opportunity?: Rising inequality, schools, and children's life chances*. Russell Sage Foundation.

Anyon, J. (2005). *Radical possibilities: Public policy, urban education, and a new social movement*. New York: Routledge.

Aradau, C., Huysmans, J., Neal, A., & Voelkner, N. (2014). *Critical security methods: New frameworks for analysis*. New York: Routledge.

Arendt, H. (1968). *Men in dark times*. Houghton Mifflin Harcourt.

Aristotle (1916). *Politics*. (B. Jowett, Trans.). Oxford: Clarendon Press.

Aristotle (n.d./1944). *Aristotle in 23 volumes, vol. 21*. (H. Rackham, Trans.). Cambridge, MA: Harvard University Press.

Artiles, A. (2003). Special education's changing identity: Paradoxes and dilemmas in views of culture and space. *Harvard Educational Review, 73*(2), 164-202.

Artiles, A. J. (2011). Toward an interdisciplinary understanding of educational equity and difference: The case of the racialization of ability. *Educational Researcher, 40*(9), 431-445.

Bachelard, G. (1969). *The poetics of space.* (M. Jolas, Trans.). Boston: Beacon.

Bakhtin, M. M. (1981). *The dialogic imagination: Four essays* (Vol. 1). University of Texas Press.

Barden, O. (2014). Facebook levels the playing field: Dyslexic students learning through digital literacies. *Research in Learning Technology, 22*.

Barron, B. (2004). Learning ecologies for technological fluency: Gender and experience differences. *Journal of Educational Computing Research, 31*(1), 1-36.

Barron, B., Martin, C. K., Takeuchi, L., & Fithian, R. (2009). Parents as learning partners in the development of technological fluency. *International Journal of Learning and Media, 1*(2), 55–77. doi:10.1162/ijlm.2009.0021

Bauman, Z. (2000). *Liquid modernity*. Cambridge, UK: Polity.

Bauman, Z. (2016). Zygmunt Bauman: Behind the world's 'crisis of humanity' [video]. Retrieved from https://www.youtube.com/watch?v=EG63MkQb1r4

Beane, L.L. (1942). *Hunting, fishing, and camping.* Bedford, MA: Applewood Books.

Beaulieu, L. J., Israel, G. D., & Wimberley, R. C. (2006). Promoting educational attainment: A partnership of families, schools and communities. In D. L. Brown and L. E. Swanson (Eds.) *Challenges for rural America in the twenty-first century*, 273-289. University Park, PA: Pennsylvania State University Press.

Becker, R. (2017, Jan. 17). Preventable death rates in rural America are higher than in cities. *The Verge*. Retrieved from: http://www.theverge.com/2017/1/12/14255940/us-rural-death-rates-america-medical-care-access

Beeson, E., & Strange, M. (2000). Why rural matters: The need for every state to take action on rural education. Retrieved from: http://jrre.vmhost.psu.edu/wp-content/uploads/2014/02/16-2_3.pdf

Beltran, D. O., Das, K. K., & Fairlie, R. W. (2006). *Do home computers improve educational outcomes? Evidence from matched current population surveys and the national longitudinal survey of youth.* National Poverty Center, University of Michigan. Retrieved from http://login.ezproxy1.lib.asu.edu/login?url=http://search.proquest.com/docview/1322253763?accountid=4485

Bhabha, H. K. (1994). *The location of culture*. London: Routledge.

Bigman, D., & Fofack, H. (Eds.). (2000). *Geographical targeting for poverty alleviation: Methodology and applications*. World Bank Publications. doi:10.1596/0-8213-4625-3 .

Billah, M. (2015, August 16). Avoid yesterday's education for tomorrow's kids. *The Daily Sun*. Retrieved from: http://www.daily-sun.com/printversion/details/67298/Avoid-yesterdayrsquos-education-for-tomorrowrsquos-kids

Bock, B. B. (2016). Rural marginalisation and the role of social innovation; a turn towards nexogenous development and rural reconnection. *Sociologia Ruralis, 56*(4), 552-573.

Bodenhamer, D. J., Corrigan, J., & Harris, T. M. (2010). *The spatial humanities: GIS and the future of humanities scholarship*. Indiana University Press.

Bodenner, C. (2016, Nov. 16). Confessions of a liberal urban elitist. *The Atlantic*. Retrieved from: https://www.theatlantic.com/notes/2016/11/confessions-of-a-liberal-urban-elitist/507926/

Bosworth, G., Annibal, I., Carroll, T., Price, L., Sellick, J., & Shepherd, J. (2015). Empowering Local Action through Neo-Endogenous Development; The Case of LEADER in England. *Sociologia Ruralis, 55*(4), 497-515.

Bourdieu, P. (1977). Cultural reproduction and social reproduction. In J. Karabel & A. H. Halsey (Eds.), *Power and ideology in education* (pp. 487-510). New York: Oxford University Press.

Bourdieu, P. (1977). *Outline of a theory of practice*. London: Cambridge University Press.

Bourdieu, P. (1986). *Masculine domination*. Palo Alto: Stanford University Press.

Bourdieu, P. (1989). Social space and symbolic power. *Sociological Theory, 7*(1), 14-25.

Bowles, S., & Gintis, H. (1976). *Schooling in capitalist America*: *Education Reform and the Contradictions of Economic Life.* New York: Basic Books.

Bowles, S., & Gintis, H. (2002). Schooling in capitalist America revisited. *Sociology of Education,* 1-18.

Brownstein, R. (2016, Nov.17). How the election revealed the divide between city and country. *The Atlantic.* Retrieved from: https://www.theatlantic.com/politics/archive/2016/11/clinton-trump-city-country-divide/507902/

Bryman, A. (2007). Barriers to integrating quantitative and qualitative research. *Journal of Mixed Methods Research, 1,*8-22.

Burdick-Will, J., Ludwig, J., Raudenbush, S. W., Sampson, R. J., Sanbonmatsu, L., & Sharkey, P. (2011). Converging evidence for neighborhood effects on children's test scores: An experimental, quasi-experimental, and observational comparison. In Duncan, G. J., & Murnane, R. J. (Eds.). *Whither opportunity?: Rising inequality, schools, and children's life chances*. Russell Sage Foundation.

Burns, C. (2014, June 21). The Maine economy is missing a key ingredient: Fiber. *Bangor Daily News.* Retrieved from: https://bangordailynews.com/2014/06/21/opinion/the-maine-economy-is-missing-a-key-ingredient-fiber/

Campbell-Kelly, M. & Aspray, W. (2004). *Computer: A history of the information machine.* Boulder, CO: Westview Press.

Carter, P. L. (2016). Carter comment on Downey and Condron. *Sociology of Education, 89*(3), 225-226.

Castells, M. (2001). Materials for an exploratory theory of the network society. *British Journal of Sociology*, *51*(1), 5-24.

de Castell, S., & Luke, A. (1986). Models of literacy in North American schools: Social and historical conditions and consequences, In: S. de Castell, A. Luke, and K. Egan (editors). *Literacy, society, and schooling.* (pp. 87-109). New York: Cambridge University Press.

Cervone, J. (2014, November 26). Who stands for rural Americans? *Truth Out*. Retrieved from: http://www.truth-out.org/speakout/item/27685-who-stands-for-rural-americans

de Certeau, M. 1984. *The practice of everyday life*. London: University of California Press.

Chapin, M. and Threlkeld, B. (2001) *Indigenous Landscapes: A Study in Ethnocartography. Arlington,* VA: Center for the Support of Native Lands.

Cieri, M. (2003). Between being and looking queer tourism promotion and lesbian social space in greater Philadelphia. *ACME: An International Journal for Critical Geographies*, *2*(2), 147-166.

Cirell, A. M., Ambroso, E., & Pivovarova, M. (2017, March). *Inequality and place amid a digital age: Place-based digital inequity in relation to economic inequality and opportunity to learn.* Association for Education Finance and Policy (AEFP), Washington, DC.

Clark, L. S. 2013. Parenting in a digital age: The mediatization of Family Life and the Need to act. In L.S. Clark (Auth.) *The Parent App: Understanding families in the digital age*. Oxford University Press.

Clyburn, M. L. (2010). *Promoting broadband policies to improve our nation*. Telecommunications Policy Research Conference: Arlington, Virginia.

Crang, M. (2005) Qualitative methods: Is there nothing outside the text? *Progress in Human Geography, 29*(2): 225-233.

Creswell, J. W. (1994). *Research design: Qualitative and quantitative approaches*. Thousand Oaks, CA: Sage.

Creswell, J. W., & Clark, V. L. P. (2007). *Designing and conducting mixed methods research*. Thousand Oaks, CA: Sage.

Creswell, J. W., & Plano Clark, V. L. (2007). Designing and conducting mixed methods research. Thousand Oaks, CA: Sage.

Creswell, J. W., & Tashakkori, A. (2007). Editorial: Developing publishable mixed methods manuscripts. *Journal of Mixed Methods Research, 1*(2), 107-111.

Cole, M. (1996). *Culture in mind*. Cambridge, MA: Harvard University Press.

Common Core State Standards. (2010). Supplemental information for Appendix A of the common core state standards for English Language Arts and literacy: New research on text complexity. Retrieved from:http://www.corestandards.org/assets/E0813_Appendix_A_New_Research_on_Text_Complexity.pdf

ConnectME Authority. (2015). *Annual Report on the Activities of the ConnectME*. Retrieved from: http://digitalmaine.com/cgi/viewcontent.cgi?article=1011&context=connect_docs

Coplan, J. H. (2015, July 20). 12 signs America is on the decline. *Fortune*. Retrieved from: http://fortune.com/2015/07/20/united-states-decline-statistics-economic/

Corbett, M. (2016). Reading Lefebvre from the periphery: Thinking globally about the rural. In C.T. Jakubowski (Ed.) *Self-studies in rural teacher education* (pp. 141-156). Springer International Publishing.

Cuban, L. (2001). *Oversold and underused: Computers in classrooms, 1980- 2000.* Cambridge, MA: Harvard University Press.

Curto, V. E., Fryer, R. G., & Howard, M. L. (2011). It may not take a village: Increasing achievement among the poor. In Duncan, G. J., & Murnane, R. J. (Eds.). *Whither opportunity?: Rising inequality, schools, and children's life chances*. Russell Sage Foundation.

Dabla-Norris, M. E., Kochhar, M. K., Suphaphiphat, M. N., Ricka, M. F., & Tsounta, E. (2015). *Causes and consequences of income inequality: a global perspective*. International Monetary Fund.

Deleuze, G., & Guattari, F. (1988). *A thousand plateaus: Capitalism and schizophrenia*. Bloomsbury Publishing.

Dennis, S. F. (2006). Prospects for qualitative GIS at the intersection of youth development and participatory urban planning. *Environment and Planning A*, *38*(11), 2039-2054.

Denzin, N. K. (1970). *Sociological methods: A sourcebook*. New York: McGraw-Hill.

Doering, C. (2013, Jan. 13). As more move to the city, does rural America still matter? *USA Today*. Retrieved from: https://www.usatoday.com/story/news/nation/2013/01/12/rural-decline-congress/1827407/

Donehower, K., Hogg, C., & Schell, E. E. (2011). *Reclaiming the rural: Essays on literacy, rhetoric, and pedagogy*. SIU Press.

Duncan, G. J., & Murnane, R. J. (2011).The American Dream, then and now. In Duncan, G. J., & Murnane, R. J. (Eds.). *Whither opportunity?: Rising inequality, schools, and children's life chances*. Russell Sage Foundation.

Edirisinghe, C., Nakatsu, R., Cheok, A., & Widodo, J. (2011, October). Exploring the concept of third space within networked social media. In *International Conference on Entertainment Computing* (pp. 399-402). Springer Berlin Heidelberg.

Elden, S. (2004). *Understanding Henri Lefebvre*. A&C Black.

Eliasoph, N. (2017, April 3). Scorn wars: Rural white people and us. *Contexts: Understandings People and their Social Worlds*. Retrieved from: https://contexts.org/articles/scorn-wars-rural-white-people-and-us/

Elwood, S. & Cope, M. (2009). Qualitative GIS: Forging mixed methods through representations, analytical innovations, and conceptual engagements. In Cope, M., & Elwood, S. (Eds.). *Qualitative GIS: A mixed methods approach*. Thousand Oaks, CA: Sage.

Ercikan, K., & Roth, W. M. (2006). What good is polarizing research into qualitative and quantitative?. *Educational Researcher*, *35*(5), 14-23.

Eubanks, V. E. (2007). Trapped in the digital divide: The distributive paradigm in community informatics. *The Journal of Community Informatics*, *3*(2).

Everett, A. (2008). *Learning race and ethnicity: Youth and digital media*. MIT Press.

Facer, K. (2011). *Learning futures: Education, technology and social change*. Abingdon, Oxon. Routledge.

Fashola, O. S. (1998). *Review of Extended-Day and After-School Programs and Their Effectiveness*. Report No. 24.

Fashola, O. S. (2013). Evaluation of an Extended School Day Program for African American males in the context of single gender schooling and schoolwide reform: A case for extending the school day for African American males. *Peabody Journal of Education*, *88*(4), 488-517.

Fielding, N., & Cisneros-Puebla, C. A. (2009). CAQDAS-GIS convergence toward a new integrated mixed method research practice?. *Journal of Mixed Methods Research*, *3*(4), 349-370.

Fishell, D. (2015, February, 24). Why government is trying to boost Maine's worst-in-the-nation Internet speeds. *Bangor Daily News.* Retrieved from: http://bangordailynews.com/2015/02/24/the-point/why-government-is-trying-to-boost-maines-worst-in-the-nation-internet-speeds/

Freire, P. (1970). *Pedagogy of the oppressed.* New York: Continuum.

Frels, J. G., Frels, R. K., & Onwuegbuzie, A. J. (2011). Geographic information systems: A mixed methods spatial approach in business and management research and beyond. *International Journal of Multiple Research Approaches*, *5*(3), 367-386.

Foucault, M. 1977. *Discipline and punish: The birth of the prison.* London: Allen Lane.

Foucault, M. (1984). *Des espace autres. Architecture, Mouvement, Continuité. 5*, 46–49.

Foucault, M. (2006). *Politics, philosophy, culture: Interviews and other writings, 1977-1984*. Routledge.

Fox, J, Suryanata, K., & Hershock, P. (2005). *Mapping communities: Ethics, values, practice*. Hawaii: East-West Center.

Fox, S. (2000). Communities of practice, Foucault, and actor-network theory. *Journal of Management Studies*, *37*(6), 853-868.

Furstenberg, F. F. (2011). The challenges of finding causal links between family characteristics and educational outcomes. In Duncan, G. J., & Murnane, R. J. (Eds.). *Whither opportunity?: Rising inequality, schools, and children's life chances*. Russell Sage Foundation.

Gavin, R. (2016, March 30). We asked Mainers: Here are the top 10 mistakes tourists make when they come to Maine. *WJPQ*. Retrieved from: http://wjbq.com/we-asked-mainers-here-are-the-top-10-mistakes-tourists-make-when-they-come-to-maine/

Gee, J. P. (1990). *Social linguistics and literacies: Ideology in discourses*. New York: The Falmer Press.

Gee, J. P. (2007). *What video games have to teach us about learning and literacy*. Macmillan.

Gee, J.P. (2012). *Situated language and learning: A critique of traditional schooling*. New York: Routledge.

Gee, J. P. (2014). *An introduction to discourse analysis: Theory and method*. New York: Routledge.

Gee, J. P. (2017). Education and politics. Unpublished ms., Arizona State University, Tempe, AZ.

Gee, J. P., & Hayes, E. R. (2011). *Language and learning in the digital age*. New York: Routledge.

Gelo, O., Braakmann, D., & Benetka, G. (2008). Quantitative and qualitative research: Beyond the debate. *Integrative Psychological and Behavioral Science*,*42*(3), 266-290.

Giddens, A. (1979). *Central problems in social theory: Action, structure, and contradiction in social analysis.* Los Angeles, CA: University of California Press.

Giddens, A. (1991). *Modernity and self-identity: Self and society in the late modern age*. Stanford University Press.

Giddings, L. S. (2006). Mixed-methods research: Positivism dressed in drag?. *Journal of Research in Nursing*, *11*(3), 195-203.

Gilbert, M. (2010). Theorizing digital and urban inequalities: Critical geographies of 'race', gender and technological capital. *Information, Communication & Society*, *13*(7), 1000-1018.

Goldin, C. D., & Katz, L. F. (2009). *The race between education and technology*. Harvard University Press.

Golubchikov, O., Badyina, A., & Makhrova, A. (2014). The hybrid spatialities of transition: Capitalism, legacy and uneven urban economic restructuring. *Urban Studies*, *51*(4), 617-633.

Gorski, P. C. (2015). *Reaching and teaching students in poverty: Strategies for erasing the opportunity gap*. Teachers College Press.

Gracia, J. J. (2012). *Painting Borges: Philosophy interpreting art interpreting literature*. SUNY Press.

Graham, S. (1998). The end of geography or the explosion of place? Conceptualizing space, place and information technology. *Progress in Human Geography*, *22*(2), 165-185.

Gramsci, A. (1926/1978). Some aspects of the southern question. (Q. Hoare, Trans.). *Selections from political writings (1921-1926).* New York: International Publishers.

Green, B., & Letts, W. (2007). Space, equity and rural education: A 'trialectical' account. In K. N. Gulson & C. Symes (Eds.), *Spatial theories of education: Policy and geography matters* (pp. 57-76). New York & London: Routledge.

Greene, M. (1994). Teaching for openings: Pedagogy as dialectic. In P. A. Sullivan & D. J. Qualley (Eds.), *Pedagogy in the age of politics: Writing and reading (in) the academy* (pp. 1-12). Urbana, IL: National Council of Teachers of English.

Gulek, J. C., & Demirtas, H. (2005). Learning with technology: The impact of laptop use on student achievement. *The Journal of Technology, Learning, and Assessment*, *3*(2).

Gunderson, J. (2014). Introduction to spatial theory. [blog post]. Retrieved from: https://sites.utexas.edu/religion-theory/bibliographical-resources/spatial-theory/overview/

Halsey, R. J. (2007). *Constructing rural principalship: Thirdspace and three worlds*. Flinders University, School of Education.

Halunen, D. (2016, November 11). Why dems lost the rust best. *The Hill.* Retrieved from: http://thehill.com/blogs/pundits-blog/economy-budget/305500-why-dems-lost-the-rust-belt

Hanushek, E. A., & Woessmann, L. (2012). Do better schools lead to more growth? Cognitive skills, economic outcomes, and causation. *Journal of Economic Growth*, *17*(4), 267-321.

Haraway, D. (1991). Cyborg manifesto: Science, technology, and socialist-feminism in the late twentieth century. *Simians, cyborgs, and women: The reinvention of nature*. (pp. 149-181). New York: Routledge.

Hargittai, E. (2002, April). Second-level digital divide: Differences in people's online skills. *First Monday,* 7(4). Retrieved April 17, 2008, from http://firstmonday.org/issues/issue7_4/hargittai/index.html

Hargittai, E., & Walejko, G. (2008). The participation divide: content creation and sharing in the digital age. *Information, Community and Society*, *11*(2), 239-256.

Harley, J. B., & Laxton, P. (2002). *The new nature of maps: essays in the history of cartography.* Baltimore, MD: Johns Hopkins University Press.

Harrington, C. (2017, Feb. 3). FCC decision to reduce Internet subsidy for low-income Americans comes straight from Fox News. *Media Matters for America*. Retrieved from: http://www.mediamatters.org/blog/2017/02/03/fcc-decision-reduce-internet-subsidy-low-income-americans-comes-straight-fox-news/215235

Harvey, D., & Braun, B. (1996). *Justice, nature and the geography of difference*. Oxford: Blackwell.

Highmore, B., ed. 2002. *The everyday life reader*. London: Routledge.

Hilbert, M. (2014). Technological information inequality as an incessantly moving target: The redistribution of information and communication capacities between 1986 and 2010. *Journal of the Association for Information Science and Technology*, *65*(4), 821-835.

Hodgson, D. L., & Schroeder, R. A. (2002). Dilemmas of counter-mapping community resources in Tanzania. *Development and Change*, *33*(1), 79-100.

Honneth, A. (1996). *The struggle for recognition: The moral grammar of social conflicts*. MIT Press.

hooks, b. (1990). *Yearning.* Boston, MA: South End Press.

Horton, J., and P. Kraftl. 2006. What else? Some more ways of thinking and doing 'Children's Geographies'. *Children's Geographies 4* (1), 69–95.

Howe, K. (2008). Evidence, the conservative paradigm, and school choice. In W. Feinberg (Ed). *School choice policies and outcomes: Philosophical and empirical perspectives on limits to choice in liberal democracies*. (pp. 61-78). SUNY Press.

Hunter-Carsch, M. (2001). Preface: bridging the gap. In M. Hunter-Carsch & M. Herrington (Eds), *Dyslexia & effective learning in secondary and tertiary education*. (pp. xvii-xxv) London: Wiley Blackwell.

Ingold, T. (2000). *The perception of the environment*. London: Routledge. http://dx.doi.org/10.4324/9780203466025

Ingold, T. (2011). *Being alive: Essays on movement, knowledge and description*. London: Routledge.

Institute for Educational Sciences (IES). (2013). The status of rural education. [website]. Retrieved from: https://nces.ed.gov/programs/coe/indicator_tla.asp

Ito, M., Baumer, S., Bittanti, M., Cody, R., Stephenson, B. H., Horst, H. A., Lange, P., Mahendran, D., Martinez, K. Z., Pascoe, C. J., Perkel, D., Robinson, L., Sims, C., & Tripp, L. (2009). *Hanging out, messing around, and geeking out: Kids living and learning with new media*. MIT Press.

Jackson, A. Y., & Mazzei, L. A. (2011). *Thinking with theory in qualitative research: Viewing data across multiple perspectives*. New York: Routledge.

Jenkins, H., Clinton, K., Purushotma, R., Robinson, A., & Weigel, M. (2006). Confronting the challenges of participatory culture: Media education for the 21st century. Chicago, IL: The John D. and Catherine T. MacArthur Foundation.

Jocson, K. M., & Thorne-Wallington, E. (2013). Mapping literacy-rich environments: Geospatial perspectives on literacy and education. *Teachers College Record, 115*(6), 1-24.

Johnson, R. B., & Onwuegbuzie, A. J. (2004). Mixed methods research: A research paradigm whose time has come. *Educational Researcher,33*(7), 14–26.

Johnson, R. B., Onwuegbuzie, A. J., & Turner, L. A. (2007). Toward a definition of mixed methods research. *Journal of Mixed Methods Research, 1*, 112–133.

Judy, R.W., & D'Amico, C. (1997). *Workforce 2020: Work and workers in the 21st century*. Indianapolis: Hudson Institute.

Jung, J. K., & Elwood, S. (2010). Extending the qualitative capabilities of GIS: computer-aided qualitative GIS. *Transactions in GIS, 14*(1), 63-87.

Kahneman, D. (2011). *Thinking, fast and slow*. Macmillan.

Kamenetz, A. (2009, Jan. 14). Ten best green jobs for the next decade. *Fast Company.* Retrieved from: https://www.fastcompany.com/1129671/ten-best-green-jobs-next-decade

Katz, V. S. (2010). How children of immigrants use media to connect their families to the community: The case of Latinos in South Los Angeles. *Journal of Children and Media*, *4*(3), 298-315.

Katz, V. S., & Levine, M. H. (2015). Connecting to learn: Promoting digital equity among America's Hispanic families. Joan Ganz Cooney Center.

Kaushal, N., Magnuson, K., & Waldfogel, J. (2011). *How is family income related to investments in children's learning?* (pp. 187-206). New York, NY: Russell Sage Foundation.

Keyes, K. M., Cerdá, M., Brady, J. E., Havens, J. R., & Galea, S. (2014). Understanding the rural–urban differences in nonmedical prescription opioid use and abuse in the United States. *American Journal of Public Health*, *104*(2), e52-e59.

Kim, J. H. (2015). *Understanding narrative inquiry: The crafting and analysis of stories as research*. Thousand Oaks, CA: Sage.

Kirkpatrick, D. (2011) *The facebook effect*. London: Virgin Books.

Knigge, L. and Cope, M. (2006). Grounded visualization: integrating the analysis of qualitative and quantitative data through grounded theory and visualization. *Environment and Planning A, 38* (11), 2021-37.

Kohn, A. (2008). Why self-discipline is overrated: The (troubling) theory and practice of control from within. *Phi Delta Kappan*, *90*(3), 168-176.

Kress, G. (2000). Multimodality. In B. Cope & M. Kalantzis (Eds). *Multiliteracies. Literacy learning and the design of social futures.* (pp. 153-161). Abingdon and New York. Routledge.

Kron, J. (2012, Nov. 30). Red state, blue city: How the urban-rural divide is splitting America. *The Atlantic*. Retrieved from: https://www.theatlantic.com/politics/archive/2012/11/red-state-blue-city-how-the-urban-rural-divide-is-splitting-america/265686/

Kubey, R., & Csikszentmihalyi, M. (2013). *Television and the quality of life: How viewing shapes everyday experience*. New York: Routledge.

Kwan, M. P. (2002). Feminist visualization: Re-envisioning GIS as a method in feminist geographic research. *Annals of the Association of American Geographers*, *92*(4), 645-661.

Kwon, Y. I. (2002). Changing curriculum for early childhood education in England. *Early Childhood Research & Practice*, *4*(2), n2.

Lareau, A. (2003). *Unequal childhoods: Class, race, and family life*. University of California Press.

Lather, P. (2016). Top ten+ list: (Re)thinking ontology in (post) qualitative research. *Cultural Studies? Critical Methodologies*, *16*(2), 125-131.

Latour, B. (1991). *We have never been modern*. Harvard University Press.

Latour, B. (1999). *Pandora's hope: essays on the reality of science studies*. Harvard University Press.

Latour, B. (2005). *Reassembling the social.* New York: Oxford University Press.

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge University Press. doi:10.1017/cbo9780511815355.003

Leander, K. M., Phillips, N. C. & Taylor, K. H. (2010). The changing social spaces of learning: Mapping new mobilities. *Review of Research in Education, 34*, 329394.

Lefebvre, H. (1968). The right to the city. *Writings on cities*. (pp. 63-181). Oxford: Blackwell.

Lefebvre, H. (1972). *Espace et politique: le droit à la ville II*. Anthropos.

Lefebvre, H. (1974). *The production of space*. Oxford: Blackwell.

Lefebvre, H. 2004. *Rhythmanalysis: Space, time and everyday life*. London: Continuum.

Levi (2013). Why is WiFi so much worse on smartphones than on laptops and computers? *Pocket Now.* Retrieved from: http://pocketnow.com/2013/06/28/smartphone-wifi-performance

Lewis, O. (1959). *The culture of poverty*. New York: Basic *Books*.

Lincoln, YS. & Guba, EG. (1985). *Naturalistic inquiry*. Newbury Park, CA: Sage Publications.

Malecki, E. J. (2010). Everywhere? The geography of knowledge. *Journal of Regional Science*, *50*(1), 493-513.

Mariën, I., & A. Prodnik, J. (2014). Digital inclusion and user (dis) empowerment: A critical perspective. *Info*, *16*(6), 35-47.

Martin, A. (2008). Digital literacy and the 'digital society'. *Digital Literacies: Concepts 5*, 151-176.

Marx, K. (1848). *The communist manifesto*. Moscow: Progress Publishers.

Marx, K. (1859). *A contribution to the critique of political economy.* Moscow: Progress Publishers.

Massey, D. (2005). *For space.* Los Angeles: Sage.

Matthews, S. A., Detwiler, J. E., & Burton, L. M. (2005). Geo-ethnography: coupling geographic information analysis techniques with ethnographic methods in urban research. *Cartographica: The International Journal for Geographic Information and Geovisualization*, *40*(4), 75-90. doi:10.3138/2288-1450-w061-r664

Maxwell, J. A. (2013). *Qualitative research design: An interactive approach.* Thousand Oaks, CA: Sage.

McBride, T., & Kemper, L. (2009). Impact of the recession on rural America: rising unemployment leading to more uninsured in 2009. [Rural policy brief]. Retrieved from: https://www.public-health.uiowa.edu/rupri/publications/policybriefs/2009/b2009-6%20Rising%20Unemployment%20Leading%20to%20More%20Uninsured.pdf

McCarthy, J. (2007). States of nature: Theorizing the state in environmental governance. *Review of International Political Economy*, *14*(1), 176-194.

Mertens, D. (2011). Publishing mixed methods research. *Journal of Mixed Methods Research*, *5*(1), 3.

Moje, E. B., & Tysvaer, N. (2010). *Adolescent literacy development in out-of-school time: A practitioner's guide. final report from carnegie corporation of new york's council on advancing adolescent literacy.* Carnegie Corporation of New York.

Moore, E., & Garzón, C. (2010). Social cartography: The art of using maps to build community power. *Race, Poverty & the Environment*, *17*(2), 66-67.

Moores, S. (2012). *Media, place and mobility*. Palgrave Macmillan.

Mossberger, K., Tolbert, C. J., & McNeal, R. S. (2008). Digital citizenship: The internet. *Society and Participation.* Cambridge, MA: MIT Press.

Murnane, R. J. (2007). Improving the education of children living in poverty. *The Future of Children*, 161-182.

National Information Infrastructure Advisory Council (NIIAC) (1996). Kickstart initiative: Connecting America's communities to the information superhighway. Available online at: http://www.benton.org/publibrary/kickstart/kick.home.html

Nespor, J. (1997). *Tangled up in school: Politics, space, bodies, and signs in the educational process*. New York: Routledge.

Neuman, S. B., & Celano, D. (2012). *Giving our children a fighting chance: Poverty, literacy, and the development of information capital*. Teachers College Press. doi:10.1007/s11159-013-9383-z

Newell, S., Robertson, M., Scarbrough, H., & Swan, J. (2009). *Managing knowledge work and innovation*. Palgrave Macmillan.

Nietzsche, F. (1887/1967). *On the genealogy of morals*, (W. Kaufman, Trans.). New York: Vintage Books.

Niglas, K. (2004) *Combined Use of Qualitative and Quantitative Methods in Educational Research.* Tallinn, Estonia: Tallinn Pedagogical University Dissertation on Social Sciences.

O'Cathain, A. (2010). Assessing the quality of mixed methods research: Towards a comprehensive framework. *Handbook of mixed methods in social and behavioral research*, 531-555.

O'Dwyer, L., Russell, M., Bebell, D., & Tucker-Seeley, K. R. (2008). Examining the relationship between students' mathematics test scores and computer use at home and at school. *The Journal of Technology, Learning and Assessment*, *6*(5).

Ohm, R. (2015, September 13). Upper Kennebec Valley Memorial High shows it's Beating the Odds. *Kennebec Journal Morning Sentinel*. Retrieved from: http://www.centralmaine.com/2015/09/13/upper-kennebec-valley-memorial-high-shows-its-beating-the-odds/

Organization for Economic Co-operation and Development [OECD] (2015). Inequalities in digital proficiency: Bridging the divide. *Students, Computers and Learning: Making the Connection.* Retrieved from: http://www.oecd-ilibrary.org/docserver/download/9815021ec008.pdf?expires=1467424100&id=id&accname=guest&checksum=7B90319A54CAE0E6DF4ADF248C3EDA10

Otterman, S. **(**2010, Oct. 12). Lauded Harlem schools have their own problems. *The New York Times*. Retrieved from: http://www.nytimes.com/2010/10/13/education/13harlem.html

Pain, R., MacFarlane, R., Turner, K., & Gill, S. (2006). 'When, where, if, and but': Qualifying GIS and the Effect of Streetlighting on Crime and Fear. *Environment and Planning A, 38*(11), 2055-2074.

Payne, R. K. (1996). *A framework for understanding poverty*. Highlands, TX: Aha Process Inc.

Pickering, A. (1995). *The mangle of practice: Time, agency, and science*. University of Chicago Press.

Pierce, J. C. (2004). Technology and social inclusion: Rethinking the digital divide [book review]. *Comparative Technology Transfer and Society*, *2*(2), 218-220.

Piper, K. (2002). *Cartographic fictions*. New Brunswick, NJ: Rutgers University Press.

Plowman, L., & Stevenson, O. (2012). Using mobile phone diaries to explore children's everyday lives. *Childhood*, 0907568212440014.

Plowman, L., & Stevenson, O. (2013). Exploring the quotidian in young children's lives at home. *Home Cultures*, *10*(3), 329-347.

Plowman, L., Stevenson, O., Stephen, C., & McPake, J. (2012). Preschool children's learning with technology at home. *Computers & Education*, *59*(1), 30-37.

Polkinghorne, D. E. (1995). Narrative configuration in qualitative analysis. *International Journal of Qualitative Studies in Education*, *8*(1), 5-23.

Polkinghorne, D. E. (2005). Language and meaning: Data collection in qualitative research. *Journal of Counseling Psychology*, *52*(2), 137.

Popa, F., & Guillermin, M. (2017). Reflexive methodological pluralism: the case of environmental valuation. *Journal of Mixed Methods Research*, *11*(1), 19-35.

Porter, E. (2014, May 27). Concentrated markets take big toll on economy. *The New York Times.* Retrieved from: https://www.nytimes.com/2014/05/28/business/economy/concentrated-markets-take-big-toll-on-economy.html?_r=0

Prensky, M. (2005). Engage me or enrage me. *Educase Review*, *40*(5), 61-64.

Provasnik, S., KewalRamani, A., Coleman, M. M., Gilbertson, L., Herring, W., & Xie, Q. (2007). Status of Education in Rural America. NCES 2007-040. *National Center for Education Statistics*.

Rank, M. R. (2004). *One nation, underprivileged: Why American poverty affects us all*. Oxford University Press.

Rao, D. K. L., & Jayasree, K. (2003). Rural Infrastructure Planning with emphasis on road network connectivity by Coplanar Concurrent Theory. In *Map India Conference*.

Raudenbush, S. W., Marshall, J., & Art, E. (1995). Year-by-year cumulative impacts of attending a high-mobility elementary school on children's mathematics achievement in Chicago. *Semantic Scholar*. Retrieved from: https://www.semanticscholar.org/paper/Year-by-Year-and-Cumulative-Impacts-of-Attending-a-Raudenbush-Jean/50febd20300d38efa927a0f03107e7f6fac94aa1.

Ravitch, D. (2010). *The death and life of the great American school system: How testing and choice are undermining education*. Basic Books.

Reardon, S. F. (2013, April 27). No rich child left behind. *New York Times*, Retrieved from: http://opinionator.blogs.nytimes.com/2013/04/27/no-rich-child-left-behind/

Reeves, E. B. (2012). The effects of opportunity to learn, family socioeconomic status, and friends on the rural math achievement gap in high school. *American Behavioral Scientist, 56*(7), 887-907.

Reid, J. A., Green, B., Cooper, M., Hastings, W., Lock, G., & White, S. (2010). Regenerating Rural Social Space? Teacher Education for Rural—Regional Sustainability. *Australian Journal of Education, 54*(3), 262-276.

Reissman, C. (2008). *Narrative methods for the human sciences*. Thousand Oaks, CA: Sage Publications.

Resina, J. R. (2012). Introduction: The modern rural. In J. Resina & W. Viestenz (Ed). *The new ruralism: an epistemology of transformed space*. Spain: Publidisa.

Rideout, V. (2014). *Learning at home: Families' educational media use in America*. New York: The Joan Ganz Cooney Center.

Rizvanoglu, K., & Çetin, G. (2014). *Research and design innovations for mobile user experience*. IGI Global.

Rogers, R., Sánchez-Querubín, N., & Kil, A. (2015). *Issue mapping for an ageing Europe*. Amsterdam University Press.

Rundstrom, R (2009). "Counter-Mapping". *International Encyclopaedia of Human Geography*: 314–318.

Sawyer, R. K. (Ed.). (2014). *The Cambridge handbook of the learning sciences*. Cambridge University Press.

Schulte, A. K., & Walker-Gibbs, B. M. (2016). *Self-studies in rural teacher education*. Springer Verlag.

Schuurman, N. (2006). Formalization matters: Critical GIS and ontology research. *Annals of the Association of American Geographers*, *96*(4), 726-739.

Shaffer, D. W., & Serlin, R. C. (2004). What good are statistics that don't generalize?. *Educational Researcher*, *33*(9), 14-25.

Shapley K., Sheehan D., Maloney C., & Caranikas-Walker F. (2009). *Evaluation of the Texas Technology Immersion Pilot: Outcomes for the third year (2007–08).* Austin, TX: Texas Center for Educational Research.

Shenton, A. K. (2004). Strategies for ensuring trustworthiness in qualitative research projects. *Education for Information*, *22*(2), 63-75.

Short, J. (2009). *Cartographic encounters: Indigenous peoples and the exploration of the New World.* London: Reaktion.

Soja, E. W. (1996). *Thirdspace: Journeys to Los Angeles and other real-and-imagined places* (p. 53). Oxford: Blackwell.

Soja, E. W. (2010). *Seeking spatial justice*. Minneapolis: University of Minnesota Press.

South, S. J., & Crowder, K. D. (1999). Neighborhood effects on family formation: Concentrated poverty and beyond. *American Sociological Review*, 113-132.

Spence, D.P. (1986). Narrative smoothing and clinical wisdom. In T.R. Sarbin *(Ed.), Narrative psychology: the storied nature of human conduct* (pp. 211-232). New York: Praeger.

Stake, R. E. (1980). The case study method in social inquiry. In *Evaluation models* (pp. 279-286). Netherlands: Springer.

Star, S. L., & Ruhleder, K. (1996). Steps toward an ecology of infrastructure: Design and access for large information spaces. *Information Systems Research*, *7*, 111–134. doi:10.1287/isre.7.1.111

Stern, M. J., Adams, A. E., & Elsasser, S. (2009). Digital inequality and place: The effects of technological diffusion on Internet proficiency and usage across rural, suburban, and urban counties. *Sociological Inquiry*, *79*(4), 391-417.

Steyaert, J. (2002). Inequality and the digital divide: Myths and realities. *Advocacy, Activism and the Internet*, 199-211.

Strickland, D. S. (2013). Linking early literacy research and the common core state standards. In S.B. Neuman, & L. Gambrell (Ed.). *Quality reading instruction in the age of Common Core State Standards.* Newark, DE: International Reading Association.

Takeuchi, L. (2011). *Kids closer up: Playing, learning, and growing with digital media*. MIT Press. 37-59. doi:10.1162/ijlm_a_00068

Tashakkori, A., & Teddlie, C. (2009) Integrating qualitative and quantitative approaches to research. In L. Bidden & D. Rog (Eds.), *The handbook of applied social research methods* (2nd ed., pp. 283-317). Thousand Oaks, CA: Sage.

Tate, W. F. (2008). "Geography of opportunity": Poverty, place, and educational outcomes. *Educational Researcher, 37*(7), 397-411. doi:10.3102/0013189x08326409

Tate, W. F., & Hogrebe, M. (2011). From visuals to vision: Using GIS to inform civic dialogue about African American males. *Race, Ethnicity, and Education, 14*(1), 51-71. doi:10.1080/13613324.2011.531980

Tate, W. F., Jones, B. D., Thorne-Wallington, E., & Hogrebe, M. C. (2012). Science and the city: Thinking geospatially about opportunity to learn. *Urban Education, 47*(2), 399-433.

Taylor, K. H., Takeuchi, L., & Stevens, R. (in press). Mapping the daily media round: Methodological innovations for understanding families' mobile technology use. *International Journal of Learning and Media*.

Thernstrom, A., & Thernstrom, S. (2004). *No excuses: Closing the racial gap in learning*. Simon and Schuster.

Thrift, N. (2003). Space: The fundamental stuff of human geography. In S. L. Hollaway, S. P. Rice & G. Valentine (Eds.). *Key concepts in geography*. (pp. 95–107). London; Sage.

Todt, R. 2010. School caught in spying scandal admits activating webcams on students' laptops. *The Huffington Post.* Retrieved from: http://www.huffingtonpost.com/2010/02/22/harriton-high-school-admi_n_471321.html

Townsend, L., Sathiaseelan, A., Fairhurst, G., & Wallace, C. (2013). Enhanced broadband access as a solution to the social and economic problems of the rural digital divide. *Local Economy, 28*(6), 580-595.

Toyama, K. (2010). Can technology end poverty? *Boston Review, 36*(5), 12-29, www.boscorueview.net/forumlcan-technology-end-poverty.

Toyama, K. (2015). *Geek heresy: Rescuing social change from the cult of technology*. Public Affairs.

Trujillo, M. (2016, March 31). FCC approves Internet subsidies for the poor. *The Hill*. Retrieved from: http://thehill.com/policy/technology/274835-fcc-approves-internet-subsidies-for-poor

U.S. Census Bureau (2010). *Selected economic characteristics, 2011-2015 American Community Survey 5-year estimates*. Retrieved from: https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=CF

U.S. Department of Education, *Digest of Education Statistics 2009, table 103*. Retrieved from: http://nces.ed.gov/programs/digest/d09

Vail, D. (2010). Amenity investments & tourist destination development: Policy insights from three rural Maine regions. *Maine Center for Economic Policy*. Retrieved from: https://www.bowdoin.edu/environmental-studies/pdf/mecep-report-vail.pdf

Vail, D. & Dickstein, C. (2015, March 24). Want to boost rural tourism in Maine? Raise Internet speeds. *Bangor Daily News*. Retrieved from: http://bangordailynews.com/2015/03/24/opinion/contributors/want-to-boost-rural-tourism-in-maine-raise-internet-speeds/

Vaismoradi, M., Turunen, H., & Bondas, T. (2013). Content analysis and thematic analysis: Implications for conducting a qualitative descriptive study. *Nursing & Health Sciences*, *15*(3), 398-405.

Valtysson, B. (2012). Facebook as a digital public sphere: Processes of colonization and emancipation. *Triple C: Communication, Capitalism & Critique. Open Access Journal for a Global Sustainable Information Society*, *10*(1), 77-91.

Van der Horst, D. (2007). NIMBY or not? Exploring the relevance of location and the politics of voiced opinions in renewable energy siting controversies. *Energy Policy*, *35*(5), 2705-2714.

Van Dijk, J. A. (2005). *The deepening divide: Inequality in the information society*. Sage Publications.

Van Dijk, J. A. G. M. (2003). De digitale kloof wordt dieper. Zaandam: SQM en Infodrome@ United Knowledge.

Veater, H., Plester, B. & Wood, C. (2011) Use of text message abbreviations and literacy skills in children with dyslexia. *Dyslexia*, *17*(1), 65–71.

Vermeylen, S., Davies, G., & van der Horst, D. (2012). Deconstructing the conservancy map: Hxaro, n! ore, and rhizomes in the Kalahari. *Cartographica: The International Journal for Geographic Information and Geovisualization*, *47*(2), 121-134.

Virilio, P. 1993: The third interval: A critical transition. In V. Andermatt-Conley (Ed.) *Rethinking technologies*. (pp. 3-10). London: University Of Minnesota Press.

Warschauer, M. (2002). Reconceptualizing the digital divide. *First Monday, 7*(7) doi:10.5210/fm.v7i7.967

Warschauer, M. (2004). *Technology and social inclusion: Rethinking the digital divide*. MIT Press.

Warschauer, M. (2006). *Laptops and literacy: Learning in the wireless classroom*. Teachers College Press.

Warschauer, M. (2008). Laptops and literacy: A multi-site case study. *Pedagogies: An International Journal*, *3*(1), 52-67.

Warschauer, M., & Matuchniak, T. (2010). New technology and digital worlds: Analyzing evidence of equity in access, use, and outcomes. *Review of Research in Education*, *34*(1), 179-225.

Watkins, S. C. (2011). Digital divide: Navigating the digital edge. *MIT Press,* 1-12. doi:10.1162/ijlm_a_00072

Weiner, D., & Harris, T. (2003). Community-integrated GIS for land reform in South Africa. *URISA journal*, *15*(2), 61-73.

Westervelt, E. (2013). A school's iPad initiative brings optimism and skepticism. *All Tech Considered.* Retrieved from: http://www.npr.org/sections/alltechconsidered/2013/10/25/240731070/a-schools-ipad-initiative-brings-optimism-and-skepticism

Wheeldon, J., & Åhlberg, M. K. (2011). *Visualizing social science research: Maps, methods, & meaning*. Thousand Oaks, CA: Sage.

Whitacre, B., Gallardo, R., & Strover, S. (2013). Rural broadband availability and adoption: Evidence, policy challenges, and options. *National Agricultural & Rural Development Policy Center (NARDeP)*.

Whitacre, B., Gallardo, R., & Strover, S. (2014a). Broadband's contribution to economic growth in rural areas: Moving towards a causal relationship. *Telecommunications Policy*, *38*(11), 1011-1023.

Whitacre, B., Gallardo, R., & Strover, S. (2014b). Does rural broadband impact jobs and income? Evidence from spatial and first-differenced regressions. *The Annals of Regional Science, 53*(3), 649-670.

Wiley, E. (2014). Broadband policy in Maine: The efficacy of the current approach and a vision of the future. Retrieved from: http://digitalcommons.usm.maine.edu/cgi/viewcontent.cgi?article=1077&context=muskie_capstones

Williams, J. H. (2005). Cross-national variations in rural mathematics achievement: A descriptive overview. *Journal of Research in Rural Education, 20,* 1-18. Retrieved from http://www.umaine.edu/jrre/20-5.htm

Wolsink, M. (2007). Planning of renewables schemes: Deliberative and fair decision-making on landscape issues instead of reproachful accusations of non-cooperation. *Energy Policy, 35*(5), 2692-2704.

Young, D. (1998). Rural and urban differences in student achievement in science and mathematics: A multilevel analysis. *School Effectiveness and School Improvement, 9,* 386-418.

Young, D. (2000). Rural differences in student achievement: The effect of student perceptions. *Educational Research and Evaluation, 6*, 207-228.

Young, I. M. (1990). *Justice and the politics of difference*. Princeton University Press.

Zwagerman, J. (2017, Jan. 17). Rural America matters to us all. *The Conversation*. Retrieved from: http://theconversation.com/rural-america-matters-to-all-americans-69756

APPENDIX A

NEIGHBORHOOD WALKTHROUGHS, SITE VISITS, AND COMMUNITY INTERVIEW PROTOCOLS

Neighborhood Walkthrough & Site Visit Protocol

Before arrival:

Wear comfortable clothing. Arrive curious and early to site or neighborhood. Map site visits to the area's local town library, schools, digital retail centers (Walmart, Marden's, and Radio Shack), and afterschool programs making sure to arrive as scheduled. One of the researchers should have the research kit, which should include the following:

- Field Notebook
- GPS/Smartphone
- Water
- Clipboard
- Pencils/Pens

Setup:

The point of this experience is to provide better understand of the role of institutional resources and social networks in shaping rural digital learning practices. So think in terms of collecting thick and descriptive accounts of neighborhoods and public learning sites from a stranger's perspective. Use the below questions to guide your field note-taking.

PART 1. Neighborhoods (20 MINUTES)

Check out condition of neighborhood. Notice safety of streets as well as scenery. Here are some questions to guide your inquiry:

- Are the streets clean or is litter scattered about?
- Are the houses crowded together or spaced apart?
- Are children playing together or are people shut in their houses or yards peering out suspiciously?
- If there are signs present, is their message legible or illegible due to graffiti or grime, etc.?

PART 2. Site Visits (20 MINUTES)

Check out condition of public learning site. Notice comfort and use of space. Talk to the technicians in charge. Ask them if this is a typical day. Do they appear to be knowledgeable and passionate or tired and uninterested in helping to answer your questions? Ask yourself the following questions (and more):

- Do people appear to know what they are doing on technology devices?
- Are the technology devices modern and are there enough?
- Is the site empty?
- Is the space clean or is cluttered?
- Are children playing unattended?
- If there are books in the area, what is the quality of the texts?
- If there are signs present, is their message legible or illegible due to graffiti or grime, etc.?

Community Interview Protocol

Before arrival:

If possible, try to gather information on notable community representative with whom you are meeting. Also try to come bearing a thank you card with the study logo and a message about our research purpose as well as a copy of the consent form noting all informed consent procedures. Therefore, the researcher kit should include the following:

- Participant Consent Form
- Interview Questions
- Historic and hon-historic images
- 1 audio-recorder (iPad)
- 1 envelopes w/thank you card
- Clipboard
- Pencils/Pens

Setup:

Greet the participant. Make sure find a room or a spot in the location to get organized. Explain to the participant what is going to happen during the interview, about how we wish to gather local accumulated geographical knowledge about the community, and how long it is going to take.

PART 2. Interview Questions (20 to 30 minutes)

Have the participant sit at a table. Show the participant various historic and non-historic town images and ask for their input or potential story. Also, for help discussing things try introducing the following questions:

- *What do you consider to be typical of a small town and how does this town fit that image?*
- *Do you have any stories of small town tradition?*
- *What do you like about living in a small town? What do you not like about living in a small town?*
- *What would you consider to be significant about children's opportunity for learning in this small town?*
- *In this town, what role does technology play in children's learning?*
- *How do you think technology has changed this rural landscape? If it hasn't yet, do you think it ever will?*

That's the interview. Thank you very much!

APPENDIX B

HOME VISIT PROTOCOLS

Home Visit 1 Protocol
Daily Media Round

Before arrival:
Wear comfortable clothing. Arrive early and rested as you will be spending an entire day with the family observing how technology is being used (or not used). The research kit will be instrumental to this day-long visit and should include the following:

- Parent Consent Form
- Child Assent Form
- Technology Inventory Questions
- Mobile Phone Diary Instructions
- Field Notebook
- GPS/Smartphone
- 1 video camera (GoPro) + 1 Bluetooth microphone
- 1 audio-recorder (iPad)
- 3 envelopes w/thank you card and $30
- Water/Snacks
- Clipboard
- Pencils/Pens

Setup:
Because this "daily media round" seeks to provide a holistic look into family members' typical daily routine experiences with media, think in terms of collecting thick and descriptive accounts from a stranger's perspective. Yet, beyond simply understanding families' lived experiences with technology, seek to uncover how they make meaning of those experiences and the dynamic of "nonhuman" agents or how technology can "act" as a force shaping social interactions. When using technology, pay particular attention to how family members come together with technology to form networks of actions with a distinct goal. Sometimes these compositions of networks are most visible when technology or routines break down. Use the below questions to guide your field note-taking.

PART 1. Technology Inventory (20 MINUTES)
This is a group interview and is guided by the Technology Interview questions. One of the other researchers will operate the video camera. The other person will step aside, observe the interaction, and take notes. Attach the microphone onto the parent. The person in charge of the technology inventory should follow the instructions. This part of the home visit might require input from the sibling and the focal child depending on who owns what device in the home.

PART 2. Daily Media Round (5 HOURS)
Take note of the location of technology being used and the duration. Also take note of the technology not being used. Notice what is being ignored and what is being attended to. Here are some questions to guide your inquiry:

- Is the family cohesive or independent? How does the technology impact this dynamic?
- How does technology and the use of technology shape/dictate the spaces the user inhabits throughout the day? For example, can the user only stay near strong Wifi connection?
- What is the purpose of their media activity? Is it clear to the user?
- What is the most meaningful technology-centered practice of the day? For whom is it most meaningful?
- What technology is being ignored? Why?

- Do the majority of technology practices in this rural family seem particularly modern (e.g., cut across space/time, enlist disembedded nonlocal systems, and inspire reflexivity)?
- If technology "acted" as a force shaping social interactions, how was this positioned in relation to larger networks (e.g., SES, family attitudes towards technology, etc.)? Or cross-competing sub-networks (e.g., schoolwork pressures)?

PART 3. Wrap up:

Thank the family for their time, and give them the envelopes with the money and the Mobile Phone Diary Instructions. Talk them through the Mobile Phone Diary Instruction sheet and answer any questions they should have. Do not forget to mention that they will receive reminder calls from us prior to the first Mobile Phone Diary day.

Home Visit 2 Protocol

Before arrival:
Arrive early. Wear comfortable clothing. The research kit will be instrumental to this second visit and should include the following:

- Parent Consent Form
- Child Assent Form
- Mobile Phone Diary "Daily Storyboard"
- Parent Interview of Importance of Technology in Rural Education
- Technology Recap and Home Visit 1 Follow-up questions
- Mobile Phone Diary Instructions
- 1 video camera (GoPro) + 1 Bluetooth microphone
- 1 audio-recorder (iPad)
- 3 envelopes w/thank you card and $30
- Clipboard
- Pencils/Pens

Setup:

Greet the family. Make sure find a room or a spot at the family's home to get organized. Explain the family what is going to happen during the home visit and how long it is going to take. Note that the parent interview will be audiotaped, while the children interview will be video-taped.

PART 1. Mobile Phone Diary Discussion and Recap of Technology from Home Visit 1 (20 to 30 minutes)

Gather the entire family in the living room and display the "Daily Storyboard" of the mounted combined photos and text messages. Ask the family to talk through the storyboard and describe what was happening. The researcher needs to flexible and adapt his/her questions based on the family's answers. Possible follow-up questions include:

- *Was this a typical day?*
- *Looking back, please talk us through this day.*
- *Could you describe what is going on in this picture? Where was this?*
- *How did you find the task? How long did the task last? Who else was there? What were other people doing?*

Follow-up with a discussion of any new intergenerational video gaming experiences or opportunities for joint media engagement since the first home visit. Avoid asking questions that have 'Yes/No' answers, instead prompt family members for explanation and meaning making. Also, make sure to ask if there were any new technologies (e.g. hand held device, TV, video gaming console, etc.) purchased since the first home visit. If the family purchased new technologies since the first home visit, ask follow-up questions about who owns/uses the technology, where it is located in the house, and what the family does with it.

If the family has nothing to report, then move to Part 2 of the protocol.

PART 2. Child's Map of Digital Access & Interview (30 minutes)

With family still in a common area, discuss the importance of getting around in rural remote areas and if the family has ever experienced transportation issues. Have child draw map of their neighborhood and how they get to their school and library (if they do get to those places). While child is busy doing that introduce the following questions to parent:

- *Has transportation or other issues of accessibility ever had negative consequences for their child's education? If so, for digital learning in particular?*
- *If accessibility was ever an issue, has community social network or Internet connection ever helped to overcome transportation accessibility issues? In what ways?*
- *Are there any other issues about the weather or living in remote rural areas that are important for your family when accessing public digital learning sites?*

PART 3. The Importance of Technology in Rural Education (30 minutes)

Have parent sit at a table. Introduce the following questions:

- *What hopes and dreams do you have for your children's education?*
- *How might rural schools and rural communities support your educational aspirations for your child?*
- *How might rural schools and communities hinder your educational aspirations for your children?*
- *What is the role of technology in your children's rural education?*
- *How much digital competency do you expect your children to learn in school?*
- *How much digital competency do you expect your children to learn at home or elsewhere?*

PART 4. Wrap-Up (10 minutes)

Thank the family for their time, and give them the envelopes with the money and the Mobile Phone Diary Instructions. Also, leave the Daily Storyboard with the family and talk them through the second round of Mobile Phone Diaries answering any questions they should have. Do not forget to mention that they will receive reminder calls from us prior to the second Mobile Phone Diary day.

Home Visit 3 Protocol

Before arrival:

Arrive early. Wear comfortable clothing. The research kit will be instrumental to this third and final visit and should include the following:

- Parent Consent Form
- Child Assent Form
- 2nd Mobile Phone Diary "Daily Storyboard"
- Technology Recap and Home Visit 2 Follow-up questions
- House Blueprint of Technology
- Family Timeline of Technology sheet
- 1 video camera (GoPro) + 1 Bluetooth microphone
- 1 audio-recorder (iPad)
- 3 envelopes w/thank you card and $30
- Clipboard
- Pencils/Pens

Setup:

Greet the family. Make sure find a room or a spot at the family's home to get organized. Explain the family what is going to happen during the home visit and how long it is going to take. Note that the Family Timeline of Technology and Family Technology Practices interview will be video-taped.

PART 1. Mobile Phone Diary Discussion and Recap of Technology & Gaming from Home Visit 2 (20 to 30 minutes)

Gather the entire family in the living room, and display the "Daily Storyboard" of the mounted combined photos and text messages. Ask the family to talk through the storyboard and describe what was happening. The researcher needs to flexible and adapt his/her questions based on the family's answers. Possible follow-up questions include:

- *Was this a typical day?*
- *Looking back, please talk us through this day.*
- *Could you describe what is going on in this picture? Where was this?*
- *How did you find the task? How long did the task last? Who else was there? What were other people doing?*

Follow-up with a discussion of any new intergenerational video gaming experiences or opportunities for joint media engagement since the second home visit. Avoid asking questions that have 'Yes/No' answers, instead prompt family members for explanation and meaning making. Also, make sure to ask if there were any new technologies (e.g. hand held device, TV, video gaming console, etc.) purchased since the first home visit. If the family purchased new technologies since the first home visit, ask follow-up questions about who owns/uses the

technology, where it is located in the house, and what the family does with it. If the family has nothing to report, then move onto the next part of the protocol.

PART 2. Follow-up from Second Home Visit (30 minutes)

Have all family members in a common area (e.g. living room, kitchen, etc.). Have this document, and the printout of the google document of follow-up question in front of you.

2. Last time we visited, you had _____ (list of technologies in the home). Do you still have these technologies? Are all these technologies in working condition? If not, which ones are not working? What happened? Have you purchased a new technology since we last visited? If so, what technologies have you purchased?

3. We'd also like to know a little more about where you use different technologies such as your cell phone, handheld device, and your tablets.

Use the same diagram with different places, and ask family members to point to the places they use different technologies. Ask for information about where this place is located in relation to their home, with whom they use it, how often, and what they do.

4. Since we last saw you, we've been busy reviewing the information we gathered between the first and second visit to make sure that we have an accurate picture of your family's technology use. I wanted to ask you a couple of clarifying questions based on previous two visits.

Go over the "Follow-up Questions" in front of you. Review each question with the family. Questions may include but not limited to: further ideas of the importance of technology in his children's rural education, children's digital practices outside of home, and/or inconsistencies between child and parent reports.

5. We are almost done with the first part of the home visit. We have all the information about the technologies you have in your house. As the last step, we would like to draw a blueprint of the house, and mark where different technologies are located in your house. This will allow us to better understand

how family members physically organize themselves around different technologies.

Sketch the blueprint of the house in a piece of paper. If appropriate, let the second researcher sketch the blueprint while the lead researcher continues onto the next section.

PART 3. Family Timeline of Technology & House Blueprint of Technology (30 minutes)

Have all family members in a common area (e.g. living room, kitchen, etc.). Have this document and the original technology inventory in front of you.

1. Let's talk about the different technologies you currently have in your home. When did you buy_____(the name of the technology)? (*mark this on the timeline*) Do you remember how you made the decision to buy it? What motivated you to buy it? Who was it for? Did your children initiate the purchase of the technology? Were there any constraints that you faced at the time of the purchase of _____(name of the technology)?

2. Now, let's talk specifically about video games. Generally, how does a game enter your house? Who discovers a game first? Who makes the decision to buy it? For example, let's talk about_____ (name of the video game), do you remember how this game was purchased or downloaded?

3. We are almost done with the second part of the home visit. We'd like to hear your opinions about technology and family life. In what ways, do you think technology changed family life? Do you think parenting is easier, more difficult, or about the same compared to how it was when you were growing up. Can you give me some examples?

PART 4. Wrap-Up (10 minutes)

Thank the family for their participation in today's visit and the study as a whole, and give them the envelopes and the "Daily Storyboard." Tell them that we will be finishing up the third home visits with all of our participating families by August, and then we will be working as a team to review all of our interviews and write reports on our findings. We hope that our findings will be helpful not only to researchers but also game designers who want to design games that support family interactions. We also hope our findings will be helpful to families. We'd like to be able to contact you as we write up our findings, in case we have any additional questions. Would that be okay?

Directions for Mobile Phone Diaries

Thanks so much for the time that you and your children spent with us today. We really appreciate your participation in our research. We will schedule our second home visit with you in about a month. Two weeks from today, we are asking that you use your mobile phone to send the research team combined picture and text messages to provide 'experience snapshots' of your child's activities six times on each of two separate days. You do not need to remember when to send combined picture and text messages, because we will be sending the text prompts at six times throughout the day. We ask you to send only one combined photo and text message at a time to the secured Google Voice account (207) 200-3162. Upon receipt of each combined photo and text message, we will send you a confirmation text.

The purpose of these mobile phone diaries is to provide an in-depth account of the focal child's daily activities and gauge the extent of their everyday media use. We don't want you to do anything out of the ordinary, just take a photo of whatever your child is doing (alone or with others). The choice of photo is up to you, but we ask that the accompanying text describe the photo to state (1) their location, (2) who they were with and (3) what they were doing (with the option of a reply saying that a picture was not possible).

We plan to have the six photos chronologically arranged on a large 24" by 36" foam board entitled "Daily Storyboard." Upon our second and third home visits, we plan to bring the storyboard and talk about the photos with you and your children, to help us better understand your child's activities. You will be able to keep the "Daily Storyboards" from each Mobile Phone Diary collection.

During the next few weeks, if you have any questions about this, please feel free to one of the project directors, Anna Montana Cirell at (207) 210-1266 or Betty Gee at (480) 965-2864.

Child's Map of Digital Access & Interview
Home Visit #2

Figure 1. Children's Maps (The first is by a child who lives in the town and the second is by a child who lives more in the country.)

House Blueprint of Technology
Home Visit #3

Figure 2. Sample House Blueprint of Technology

Technology Inventory Instructions
Home Visit #1

The technology inventory part of the home visit should be done with great attention. Further, the researcher should have this document in front of him/her when going through the parent interview survey. The answer to question 7 on the parent interview survey should also be marked below and throughout the document in appropriate places. This will allow the researcher to focus on devices the family has in their home without having to go back to the parent interview survey.

Upon completing the parent interview survey, the researcher should walk with the parent to the living room. Before getting started, make sure to attach the microphone onto the parent, and start the video recording. The researcher should take notes only for the questions indicated. Additionally, a video camera can be set up to capture devices, books, video games, etc. that are being reviewed by the parent and other family members.

The researcher should be in control of the pace of the technology inventory. In the case the parent already answered a question previously, say: "You might have already answered this before?" Only go over the devices that the parent reported s/he has in their home. If necessary, recruit the focal child and the older sibling to answer the questions.

Technology Inventory Introduction

"Now, we'd like to talk more about different kinds of technology devices that you have in your home. On the parent interview survey earlier, you said you have…"

☐ Cable or satellite TV (go to page 2)

☐ A video game player that hooks up to your TV (like an X-Box, Playstation, or Wii) (go to page 5)

☐ A handheld video game player (like a Gameboy, PSP, or Nintendo DS) (go to page 8)

☐ A "smartphone" (in other words, you can send email, watch videos, or access the Internet on it) (go to page 10)

☐ An iPod Touch or other type of video iPod (go to page 12)

☐ A tablet device (like an iPad, Galaxy Tab, Nexus 7, Microsoft Surface, or Kindle Fire)

☐ A basic e-reader device (like a Kindle or Nook) (go to page 16)

☐ A laptop or desktop computer (go to page 18)

Technology Inventory Questions

"…Let's start talking more about your…"

☐ **Cable or satellite T.V.**

1. How many cable or satellite T.V.s do you have in your house?_____.

2. Which room(s) is your cable or satellite T.V. located? [Check all that apply.]

O Living Room **O** Kitchen **O** Parent(s) Bedroom

O Focal child's Bedroom **O** Younger sibling(s) Bedroom

O Older sibling(s) Bedroom **O** Other: _____

3. If applicable, who owns the cable or satellite T.V. in this/these location(s)?

[Write down name of owner along with location below.]

4. If applicable, who uses the cable or satellite T.V. *the most* in this/these location(s)?

[Write down name of person along with location below.]

5. Tell me more about the T.V. in…

[Read the locations reported previously on Question 2 only. If the parent mentions playing games as an activity, say: "That's great. We will talk more about that in a bit."]

What activities do people in your family, including yourself, do on the TV?

…the living room? Who does it? When do they usually do it?

the parent(s)'s bedroom? Who does it? When do they usually do it?

…the focal child's bedroom? Who does it? When do they usually do it?

…the younger sibling(s)'s bedroom? Who does it? When do they usually do it?

6. Do your children ever fight over using the T.V.? [If yes] What kinds of things do they fight about? How do you or they resolve these conflicts?

7. Do you have any rules around using T.V.? If so, what are some of the rules you have around using T.V.?

"…Let's talk more about your…"

☐ **Video game player that hooks up to your TV (like an X-Box, Playstation, or Wii)**

1. How many video game players do you have in your house?_____.

2. Which room(s) is your video game player located? [Check all that apply.]

O Living Room **O** Kitchen **O** Parent(s) Bedroom

O Focal child's Bedroom **O** Younger sibling(s) Bedroom

O Older sibling(s) Bedroom **O** Other: _____

3. If applicable, who owns the video game player in this/these locations?

[Write down name of owner along with location below.]

4. If applicable, who uses the video game player *the most* in this/these location(s)?

[Write down name of person along with location below.]

5. Tell me more about the video game player in…

[Read the locations reported previously on Question 2 only. If appropriate, encourage the family to show you the video games they play: "Actually, it would be great if you could

show me the video games you play." Also, seek the focal child's and older sibling's input: "Let's ask…about the games s/he plays."]

What games do people in your family including yourself play on the video game player?

…the living room? Who does it? When do they usually do it?

[Write answer below]

the parent(s)'s bedroom? Who does it? When do they usually do it?

[Write answer below]

…the focal child's bedroom? Who does it? When do they usually do it?

[Write answer below]

…the younger sibling(s)'s bedroom? Who does it? When do they usually do it?

[Write answer below]

[Use the below space to write down additional information that does not fit into the table about the video games the family plays]:

6. Do your children ever fight over using the video game player or playing video games? [If yes] What kinds of things do they fight about? How do you or they resolve these conflicts?

7. Do you have any rules around using the video game player or playing video games?

"…Let's talk more about your…"

☐ **Handheld video game player (like a Gameboy, PSP, or Nintendo DS)**

1. How many handheld video game players do you have in your house? _____.

[List the names below]:

_____

2. If applicable, who owns the handheld video player(s)?

[Write down name of owner along with the type of handheld video game player below.]

3. Which room(s) your handheld video game player(s) is usually kept? [Check all that apply.]

O Living Room **O** Kitchen **O** Parent(s) Bedroom

O Focal child's Bedroom **O** Younger sibling(s) Bedroom

O Older sibling(s) Bedroom **O** Other: _____
[write down the location]

4. Tell me more about…

[The questions might only apply to the person who owns the device. Adjust if needed, e.g. rather than "people", say the name of the person who owns the device.]

What games do people in your family, including yourself, play on the handheld game player?

…the handheld video player 1: Who does it? When do they usually play?

the handheld video player 2: Who does it? When do they usually play?

…the handheld video player 3: Who does it? When do they usually play?

[Use the below space to write down additional information that does not fit into the table about the video games the family plays on the handheld video player device]:

5. Do your children ever fight over handheld video game player? What kinds of things do they fight about? How do you or they resolve these conflicts?

6. Do you have any rules around using the handheld video game player?

"...Let's talk more about..."

☐ **Smartphone (in other words, you can send email, watch videos, or access the Internet on it)**

1. How many people in your family have smartphones?_____.

2. Who owns a smartphone in your family? [Check all that apply.]

O Parent **O** Focal Child **O** Younger Sibling

O Older Sibling **O** Entire Family **O** Other: _____

3. Tell me more about the things people in your family do on their smartphones, let's start with…[Read only the people who have smartphones.]

[Use the below space to write down additional information that does not fit into the table. If the person plays games, then write down the games below]:

4. Do you or your children ever fight over using smartphones? What kinds of things do they fight about? How do you or they resolve these conflicts?

5. Do you have any rules around using smart phones?

"...Let's talk more about your smartphone"

What activities do you do on your smartphone?

…You? When do they usually do it?

Focal Child? When do they usually do it?

Older Sibling? When do they usually do it?

Other? When do they usually do it?

☐ iPod Touch or other type of video iPod

1. How many people in your family have iPod Touch?_____.

2. Who owns an iPod Touch in your family? [Check all that apply.]

O Parent **O** Focal Child **O** Younger Sibling

O Older Sibling **O** Entire Family **O** Other: _____

3. Tell me more about the things people in your family do on their iPod Touch, let's start with…[Read only the people who have iPod Touch.]

What activities do you do on your iPod Touch?

…You? When do they usually do it?

Focal Child? When do they usually do it?

Older Sibling? When do they usually do it?

Other? When do they usually do it?

[Use the below space to write down additional information that does not fit into the table. If the person plays games, then write down the games below]:

4. Do you or your children ever fight over using the iPod Touch? What kinds of things do they fight about? How do you or they resolve these conflicts?

5. Do you have any rules around using the iPod Touch?

"…Let's talk more about your…"

☐ **Tablet device (like an iPad, Galaxy Tab, Nexus 7, Microsoft Surface, or Kindle Fire)**

1. How many tablet devices do you have in your house?_____.

2. Who owns a tablet device in your house? [Check all that apply.]

O Parent **O** Focal Child **O** Younger Sibling

O Older Sibling **O** Entire Family **O** Other: _____

3. Tell me more about the things people in your family do on the tablet device, let's start with…

What activities do you do on your tablet device?

…You? When do they usually do it?

Focal Child? When do they usually do it?

Older Sibling? When do they usually do it?

Other? When do they usually do it?

[Use the below space to write down additional information that does not fit into the table. If the person plays games, then write down the games below]:

4. Do you or your children ever fight over using the tablet device? What kinds of things do they fight about? How do you or they resolve these conflicts?

5. Do you have any rules around using the tablet device?

"…Let's talk more about your…"

☐ **Basic e-reader device (like a Kindle or Nook)**

1. How many e-reader devices do you have in your house?_____.

2. Who owns the e-reader device(s) in your house?

O Parent **O** Focal Child **O** Younger Sibling

O Older Sibling **O** Entire Family **O** Other: _____

3. Tell me more about who reads what books on the e-reader. Let's start with…

What activities do you do on your e-reader?

…You? When do they usually do it?

Focal Child? When do they usually do it?

Older Sibling? When do they usually do it?

Other? When do they usually do it?

5. Do your children ever fight over using the e-reader device? What kinds of things do they fight about? How do you or they resolve these conflicts?

6. Do you have any rules around using the e-reder device?

"…Let's talk more about your…"

☐ **Laptop or desktop computer**

1. How many laptop or desktop computers do you have in your house?_____.

2. Which room(s) laptop or desktop computer is located? [Check all that apply.]

O Living Room **O** Kitchen **O** Parent(s) Bedroom

O Focal child's Bedroom **O** Younger sibling(s) Bedroom

O Older sibling(s) Bedroom **O** Other: _____
[write down the location]

3. If applicable, who owns the laptop or desktop computer in this/these location(s)?

[Write down name of owner along with location below.]

4. If applicable, who uses the laptop or desktop computer *the most* in this/these location(s)?

[Write down name of person along with location below.]

5. Tell me more about the laptop or desktop computer in…

What activities do people in your family, including yourself, do on the desktop computer or laptop?

…the living room? Who does it? When do they usually do it?

the parent(s)'s bedroom? Who does it? When do they usually do it?

…the focal child's bedroom? Who does it? When do they usually do it?

…the younger sibling(s)'s bedroom? Who does it? When do they usually do it?

[Use the below space to write down additional information that does not fit into the table. If the person plays games, then write down the games below]:

6. Do you or your children ever fight over using the laptop or desktop computer? What kinds of things do they fight about? How do you or they resolve these conflicts?

7. Do you have any rules around using the laptop or desktop computer?

Date: _____ **ID#_____**

APPENDIX C

IRB APPROVAL

APPROVAL: EXPEDITED REVIEW

Elisabeth Gee
Division of Educational Leadership and Innovation - Tempe
480/965-2864
Elisabeth.Gee@asu.edu

Dear Elisabeth Gee:

On 4/13/2015 the ASU IRB reviewed the following protocol:

Type of Review:	Initial Study
Title:	Rural Families and Digital Media Project
Investigator:	Elisabeth Gee
IRB ID:	STUDY00002447
Category of review:	(6) Voice, video, digital, or image recordings, (7)(b) Social science methods, (7)(a) Behavioral research
Funding:	None
Grant Title:	None
Documents Reviewed:	• Mobile Phone Diary Instructions.pdf, Category: Participant materials (specific directions for them); • Apendix A.Home Visit Protocols.pdf, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • Appendix B. Interview Survey Instruments.pdf, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • Rural Families and Digital Media Project.protocol.docx, Category: IRB Protocol; • Parent Consent Form.pdf, Category: Consent Form; recruitment flyer.pdf, Category: Recruitment Materials; Child Assent.pdf, Category: Consent Form;

The IRB approved the protocol from 4/13/2015 to 4/12/2016 inclusive. Three weeks before 4/12/2016 you are to submit a completed Continuing Review application and required attachments to request continuing approval or closure.

If continuing review approval is not granted before the expiration date of 4/12/2016 approval of this protocol expires on that date. When consent is appropriate, you must use final, watermarked versions available under the "Documents" tab in ERA-IRB.

In conducting this protocol you are required to follow the requirements listed in the INVESTIGATOR MANUAL (HRP-103).

Sincerely, IRB Administrator

cc: Anna Montana Cirell

APPROVAL: CONTINUATION

Elisabeth Gee
Division of Educational Leadership and Innovation - Tempe
480/965-4284
Elisabeth.Gee@asu.edu

Dear Elisabeth Gee:

On 4/18/2016 the ASU IRB reviewed the following protocol:

Type of Review:	Continuing Review
Title:	Rural Families and Digital Media Project
Investigator:	Elisabeth Gee
IRB ID:	STUDY00002447
Category of review:	(7)(b) Social science methods, (7)(a) Behavioral research
Funding:	None
Grant Title:	None
Grant ID:	None
Documents Reviewed:	• recruitment flyer.pdf, Category: Recruitment Materials; • Child Assent.pdf, Category: Consent Form; • Parent Consent Form.pdf, Category: Consent Form;

The IRB approved the protocol from 4/18/2016 to 4/11/2017 inclusive. Three weeks before 4/11/2017 you are to submit a completed Continuing Review application and required attachments to request continuing approval or closure.

If continuing review approval is not granted before the expiration date of 4/11/2017 approval of this protocol expires on that date. When consent is appropriate, you must use final, watermarked versions available under the "Documents" tab in ERA-IRB.

In conducting this protocol you are required to follow the requirements listed in the INVESTIGATOR MANUAL (HRP-103).

Sincerely,

IRB Administrator
cc: Anna Montana Cirell

APPROVAL: CONTINUATION

Elisabeth Gee
Division of Educational Leadership and Innovation - Tempe
480/965-2864
Elisabeth.Gee@asu.edu

Dear Elisabeth Gee:
On 4/11/2017 the ASU IRB reviewed the following protocol:

Type of Review:	Continuing Review
Title:	Rural Families and Digital Media Project
Investigator:	Elisabeth Gee
IRB ID:	STUDY00002447
Category of Review:	(7)(b) Social science methods, (7)(a) Behavioral research
Funding:	None
Grant Title:	None
Grant ID:	None
Documents Reviewed:	

The IRB approved the protocol from 4/11/2017 to 4/10/2018 inclusive. Three weeks before 4/10/2018 you are to submit a completed Continuing Review application and required attachments to request continuing approval or closure.

If continuing review approval is not granted before the expiration date of 4/10/2018 approval of this protocol expires on that date. When consent is appropriate, you must use final, watermarked versions available under the "Documents" tab in ERA-IRB.
In conducting this protocol you are required to follow the requirements listed in the INVESTIGATOR MANUAL (HRP-103).

Sincerely,
IRB Administrator

cc: Anna Montana Cirell