LIMITLESS CLASSROOM: INVESTIGATIONS AND INTERVENTIONS IN SPACES

OF GEOGRAPHY TEACHER EDUCATION

by

STACEY LEIGH KERR

(Under the Direction of H. James Garrett)

ABSTRACT

Using mobilities theories, I established that geography teacher education does not simply occur in geography education specific programs, but primarily in social studies education programs, and in other non-traditional spaces – like online in Twitter chats, in conversations between peers, in professional development, and in personal navigations of the available curriculum. Through the use of survey and interviews with geography teachers, a content analysis of three Twitter chat sessions geared towards geography pedagogy, and the enactment and analysis of two interventions in a teacher education course, I found that complexity and integrity of the types of education that exist for pre-service and in-service geography teachers is varied across the different spaces. Thus, this dissertation study demonstrates where future research might focus their attention and to consider the contexts where geography teacher education is *actually* taking place. This was only found out by focusing upon the spaces of geography teacher education – to simply focus on phenomena, the backgrounds of teachers, practices, and processes without considering space leaves out a whole host of possible understandings of the ways in which geography teacher education occurs.

INDEX WORDS: geography education, teacher education, social studies education,

mobilities theories

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STACEY LEIGH KERR

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DEDICATION

To my parents – Bill and Shelley Kerr – who created the space that made all of my pursuits possible.

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INTRODUCTION

Introduction to the Problem

If you have access to cable TV or Internet and watch the odd late night talk show or clip from one, it is highly likely that you have seen a skit that capitalizes comedically off of Americans' inability to answer questions about geography. The premise of these skits is simple. The host/comedian goes out onto the streets of some random American city and asks passersby a series of questions like: Can you find the United States on this world map? How many states are in the United States? What body of water separates North America from Europe? What religion do Buddhist monks practice? What language do people speak in England? Those stopped answer the questions so pathetically that the whole scene is worthy of primetime television and/or several million online views. If this sounds unfamiliar, simply go to YouTube and type in "Americans and geography." What you will find are hundreds of videos from television shows all over the world making fun of Americans who cannot answer seemingly simple questions about the world. A typical clip title from a search like this is something like, "Why we need to teach geography," or "Why people think Americans are stupid." Why is this so? How has Americans' (perceived lack of) geography knowledge[1] become a "go-to" for a guaranteed laugh? While the point of these clips is to entertain, and of course those selected to be on the clip do not serve as a representative sample of Americans, the fact that this phenomenon exists within comedy

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[1] Or what is often perceive of as geography knowledge.

should not be ignored. These stories assert a common refrain that Americans do not know anything about geography and the world.

Yet, latent in these clips are *other* facets of geography knowledge that cannot necessarily be accessed through fact-based questions. This is because knowledge of geography (and relatedly, of space) can be exhibited in a multitude of ways. One way is certainly naming places and finding locations on a map, but there are many other types of knowledge that are also geographic. For example, present in these clips are people moving through spaces. While this may seem cursory, movement in(to) a city (or any other place for that matter) requires a number of engagements, navigations, and negotiations, which all geographic skills built upon spatial literacies. For example, these people likely crossed the threshold between the "private" space(s) of their home and the "public" world beyond it, they utilized, interpreted, and enacted a set of directions from a GPS, a friend, a paper map, or even a mental map to get where they wanted to go, walked, took public transit, rode in a car, or perhaps embarked on a flight to get from Point A to Point B, and communicated and interacted with others explicitly (e.g. talking) and implicitly (e.g. not bumping into others while walking on the street). While these actions might not seem like the geography knowledge that gets perpetuated by the comedy clips discussed above, or even the geography knowledge from courses people seem to remember from their schooling experience(s), they are fraught with spatial concepts and interactions in space.

Every movement that someone makes happens somewhere and that somewhere is a space that is comprised of systems created by networks of people, the built environment, discourses, and a number of other entities from the most minute to the grandest of scales. To exist in this world requires navigation of these networks, and thus mobilization of geographic knowledge. Therefore, people are always exercising geographic knowledge in

everything they do; it just may not be recognized it as such. So while the people from these

clips may not have the ability to answer questions about locations in the world and facts

about them, this does not mean that they are devoid of geographic knowledge. What these

skits present then is not only a surface level issue with one facet of some people's geographic

knowledge (the inability to recognize places on maps and facts about those places), but they

also represent a much larger issue of the inability to recognize geography as an area of study

that stems far beyond (but also includes) knowing where something is on a map.

Geography As Discipline, As Discourse

The term "geography," stems from the Greek word *geographia* and literally translates

to "earth description" (Online Etymology Dictionary, 2009, np). How people go about

describing the Earth has many forms though: from human geographers who investigate the

interactions between people and places, to geomorphologists who seek to understand why

the physical landscapes of the planet look the way they do. Geography is thus highly

interdisciplinary. Geographers can (and do) study nearly any topic. While *what* geographers

study is highly differentiated, there is a common thread that guides *how* they investigate

topics. There is always a focus and keen attention paid to the spatial and inquiry is guided by

variations of the three basic questions of geography: What is where? Why there? Why

should we care? Therefore *anything* can be investigated from a geographic lens, so long as

that investigation is guided by something resembling those three questions. Delving into the

why of where, the basis of geographic inquiry entailed in these questions, offers a unique

perspective that allows for people to make sense of, and interact with/in the ever-changing

world.

Because of the diversity of topics that tend to fall under the umbrella of geography proper, it has been argued that geography should be considered a discourse rather than an enclosed discipline (Gregory, 1994; Hurren, 1998; 2000).

> A discourse constitutes the ways that we think and speak and write about geography in our everyday living, as well as the skills and tools we use in our negotiations of space, places, and landscape. How we write and speak and study geography (the discursive practices) is just as important to inquire into as its content. (Hurren, 1998, p. 85)

Thus, to consider geography as a discourse instead of a discipline, allows one to not only study the content (e.g. the fact-based map identification content) but to also consider one's habits of thinking about geography, and ways of "making sense of places, spaces and landscapes in our everyday lives" Gregory, 1994, p. 11). When one speaks about geography in the ways that it is presented in the comedy skits, the idea of it as a static subject (instead of a way of thinking/speaking/doing) is perpetuated. Instead, an approach to geography as a discourse includes map and fact questions (the content, so to speak), but also asks that people analyze and critique these types of skills and questions, the ways that maps and facts can be manipulated to advance specific ideas, and to consider the "lived-in spaces on the maps" (Hurren, 1998, p. 85). Ultimately, the consideration of geography as a discourse "is a recognition that what we do and say and write regarding geography is all part of what geography is (becoming)" (Hurren, 1998, p. 87). This understanding helps move geography's relevance beyond the confines of the formal classroom and instead allows one to think about its presence, use, and importance in the spaces of daily life.

Laying the Foundation for this Dissertation

Why have I talked about comedy skits, basic definitions of geography, and considerations of geography as a discourse instead of discipline? I have done this to lay the foundation to talk about the main problem I address in this dissertation: geography education lacks a well-rounded approach to geography. What I mean by this is that at present, geography education at the K-12 level in the United States lacks a focus on in-depth and sustained spatial inquiry that delves in the why of where. Whereas exciting, critical, and engaged interactions with geography content (and analyses and critiques of the discourses that comprise the content) are present in academic geography research (what I will refer to as *academic geography* from here on), this is rarely present in K-12.

This is not to say that geography education at the K-12 level is devoid of well-rounded geography content and approaches. But, like in the clips, what *counts* as geography often goes unrecognized, and thus unfocused upon both in terms of instruction, assessment, and attempts at improvement from formal instructional approaches. So while well-rounded ideas of geography that include content as well as analyses and critique of the content is often (at least latently) present in K-12 geography, a sustained and in-depth engagement with these ideas does not often exist. Instead, geography in K-12 is framed by the types of questions and related skills that are perpetuated by the TV, where the goal of geography is to identify and locate places as well as recite facts about them, instead of considering ideas related to the understanding of geography as a discourse like how those facts and maps came to exist, the power and ideas that they hold, and how this "content" is connected in imbricated with interactions in daily life.

To begin to understand why geography in K-12 has focused so heavily on fact-based questions instead of ways of thinking and sense-making, I take the approach of inquiring

into some of the spaces in which teachers – one of the main groups of gatekeepers of the subject area - learn to teach geography. These spaces certainly entail formal settings like teacher education programs, but also extend to informal spaces of education like Twitter, coffee shops, and at home. I use this dissertation to investigate and intervene in several formal and informal spaces where geography teacher education has taken, and is taking place. I do this to gain an understanding of, as well as examine the ways that different understandings of/approaches to geography can be/are being mobilized by teachers and how these practices perpetuate a certain *type* of geography present in K-12.

Chapter Overview

In this first chapter I contextualize the need for, and approach to, this dissertation study that investigates and intervenes in the spaces where teachers learn how to teach geography. I first provide the Statement of the Problem. Next, I introduce the Background to this Problem by discussing some of the literature on geography teacher education and delving into a review *A Road Map for 21ˢᵗ Century Geography Education: Instructional Materials and Professional Development* (here after referred to as the *Road Map*) the influential product of a National Science Foundation grant that investigated issues in geography teacher education and made recommendations for its improvement. I then discuss this study's significance. This is followed by an introduction to my research questions. Finally, I provide an overview of the following chapters in this dissertation.

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Statement of the Problem

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In this study informed by mobilities theories, I investigate and intervene in geography teacher education spaces where preservice and practicing teachers develop, gain, and refine their knowledge of geography content and pedagogy as ways to both gain an

understanding of these spaces, and also develop strategies to combat the lack of well-rounded geography in geography education.

Background to the Problem: Literature on Geography Teacher Education

Geography is in a growth phase in the United States. The U.S Bureau of Labor Statistics (2015) reported that jobs related to geography and geographic information systems (GIS) will grow 29% over the next decade, and high school students enrolling in the AP Human Geography course grew nearly 5000% between 2001 and 2015 (see Figure 1).

Year	Exams
2001	3272
2002	5286
2003	7329
2004	10471
2005	14139
2006	21003
2007	29005
2008	39878
2009	50730
2010	68397
2011	83841
2012	98679
2013	114361
2014	136448
2015	159609
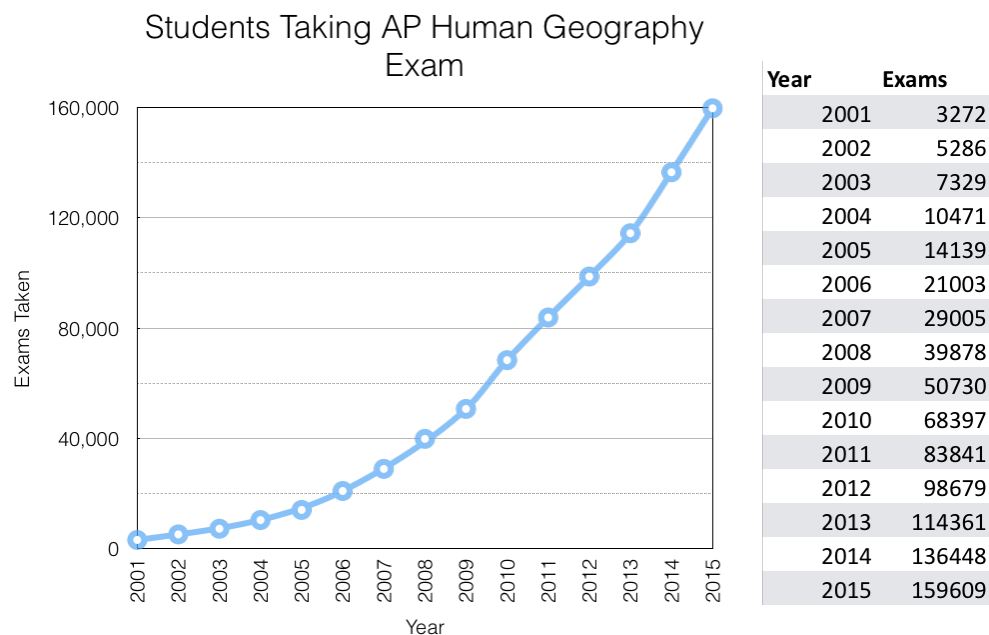
Figure 1: Number of students taking AP Human Geography Exams (2001-2015)

Despite this growth, K-12 geography education remains plagued with problems. Reports perennially surface that suggest the American education system does not prepare students to be geographically-literate (Edelson et al., 2013; Schell, Roth, & Mohan, 2013). For example, during the most recent National Assessment of Educational Progress (NAEP) testing, less than 30% of students in the United States were deemed proficient in geography (National Center for Education Statistics, 2011). This means that greater than 70% of students in

grades four, eight, and twelve (the grades tested by NAEP) were unable to perform at a level

that is expected for their respective grade. Comparatively speaking, this type of geographic

illiteracy is akin to 70% of high school graduates "unable to read a newspaper editorial and

identify the assumptions, evidence, and causal connections in its argument" (Edelson &

Pitts, 2013). Teachers' inability to implement a robust geography education is considered a

major factor in students' poor performance on these assessments (Edelson et al., 2013;

Schell, Roth, & Mohan, 2013). This inability is considered a result of inadequate teacher

education practices which generally include little to no formal training or coursework in

geography or geography pedagogy (Bednarz & Bednarz, 2004; Butt, 2002; Boehm, Brierly, &

Sharma, 1994; Schell, Roth & Mohan, 2013).

There is a body of literature - albeit a small one - that focuses on creating

understandings about the backgrounds, processes, and practices of geography teacher

education, and relatedly teachers' perspectives of these processes, all as a means to improve

the above-cited issues in geography education. The prominent idea that circulates within

this field is that if geography teachers improve their practice, then students will better

understand geography.

Method of Literature Collection & Review

To gain a broader understanding of this type of research, I review literature from the

field to highlight the most commonly circulated ideas about the biggest issues germane to

geography teacher education. I do so to identify the major contributions and knowledge

developed in the field, as well as point to the holes in this body of research. This review

situates my own dissertation study and shows how my work contributes to the knowledge in

the field.

I initially reviewed 33 articles written between 2000 and 2015 on geography teacher education. To gather articles for this review, I conducted ERIC and Google Scholar searches using a variety of search times like: "geography teacher education," "geography teacher," "teacher education" + geography, "social studies education" + geography, etc. I only reviewed articles and dissertations that explicitly discussed pre-service or in-service geography teachers, and/or described the piece's primary function as informing geography education and geography teacher education. Thus, while there were several pieces that came out of the search on ERIC and Google Scholar that *mentioned* geography as part of the preparatory practices of social studies and other teachers, I did not include them in this review since geography (teacher) education was not the focus. I limited my scope in this way because "formal" studies on geography teacher education are the ones that are most often mobilized in policy pieces like the *Road Map* and then re-mobilized in the creation of national standards, assessments, and curricula.

I earlier made an allusion to my understanding that everything is connected to geography. By the same token, all different kinds of research from any number of fields *could* potentially qualify as research that (at least tangentially) relates to and informs geography teacher education. Therefore, it may have been fruitful to venture outside of the formal literature on geography teacher education (and will certainly be something I do in the future) yet, I felt it made more sense to limit my scope for this dissertation project. In the following sub-section, I present findings from this review.

Findings

The bulk of studies within geography teacher education literature can be categorized into three intertwined areas of interest: studies about the backgrounds of geography teachers, those on teachers' perceptions and skills related to geography content and pedagogy, and

recommendations for geography teacher preparation/professional development practices. In each of these subsections, I highlight the major findings from each categorization.

      Backgrounds of Geography Teachers. Many of the studies I reviewed in this body of literature attribute teachers' lack of preparation in geography as the main cause of what are deemed ineffective teaching practices. In particular, it has been reported time and time again that most geography teachers have little to no formal training in the discipline (Bednarz & Bednarz, 2004; Butt, 2002; Boehm, Brierly, & Sharma, 1994; Schell, Roth & Mohan, 2013). In previous decades, it was not uncommon for geography majors to become geography teachers. With the recent proliferation of jobs related to geography and Geographic Information Systems (GIS), however, fewer people formally trained in the discipline seek a career in education (Bednarz, Bockenhauer, & Walk, 2005). Now, geography teachers rarely have backgrounds or training in geography.

      Most geography teachers instead are broadly trained social studies teachers who received a degree in social studies education (Theobald, Dixon, Mohan, & Moore, 2013). If social studies education programs gave equal attention to the disciplines within social studies, this would not likely be a problem. Yet, the preponderance of social studies teacher education programs focus on the discipline of history, and mainly attract history majors (Bednarz & Bednarz, 2004, p. 177; Boehm, Brierley, and Sharma, 1994; Gregg & Leinhardt, 1994; Bednarz, 2002; Bednarz, Stoltman, and Lee, 2002). Compounded upon this is the fact that a significant number of teacher education programs do not require preservice teachers to take any courses in geography at the post-secondary level (Womac, 2013). Further, it has been established that most people who become geography teachers, rarely set out with that intention and therefore do not often electively take what might be considered ample coursework in geography (Bednarz & Bednarz, 2004; Butt, 2002). Simply, this means many

teachers arrive in PK-12 geography classrooms with little to no formal preparation in geography content or pedagogy. It is thus entirely possible that a practicing geography teacher has not taken a geography class since middle school (Womac, 2013).

Teacher Perceptions and Practices. To further understand what is often construed as poor geography teaching, a number of studies in geography teacher education survey, interview, and ask in-service and pre-service geography teachers to perform certain assessments as a means to develop methods to mitigate pedagogical issues. These perceptions and assessment results are then often analyzed alongside factors like teachers' educational backgrounds to help make claims and recommendations about potential improvements in teacher education and professional development practices.

For example, Mohan (2009) surveyed 101 and interviewed 6 geography teachers from the Southwestern United States to determine the correlation(s) between educational backgrounds and teacher feelings of self-efficacy in geography instruction. Using a mixed-methods approach she established that there was a statistical correlation between experience in academic geography and feelings of efficacy in geography teaching. In particular, Mohan noted that there was a strong correlation between those teachers who had the most classes in geography and those who feel most effective at their jobs. Given the findings produced in this specific context (107 teachers in Texas), Mohan recommended that pre-service teachers in other contexts take more classes in geography, and that more professional development opportunities be made available to those who do/did not have the opportunity to take more geography coursework.

Kaufman's (2004) study on pre-service geography teachers' working abilities with spatial-temporal primitives serves as an example of an assessment study geared toward mitigating pedagogical issues in geography. Kaufman developed an activity to help pre-

service teachers improve their spatial literacy; something he believes is an integral knowledge and skill for a geography teacher. He created and assessed pre-service teachers' performance on a series of tasks related to placing and manipulating spatial entities. Specifically, he asked pre-service teachers to create the most efficient and commonsensical arrangement of neighborhood entities (e.g.: school, fire department, roads) on a piece of graph paper. He created a set of criteria to gauge their arrangements as indicators of their spatial thinking and reasoning abilities. Kaufman found that as students practiced completing these types of tasks, their spatial literacy improved. This study produced a rich data set of 500 student responses gathered over a six-year period, as well as Kaufman's description of the types of things students said and did before, during, and after completing the activity. Using this data, Kaufman developed a working theory that implementation of such an activity could improve pre-service teachers' spatial literacy, and thus, their ability to teach in spatially informed ways. Given its efficacy, Kaufman suggested that this activity be extended to other teacher education contexts to help improve pre-service teachers' spatial thinking. The author uses one kind of activity (manipulation of spatial-temporal primitives), in one context (500 trials over 6 years at the University of Michigan-Flint), to make the claim that the *Geography for Life* standards should be revised to include similar spatial-temporal considerations (p. 171). Taking into account context and relationality, it seems tenuous to extrapolate these findings to a large scale given that they were generated in one place from one assignment.

A number of other studies employ similar empirical methods to Kaufman (2004) and Mohan (2009) with the goal of knowing teachers' perspectives and abilities as a way to mitigate pedagogical issues and preparation practices, e.g. surveys to gain insight into teacher perceptions about professional development activities (Frazier & Boehm, 2012; Kenreich,

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2004), surveys and interviews to understand how pre-service teachers perceived the effectiveness of paired placements their student teaching experiences (King, 2006); surveys and follow-up interviews to determine correlation between perceived ability to implement geography and attendance at geography workshops (Gandy & Kruger, 2004); interviews and writing responses about micro-teaching experiences (Corney, 2000); surveys and interviews to gain understanding of pre-service teacher perceptions of geography as a discipline (Alkis, 2009), and interviews to determine how teachers felt about planning and implementing lessons about sustainability (Firth & Winter, 2007). These studies - though different in their questions, goals, and specific approaches - have a general recommendation that geography teachers need to be exposed more often to geography and related content and activities to improve their geography pedagogy and content knowledge across contexts. In other words, a lack of exposure to geography is the main idea that circulates as the reason behind teachers' poor geography instruction at the K-12 level.

Preparation Practices and Recommendations. In this section, I focus most closely on The *Road Map* and its recommendations because of its presence and influence in the field. As a piece of literature, it carries clout because of its funding, authorship, and scope. Its authors partnered together under a 24-month $2.2 million grant from the National Science Foundation and were representatives from the most powerful bodies in geography education: The National Geographic Society, the Association of American Geographers, the American Geographical Society, and the National Council for Geographic Education. The partner organizations assembled three committees who created reports that examined research and made recommendations for areas of geography education that were "critical to improvement" (Edelson et al., 2013, p. 1) - education research, assessment, and instructional materials and professional development. The recommendations for each report

aim to advance a common goal of "presenting an approach to geography education that balances 'knowing geography' with 'doing geography'" (p. 1). This goal relates to the issue I presented earlier in this chapter that geography education in K-12 has focused in imbalanced ways upon geography facts (what the *Road Map* authors refer to as "knowing geography"). The reports and recommendations in the *Road Map* also seek to advance a type of well-rounded approach to the teaching and learning of geography.

The *Road Map* is comprised of what has been called "landmark reports" (p. 2) because of their scope, authorship, and systematicity as well as their focus upon "strategies for making meaningful, large-scale improvements in geography education" (p. 2). This focus upon "large-scale" is a driving force amongst the reports, but in its advancement, there is an absence of the various contexts that come together to form a national-level or large-scale. In what follows, I delve into the *Road Map's* section on instructional materials and professional development because it discusses geography teacher education practices at length and "makes recommendations about the design of instructional materials and the education of teachers" (National Geographic Society, nd, np); ideas directly related to the focus of this dissertation.

The *Road Map* agrees with the research literature discussed that deems it problematic that geography teachers are not often prepared in geography content, skills, or pedagogy. Based on their own analysis and a review of research, the *Road Map* committee tasked with focusing on teacher education "formulated recommendations and guidelines for both instructional materials and professional development that *will* lead to improvements in instruction and in learning outcomes" (Edelson, 2013, np, emphasis added). Embedded in this statement is the belief that the recommendations *can* and *will* be implemented, and that this implementation will result in better-prepared teachers, and thus more student learning in

geography. Yet, the recommendations disregard the current climate and context of teacher education in the United States. They represent an ideal but not a possible reality.

While Edelson et al. (2013) claim that each report in the *Road Map* "evaluates current conditions" (p. 1), this is not what is present in the recommendations for teacher education. Consider the first recommendation made by Schell, Roth, and Mohan (2013) that suggests increasing pre-service teachers exposure to academic geography as a method to improving geography education. The recommendation reads as follows:

> Geography educators have called for more geography-specific coursework for prospective teachers who intend to teach geography. In defining a highly qualified geography teacher, GENIP called for content preparation appropriate to the grade level in which they practice as professionals:
>
> 1. High School teachers should have successfully completed course work or the equivalent to a content major in geography (at least 30 credits).
>
> 2. Middle School/Junior High School teachers should have successfully completed course work or the equivalent to a content minor in geography (at least 15 credits).
>
> 3. Elementary School teachers should have completed course work or the equivalent of a minimum of three content courses (nine credits) introducing Earth's physical and human systems. (p. 92)

Following this description of increase in proposed credit requirements for prospective geography teachers, the committee writes something of a disclaimer. They say: "This Committee acknowledges that adding more coursework to teacher preparation programs is not the only answer to the development of teachers' geographic knowledge, and it may be difficult for universities to implement such recommendations" (p. 92). It is then stated that

they "strongly urge programs to reconsider and revise the existing coursework requirements to better integrate geography content in preservice teachers' programs" (p. 92). What these two statements reflect is a lack of accounting for the current context of teacher education, a "complicated phenomenon made up of many discrete policies, programs, entry pathways, processes, and people who function in various roles" (Cochran-Smith et al., 2014, p. 4). It is not simply "difficult" (Schell, Roth, & Mohan, 2013, p. 92) for universities to implement changes to coursework requirements, it is impossible in many cases because it is the state, not the university, who sets requirements for teacher certification. While it would indeed be desirable that all teachers be prepared in geography in the ways described above, the recommendations have a disregard for the increasing constraints placed upon teacher education programs and pre-service teachers (e.g. the emergence of edTPA, state-specific content and pedagogy exams).

This specific recommendation serves as an example of how the *Road Map* and related literature on geography teacher education pays little attention to the broad context of teacher education or the landscape of K-12 education as a whole. The *Road Map* also serves as an example of literature from geography teacher education research that aims to extend contextual findings to the research community at large without regard for the ways context plays a major role in implementation. While this body of research and the embedded recommendations have the potential to improve geography teacher preparation, their implementation is unlikely because of the major restructuring that would be required of preservice programs to accommodate these changes. One might realize that these types of changes are unrealistic if they were to examine the context of teacher education in the United States and the status of geography education within the curriculum. Yet, in the bulk

of the studies I examined within this literature review, there is a lack of attention paid to the spaces in which the research occurs.

Overall findings. In effect, studies on geography teacher education do not (often and/or explicitly) employ geography or spatial theories or account for context in the research process. Although geography is always latently present, it goes largely unanalyzed within the body of literature. This is curious because most of the studies I reviewed were written by geographers, those most likely to be familiar with spatial theories as well as the so-called "geographer's toolkit." Theories and methodologies in which space is the focus, as well as questions stemming from the *why of where* comprise the geographer's toolkit; yet they go practically unutilized throughout this body of literature. This is not to say that these studies do not *do* something, but instead, that by ignoring a whole approach and perspective, particularly one so germane to geography and geographers, the field is missing out on a whole host of other understandings that could be gleaned by looking at the spaces in which these research projects occurred. In short, there is an absence in the literature I reviewed – the use of geography theories to make sense of generated data, research processes, and contexts.

What a Focus on Space Makes Possible. While this type of place-centric work is absent from geography teacher education literature curiously enough, it has been mobilized within other contexts of educational research with provocative results. Consider for example, the work of Schmidt (2011) who used critical geography theories of place as well as conversations with six high school students to argue for the importance of incorporating the place (meaning) making skills and knowledge that students use in their daily lives into the spaces of the formal (geography) curriculum. Schmidt used walking interviews, location observations, map sketching, and discussion of place (geographically-informed methods

aligned with her theories of critical geography) with participants to highlight how students' engagement with the physical environment and the entities therein led them to make meaning of certain places. For example, when Schmidt traveled with Stephanie to a coffee shop, she found that this student deliberately paid attention to the "human and physical environment in navigating place" (p. 24). For Stephanie, choosing a coffee shop was not about the quality of the coffee, but was instead informed by her "observations of the physical environment" (p. 24) and the people that would be present that helped her decide where to go. These observations included the presence of power outlets and large tables that to her, indicated a place where (school)work could be done, as well as the types of chairs and lighting which may have indicated a more social type of space. In this example, we see how Stephanie acknowledged that both "physical and human features [affect] the meaning she made of the place" (p. 26) and that acknowledgement of these factors, alongside her own social needs, affected the meaning she gave the space of the coffee shop. Schmidt used this interaction and similar instances with other participants to argue that there is a need to "think theoretically about the concept of places used in school" (p. 32). The students' use of tactics of place-making and place meaning-making in the space of their daily lives helped Schmidt destabilize the static nature in which place is often presented in the formal curriculum. Schmidt argued that students have the ability to recognize the complexity and contested meanings of places and thus, teachers must be "more attentive to the manner in which they engage place with students in the curriculum" (p. 33). Ultimately, her study demonstrated that students employ geographic tactics and skills throughout the spaces of their daily lives, and as such, the geography curriculum within schools should provide students the opportunity within the formal curriculum to exercise this knowledge. This was

accomplished by utilizing geographic theories of space to make sense of processes in education.

In another project where theories of space and place were central to the research process, Helfenbein (2006) used understandings purported by critical geographers to engage pre-service teachers in a history methods course with more complex ways of thinking about history as a discipline and the teaching of it. In particular, Helfenbein challenged the traditional social studies curriculum familiar to pre-service teachers by examining events in history from a spatial perspective versus one of historical linearity. He prompted pre-service teachers to continually interrogate the ways that location was intertwined with conceptions of subjectivity; specifically within the context of exploring history content pertinent to the Southern United States, and related ideas of reconstruction, slavery, and the Civil War. Helfenbein argued that using critical geography allowed pre-service teachers to "see history in a way" when examined from a spatial perspective. This perspective prompted a deeper engagement with history content and pedagogy in addition to helping pre-service teachers think broadly about processes in education. In particular, he prompted pre-service teachers to understand their own place and connection to the creation of places and their connection to historical events. This spatial perspective allowed for new understandings of history and social education, as well as helping pre-service teachers understand the ways in which "why, how and for whom social/educational formations do or do not work" (p. 114). Like Schmidt (2011) Helfenbein demonstrated that the uses of geographic theories can prompt new perspectives on previously established understandings of specific processes and contexts; in this case, the understanding of history content and pedagogy.

What the work of Helfenbein (2006) and Schmidt (2011) provide as examples of spatially-informed/centered research is that when context and theories related to

place/space are central to the research process, we can gain different ways of thinking about what is happening in (educational) spaces, and how we might use these understandings to inform practices within schools, with the curriculum, with teachers, and with students. They demonstrate that use of geographic theories and perspectives can give us new ways of looking at, and being in the world. Given the lack of spatial perspective, theories, and tools employed in geography teacher education research, I highlight this type of work to establish the types of ideas that could be generated if research in geography teacher education employed spatial theories to make sense of what is happening in the educational processes of pre-service and in-service geography teachers. I thus use this dissertation to help connect spatially-informed research in social studies education literature to the body of literature on geography teacher education described previously within this review of literature. I connect these two realms of research in this dissertation by using similar methods as those employed in typical research in geography teacher education literature (e.g. surveys, interviews, interventions), yet like Schmidt and Helfenbein, I focus on the spaces in which this research occurs by employing spatially-informed theories and methodologies.

Significance of the Problem

This dissertation study is significant because it identified a systemic education problem in which geography education and research on geography teacher education lacks well-rounded approaches to geography. By focusing on the spaces of teacher education, I gained an understanding of some of the spaces where pre-service and practicing teachers develop, gain, and refine their knowledge of geography content and pedagogy. Given this focus, this dissertation also addressed the disconnect between the work done in academic geography, geography education at the K-12 level, and research on geography teacher education.

I focused upon teachers (both in-service and pre-service) in this study because the preparation of teachers to teach geography, as well as the amount, type, and quality of geography instruction is currently understood as insufficient to prepare students for life in the 21st century (Edelson & Pitts, 2013, p. 1). Data from NAEP indicate that "an overwhelming majority of high school graduates are not prepared to do the ordinary geographic reasoning that is required of everyone in our society in the course of caring for themselves and for their families, making consequential decisions in the workplace, and participating in the democratic process" (p. 1). As stated previously, NAEP found that fewer than 30% of students in the United States were proficient in geography and more than 70% of students in grades four, eight, and twelve were unable to perform at the level expected for their grade level (National Center for Education Statistics, 2011). Furthermore, nearly 40% of students in grade twelve scored below "basic," which indicates they had not mastered foundational geographic concepts or skills expected of students in fourth and eighth grade.

An improvement in geography education is not just about increasing test scores though. A robust geography education, particularly one that builds upon ideas focused upon in academic geography that go *beyond* a focus on identifying, locating, and reciting facts, is critical in preparing students for civic life and careers in the 21st century (de Blij, 2012; Edelson & Pitts, 2013). Everyday activities are fraught with the requirement that one mobilizes geographic skills and knowledge. Where we live, how we travel, and with whom we interact are decisions that have significant impact on the environment, social welfare, the economy, and culture. Even from a practical sense, as geography-dependent jobs continue to proliferate (U.S. Bureau of Labor Statistics, 2015), it is necessary that people be prepared to do them. For example, geography skills are integral to processes related to emergency

preparedness, public safety, city development, transportation network development, defense, intelligence, diplomacy, and business (Edelson & Pitts, 2013). For people to benefit from the understandings that geography allows civically, socially, and even economically, it is important that teachers can adequately teach the subject.

Geographic theories and forms of inquiry guide the investigations and interventions in spaces of geography teacher education present in this dissertation. Using geography (theories, methodologies, skills) to make sense of geography education is a research perspective that has gone unused in much of the formal geography teacher education research literature yet provides a unique perspective. Therefore, this dissertation is also significant from a research perspective because it offers an example of what thinking *with* geography can allow for investigation, and intervening in, and analyzing spaces of geography teacher education.

Research Questions

1. How do geography teachers (both in-service and pre-service) in particular spaces develop, gain, and refine geography knowledge?
2. What do teachers encounter in these spaces and how do they navigate them?

Chapter Overview

Chapter 1 has just introduced the statement of the problem, background to the problem, significance of the problem, research questions, and the theoretical framework. It provides the platform upon which the rest of the dissertation is built.

In Chapter 2, I present the major theoretical concepts that guide the implementation and analysis of the studies in this dissertation. In particular, I introduce mobilities theories as a theoretical paradigm that uses analyses of movement as indicators of spatial compositions. Relatedly, I introduce the idea of spaces as texts as that can be read through

exercising critical spatial literacy. I define these two terms and show how they are operationalized in both the investigations and interventions found in the dissertation.

Chapter 3 is an overview of the methodological framework I use in this dissertation study, built out of mobilities theories for investigating and intervening in spaces of geography teacher education. In this chapter, I provide a broad overview of this dissertation's research design, methods of data generation, and modes of data analysis. After Chapter 3, the remainder of this dissertation is separated into two major sections: Investigations, and Interventions.

The first investigation is presented in Chapter 4. This chapter delves into a survey study I conducted to learn more about spaces of geography teacher education as reported by teachers. In it, I had findings that both corroborated and challenged established understandings in the field of geography teacher education. While the survey confirmed findings from the field that suggest geography teachers are rarely prepared in academic geography, mostly social studies education majors, and do not actively seek jobs as geography teachers, I also found that geography teachers do not perceive their geography knowledge as lacking, but that lack is present in other facets of K -12 geography education (e.g. the curriculum, resources, time). This finding is different than the bulk of research in geography education that attribute poor student ability in geography to lacking teacher knowledge.

Chapter 5 is a presentation and analysis of interviews that took place with four practicing teachers who took part in the survey study. I delve into the ways that the interviewees – Carrie, Sarah, Lillian, and Sadie[2] – individually described their educational

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[2] All names in this dissertation are pseudonyms.

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backgrounds and work as geography teachers and how those experiences were influenced by the intertwined nature of lack, movement, and subjectivity. In the analysis of these conversations, I found that the four teachers had developed strategies that helped them navigate lack in geography education that was contingent upon their perceptions of potential movement through and with the curriculum, as well as their available subject positions.

Chapter 6 delves into a "new" space of geography teacher education; the online space(s) of Twitter chats. In a review of the literature on Twitter chats, I find that there is a dearth of research that examines the content of these chats. While research has established that Twitter chats help educators expand their personal learning networks and that teachers tend to enjoy the experience of participating in the chats, little has been done to examine what types of exchanges take place, and what ideas circulate in the space of a Twitter chat. Thus, I analyze the content of three Twitter chats centered on conversations about geography content and pedagogy. I argue that while Twitter serves as a greater connector between educators in different places and contexts, there is no evidence in the content of the chats that these chats function as a form of professional development.

In Chapter 7, I present two interventions that were developed in the space of a Teaching Geography courses at the university level as a way to combat the established lack in geography education. I created two activities that taught *about* and *with* geography. Both activities (mapping pedagogy and a dérive) prompted pre-service teachers to learn about geography content, while applying geographic theories and skills. When pre-service teachers engaged in these activities, they exercised and further developed critical spatial literacy. This means that they employed both spatial thinking and spatial reasoning, they recognized the connection between the authorship of spaces and potential/available movement, as well as experienced the connections between movement, authorship of spaces, and subjectivity.

In Chapter 8, I present conclusions and implications about what these interventions and investigations into spaces of geography teacher education might mean for teacher education and geography education at large. I describe what the findings of this dissertation study contribute to the field of geography teacher education research particularly through its use of spatial theories. Overall, I argue that the investigations with a spatial focus, and the interventions in geography teacher education offer ways in which teacher educators can help pre-service teachers and in-service teachers navigate the lack (in various capacities) present in geography education.

CHAPTER 2

THEORIES, CONCEPTS, & ORIENTATIONS

In this chapter, I present my own personal geographer's toolkit that I employ for this dissertation study: mobilities theories, the idea of spaces as texts, and critical spatial literacy. I first introduce my overarching theoretical framework: mobilities theories. Mobilities theories, sometimes referred to as the *mobility paradigm* or *theories of (im)mobility,* are emerging spatially-focused approaches to scholarship that take movement and its relationship to the composition spaces as the main focus of analysis. After I have set this theoretical foundation, I introduce a specific concept connected to mobilities theories: the idea of space as a text. By situating the idea of space as a text, I create an entry into my next discussion of critical spatial literacy; an idea I have created that expands the definition of spatial literacy to also include the important act of reading authorship into spaces. Finally, I situate these three interrelated concepts (mobilities theories, space as text, critical spatial literacy) within my understanding of the purpose of (social) education to demonstrate the connections between my theoretical toolkit and the goal of social studies and geography education.

Mobilities Theories

There is consensus that considerations of space can give us "new and different ways of looking at the world" (Soja, 2004, p. xv, see also: O'Rourke, 2013) and as such, these considerations might afford us new ways of thinking about geography education, and geography teachers. Recently, there has been a push in the social sciences, especially sociology and geography, to not just consider space, but to also analyze the development, collapse, and sedimentation of spaces that occurs through the movement of people, ideas,

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objects, and practices (Sheller & Urry, 2006; Urry 2000; Urry, 2007). This work, where both space and movement (or lack of movement) are foregrounded, is often referred to as *mobilities theories*.

Mobilities theories characterize spaces as a series of "hybrid, entangled, and turbulent" (Fenwick, Edwards, & Sawchuk, 2011, p. 11) networks that are comprised of humans, non-humans, technologies, discourses, movements, socialities and power structures. The spaces that evolve from these networks "all involve, entail or curtail various kinds of movement of people, or ideas, or information or objects" (Urry, 2007, p. 18). This focus on the movement of people, ideas, information, objects, and other entities is what separates mobilities theories from other understandings of space purported by critical geographers, where movement is considered secondary to primary considerations of space and location (Cresswell & Merriman, 2011). In its broadest sense, mobilities research is not only concerned with physical movement and its connection to spaces, but also "potential movement, blocked movement, immobilization and forms of dwelling and place-making" (Sheller, 2011, p. 6). These forms of (im)mobility are all indicative of the networks present in the composition of spaces and thus require due attention.

To illustrate how mobilities theories consider space(s) with movement as its focus, imagine the airport. While on the surface, airports might appear to have a singular function (a place for planes to land/depart with passengers embarking/disembarking), "airports vary in size and function, ranging from rural aerodromes to international airports and military airbases; facilitating business travel, holiday flights, amateur aviation, military bombing campaigns, and extraordinary rendition" (Cresswell & Merriman, 2011, p. 8). Each airport is unique in their size and function, but chiefly so because of the networks present in the continuous making and remaking of their individual airport spaces.

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As a more explicit example, consider some of the networks present in the space of the Toronto's Pearson International Airport. On a day-to-day basis, the space of this airport constantly fluctuates because of the movement present in the networks that comprise the space; networks related to passengers (where they are from, where they are going, and for what reasons, their length of time spent at the airport either for immediate departure/wait out a delay/rest during a layover), the airlines/businesses present there (what they sell, from where their products hail, where they will travel), the infrastructure of the airport (30 runways, 3 terminals, built for sustaining the movement of 432,800 flights moving 38.6 million passengers, and 448,000 metric tons of cargo per year, (Toronto Pearson Fast Facts, 2015)) and many others. Now consider the Toronto Airport at the time of my writing, when Prime Minister Justin Trudeau and Ontario Premier Kathleen Wynne recently visited to welcome the first wave of Syrian refugees to Canada; 125 of a proposed 25,000. Their presence represents an adding of networks related to political movement (both explicit and implied, e.g. from a conservative and xenophobic government to a liberal and multiculturally-focused one), as well as the resulting movement of refugees (who gets to come, where in Canada will they be destined to live, will they ever get to/want to return to their homeland?). Their presence serves as an illustration how new networks can open create new spaces while also remaking existing ones in new ways.

What this example of the Toronto Airport illustrates is that movement (as well as the potential for movement, and moorings or resting points) is the main component in thinking about space in mobilities theories, not an afterthought. Movement within this paradigm can be understood as an expression of the networks that comprise spaces (Cresswell & Merriman, 2011; Urry, 2007; Urry & Sheller, 2006). These networks, and the spaces they comprise, "are continually practiced and performed through the movement and enfolding of

a myriad of people and things" (Cresswell & Merriman, 2011, p. 7). In effect, how entities can/'t move in and through a space is dependent upon the networks that are present within the system of the space. The role that the networks of the built environment play in the possibility for movement in and through spaces is of particular note. This is because:

> [a]lmost all mobilities presuppose large-scale immobile infrastructures that make possible the socialities of everyday life. These immobile infrastructures include paths, railway tracks, public roads, telegraph lines, water pipes, telephone exchanges, pylons, sewerage systems, gas pipes, airports, radio and TV aerials, mobile phone masts, satellites, underground cables and so on […] Intersecting with these infrastructures are the social solidarities of class, gender, ethnicity, nation and age orchestrating diverse mobilities, including both enforced fixity as well as coerced movement. (Urry, 2007, p. 19)

What is important to highlight in this quote is that paying attention to the connection between infrastructure and the social world does not mean that infrastructure wholly determines the types of spaces and socialities that are possible. To think in this way would be deterministic; a causal type of understanding between environment and reality that mobilities theorists (and almost all other geographers as well) eschew. While geographers of the past (e.g. Huntington, 1943; Sempel, 1912; Taylor, 1937) tried to make the case that the physical landscape determined and dictated the success of populations, the work of mobilities theorists is to think about spaces in complex, not reductionist, ways.

Rather than saying that the presence and type of infrastructure dictates movement, I instead use the above quote to highlight that the built environment (versus the physical environment for example) is representative of the networks of choices, ideals, predilections, and power of those who created them. In particular, mobilities theorists contend that

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movement is "central to how we experience the world" (Cresswell & Merriman, 2011, p. 5) and the different subject positions available to individuals (Cresswell & Merriman, 2011; Fenwick et al., 2011). This means that the different types of networks present (whether they be infrastructure, economic, or social structures, for example) make possible certain type of movements as well as ways of being.

To visualize the connection between the built environment and available mobilities, think of the airport again. The Toronto Airport can accommodate the movement of nearly 40 million people per year chiefly because of the built environment; infrastructure that can accommodate the movement tens of thousands of people at any given moment, the planes that assist in moving them, and the connections to other networks that can allow for the planes' and peoples' movement to and from the space of the airport by various means (the runways, the massive highway structures located directly beside the Pearson International Airport connecting the airport to downtown Toronto), as well as other spaces to accommodate the planes' and peoples' moorings (e.g. hangers, the vast expanses of the Greater Toronto Area). Yet, socialities are equally important and interconnected with the airport's associated movement; e.g. a city's desire (whether for economic or other personal reasons) to be home to a major travel hub, the relationships between the home city and the cities to which their planes may think (think about the ways that a flight from Toronto to Havana in the years prior to the American lift of travel bans to Cuba, might be construed and representative of social relationships between countries).

In effect, the networks present in the built environment and the connected socialities and possible mobilities come together to form complex systems that exist at a variety of scales – from the individual, to the local, to the global. There may be a number of spaces that exist at any scale, and those spaces may be interconnected with those on the same scale

of others. How spaces function is dependent upon their connections and interactions with other spaces and the networks therein. Specifically, spaces find their meaning relationally; it is the "mutuality of the relationships in which they are involved constitutes what and how they are" (Urry, 2007, p. 25). This means that spaces are complex systems where entities that comprise the space together do not exist in entirety outside of each other. It is instead through their interconnections that they are constituted (Urry, 2007).

A complex system or other entity is different than one that is complicated (Cochran-Smith et al. 2014; Davis & Sumara 2006). Take a car for example. A car is comprised of individual parts that make up the whole of the machine. The car, while complicated in its composition, can be taken apart, and each individual part will wholly maintain its individual form and function. Entities that are complex on the other hand are not reducible in such a way. Once they are deconstructed, they do not maintain the form they possess inside of the system. This is what is meant by complexity. Mobilities theorists characterize spaces, as well as the social world they include, as complex because of their networks, irreducibility into holistic individual parts, as well as their "flux-like dialectic of immobility and mobility" (Urry, 2007, p. 26). Spaces are always active and undergoing constant flux. As the networks that comprise space(s) move and adjust, so do the spaces. All of these intertwining networks are important to consider because people control many of these components of the networks that comprise spaces. This means that spaces are in part authored in ways that purport certain activities, ideas, and ways of being, while simultaneously discouraging others.

With all of these ideas in mind, mobilities theories offer a rich theoretical framework for working with issues in geography education; a framework that has not been used by geography education researchers before to generate and make sense of data about the field. In the context of this study, spaces and the mobilities that comprise them are central. Spaces

of geography teacher education are not just formerly "empty" spaces that are then filled by teachers and students, but are instead dynamic systems of networks that certainly involve students and teachers, but also include things like: discourses about and in schools, the spatial arrangement of the classroom, the objects in the room, and the practices and experiences that accompany students and teachers and the movement of all of these entities, as well as the networks and resulting systems they comprise. The use of a mobilities framework in this dissertation frames the investigations, interventions, and analyses of how spaces (like the classroom, or a space where geography is being learned), teacher challenges, and interventions emerge, adapt, evolve, interact, and self-organize; a continual flux with spaces of education.

Spaces as Texts

Mobilities theories acknowledge that spaces are complex systems built through the connections of fluctuating networks and the entities therein. In this sense, space can also be understood as a type of text (Moore, 1986; Morrison, 2000). This is because texts - like the definition of space I outlined above - have long been understood as complex systems that can be, and often are, authored in certain ways (Moore, 1986). A text is not limited solely to the written word. Many entities can also be understood as texts; literature, photographs, songs, maps, and even space, itself (Moore, 1986). Thus spaces, like other entities more traditionally understood as texts, are never free from bias and are seldom "natural" (Morrison, 2000, p. 87). As Werner (2000) writes:

> Texts are produced out of, and are positioned within, complex sets of relationships and processes (e.g . of publishing, marketing, consuming, reading, etc.) in particular times and places, and are not, therefore, to be read as fully self-contained and

independent entities, knowable apart from their own time and the time of their

recovery." (p. 194)

Thinking in this way can help one see that like other texts, spaces, in most cases, are also

authored. They are articulations of the networks present in the space; networks of

relationships relating to humans, non-humans, economics, culture, and the social world. The

authorship of a space can be perhaps seen most explicitly in planned spaces like a park or

housing development in a suburb, but authorship of spaces also occurs in the seemingly

natural.

The understanding of space as a text sits in opposition to structural understandings

of space, where the goal is to "discover meaning by reducing the organization of space to its

constituent elements or underlying structures" (Moore, 1986, p. 80). Instead, the goal of

analysis in thinking about spaces as systems and texts is the advancement of understandings

of complexity. Complexity thinking, theories with which mobilities theories are deeply

connected, maintain that to make sense of phenomena, "one must 'level-jump'—that is,

simultaneously examine the phenomenon in its own right (for its particular coherence and its

specific rules of behavior) and pay attention to the conditions of its emergence (e.g., the

agents that come together, the contexts of their co-activity, etc.)" (Davis & Sumara, 2006, p.

xi). This type of level-jumping allows for another form of criticality that allows one to

eschew linear/reductionist thinking and in turn "examine their own assumptions and

theoretical commitments" (p. xii). For the sake of retaining a critical orientation, it is

important to think of space as complex; something that is irreducible.

The irreducibility of the text applies to texts of all kinds. A literary text is not

reducible to the meanings of its individual sentences; a spatial text cannot be brought

down to the structure of its material parts; and social action cannot be understood as

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a mere conglomeration of events. This is because, although the text, as work,

preserves the properties of its individual elements, it produces them in such a way as

to demand a particular sort of interpretation. (Moore, 1986, p. 80)

In this way, thinking about space as a text helps one see the ways that spaces might be open

to interpretation. For example, one might infer how (infra)structures act on spaces, and the

types of implicit nods the construction of a space makes to us as people in and co-

constituting it – how to act, how to move, where to be, who to speak with, and with what

other entities one interacts. Further, if a space is to be understood as a text that can be

interpreted, it is easier to see how a space might be imagined as a form of representation.

This is not a static representation in which the essence of space can be "pin[ned[down"

(Massey, 2011, p. 80) or stabilized like we might imagine a traditional map, but one instead

where a space can be understood demonstrative of the attitudes, processes, and networks of

people and other entities present in its composition. These representations can also be

queried about what they represent; be it the social, economic, or cultural attitudes and

practices of people as well as non-human entities. In other words, thinking about spaces as

texts allows an easier entry into thinking about the ways that spaces and authored, and how

one might begin to *read* authorship into spaces; or in other words, exhibit critical spatial

literacy.

Reading Spaces as Texts: Critical Spatial Literacy

The most widely accepted definition of spatial literacy stems from researchers in

geography education who assert that spatial literacy is the nexus of spatial thinking and

spatial reasoning. Spatial thinking is the process of being able to "identify, explain, and find

meaning in spatial patterns and relationships" (Bednarz & Kemp, 2011, p. 19) such as the

dis/similarities between places, the connections between physical features and human

activity, and the interconnections between communities at local, regional, and global scales. To be able to use spatial thinking, it is crucial that one develops knowledge of spatial concepts like scale and directions as well as the ability to construct and interpret spatial representations like a map (Bednarz & Kemp, 2011). Spatial reasoning, on the other hand, can be understood as putting spatial thinking to use to solve spatial problems. A spatial problem can be many things such as determining how to fit items neatly into a piece of luggage, deciding upon the best location to build a new store, or choosing the fastest route to travel home from the airport. When spatial thinking and spatial reasoning are combined then, they can be understood together as spatial literacy. Michael Goodchild (2006), thus simply defined that someone who is spatially literate can

> …capture and communicate knowledge in the form of a map, understand and recognize the world as viewed from above, recognize and interpret patterns, know that geography is more than just a list of places on the Earth's surface, see the value of geography as a basis for organizing and discovering information, and comprehend such basic concepts as scale and spatial resolution. (n.p.)

While I find this definition to be both good and true, I wish to take it in a direction that incorporates ideas informed by mobilities theories; one I call *critical spatial literacy*. The term critical spatial literacy has been mobilized previously (e.g. Amoo Adare, 2013) yet, I am using this term differently to connect my critical affiliation in social education (explained in depth in the following section) and the importance of spatial literacies where one uses understandings of space to read authorship embedded in spaces.

Reading authorship into spaces is an important part of developing a critical orientation that allows one to question the seemingly natural, harmless, and apolitical. Another way to read a space would be by moving in and through it coupled with spatial

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thinking and reasoning. This would be a type of spatial literacy that is utilized "on the ground" in which someone reads the authorship in spaces, by assessing how their movement is encouraged, restricted, coerced, forced, or even non-existent. The types of available movement are indicative of the networks at play in the space (Sheller, 2011; Urry, 2007). Potential movement, or lack there of, is also accompanied by observations of the visible physical space that can be indicative of the networks that comprise a space (e.g. using other spatial thinking and spatial reasoning skills in addition to moving in and through the space).

Knowledge of these networks can tell someone about what is valued, discouraged, required, etc. in a space; essentially, what potential authorship is present in a space, and what that authorship speaks to. To understand what is implied through the composition of the space, networks can be read in ways similar to what Werner (2000) discusses in his piece on reading authorship into texts which prompts readers to consider the presence of representation, gaze, voice, absences, authority, intertextuality, mediation, and reflexivity in texts. By acknowledging these various components, readers of texts (from written texts to spaces) can become more aware of authorship and in turn, make the texts more open to critical question, multiple readings, and more thoughtfulness. Werner purports that these types of reading are important because they allow one to move beyond "passively receiving the 'given' interpretation" (p. 195) and permits one to instead "question, dispute, or even reject what they read, thereby repositioning themselves as agents in relation to the text" (p. 195). To think about why critical reading of texts might be important, take the example of the authorship at play in a space like a planned residential community.

In the space of a planned community, mobilities theories draw attention to the networks that restrict, coerce, fix, or prompt certain types of movement (Cresswell & Merriman, 2006; Urry, 2007). Inquiring into this authorship and the types of movement it is

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connected to provide a way to think about socialities within the space, as well as important ideas related to larger forces and discourses at work such as power, gender, and class. In the example of a planned residential community, networks can be read (and thus questioned) when one begins to recognize the presence of networks related to the organization of housing plots, the construction of streets and sidewalks, home owner association (HOA) rules, housing pricing, and proximity to schools and places of business impact the ways that people and other entities can exist and behave in the space. These factors may dictate the type of people who may and do become residents (e.g. Who can afford to live there? Does public transportation service the community? Are there community service requirements or volunteering duties associated with residency?), how residents and visitors move into and through the space (e.g. Is there a gate that requires resident status or guest approval? Are there speed limits different than the county's?), and even require residents and visitors to behave in certain ways (e.g. Can you host an outdoor party? May you paint your door red? May you park your car in the driveway?). In addition to these explicit forms of spatial authorship, one might also see authorship in a space based upon more presence of more implicit cues as well as complete absences (Urry, 2007).

Consider the college campus and its potential absences that are impactful on the type of movement that one has available to them in the space of campus. What does it mean when it does not have a women's center? A rugby field? Adequate parking for bicycles? Accessible building entrances for those with dis/abilities? The absence of certain elements tells someone many things about the space and can encourage, discourage, coerce, or restrict their movements. Through the absences, one can read what is valued, what is not, what should be segregated and compartmentalized, and whose interests are regarded as important in a space (Soja, 1989; Western, 1986). Further, if we look at implicit cues of authorship on

spaces and their connections to potential movement, what does it say about a campus, for example, when faculty and students cannot use the library and academic offices during football games? Or that the names of buildings are those of affluent, white, and in many cases outwardly racist men? Looking for the absences and implicit actions in the authorship of spaces can help one see that certain spaces are authored in more covert ways to advance certain ideas or mobilities while simultaneously discouraging others.

The idea of extending the definition of spatial literacy to include the reading of authorship into spaces by thinking about available mobility fits well with two essential components of spatial literacy outlined by Bednarz and Kemp (2011) – thinking *about* space, and thinking *with* space. Thinking about space is concerned with the learning of factual data, concepts, and other generalizations about the world. Thinking with space, on the other hand, talks about the ability to use space as an "organizing framework to conceptualize problems and make decisions" (p. 20). Through the addition of thinking with mobilities theories to consider spatial literacy, we might call the ideas discussed previously as thinking in and through space, e.g. using an analysis of movement to read the presence of networks and connected forms of spatial authorship. Finding the authorship in space is an important part of spatial literacy because in addition to adding a certain amount of criticality to this literacy, it also can aid immensely in the problem solving process – a skill, ability, and orientation towards issues that everyone should have. If one may interpret how a space was authored, and why it was created in such a way, they might be able to better understand the processes that may happen within, and how they might solve associated problems.

In all, a critical spatial literacy could be understood as:

- Using spatial thinking and spatial reasoning

- Critically questioning the composition and authoring of spaces and their
  connection to available movement

- Assessing the movement available to oneself in certain spaces and
  understanding what movements are encouraged, discourage, restricted,
  coerced, or forced (as a way to acknowledge and build awareness of the
  possible networks at play in the constitution of a space) and how those are
  tied to personal experiences in and of spaces

These characteristics are mobilized and enacted in the spaces I investigate and intervene in in this dissertation.

Situating This Dissertation, Mobilities Theories, and Critical Spatial Literacy Within Social Studies Education

While I situate this dissertation study under the umbrella of geography teacher education research, it is important to note that it is informed not only by this field of research, but also spatial theories, and critical approaches to social education. I am of the mind that social education, an in particular, geography education, is about developing a critical orientation toward the world and the *texts* that comprise the world.

Someone who is critically oriented asks questions of the seemingly natural and takes nothing at face value. This type of orientation allows one to "[see] texts 'not as ways to describe the world' (Wineburg, 1991, p. 449) but as instruments masterfully crafted to achieve social/political ends" (Wineburg, 1991, cited in Segall, 1999, p. 369). Although Segall is speaking most specifically about history education, his ideas on criticality in education are important for all of social studies and geography education in particular. He writes that critical questioning

helps to make both visible and problematic the presuppositions of discourses, values, and methodologies that legitimate and enforce particular arrangements constituting history education and its relation, through power and convention, to knowledge. Engaging the inevitability and partiality of inscription and how language, author(ity), and agency become factors of truth, we begin to see how history constructs and conditions knowledge--any knowledge, regardless of perspective or worldview. (p. 370)

Spatial literacy, a literacy situated within geography but pertinent to social education, offers a type of critical lens for thinking about the construction and condition of knowledge, particularly knowledge that can be gained from interactions with and in spaces. As mentioned above, a critical spatial literacy offers ways to think about, critique, and question the authorship of spaces. Authorship is something social studies educators are concerned with (e.g. Segall, 1999, Werner, 2000) and something I see as essential in honing a critical spatial literacy as well as critical orientations to the world.

When I investigate and intervene in spaces of geography teacher education in this dissertation study, I work from the assumption that there is something good about criticality. The ability to be critical, though often misconstrued as negative, can provide many benefits in the realm of education and our daily lives in terms of developing an understanding of how to be with one's self and others in the world. As mentioned above, a critical orientation can allow one to see how the authorship of texts is not "natural" but instead instruments for political and social goals; an important quality for the civically-minded citizen so prevalent in social education research. I have a commitment to the idea that critical reading of texts can provide access to these benefits, and as such, has huge importance for educators, particularly social studies educators, to help students make sense of different landscapes and concepts.

Another important component of criticality is using theories to make sense of the world. This often requires a distancing of self. While one can never truly distance themselves from their self (or selves, depending on what theoretical paradigm you work from), social studies educators and researchers have written at length about the types of theories and practices that can provide distance and a different viewpoint so that one can, for example, make sense of the world (e.g. Thornton & Barton, 2010), develop empathy (e.g.: Thomas-Brown, 2010), or think about/understand/experience an event from multiple perspectives (e.g. Marcus & Stoddard, 2009). These types of practices are productive goals for social education. Yet, it is never truly possible to *know* what it is like to be someone else, or walk in someone else's shoes; these practices all require interpretation and theorization.

I have thus worked to think of ways in both my investigations and interventions that a social studies (and geography) educator might access the distance so necessary for the practice of theorizing which requires that one "detaches" (Grumet, 2009, p. 223) themselves from their own communities/familiar ways of thought to come to differed understandings of social relationships and everyday practices. Therefore, for social studies and geography educators concerned multiple perspectives and prompting their students to see things in new ways, these investigations and interventions may help one see that it is not a not a mystery in how to implicate people in the multiplicity of perspectives. Taking multiple perspectives requires empathy and necessitates us stepping into other shoes; which is never possible. Thus, the studies that comprise this dissertation are concerned with prompting participants to new perspectives and recognition of geography by way of staying in one's own shoes, and experiencing one's own shoes differently.

CHAPTER 3

QUALITATIVE RESEARCH ON THE MOVE

Chapter 3 is an overview of the methodological framework I use in this study, built out of mobilities theories for investigating and intervening in spaces of geography teacher education and devised for addressing the dearth of spatial theories in geography teacher education research. In this chapter, I first situate this dissertation's research design within a broad theoretical context by discussing mobilities theories' methodological connections to what has been called "post-qualitative research" (St. Pierre, 2011). Then, I provide an overview of the research design, including methods of data generation as well as modes of data analysis for each individual chapter. Each chapter then provides a deeper discussion of methods of data generation and analysis as it pertains to each investigation and intervention.

Situating the Research Design Theoretically

Mobilities theories are a fairly new theoretical paradigm and as such, "best practices" in research design have not been developed. Research studies using mobilities theories have generated empirical data that include everything from time-space diaries, participant-observation, mobile video, autobiographical narrative, bodily immersion of the researcher in mobile activities, and ethnographic studies of the daily experiences of mobility for different groups of people (see Laurier et al., 2008; Sheller, 2011; Vannini, 2009, 2011). These varied and unstandardized approaches offer both a challenge and an opportunity for researchers working within this theoretical context – a challenge, because there are few "exemplar" studies for others to follow, but an opportunity because of the possibility inherent in doing

something that has not been done (much) before; particularly in the realm of geography

teacher education research and education at large.

Mobilities theories, and their connection to complexity, can be situated within what

researchers (St. Pierre, 2011) have called "post-" paradigms. While individual post- theories

(e.g. poststructuralism, new materialism/empiricism, post-humanism, postmodern,

postcolonialism) can differ greatly, a common thread throughout them is that there is a

questioning of universal explanations as well as the working assumption that "position and

context are centrally and inescapably implicated in all constructions of knowledge"

(Cosgrove, 1999, p. 7). There has been a call recently to put to work "postqualitative

inquiry" (St. Pierre, 2011) to mobilize post- theories in different ways in research. In

educational research, the term postqualitative inquiry has been called both a critique and a

coming after of "conventional humanist qualitative research traditions" (St. Pierre, 2011, p.

613). This form of inquiry - which St. Pierre argues is produced through different types of

post- inquiry including postmodern, poststructural, and new materialist, to name a few -

works with the idea that there is not "a reality or a truth before or after the social world" (St.

Pierre, 2012, p. 494). This means, that unlike in the positivist view in which the scientist can

go out into the world and discover a truth through the use of the scientific method,

postqualitative work (building off of an interpretive tradition) maintains that the social world

is far too complex and contingent to be able to develop knowledge that can predict, control,

manage, and measure all (or any) social components of life.

Mobilities theories help to make sense of and question the role in which the

composition of spaces play in processes. These processes are never simple, but always in

flux and complex. I find the type of complexity that mobilities theories productive because I

work from the assumption that new ideas are produced through paradoxes in understanding,

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not by agreements (Jameson, 1984). My work in this dissertation study, while corroborating some of the established literature in the field of geography teacher education, challenges many of the narratives that circulate about geography education and geography teachers; something I understand as productive for the research community. Different types, uses, and understandings of knowledge "disturb the order of reason" (p. xxv) and in turn, invention can be born of the dissension. It is working outside of established norms that creates new ideas (Lyotard, 1979/1984) and thus, new potential pathways for research and pedagogical practices in geography teacher education.

Conducting research from a mobilities perspective requires the use of methods that can generate data that are indicative of movement and the spaces its comprises. To generate this form of data, I assembled a number of methods that indicate the ways that participants across the investigations and interventions encountered the composition of spaces and the mobilities therein. The methods I used – surveys, interviews, observation, photography, video, content analysis - are interconnected and exist within specific epistemological and ontological contexts; much like the data they produce and generate. In this way, the methods selected "limit the realities that can be known, and forms by which we can know" (Law, 2004, p. 103). Therefore, there is a necessity to make judgments about methods, and their assembling together in ways that are "specific and local" (p. 103) to the context in question. Thus, my selection of these methods was done so in a way that data about movement could be central. While the methods I used in this dissertation are fairly traditional qualitative measures, it was my emphasis on analyzing the data for instances of movement that allowed me to contextualize, analyze, and understand the investigations and interventions in specific ways. I recognize that what I generated as data about spaces of

geography teacher education is contextual and can never be separate from the theoretical or the material, nor the methods that generated it.

Understanding the situatedness of data and methods is in line with my thoughts on the importance of criticality in social studies and geography education. Segall (2013) argues for the interspersion of critical discourses into research in social education (of which I count geography a part). What is important about Segall's essay in relation to this dissertation study, and in particular, the data generated for it, is that he draws attentions to the possibility afforded to researchers and pedagogues who use critical discourses and critiques in their work, something that inquiring into spaces of geography teacher education using a spatial theory and methods focused on generating "moving" data allows. This dissertation study is especially timely because research in geography education has shied away from critical discourses and spatial theories to inform its work. The context in which research has occurred has gone largely ignored yet the data generation and analysis in this dissertation have put space at forefront.

Research Design

Methods

The methods I used for this dissertation study combine the traditional qualitative data collection methods and practice-based methodologies, with mobilities theories to provide an opportunity to inquire into and with the spaces of geography teacher education. The types of methods I selected generated a specific kind of data that would help in answering the overall research questions of the dissertation related to spaces of geography teacher education. To gain perspective on spaces of geography teacher education across various scales and contexts, I comprised my study of investigations and interventions. In these investigations and interventions, I used surveys, interviews, photographs, videos,

participant's written content in response to prompts I created, databases of tweets and other Twitter interactions, maps, pre-service teacher work, and my own research notes as forms of data. The data produced through each of these processes provided information about what is happening/has happened with individuals across these various spaces at different scales.

This section provides an overview of each method employed throughout the dissertation and the data that were produced through these methods. A commonality across these chapters is that data were generated through traditional qualitative measures and were analyzed with mobilities theories. Therefore in each, my analysis centers on recognition and comparison of the functions of mobilities within the data - whether it was discussed, visible (e.g. in a photograph), or implied (e.g. changing one's mind). Again, each respective chapter contains further explanation of pertinent processes related to methods of data generation and analysis.

Chapter 4. I designed a web-based survey to produce data on teacher-provided perspectives related to their preparation to become a geography teacher and their current practice in geography teaching. The methods generated large-scale data about the backgrounds and practices of geography teachers, while also providing individual stories through participants' discrete responses. The survey contained both open-ended as well as multiple choice questions and in turn, generated both quantitative and qualitative forms of data. In this chapter, I use participant responses on an individual level, as well as on a collective level (i.e. responses from many participants that fall under a similar category) to make claims about their experience(s) in spaces of geography teacher education, their knowledge of geography content and pedagogy, as well as their challenges and successes in the teaching of geography. In the analysis of the survey responses, I pay particular attention to the ways that movement is present within this surveys; e.g. how it moved from my own

computer out to those of 80 participants in various locations in the world, the ways that participants described their navigation within the geography curriculum, and how geography teachers within the survey describe their movement from spaces of teacher education to those where they ended up teaching geography.

Chapter 5. Interviews were conducted with four practicing teachers as a follow-up to the survey. They were semi-structured and designed to provide further insight into the backgrounds of geography teachers/teachers of courses with significant geography content, as well as further commentary on the challenges and successes they face in their pedagogical practice. I created prompts and representations from initial survey findings and steered conversation using these artifacts centered on descriptions of lack present in geography education. In this chapter, conversations that centered on lack served as indicators in the ways that the participants mobility was intertwined with the spaces of geography teacher education they encountered, their subject positions, and their navigation of lack as it manifested in various ways.

Chapter 6. I conducted an overarching analysis of three formally sanctioned Twitter chats for educators connected to geography education. To gain general information about these chats (delineated by hashtag use), I used CartoDB a web mapping serving that can also extract Twitter data to look at the frequency of hashtag use and other associated data. Then, using Twitter chat databases, I downloaded three complete interactive chat sessions thAt delved into conversations about geography curriculum and pedagogy. A Twitter chat and the tweets therein are not only understood as points of communication, but also as indicators of the ways that teachers form networks between each other in online space(s), and how ideas presented through tweets move through the spaces of the chats.

Chapters 7. Data in the interventions were texts generated as part of a teacher education course on geography content and pedagogy (e.g. assignments, various assessments, photographs) as well as artifacts created as a result of the two interventions. In the analysis of these interventions I reviewed data that both that pre-service teachers and I generated that included: photographs, video, GoPro video, audio recordings, maps (both hand drawn and GIS-created), as well as various writing responses, and researcher notes. The data generated through the intervention activities stood in for evidence of pre-service teachers exercising and developing critical spatial literacy as they moved through the formal spaces of the curriculum as well as spaces outside the classroom.

CHAPTER 4

SURVEY OF GEOGRAPHY TEACHERS

As mentioned in Chapter One, failing tests scores in American K-12 schools across the board in geography are consistently attributed to poor geography instruction. Calls are consistently made for the improvement of the education of geography teachers as a means to improving geography education (Edelson, Wertheim, & Schell, 2013). These calls are not often made with the general teacher education curriculum in mind, but are instead geared towards geography education specific programs; of which there are few. In general, spaces of geography teacher education are painted as monolithic spaces where people who know they want to be geography teachers attend to gain knowledge and experiences in geography content and pedagogy. Yet, time and time again, it is reported that this is seldom the case. Why do recommendations continue to be made for this one space and not other spaces of geography teacher education? It is perhaps because little is known about *other* spaces where geography teacher education happens, since as I demonstrated in Chapter 1, spaces are rarely focused upon in research on geography teacher education.

This survey thus served to gain insight into the multiple spaces of geography teacher education that exist. I created questions in the survey as a way to mobilize a dialogue between question prompts, participants (geography teachers), and their individual understandings and experiences with geography education and teacher preparation practices. As such, the survey results not only report teacher perceptions of (facets of) spaces of geography teacher education, but it also created a space of geography teacher education. It

did so by asking teachers to engage with a variety of questions related to the discipline, and to communicate their understandings about geography.

In the analysis of these individual dialogues, I found linkages between the ideas that participants put forth and other participants' ideas, as well as linkages and borders between their responses and previously established data in geography teacher education research. I found that a number of responses to certain survey questions are strongly linked with results from other studies in geography teacher education. In particular, the survey confirmed Bednarz and Bednarz's (2004) account that most geography teachers do nor set out to become geography teachers. It also confirmed other studies' (Bednarz & Bednarz, 2004; Theobald, Dixon, Mohan, & Moore, 2013) findings that most geography teacher have little coursework in geography at the post-secondary level and are generally trained in social studies education programs.

The results of the survey differed from other research on geography teacher education in how the discourse of "lack" circulated. Although lack is certainly mentioned in the literature, it is most often used to describe geography teachers' knowledge. Yet in this survey, lack in geography education was also pinned to other entities generally unmentioned in the literature – students' knowledge/interest/engagement with the subject, time to teach the subject, up to date resources, and relevant curriculum. In the sections that follow, I go deeper into these findings and describe the individual responses to certain questions as well as how they connect to my original research questions and previously established findings in the field.

The Survey

In most uses of surveys in educational research, there is a goal of designing an instrument in such a way that responses can be turned into numbers, that can thereby be

scored, analyzed and run through statistical tests to determine the survey and its collected data's validity (Desimone & Le Floch, 2004; Mohan, 2009). Given my theoretical orientation and commitments, this was not the goal of the survey I developed. Instead, I hoped to generate a relatively large amount of data that I would not have access to otherwise (e.g. through interviews, focus groups, etc.).

Survey Design

The survey was web-based and hosted on the Qualtrics platform (an online software platform used for survey creation and execution). The survey contained a series of 42 open-ended and multiple-choice questions that asked questions related to the following categories:

Eligibility & Consent. Questions in this section were multiple choice and determined whether or not participants were eligible for the survey. To be eligible, participants had to be teaching, or have previously taught a K-12 geography course, or a course with significant geography content (e.g. middle grades social studies). Student teachers with these same credentials were also eligible to participate.

Location. Questions in this section were a combination of multiple choice and manual entry that asked participants questions related to location. Participants were asked where they currently taught as well as if they had ever taught in a place other than their current location of employment. While not asked expressly in the survey questions, location data was also generated if participants used a computer with an open IP address. The IP address served to show where participants were when they took the survey.

Educational Background. Questions in this section asked participants a series of open-ended and multiple choice questions about their educational backgrounds. For example, participants denoted their highest degree completed, where their degrees were completed, and the focus of their post-secondary studies.

Preparation in Geography. This section asked a series of multiple choice and open-ended questions about participants' backgrounds in academic geography as well as geography teacher education. These questions could be subdivided into three categories: questions about participants' (1) experience in academic geography at the post-secondary level, (2) experience with training in geography pedagogy, and (3) path to becoming a geography teacher. In this first subdivision, participants were asked to select how many geography courses they had taken at the post-secondary level as well as which geography courses they were. In the second subdivision, participants were asked series of questions that asked them to rate their experiences that prepared them to become a geography teacher (coursework, field placements, professional development). Lastly in the third subdivision, participants were asked to describe how and why they became a geography teacher.

Current Teaching. Questions in this section were multiple choice in nature and asked participants to questions related to the grade-level taught, courses they currently taught/had most recently taught, as well as how long they had been teaching.

Pedagogical Practices. Questions in this section asked participants to answer a series of multiple-choice questions about their pedagogical practices in geography courses. The section included questions about how/if participants used curricular standards to guide instruction, the types of methods they employed in geography classes, their use of GIS.

Challenges and Successes. This section contained a series of open-ended questions that asked participants to describe the challenges they faced in their geography instruction as well as how they perceived that those challenges could be assuaged. Participants were also asked to describe a successful teaching moment in their geography instruction.

Understanding Geography. This section included two open-ended questions that asked participants to define geography as an academic discipline, as well as describe why they perceived it as an important subject or not.

Participants

To recruit participants to take this survey, I utilized what I call a *social media snowball.* In traditional literature, snowball recruitment (Goodman, 1961) is a sampling method in which initial participants recruit other participants from amongst their personal connections. This type of convenience recruitment was enacted but through the use of my own social media connections and networks. For instance, I used my own personal Facebook and Twitter pages to advertise the survey. I asked others with teacher friends to also share this advertisement on their personal profiles. I also used personal connections developed through my work in the social studies department at the University of Georgia to send a link to the survey to teachers who had previously served as mentor teachers, as well as those on our department's listserv for E-Portfolio night. Further, I shared the survey advertisement on the Facebook group pages for the College & University Faculty Assembly (CUFA), the CUFA Graduate Forum, the National Council for the Social Studies, as well as the #sschat Facebook page. As mentioned above, participants were eligible to take part in the survey if they were teaching or had previously taught a course in geography at the K-12 level. Alternately, participants could also identify as a teacher of another discipline area that contained significant geography content, e.g. middle grades social studies. After these various recruitment efforts, 80 participants took part in the survey.

Participants self-administered the survey using the link to the survey hosted on the Qualtrics website. Question completion was left optional. Therefore, once participants had completed the initial required research consent questions and determined their eligibility to

participate, they were free to answers as many or as few questions as they chose. Typically 40 to 50 participants elected to respond to each question. Their responses to questions were not tested for "validity" but were instead used to help paint a picture of the types of spaces and experiences therein of geography teachers in different contexts.

It is important to note that because of this recruitment method, the people who took the survey were not randomized, nor do they represent a statistical sample of geography teachers. Therefore, the findings presented in this chapter do make generalizable claims about geography teachers, but instead function to gain different insight into spaces of geography teacher education and geography teacher practices[3].

Survey Results

In this section, I provide an overview of the major findings from each of the above-described categories: location, educational background, preparation in geography, current teaching, pedagogical practices, challenges and successes, and understandings of geography.

Location

Most survey participants currently taught in the United States. Out of 58 people who answered the question: "Do you currently teach in the United States?," 79% (n=46) of participants responded yes. Out of those who taught in the United States almost half, 49% (n=22) responded that they taught in Georgia. Another 16 other states were represented; respondents also reported that they taught in who taught in Alaska (n=1), Colorado (n=3), Connecticut (n=1), Florida (n=3), Indiana (n=1), Maine (n=1), Massachusetts (n=1), Minnesota (n=2), Missouri (n=1), Nebraska (n=1), New York (n=1), North Dakota (n=1),

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[3] Unfortunately, in a combination of human/computer interaction error, the automatically-generated questions about participants' demographics did not launch in the survey. So while I have a large amount of data about participants' current locations, educational backgrounds, and teaching practices, I do not have the corresponding demographic data that would typically be generated through a survey.

Ohio (n=1), Oklahoma (n=2), Rhode Island (n=1), South Carolina (n=1), and Texas (n=1).

Those who answered "yes" to teaching in the United States were also asked: "Have you ever taught in another state than the one in which you currently teach?" More than three quarters (78%, n=35) of question respondents said "no." Only 10 respondents (22%) said that they had taught in a state different than where they currently taught. What this indicates is that participants in this survey are not particularly mobile on a large scale – most of the participants tend to stay in one state.

Although the majority of participants taught in the United States, 21% (n=12) participants did not teach in the United States. Out of respondents who responded to the questions "In which country do you currently teach?," question respondents reported that they taught in Canada, Croatia, Korea, and Nepal.
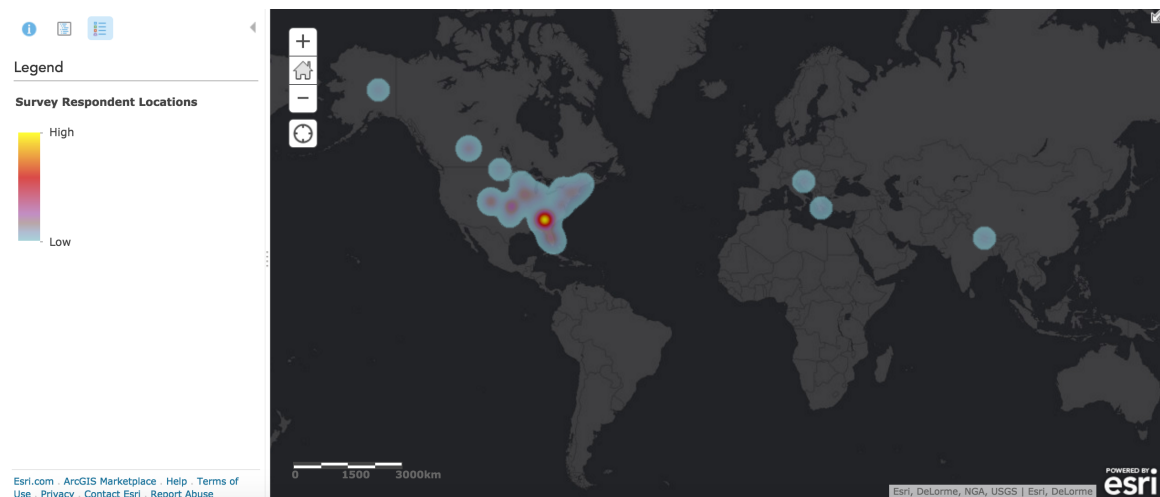
Figure 2: Geographic location of survey participants.

Beyond what was actually reported by survey respondents via question responses, location information about where participants took the survey was automatically recorded through participation in the Qualtrics survey. As such, these maps are not answers to a survey question, per say, but are instead point data generated through the collected IP

addresses of participants' computers. Every time a participant took the survey from a computer with an unblocked IP address, the computer's general location (approximate latitude and longitude) was recorded, and became available to me through the generated data charts provided by Qualtrics. Then, using ArcGIS Online, a Web GIS platform, I input the generated point data (latitude and longitude = x and y data) into an Excel file that was then uploaded to the GIS. This then generated a map that could show the location of survey participants (Figure 2).

The map in Figure 2 is a heat map. This heat map uses a high to low color scheme to cartographically illustrate where there were "hot" spots of people taking the survey. Using the legend, we see in the above map that a yellow color on the map illustrates an area where a larger number of participants took the survey. If we look to the map, we can see that the brightest yellow spot is in the Atlanta area. This means that the largest number of people who took the survey were located in the Atlanta area at the time when they responded to the survey. This major hot spot ring extends beyond Atlanta though to also include the Athens area (another "hot" spot, though not as hot as Atlanta, meaning that there were many people in Athens who took the survey, but not as many as Atlanta). Looking beyond the hottest spots denoted in bright red and yellow, the map shows that the predominance of participants were located in the Midwest and Eastern portions of the United States (denoted by lighter red and blue). What the map shows is that there were participants who took the survey in Alberta, Alaska, Eastern Europe, and Nepal. It also helps illustrate the mobility of the survey itself within the space(s) of the World Wide Web. Even though there were no formal boundaries that limited how the survey could move across the Web, locality still dominated. By this, I mean, that proximity mattered greatly in the dispersion of the survey (i.e. the greatest instances of survey taking were still within

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Georgia and in other nearby places in the United States). So while movement was possible

to any space on the web, the survey tended to stay close to its origin.

Educational Background

The map in Figure 3 demonstrates from where survey participants obtained their

university degrees. The question that generated this data asked: Where did you complete

your degree(s)? Please specify institution from each degree, e.g. Bachelor's – The University

of Miami, Master's – Georgia Southern. Thus, to answer this question, participants typed

their responses into an open text box. While reviewing the responses, I recorded all of the

locations of the listed universities into an Excel spreadsheet. Then, using Google Maps, I

obtained the point data (latitude and longitude) corresponding to the university's main

campus location. If participants attended the same institution as another participant, I

recorded those coordinates in the Excel spreadsheet again so that the frequency could be

used to generate a heat map. Using the same process as the prior heat map in Figure 2, I

then input this Excel file into ArcGIS Online to generate a cartographic representation of

the location of participants' degrees.
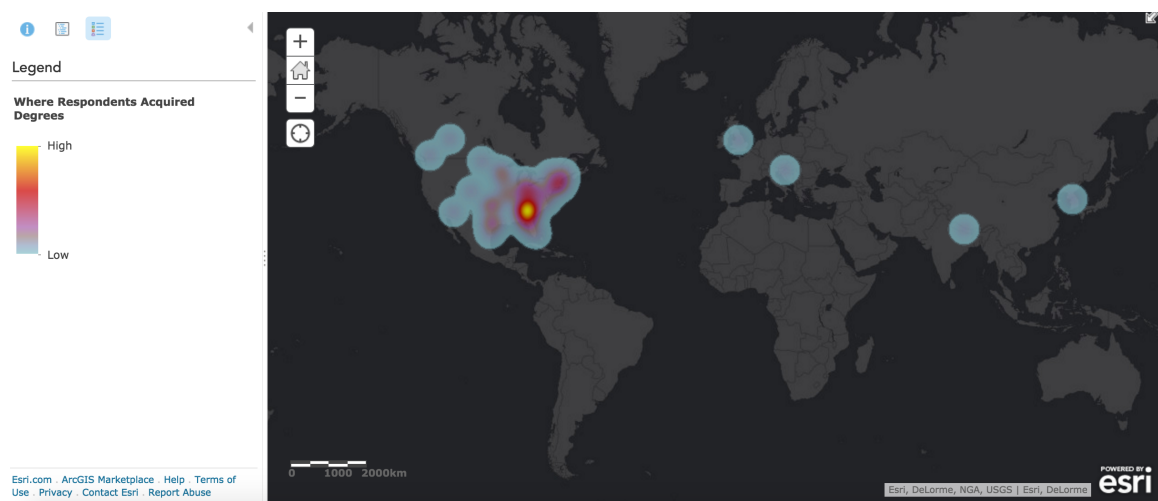
Figure 3: Location of post-secondary institutions attended by participants.

Similar to the data in the map in Figure 2, the predominance of participants obtained their degrees in the United States. If we look to the heat map in Figure 3, we can see that the hottest spot was located in the Southeastern United States, particularly in Northeast Georgia. There is also a "hot" corridor along the Northeast part of the United States. Very few respondents of the survey were located outside of the Midwestern of Eastern portions of the United States, although there were participants who reported that they had attended post-secondary school in the United Kingdom, Croatia, Canada, Nepal, and Korea. The clustering of participants (in terms of where they took the survey as well as where they obtained their degrees) can likely be attributed to the ways by which I recruited participants. Because recruitment efforts were made through a social media snowball, the majority of my connections were from geographic areas similar to where I am currently located (Georgia) and where I have spent the bulk of my professional time (in the Eastern portion of the United States). Knowledge of the survey moved through chains and connections of people, thereby restricting its movement to a already established networks and not far beyond my personal connections.

When I view this map alongside the other in Figure 2, I infer that participants tend to teach in places that are similar to where they received their degrees. Like the question from the prior section that asked if participants had ever taught in another state, this map also helps demonstrate that this population of geography teachers are not necessarily mobile – they tend to stay in general geographic areas that are similar to where they received their degrees. This presents an implication for the ways that professional development is offered to teachers once they enter the field. If many of the teachers tend to stay in similar geographic areas to where they received their degrees, it would likely be of value to form connections between State Geographic Alliances (agencies that provide support and

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professional development opportunities for geography teachers) and social studies teacher education programs. As I will demonstrate later, very few participants in this survey said that they participated in State Geographic Alliances and are thereby missing out on major opportunities to potentially advance both their geographic content and pedagogical knowledge.

When asked, "What is your highest degree completed?" the predominance of survey respondents said that they had obtained a master's degree (57%). Seventeen of the 53 respondents (32%) said their highest degree was a bachelor's. Fewer respondents had obtained a Specialist's degree (8%) and even fewer had some form of doctorate (2%). Therefore, 67% of participants have a master's degree or higher. This percentage is slightly higher than the percentage of all teachers in the United States in with a master's degree or higher. In 2011-2012 (the most recent figures available nationally about teachers in the U.S), the National Center for Education Statistics reported that 56% of teachers had a master's degree or higher. This type of data demonstrates that the participants in this survey were upwardly mobile in their educational attainment.

The next question was in an open-ended format and asked survey participants: "What was the focus of your studies? Please list each degree followed by the major or focus of that degree, e.g. Bachelor's - Geography & Elementary Education, Master's – Educational Technology." Going through this list, I recorded each individual degree and grouped them based to determine the frequency of degree focus of survey respondents. As Figure 4 demonstrates, the predominance of survey respondents obtained a degree in social studies education (20 out of 50 respondents, 40%). This was followed closely by history and history education.

Degree Focus of Survey Respondents

Degree	Frequency
Social Studies Education	20
History	14
History Education	7
Curriculum & Instruction	5
Ed. Leadership/Administration	4
Geography	4
Elementary Education	3
Middle Grades	3
Secondary Education	2
Political Science	2
Integrated Social Science	2
Ed. Technology	1
Global Education	1
Geography Education	1
Speech and Communication	1
Climate Science	1
Sociology	1
Psychology	1
Business Education	1
Special Education	1

Figure 4: Degree focus of participants.

This survey result echoes what has been found in previous studies (e.g. Bednarz & Bednarz, 2004; Theobald, Dixon, Mohan, & Moore, 2013); that most people who become geography teachers most often have degrees in social studies education. It is important to note that out of the 50 respondents who answered this particular question, only 5 of the recorded degrees were in geography or geography education. This speaks back to what I mentioned earlier in this chapter as well as in Chapter 1; there is a problem with focusing interventions and policy changes towards geography/geography education specific careers. If it has been established across various studies that very few geography teachers are traditionally prepared through geography (education) programs, it is problematic that the bulk of recommendations made are not in the context social studies education programs where geography teachers tend to be prepared.

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Preparation in Geography

In the section that asked questions about participants' preparation in geography education, there were mixed results. All but one respondent had taken at least one geography class at the post-secondary level. This type of response was encouraging because it has been cited in the literature that oftentimes, geography teachers do not actually have any post-secondary coursework in geography (Bednarz & Bednarz, 2004). Even so, the majority of respondents (33%) said that they had only taken one course in geography at the post-secondary level. While one course is arguably better than none, it is still unlikely that enrollment in one class can help someone gain the content knowledge required to effectively teach a K-12 geography course. Further, the most popular courses that participants said to have enrolled in were mostly classes in human geography (e.g. World Regional Geography). Out of the 49 question respondents, only 9 participants (18%) said to have taken a course on geography education/pedagogy. This is also potentially problematic because it has been noted in the literature that preservice teachers often have difficulty connecting content to pedagogical measures (e.g. Shulman, 1987).

Yet there was not a major agreement as to whether participants' felt they were adequately prepared to teach geography – whether it was through exposure to content, exposure to teaching methods, or practicum/student teaching experiences in geography classrooms. For example, when prompted to describe their level of agreement (strongly disagree, disagree, neither agree nor disagree, agree, or strongly agree) to the following statement: "During my education, I feel that I learned enough geography content to effectively teach geography," 38% of respondents (n=18) said that they agreed with the above statement. Yet, 26% (n=12) of respondents disagreed with the statement. Similar results were present in the question that prompted participants to rate their level of

agreement to the following statement: "During my education, I learned instructional methods that are effective for the teaching of geography." In particular, 34% (n=16) of participants said they agreed with the statement while a close 32% (n=15) said they disagreed. In yet another similar split, 38% of participants (n=18) disagreed with the statement, "During my education, I feel I gained enough practicum/student teaching experience in geography classrooms or classrooms where geography was a significant part of the curriculum." Conversely, 26% (n=12) of participants agreed that they had received adequate experience in geography classrooms. One might infer from reviewing these data points that simply having coursework in geography does not adequately prepare one to become a geography teacher.

Some of the most interesting results of the survey came from the questions that asked participants how or why they became geography teachers (Figures 5 and 6). I found participant responses to be particularly interesting because of the types of audiences that tend to be targeted for the improvement of geography education. As I have mentioned before, policy pieces and other research tend to make the bulk of their recommendations toward a group of teachers that perhaps are not as present as once thought – those who intend to become a geography teacher and actively pursue a career as such. When asked "Why did you become a geography teacher?." , 42 of the 47 responses could be categorized. Five responses were omitted because they were not comprehensible/did not answer the question posed. Although individual phrasing varied because of the open-ended question format, participants reported that they became geography teachers because they

- Were trained in geography (1/42 = 2.3%)
- Wanted to coach a sports team and saw teaching geography as the pathway to doing so (1/42 = 2.3%)

- Were inspired by travel (1/42 = 2.3%)

- Were able to teach geography because of coverage through a social studies teaching certificate (3/42 = 7.1%)

- Had an interest in history and saw geography as the pathway to maintaining this passion (3/42 = 7.1%)

- Loved social studies (4/42 = 9.5%)

- Had an interest in the subject (13/42 = 30.9%)

- Were placed in a geography classroom/it was the only available job (16/42 = 38%)
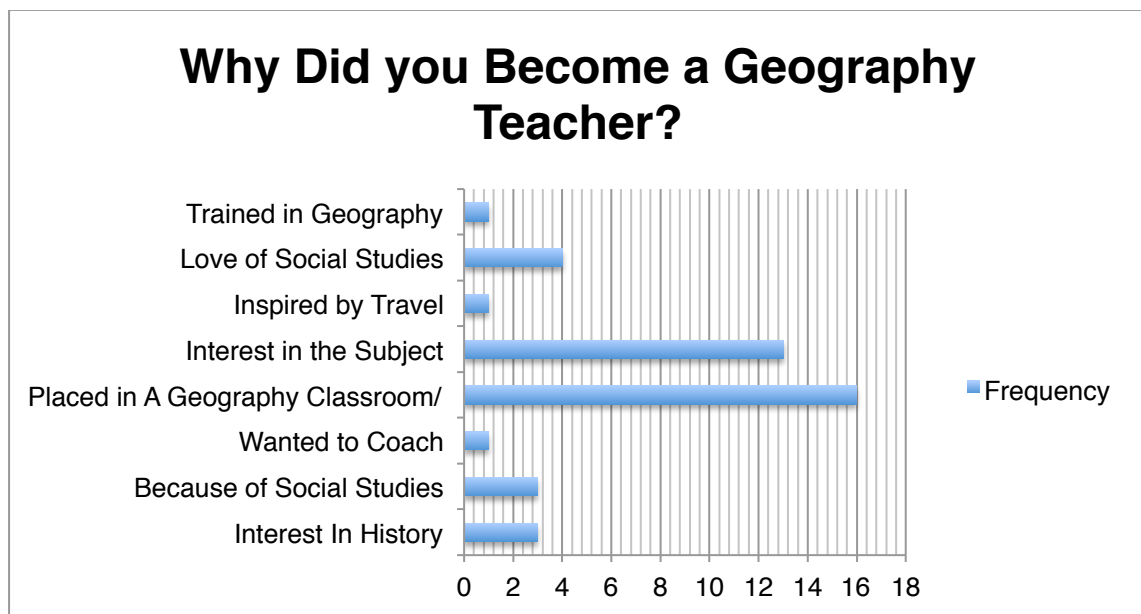
Figure 5: Survey responses to question: Why did you become a geography teacher?

A striking number of participants fell into the category: "Placed In a Geography Classroom/Only Available job." This suggests that the majority of survey participants did not actively pursue a career as a geography teacher. This result can be placed alongside that prior survey question that delved into the degree focus of participants. The majority of

survey respondents noted that their degrees were in social studies education. Therefore, it

might not be that far of a leap to infer that most of the survey participants entered into a

social studies degree program to become a teacher of another social studies discipline, likely

history, rather than becoming a geography teacher. In this way, survey participants were

mobilized into spaces of geography education not by choice, but by the movement that was

available to them (e.g. taking the geography teacher job).

Even more striking perhaps, were the results of the survey question that asked "How

did you become a geography teacher?" (see Figure 6). Only 4 out of 45 question

respondents (8.9%) described an active pursuit of a career as a geography teacher. Over half

of respondents (55.6%) said they became geography teachers because that was the position

they were assigned. Another 35.5% described that they became geography teachers because

of licensure coverage through their teacher education degree. This data echoes what has

been found in other studies on the backgrounds of geography teachers (Bednarz & Bednarz;,

2004; Bednarz, Bockenhauer, & Walk, 2005; Schell, Roth, & Mohan, 2013) as well as prior

results indicated in this survey; that many who teach geography have little background or

experience in academic geography, both in terms of geography content as well as pedagogy.

Geography teachers in this survey tend to move from one academic discipline to another to

gain a job or fulfill some type of other job; essentially they are mobile in their teaching across

disciplines.

How did you become a geography teacher?

Category	Frequency
Trained in Geography	2
Part of Curriculum (e.g. Middle Grades Social Studies)	3
Actively Sought Job	4
Certification Coverage	5
University Training	3
Available Position	21
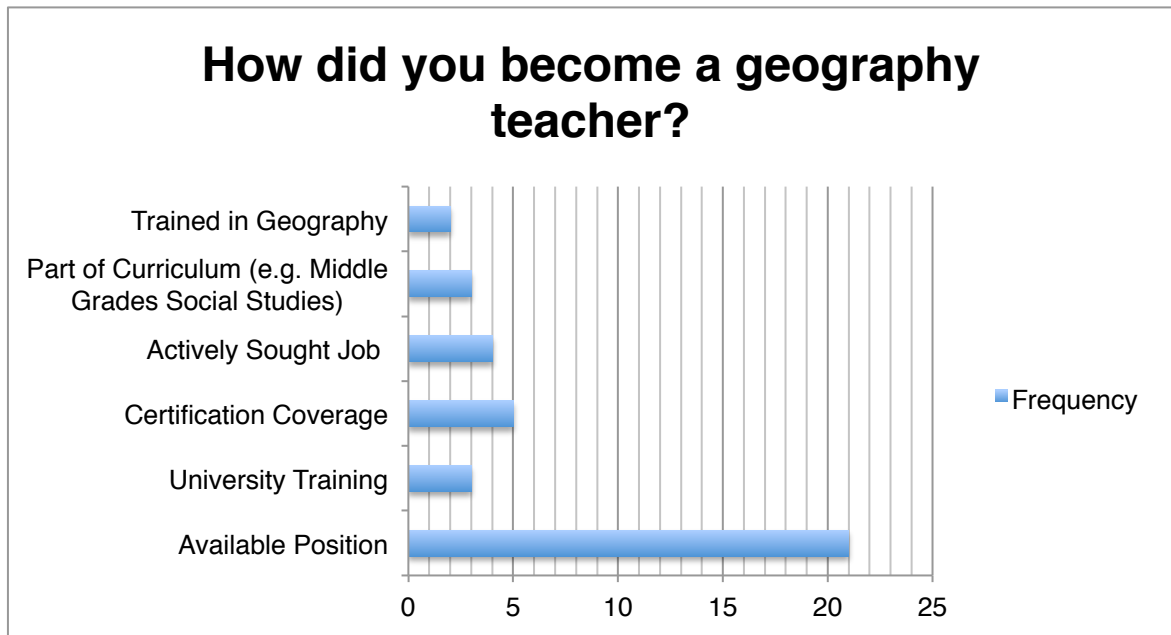
Figure 6: Survey responses to question: How did you become a geography teacher?

When this data is placed alongside the data generated through the previous question: "Why did you become a geography teacher?" we can see that geography as a teachable subject allows for mobility amongst participants. In these data points, geography served as a mobilizer that allowed participants to move from being unemployed, to employed; and to also move from being a social studies teacher, to a geography teacher. Further, geography as a teachable subject also allowed other mobilities of participants to take place – to become a coach, to find a job, or to further a passion for history. This type of movement might be understood as a type of unintended/unexpected voluntary movement; one undertaken to move in a way that provided a desirable subject position (of coach, of employed, etc.).

Current Teaching

All survey respondents taught at the middle or secondary level. The highest represented grade levels were 7th grade with 42% as well as 9th grade with 40% of participants. This could likely be attributed to the fact that the predominance of survey respondents came from Georgia, where the 7th grade curriculum social studies curriculum is heavily weighted in geography content, and World Geography is often offered in 9th grade. This is also reflected in the responses to the survey question that asked: "What subject(s) do you currently teach?" In the responses, 49% (n=26) of participants said that they taught middle grades social studies. Another 40% (n=21) said they taught World Geography. In addition to teaching geography courses, survey respondents also noted that many of them taught either World History or U.S History (combined, 42% of participants).

In the series of questions that asked participants to note how long they had been teaching, as well as how long they had been teaching geography, there were mixed results. Thirty percent of participants had taught for five years or less, while 46% of participants noted that they had been teaching for 10 years or more. When asked specifically about teaching geography, similar results were present, though weighted more heavily towards fewer years in the geography classroom. In particular, 56% of participants responded that they had been teaching geography for 5 years or less. Even so, there were still many respondents (20%) who said they had been teaching/taught geography for 10 or more years.

Pedagogical Practices

In this section of questions, participants were given a variety of multiple-choice/level of agreement prompts about their pedagogical practices in their geography teaching. The majority of respondents 83% either agreed or strongly agreed that they used curricular

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standards to guide their instruction in geography. I followed up that question with one about how closely teachers follow curricular standards in their teaching. In particular, I asked participants to rank their level of agreement to the following statement: "I stick to what is in the standards and focus my teaching on what students need to know to pass their test." These results to this question were more varied. Approximately 38% of participants either agreed or strongly agreed with the statement, while 45% of participants either disagreed or strongly disagreed. In this way, participants in the survey move through and mobilize the geography curriculum in varied ways. Unfortunately, these questions do not tell us as much as I had intended they would when I wrote them. I should have phrased the questions in a different way, or followed them with another question that asked participants to describe how they navigated curricular standards in their own instruction. I had originally wanted to know if participants relied heavily on what was in the standards and whether that indicated a lack of content knowledge. How I asked the question though does not tell us anything about this other than if participants use curricular standards or not.

Another question that was not as productive as I intended was when I asked participants to identify the types of methods that they use to teach geography. Perhaps unsurprisingly, the most traditional types of methods (lecture, PowerPoint, small group work, and whole group discussion) were the most popular. This question and the ones prior about curricular standards could have been tied together in a better way to help paint a more complex picture of the types of geography teaching that occur. These poor questions aside, I later asked participants to describe challenges and successes in their geography teaching as well as questions geared towards gaining insight into participants' understandings of geography (discussed in the next subsection). I think that these questions got closer to what

I was hoping to learn about participants' geography instruction and knowledge that these multiple-choice type questions did not address.

After asking participants a series of questions related to their general instruction in geography, I asked them four questions that particularly addressed their use of GIS in their geography instruction. GIS, while a productive tool in academic geography with much potential in geography education, has long been cited as underutilized in the K-12 classroom (Kerski, 2009). I first asked participants whether or not their school had access to GIS software or devices with an Internet connection. To my surprise, 66% (n=31) of participants said that they did not. This question result is not conclusive though. It is more likely that participants are simply unaware that they have free access to online GIS platforms (e.g. ArcGIS Online) since I think one would be hard-pressed to find a school in the United States today that does not have some form of computer access and Internet. Perhaps unsurprisingly, when participants were then asked to rank their level of agreement to the following statement: "I use GIS often in my instruction" 72% (n=34) either disagreed or strongly disagreed. Only 15% of participants (n=7) either agreed or strongly agreed. Similarly, when asked to rank their comfort with using GIS for instruction, 66% of participants said they would be uncomfortable or very uncomfortable with using GIS in the classroom.

Despite these results, the next question was constructed to gauge participants' interest in gaining guidance in using GIS in instruction. The question asked participants to rank their level of agreement to the following statement: "I could use some help in figuring out how to use GIS with my students." In the report, 70% of question respondents (n=33) said that they agreed or strongly agreed with the statement. Only 13% of participants (n=6) disagreed or strongly disagreed. This represents a desire for geography teachers in this

survey to move from being someone who is unfamiliar with GIS and its pedagogical possibilities, to someone who has another resource for potentially enhanced geography instruction.

Lastly, this section asked participants about their opportunities for professional development in geography as well as their membership in professional organizations geared towards the improvement of geography education. When asked to rank their level of agreement to the following statement: "In my current position, I am given the opportunity to improve upon my geography instruction through professional development workshops, online courses, specialist support, etc.", 51% of question respondents (n=24) said that they agreed or strongly agreed. Another 19% (n=9) neither agreed nor disagreed. Finally, 30% of respondents disagreed or strongly disagreed (n=14).

Alongside this question, participants were also asked to check which, if any, professional organizations committed to geography/geography education with which they had memberships. Their choices were: the National Council for Geography Education, A State Geography Alliance, the Association of American Geographers, or none. An overwhelming 88% (n=42) of respondents selected none. Six respondents said they were members of a State Alliance (10%), while three (6%) said they were members of the National Council for Geography Education.

In retrospect, I should have followed up to this question, or added on to it, by asking participants if they were members of any organizations like the National Council for Social Studies or if they had ever attended any of the respective groups' conferences. Perhaps this would have helped my understanding of whether or not these groups of geography teachers were non-participatory in professional organizations, or simply professional organizations related to geography education.

Challenges and Successes: Navigations of, and Experiences with Lack

This section of questions aimed to gain insight into the challenges and successes teachers encountered in the space of their geography teaching, yet, it also provided demonstrations of teachers' geography knowledge and the perceived importance of the discipline. The first question asked: "What challenges do you face in your teaching of geography?". After reading through the responses, I noticed that one word dominated the responses: *lack*. Once I had established that the idea of lack was a major theme in these responses, I went through the data generated from this question and tagged the relevant responses to categorize the types of lack discussed by participants. I use the word *tag* versus code because many of the responses were able to fit into multiple categories of lack. Coding allows for single pieces of data to straddle multiple categories instead of being relegated to one. This idea is important to maintain for work within mobilities theories where the focus is on maintaining, instead of reducing complexity. As an example of lack described by participants that was tagged in multiple ways, one participant wrote about their challenges in geography education as such:

> Lack of motivation in students and a lack of class wide technology to use for interactive map games and quizzes. There is also a lack of time. So many standards are pushed into a year that we have little time to eave the geography together with the history and cultures of the places students are to study.

In this response, there are three types of lack mentioned: lack of student motivation, lack of resources, as well as lack of time. I also might infer that this participant also means that their curriculum is lacking – though not lack in the sense of having too little, but lack as excess. Excess in this sense creates a burdensome situation in which the participant lacks the ability navigate the excess. Across all of the participant responses, there was an acknowledgment

that the major challenges they faced in their geography instruction could be attributed to a lack of:

- resources (14 mentions)

- student knowledge, motivation, or interest in geography (12 mentions)

- time (9 mentions)

- their own knowledge of geography or how to navigate the curriculum (3 mentions)

- engaging/relevant curriculum (4 mentions)

Two others ideas were also present in the responses: the idea that class sizes were too large (3 mentions), and also that they felt the geography portion of the curriculum was overshadowed by another discipline that shared the same curricular space (3 mentions). These ideas too could be understood as a form of lack. Large class sizes could be related to the ideas of a lack of time or lack of resources. Overshadowing could be connected to the other mentions of lack of engaging curriculum.

Thought about through the lens of mobilities theories, we might think of the term lack, as something that limits or restricts participants' movement (Urry, 2007). Mobilities theorists acknowledge that lack has the potential to create borders (Urry, 2007, Sheller, 2011). Thinking about how lack creates borders is important because a border is "constituted by regulation of mobility" (Sheller, 2011, p. 5). Looking at the responses above, this means that a lack created borders and therefore impacted the ways that geography teachers hoped to move through the curriculum or content. In this way, lack works as an impediment for movement. It restricts desired movement, or force movement in ways that are undesired by the participant (Sheller & Urry, 2006; Urry, 2007).

When participants were asked, "What are some ways you could be helped in facing these challenges?", many of the comments that circulated throughout the responses were

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counterpoints to the prior commentary on lack. For example, participants suggested that curricular materials be updated, that more resources be made available, and that more time be given to geography in the school day. One thing was particularly interesting about these responses thought was that the most common response among participants (33%) were calls for more training and opportunities for professional development. I find this curious because as noted in the responses to the previous question, lack of teacher knowledge was not often cited as a major challenge; it was only mentioned in three responses. Yet, if we look at the responses to this question, the biggest issue at hand might be interpreted as a lack of teacher knowledge/experience in geography education. This poses a greater question – did many participants' inherently know that their own challenges lay in their own knowledge and abilities? Or, like the comedy skits describes in Chapter 1, did geography teachers perceive that their own knowledge of geography was lacking because of the way geography as a subject area is often framed?

When asked to "Describe a powerful geography teaching experience that you had with your students in the past year" the majority of participant responses centered on students "getting it" in some way or another. Latent in these descriptions were students moving from positions of being unknowing/uninterested subjects to those that are learning/engaged. The bulk of responses described an experience in which the participant successfully wove geography content through a lesson in a way that facilitated student engagement, interest, and learning.

Eight responses described other disciplinary lessons in which geography was infused. For example, one participant wrote: "Using geography to detail Confederate and Union strategies at the Battle of Gettysburg." In this quote, it is unclear what exactly the participant means by "geography" but I infer that they are referring to physical landforms

and terrain that impacted that ways the strategizing and outcomes for these particular battles during the Civil War. While on the surface this may appear to be surface-level integration of geography on the part of the participant, it demonstrates a greater knowledge on the part of the participant that geography, and its related concepts, are intrinsically important to events in history for example.

Another participant also described how they used geography to teach another disciplinary topic. They wrote:

> We recently discussed the exploration of the Greater Antilles and we discussed the impact of Christopher Columbus' exploration on the lives of Native Americans. We discussed the idea that he is often framed a hero, but little is mentioned about his negative impact. This was followed with a simulation where we discussed who was to blame for the decline of the Tainos Indians. This lead to a great conversation about the system of empire, its effects, and also how people determined inferior/superior status.

This quote demonstrates a strong knowledge of geography and its relevancy to other disciplinary topics. On the surface, there are perhaps only two explicit mentions of the type of geography content one might expect to see in the standards – the Greater Antilles, and the idea of empire. Yet, understandings of geography are required by the teacher to be able to connect the ideas related to colonization, the effect of empire rule, and how the livelihood of persons is intertwined with these ideas.

Navigating Lack by Thinking *About* and *With* Geography. Both of these quotes - one being more "surface-level," the other more complex –serve as examples in which participants were both thinking *about* and *with* geography. By this, I mean that they likely brought in geographic content (e.g. those found in the standards) but then also

demonstrated how facets related to geography can function as a tool for sense-making; a part of critical spatial literacy. In the first quote, the participant prompted students to think *about* geography to recognize the particular landforms and terrain that were present on the battlefields, while also prompting them to think *with* geography by thinking about and theorizing how these particular landforms impacted and influenced the ways that leaders strategized. In the second quote, the participant prompted students to think *about* geography by drawing students' attention to the Greater Antilles (a grouping of large islands in the Caribbean) and the routes of Columbus's exploration, while also thinking *with* geography to consider why the ideas of empire and the dehumanization and decimation of indigenous populations are entwined with matters of location.

In both instances, thinking about and with geography was a productive practice; productive enough for it to be mentioned as a "powerful" teaching moment in geography. Thinking with and about geography helped create relevance between disciplinary topics in geography and the "real world." I understand this thinking about and with geography as a form of movement because the process of thinking about and with geography allows the content, skills, and modes of inquiry present in the described powerful moment to be mobilized to the world outside of school. This separates it from a "static" subject where things are only worth knowing in one place, i.e. the geography classroom.

Understandings of Geography

The first question of this section was geared towards gaining insight into participants' understanding(s) of geography. It said: "How would you describe the subject of geography to a student?". Present in the responses were a large number of "textbook" answers. For example, 14 of the 43 responses paraphrased the famous three questions of geography: variations of "What is where? Why there? Why should we care?". One

participant, for example, wrote that geography is the "Study of everything! Geographers ask: what is it, where is it, why is it there?". Another wrote: "Geography is the study of why what is where and so what." I interpret these types of comments in two ways. Firstly, these responses can be understood as participants having a strong knowledge of geography. Participants could be mobilizing information they may have learned in geography coursework, or from their own courses that they teach into the space of their survey. Conversely, this type of response could also be a type of regurgitation of a commonly used phrase that is prevalent across contexts in geography courses. Without a follow-up question or interview, I cannot be sure as to what exactly is happening in these phrases, yet, it is of note that a fairly large number of participants (14) relayed these questions in some fashion or another.

Similarly, a number of participants presented a comparable type of recitation of another commonly used phrase in geography. This other common definition of geography is often found in course descriptions and textbooks. It generally states that geography is the study of humans and their interactions with the environment. What is interesting about this definition though is that it is almost solely specific to human geography. This definition would not necessarily ring true for the fields of physical geography, climatology, hydrology, geomorphology (all sub-disciplines of geography) where the focus is on some physical facet of the environment, and does not necessarily involve or a require a human element to be present for study. I infer that participants who wrote these types of responses had a less complex understanding of the entirety of the field of geography as they completely ignored a major component of the field – the subfields that focus their study primarily on the physical world.

These two types of "textbook" responses could be positioned against a number of other responses put forth by participants that demonstrated a strong understanding of the subject. Ten participants wrote their own definitions of geography that established a complex understanding of the intertwined nature of the discipline. One example of this type of responses would be the participant that wrote:

> Geography is the study of earth and everything in/on it. It extends to earth's position in the universe, to climate, topography, culture, economics, politics and religion, and spatial elements (cartography, regions, and location).

This complex and informed definition of geography is not a textbook recitation and demonstrates that the participant has constructed their own working definition of the discipline. In it, the participant is addressing many facets of geography – the human component, the physical side, as well as associated skills and ways of thinking (e.g. the mention of spatial elements and cartography). As such, the participant is demonstrating a holistic view of the field, not simply one in which geography is understood of as a subject built around identification and location questions.

Another answer I classify as having a sophisticated understanding of the subject came from a participant that wrote:

> At the start of the year I discussed with my students that each day they interact with geography, but never knew there was a label for these interactions until now. I discussed that geography is everything – from physical features, to the way we greet on another, where we live, what we eat, how we speak. We discuss that geography is often confused to be just the physical features of an area, but this is only a portion of the study of geography.

This quote demonstrates the participants' ability to connect geography to everyday life; an important component of constructing engaging pedagogy. What this participant is doing is relaying the idea that geography is relevant to everyday life and present across a number of contexts beyond school; they are mobilizing the content of geography form the classroom to the outside world (a facet of critical spatial literacy). This is evidenced through their mention of both "physical features" as well as social factors (e.g. "where we live, what we eat, how we speak"). Also, the participant writes the phrase "this is only a portion of the study of geography" which demonstrates another understanding: that geography is often confused for a simple subject area that only pertains to landscape or location type topics.

Whether participants demonstrated a strong understanding of geography or not in these responses, there was the circulation of many implicit arguments about geography's importance. These arguments are most visible in the responses that aimed to illustrate the "big picture" nature of geography. For example, one participant wrote, "It's everything everywhere" while another similarly said, "Studying the world!". In these responses, the participants' use of totalizing words (e.g. everywhere, the world) illustrates their understanding of the relevance and importance of geography across contexts (even if we do not know what *exactly* they understand geography to be). Another response that illustrated the type of implicit argument of geography's importance in a more nuanced way was:

> Geography is more than map and globe skills. The course is more than simply where a state or country is located and what is capital is called and where it can be found on a map. Geography is a living and vibrant subject that can come on a daily basis if you know what to look for, and what you are looking at.

In the quote above, the implicit argument for the importance of geography can be seen first in the opening sentences. The participants' use of the words "more than" in both contexts

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sets up a comparison between what they believe geography is, and how it is often referred to in everyday life. The participant is making an argument here that geography is not just about naming places on a map, but that it serves a greater purpose. Their idea of what a greater purpose is, is demonstrated in their final subject of the statement. When they say that geography is a "living and vibrant" subject they are making a case for the subject of geography as something that is complex, and placing their understanding of it in opposition to an understanding that may simply see geography as shallow and static. This idea of geography as complex can also be seen in the second part of that sentence when the participant writes the statements "if you know what to look for" and "what you are looking at." In this, the participant is making the case that one must have a strong understanding of geography to be able to use it as a tool for sense-making.

These types of responses - in which implicit arguments are made about the importance and relevance of geography – imply that a number of participants do not see any topic as outside of geography. This is a crucial understanding for the subject's implementation in its own discipline and across others. In this though there is also a challenge – if everything is geography – where do we draw the line? How do we know what to talk about with students? What facets to address in the curriculum? If it is everything, might it also then be nothing? That's where thinking about geography as a tool for developing critical spatial literacy is helpful; through exercising critical spatial literacy, geographic understandings and skills can be employed as tools and perspective to make sense of processes and events in the world.

Participants displayed forms critical spatial literacy in the next question in this section, and the final question of the survey that asked participants: "What do students need to learn about geography to be competent members of society?". Six respondents explicitly

stated in some form that understandings of geography served as a method for sense-making and understanding. For example, one participant wrote that they felt that students needed to know "nothing directly related to content" but that they instead "need to learn how to think" using geography. Another participant said:

> Students need to be able to think spatially about problems to help them to solve public problems. They also need to learn about others' experiences in a non-ethnocentric way in order to solve public problems.

Both of these quotes, and others like them, illustrate how participants, when prompted to think about geography beyond identification and location questions, can describe geography as subject that is not only about place naming but also a way to think about and understand processes in the world. It is in this way that this survey served as a space of geography teacher education; a tool that prompted participants to mobilize and enact knowledge that they might have about the subject area. In the quote above, this is illustrated through the participants' mention that students "need" to learn how to think spatially and also about others' experiences. The use of the word need sets a precedent of importance in how geography can function as a tool for thinking, and also for being an empathetic individual (in this quote, evidenced by the participants' stressing that geography provide a pathway to understanding people of the world in "non-ethnocentric" ways); both facets I describe in Chapter 2 as being part of a critical spatial literacy.

In addition to types of critical spatial literacy demonstrated and the mentioning of certain forms of thinking skills, a number of participants also expressed that they felt that geography was important for the development of rote skills. Several participants, in particular, mentioned that students need to learn how to use maps. The ability to read a map was coupled with the participants' mention of the importance of using maps to identify

locations as they pertain to the existence of certain cultures. In these quotes, the rote skill was necessarily for engaging in learning of new ideas. The use of a map, particularly in the service of other form of learning, can be categorized as a form of spatial thinking and reasoning – two major components required for critical spatial literacy. These abilities, while rote in nature, can allow people to make sense of their world both through reading and creation of cartographic representations.

While geography as a tool and the ability to read maps were cited numerous times as reasons why students should know geography, the most common response for this question was one in which participants described understandings of geography as a way for students to connect with the world at large. There were a number of mentions of how geography connected to global citizenship, to students' understanding their "place in the world," as well as its connection to civic duty. One participant wrote, for example, that students "need to learn how geography has helped shaped culture, religion, wealth, and any other number of things that they will be concern with (or should be) as they become adults who have to vote and make decisions in the real world." In this quote, and others like it, we see the way that the participant connects geographic understandings to real world relevance. In this particular quote this is through the knowledge of the intertwined nature between location and social factors and how those ideas come to matter in the civic process and other "adult" duties. Even the use of the term "real world" is indicative of participants' perceived importance of geographic learning. This type of understanding of geography is closely aligned with the often cited reasoning for the existence of social studies, and even education at large – as means to produce an informed citizenry. The prevalence of this type of response likely existed because of the high number of participants who had graduated from social studies education programs. It should be unsurprising then that most of them view

geography from a social studies perspective where civic duty is central to the reasoning behind a discipline.

Summation of Findings & Implications

The survey results indicate that geography teacher education does not just occur in formal context and geography-specific programs, but in many other places, like social studies education, through (forced) on the job learning (e.g. had to learn how to teach geography on the fly because they were placed in a geography classroom), through interactions with colleagues, and when asked specific questions on a research survey such as this one. It is within these spaces that geographer teachers are gaining and refining their knowledge of geography content and pedagogy. This survey does not aim to provide totalizing data about all geography teachers. It instead provides an opportunity to learn more about individual geography teachers and their experiences in their teacher education and their current pedagogical practices. These individuals together comprise different systems of educational experiences, current practices, and knowledge of geography to illustrate at least in part, how geography teacher education functions in different spaces and for different people and at different scales. This fairly large and diverse sample of geography teacher perspectives provides insight into the types of geography teacher education and current pedagogical practices that exists predominantly in the Midwestern to Eastern parts of the United States, but also in other places in the world. This set of qualitative data provides another view into the first research question of this dissertation (in what spaces do geography teachers gain, develop, and refine geography knowledge).

On a large scale, geography teachers who took this survey were mostly inexperienced and unprepared in academic geography before teaching it themselves, with the bulk of participants only taking one course in post-secondary geography; a finding that corroborates

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the established literature in the field of geography teacher education resarch. Further, the majority of participants were prepared in social studies education programs and became geography teachers because of job availability; another piece of supporting for the established findings of the field. A large number of participants cited various forms of "lack" as the main challenges they face in their instruction of geography. Yet unlike the research in geography teacher education, participants did not attribute poor teacher knowledge as the primary issue with geography teacher education. Instead, participants suggested lack was mostly present in the curriculum, in the amount of time for the subject, and in students' interest of it.

On an individual level, there was a wide range of represented knowledges and experiences with geography that were demonstrate through the mobilization of different question engagement. When prompted, some participants demonstrated complex understandings of geography content and pedagogy, while others expressed a lack of confidence in their geography knowledge and advocated for more opportunities to further learn about geography content, pedagogy, and related practice (e.g. the use of GIS). Thus, in relation to the second research question, when geography teachers encounter discussions of geography, many have the ability to mobilize complex understandings of the subject area that extend beyond the lacking nature of K-12 geography education. Thus, while the problem with failing geography scores has been attributed most frequently to teachers in the research literature, this blaming is too easy; a lacking geography education system can be attributed to a variety of factors including curricula, time, and student interest.

Ultimately, what the survey results demonstrate is that there is not a standard approach to becoming a geography teacher and that geography teachers themselves are a diverse population. This presents implications for the types of recommendations for

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improving geography teacher education – given the diversity amongst respondents, one-size-fits-all types of recommendation present throughout the body of literature on geography teacher education become especially problematic.

Conclusion

Overall, the survey reaffirms findings from other studies cited in my review of literature in terms of geography teachers' backgrounds and preparation practices. Where the findings from this survey differ from understandings of the field is that there is learning taking place in other places other than formal geography education spaces. Thus, when recommendations are solely being made about increasing exposure to geography (e.g. Schell, Mohan, & Roth, 2013), researchers are not taking into account that geography teachers are also learning geography beyond the formal confines of geography education.

Also, while lack is something that geography teachers talk about, when prompted, it is not clear as to whether or not their own knowledge is lacking as the research literature often suggests. With specific questions, a number of geography teachers have the ability to write complex and engaged definitions and understandings of geography that move beyond a basic understanding. Thus, blaming failing geography test scores solely on teachers seems a bit unfair – the lack may be present elsewhere, or like the idea I presented earlier, the problem might not be a lack of geography (or geography knowledge of teachers) but a lack of being able to recognize geography (education) in its various manifestations. As we move into the next chapter, I will take up questions related to lack theorize the ways in which lack is connected to geography teachers' mobilities and subjectivities.

CHAPTER 5

CONVERSATION ON LACK: TEACHERS DISCUSS GEOGRAPHY

EDUCATION

Once the survey data had been generated and put through an initial analysis, I used that data and the respective representations of the data to guide further conversations with four of the initial survey participants. Through these conversations, I aimed learned more about the backgrounds of geography teachers, their challenges in the classroom, and their pedagogical successes. Specifically, I heard personal accounts of the ways that teachers encounter and navigate lack in their teaching of geography. Lack, as described in these interviews, created borders that modified teachers' movement through the curriculum, feelings of self-efficacy, as well as their ability and/or opportunity to mobilize geography teaching that they did not perceive as lacking in itself.

In this chapter then, I first provide an overview of the structure of the interviews. I discuss the design and participants, their connections to the previous survey data, as well as the methods of analysis used for making sense of the generated data. I subsequently detail the findings that I came to when I put the interview data under the lens of mobilities theories. I delve into the ways that the interviewees – Carrie, Sarah, Lillian, and Sadie – individually describe their educational backgrounds and work as geography teachers and how those experiences were influenced by the intertwined nature of lack, movement, and subjectivity.

<center>**Interviews**</center>

Design & Participants

Interviews were conducted as a follow up to the survey. All interview participants had taken the survey. In the survey they indicated that they would be interested in volunteering to take part in an interview. There were originally 15 survey participants who volunteered to participate in interviews or small focus groups. Yet, when contacted, only six replied to the follow-up. Of those six, four participants ended up participating. The two that did not participate were originally set to take part in an online focus group facilitated through Google Hangouts, but at the last minute informed me they were unable to attend. When asked to set up another time, they unfortunately did not reply.

Through all of these kinks, I ended up conducting three different semi-structured interviews with four practicing teachers. Two of the interviews (Sadie and Carrie) happened at different times in coffee shops in Athens, GA selected by the participants, while the interview with the other two participants (Lillian and Sarah) occurred concurrently on a Google Hangout. Interviewees were teachers who were attending/had attended the University of Georgia for social studies education degree(s) and were currently teaching somewhere in Georgia. All interviews were one hour and a half to two hours in length. None of the participants were currently teaching geography as a stand-alone course, but had all previously taught it in the past, or had taught a course that contained a significant amount of geography content (e.g. middle grades social studies). Table 1 details basic information about the interview participants:

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Table 1: Interview Participant Descriptors

Name	Current Position	Grade Level	Current Grade/Subject(s)	Highest Degree Attained	Years Taught
Lillian	Teacher Candidate	Middle Grades	6th Grade Social Studies	B.S.Ed	<1
Sarah	Teacher	Secondary	World History, Economics		6
Sadie	Teacher	Secondary	Art History, World History	Currently enrolled in Master's	3
Carrie	Teacher	Secondary	Art History, World History	Currently enrolled in Social Studies PhD	10

The interviews and the ideas I detail next reflect meaning made from comments from a group of teachers that came from similar teacher education contexts. While the initial survey data provided information about geography teachers on a broader scale, the interviews reflect interpretations about geography teacher education on a more local level. All four participants offered valuable insight into the specific spaces of geography teacher education they encountered and experienced during their formal schooling as well as in professional contexts. They all also had degrees (or were soon finishing degrees) in social studies education from the same institution. Additionally, all four interviewees fell into the dominant category of teachers identified through my survey – people who ended up teaching geography with no prior intention of doing so. Given these characteristics, I felt Sadie, Carrie, Lillian, and Sarah could offer localized insight about what it meant for them to move through spaces of geography teacher education and into the role of geography teacher.

Existing Relationships with Participants: What Opens Up and What Shuts Down in the Interview Process. Prior to the interviews, I had existing relationships with all of the participants. Both Sarah and Carrie had been mentor teachers for my own students in practicum and student teaching placements. Carrie was also a newly enrolled doctoral student with whom I had interacted when I gave a guest lecture in the initial orientation course required of all doctoral students within the department. I had been Lillian's instructor for several courses and also served as her field instructor during her practicum in the social studies education program. I first met Sadie when I reviewed her teaching portfolio for our department's E-Portfolio night. Her portfolio of work was developed during a semester she had spent student teaching in Sarah's classroom. Sadie and I later became friends through a combination of mutual acquaintances and a shared interest in hot yoga. Further, it is of note that all four participants and I are friends on Facebook and I follow Lillian and Sadie (and they follow me) on both Instagram and Snapchat. What this means is that my understandings of these participants, their experiences, and their documentation of both, goes beyond the face-to-face relationships and also includes my own understandings of the selves they present in the space of social media.

In other theoretical or methodological paradigms these types of pre-existing and intertwined relationships might be thought of as "tainting" the data because they remove all possibility for objectivity. Yet, I work from the assumption that objectivity in the case of qualitative research is never possible because the research process is the researcher's construction which only allows for certain types of data, interpretations, and findings to be generated. Even so, it is important to note that the relationships I shared with participants made particular points of conversation possible while simultaneously constraining others. In other words, the lack of personal distance I had with participants created boundaries and

openings that both forced and allowed the conversation to move in ways different than if I had not known the participants prior to the interviews.

For example, Sadie, Carrie, Sarah and Lillian all knew about my history, interest, and research in geography. It is thus likely that the types of conversations and comments made during the interviews were said in a particular way they felt was related to what they thought I wanted to hear and would be of interest to me. This possibility was most evident to me after the interviews had taken place when I sent out various forms of communication thanking the interviewees for their particular. In a text message I sent Sadie letting her know that I found the conversations in her interview engaging and that I was excited to write about them in my dissertation, she replied: "I am so so glad that you could use my interview (I felt like a babbling idiot haha)" (Sadie, personal communication, February 22, 2016). Her mention of the word "use" helps paint the picture that Sadie recognized that the space of the interview served a specific function, one in which her words, comments, and stories, were generated to fulfill a specific purpose (in this case, writing a chapter in a dissertation). Her interpretation of that specific purpose is likely different than what would have been interpreted by an interviewee with whom I had no prior relationship.

Sadie's subsequent comment referring to herself as a "babbling idiot" reasserts her lack of confidence on topics related to geography (a topic I delve into in the next sections) and reflects the presence of a *power geometry* (Massey, 1994) present in the interviews that allowed for certain types of movement while constraining others. Power geometry is the way that spaces and the mobility available therein are both shaped by and reproduced by power differentials. In reference to the flow of power through spaces, Massey writes:

> …different social groups and different individuals are placed in very distinct ways in relation to these flows and interconnections. This point concerns not merely the

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issue of who moves and who doesn't, although that is an important element of it; it

is also about power in relation to the flows and the movement. Different social

groups have distinct relationships to this anyway differentiated mobility: some people

are more in charge of it than others; some initiate flows and movement, others don't;

some are more on the receiving-end of it than others; some are effectively

imprisoned by it (Massey, 1994, p. 149).

Thus in the space of these interviews, the established power dynamics present in my various

relationships with the participants allowed certain types of conversations to be initiated and

the interview as a whole to move in different ways. It is not a fact of whether the

conversation moved or not, but more so how the power was imbricated with the ways that

the conversation could flow (or not). The space of the interview created a number of

power-differentials between interviewer (me) and interviewees (Sadie, Carrie, Lillian, and

Sarah). Yet these were not the only subject positions (interviewer/interviewee) present and

thus the conversation shifted depending upon the specific topic at hand. For Sadie, the

power dynamic was shifted in my favor, one in which she regarded me as some type of

expert, and herself as a "babbling idiot." Conversely, the two veteran teachers, Carrie and

Sarah, were both aware that I had never been a full-time teacher in a K-12 classroom. In my

analysis of the interviews, it seemed as though they were both more forthcoming in

conversation about topics related to general classroom experiences, instructional decisions,

and the like. In discussion of these topics, Carrie and Sarah spoke at length, and spoke with

authority. When speaking about topics related to geography however, Sarah and Carrie

seemed more unsure, as indicated by questions they asked me and the ways that they

deferred to me in these parts of the conversation. We thus produced each other as different

types of subjects given our knowledge of each other, our respective professional positions,

and the topic at hand in the space of the interview. The types of subjects produced in the space of an interview with people I did not know previously would have been entirely different and resulted in different types of conversation and data generation.

Whether relationships existed prior to the interviews or not, none of the comments generated through an interview could be considered brute data or "pure" (Jackson & Mazzei, 2012, p. 3) because all occur within the space of participants'/interviewers' relationships and the types of questions and comments the relationships (and embedded power geometries) allow one to make. The stories participants choose to tell, and the ways they tell them have already been interpreted personally and made meaning of, and are retold in specific ways dependent upon one's power, subjectivity, and associated mobility in the interview. This is to say that interviews with strangers in this study would not have resulted in anymore "pure" types of responses. Instead, the questions I felt I was able to ask and the types of responses participants were able to give would have been different. Regardless of context – or perhaps because of it – comments and the data generated through the comments, are always been "re-told and re-membered" (p. 3) because no social space, including that of an interview, exists in a vacuum.

Interview Process. Prior to the interviews, I emailed Sadie, Carrie, Sarah and Lillian requesting that they fill out and return appropriate consent forms. In this same email, I also asked participants to go over a set of data prompts (see link below) generated through survey results, and to also take a picture of an interpretation of a geography standards. The specific instructions read:

(1) Before participating in the focus group, I would like you to complete a *short* activity. Please **choose a Geography Standard** - either from the National Geography for Life Standards (http://education.nationalgeographic.com/education/standards/national-

geography-standards/?ar_a=1) or your state's geography standards (any grade level) - **and
take a photograph of a scene, item, person, group etc. that you feel represents, or is
connected, to that standard.** If possible, please take the photograph using a smart device
with the **location services on** so that the photograph's metadata includes the geographic
coordinates (geotag) of the picture's location. *If you need help with geotagging your photo, let me
know.* Get creative and interpret the standard photographically in whatever way you see
fit! **Please be prepared to discuss your standard and photograph with the group as
well as a short narration** as to why you think your photograph is representative
or connected to a specific geography standard. Prior to the focus group time, **e-mail
me your photograph** so that I have the digital files available for sharing with the group.
(2) Take a quick look at this link to see some of the data visualizations we will discuss
together: https://www.evernote.com/l/ASTLCuNAZEtCkqMcZODoP4eTtkp8D19hsow.
There are some questions embedded in the note, but be sure to also begin to think about
what is surprising/not surprising, interesting, relevant to your work, etc. These items may be
easier to discuss if you are familiar with them beforehand.

I designed these instructions with a larger set of interviewees in mind. I hoped to
generate a bank of photographs that would be understood as participants' interpretations of
various geography concepts and that those photographs as a set could be analyzed as a form
of data on geography teacher knowledge, understandings, and interpretation. I asked
participants to geotag their photographs in the hope that the respective location data could
then be mapped and analyzed spatially. Unfortunately, only participants in the first interview
(Lillian and Sarah) completed the activity (their photographs are present in Figures 8 and 9).
The other two, Sadie and Carrie, did not complete this portion.

I followed the same general structure for each of the interviews. Although I primed interviewees with prompts of how the interview would be conducted and what data from the surveys would be discussed, I began each interview in the same way by providing an overview of my dissertation study. I allowed participants to ask questions, and I also provided more information about the survey in which they had participated. Then, I presented participants with a series of charts, maps, and other representations created from data generated by the survey; the same data they had been given to look at ahead of time in the email. I presented each representation one at a time, and simply asked participants to make sense of what they were looking at, and to connect what they thought with their own personal histories or practices. Following discussion of these prompts generated through survey responses, I invited participants to discuss their own teaching practices. In each interview, I asked participants to describe challenges and successes in their recent geography teaching practice, as well as input on how they felt challenges in geography instruction might be mitigated. What emerged out of these conversations were a number of mobilities-laden discussions of their interactions with and in geography (teacher) education.

Methods of Analysis

Immediately upon completion of each interview, I took a number of research notes based on my initial reactions of the events that had taken place in the interviews. I recorded these thoughts, how I inferred the interviewees' comments might connect to my understandings of the research literature on geography teachers, as well as how what they had to say was connected to what I saw in the survey responses. Within 48 hours of each interview, I transcribed the respective audio files. During the transcription process, I made notes in the text of things that I found interesting or surprising so that I may return to them later. Several months later, I returned to the transcripts and read them all over a number of

times in succession. It was at this point that I noticed a number of similarities between the types of things that participants discussed – mentions of the ways that their knowledge (or perceptions of a lack thereof) of geography content was connected to their challenges and successes in the geography classroom, opinions about how lack does/does not exist in the spaces of the(ir) geography classroom, a desire to turn the interview space into one where I might help them think of ideas of ways to use geography in their classrooms.

Knowing that these ideas were present in all of the interviews, I read the transcripts again paying particular attention to how the different participants talked about these subjects. I found it striking how often instances of movement and/or mention of mobility occurred. I started to focus in on the way words, comments, and other ideas put forth by myself and participants were connected to movement. I went through the transcripts again – highlighting mentions of movement, both explicit and implicit. When I say "mentions of movement" I am drawing upon the most basic definition of mobility presented by mobilities theorists. In this definition, mobility is understood as "the ability to move between different activity sites" (Hanson, 1995, p. 4). What is considered an activity site is fairly ambiguous; it could be anything from a physical place to one that is mental or psychologically driven. Regardless of what constitutes an activity site, mobility within this paradigm is understood as the "idea of an act of displacement that allows objects, people, ideas – things – to get between locations" (Cresswell, 2001, p. 14). Again, like the activity sites mentioned in the first quote, what defines a location is debatable and can encompass many entities. It includes those that are physical as well as those that do not have a material presence. Because of this ambiguity, mobility can be understood as many different forms of movement. It can certainly be physical movement from one place to another, but it also includes the type of movement that cannot necessarily be seen, or even resultant in physical

displacement. Further, there are no limits on the smallness or largeness of the scale of the mobilities. All movement is considered; "from the flickering of eyelids to the transnational movement of migrant bodies" (James & Phil, 2011; see also: Merriman, Revill, Cresswell, Lorimer, Matless, & Rose 2008).

With these working definitions of the different kinds of mobility in mind, I made a note in the transcripts whenever a participant used a movement action word to describe something (e.g. "he walked in and the kids just started going") as well mentioned more implicit forms of movement (e.g. "how do I get them to that point?"). I then began to categorize these different types mentioned movements and I thought they might relate to the similarities I found across the interviews in my initial readings of the transcripts. Then, I theorized the similarities, detailed next in Findings.

Findings: Geography is Lacking

My review of the interview data yielded a noticing of many comments about movement – some in explicit forms, and others subtle. This occurrence might not be surprising given that I used the same prompts and general interview structure. Yet, these similarities were not present as direct answers to the prompts or questions, but instead in the varied conversations that stemmed from them. This was why when I noticed that participants all engaged with similar ideas that can all connected back to lack - I knew I had to deploy theory to make sense of what was happening, and understand, or at least theorize, why these ideas kept surfacing. I take the similarities across the interviews now and refocus them using mobilities theories.

In what follows, I describe how these discussions on geography (teacher) education centered on the interconnections between mentions of lack, movement, and subjectivity. I use the conversations and my respective theorizations centered on lack to highlight: how

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participants navigate lack as it relates to student knowledge, their own teacher knowledge, time, resources, and the curriculum; the ways that lack and the related movement is connected to occupied and available subject positions of participants; and the strategies that participants employ to connect the curriculum to the world.

Prompting Conversations on Lack

Lack was a recurring theme in the survey responses on the question that asked participants to describe their challenges in geography teaching. Participants mentioned lack in the context of their own geography pedagogy as it related to: student knowledge/interest/engagement, their own teacher knowledge, access to resources and up to date curricula, and time. To represent these results for interviewees, I created a prompt using the generated survey responses and Wordle.net. I input the free responses from the question on the survey asking about pedagogical challenges faced in the teaching of geography. I removed words from the prompt (i.e. The challenges I face in my instruction are…) as well as statements beyond challenges (e.g. To face these challenges, I seek the advice of…) in the text input section. Wordle.net runs user-input text through an algorithm that calculates the number of times a word is used. It then creates a graphic representation of word frequency. The larger the word in the generated image, the more frequently that word was used in the free responses.

The image in Figure 7 is what Wordle.net generated out of the input text from the survey question that asked participants: What challenges do you face in your teaching of geography? The words time, lack, student(s), knowledge, curriculum, etc. were some of the most frequently words used in the free responses. Lack was by far the largest though, meaning it appeared most frequently out of all the input survey responses. This prominence alone pushed me to further investigate its persistent presence. Why was this word was so

common amongst the responses from survey participants and did the interview participants feel the same?

To begin to answer this question, I presented the graphic in Figure 7 to interviewees ahead of the interviews in an e-mail, and then showed it again during the interviews. After participants had a chance to look at the image a second time during the interview, I first asked: How do you interpret these words and this image? Then later: What do you make of the prominence of the word "lack" in the responses? The findings that I discuss in this subsection were all resultant conversations from these two initial questions asked in the three interviews.

Figure 7: A Wordle representation of cited challenges faced by survey participants.

Theorizing Lack

Mobilities scholars have theorized that the presence of lack creates borders. Border in this sense are "constituted by regulation of mobility" (Sheller, 2011, p. 4-5). This regulation of mobility results in a shift in movement. In other words, lack creates borders

(physical, mental, imagined, etc.) that impede, limit, or coerce types of movement other than those desired (Sheller, 2011; Kenyon, 2006). These obstructions to movement were present in the responses from the survey about the challenges faced in the teaching of geography. Lack in its various manifestations in geography education served as an impediment to teacher movement. Specifically, lack restricted desired movement and also forced movement in ways that were undesired by the participant – whether that was having to having to enact a curriculum they felt was outdated or incomplete, or taking a job for which they felt unprepared.

Immobilities produced through lack can tell as much about the systems/entities as the mobilities that exist within them (Urry, 2007). An attention on "immobility, both voluntary and forced…interrogates who and what is demobilized and remobilized across many different scales, and in what situations mobility or immobility might be desired options, coerced, or paradoxically interconnected" (Sheller, 2006, p. 2, see also: Adey, 2010). This is why in addition to mobility, it is important to pay particular attention to moorings and entities that try to (temporarily) stop, stabilize, or restrict movement. Certain objects, connections, and resulting networks can prompt one to new movements as well as temporary states of immobility. Examples of such affordances are:

> a path that draws people to walk along it, a beach that invites one's skin to be tanned, a mountain that reveals a clear way of climbing it, a wood that is a repository of childhood adventures, and a museum that facilitates 'touching' the displays by the visually impaired moving through it. (Urry, 2007, p. 51)

In the quote above, the beach where one may rest temporarily would be an example of a desired form of immobility. This could be put in contrast to undesired form of immobility like the aspirational migrant who does not possess the necessary paperwork to travel across

international borders. The path that beckons one to walk along it would be a desired form of mobility while an undesired form of mobility might occur when someone is evicted from their home. I draw out these examples to illustrate that mobility and immobility are intertwined and should not be considered inherently good or bad things, but instead indicators of the connections between (social) relationships, the built environment, and the power geometries therein. Mentions of lack might initially seem devoid of movement, but they are actually fraught with connections to how participants can/'t move/mobilize in their lives and respective practices, as well as the types of subject positions they have available to them. This is because opportunities for mobility are tied to available subject positions.

Subjectivity and mobility are intertwined and simultaneously define each other. A number of factors contribute to a person's subjectivity and their "capacity to be mobile, whether this is physical aptitude, aspirations to settle down or be mobile, existing technological transport and telecommunications systems and their accessibility, space-time constraints (location of the workplace), [or possessing] acquired knowledge such as a driver's license" (Kaufmann, 2002, p. 38). This means that not only are opportunities for mobilities different for different people, but also that "mobilities are experienced and practiced differently" (Uteng & Cresswell, 2008, p. 2). The processes of creating one's "subjectivity is enacted through the idea of movement into and back from liminal spaces" (Uteng & Creswell, 2008, p. 37). The liminal spaces in question here could be the lack-created borders, and as such, subjectivities are produced through movement across and through the borders. For example, someone with an American passport who travels the world could take up the subject position of "traveler," or even "cosmopolitan" whereas someone without a passport fleeing somewhere war-torn does not have the option of taking up the "cosmopolitan" subject position and is instead relegated to the position of "refugee." These differences in

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subject positions are connected to how one can or cannot move across borders and what this movement or fixity looks like.

In the context of the interviews, there was evidence of the ways lack is imbricated with the movement and subjectivities of the participants. What these four teachers certainly claimed to experience and encounter lack in various ways in their teaching of geography – in the curriculum, in their own knowledge, in the interest of students, and in their access to resources. Yet, they had all developed strategies to navigate the lack they faced in the context of their practice – through working with peers, making their own resources, using their knowledge of geography to connect its content into the space of other subject areas, and even avoiding it. In other words, they created strategies to maintain movement even if it was in a different fashion than their initial desire. Lack might have impeded their movement in one sense, but Sadie, Carrie, Sarah, and Lillian had all developed their own ways to free up their movement through geography curricula and in their classrooms. In a sense, lack was also productive in some cases. Their negotiations and navigations of lack are tied to the different subjectivities they have access to in their teaching of geography.

In the following discussions of findings, I use participant mentions centered on, or stemming from, discussions of lack as a jumping off point to examine the ways that various forms of (im)mobility exist in the interviews. This helps paint a picture of the spaces of geography (teacher) education that interviewees report to have experienced and encountered and how those spaces prompted participants to gain and/or refine their knowledge of geography content and pedagogy. First, I describe the ways that the participants described encountering lack in geography education. Then, I present a discussion of the strategies and practices that participants deployed to combat this lack. Within these discussions, I embed

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descriptions of the ways that lack, mobilities, knowledge(s), and subjectivities are intertwined.

Spurring Conversations of Lack

When asked to respond to the graphic prompt in Figure 7, all participants in some way agreed or made mention of that the fact that they felt the geography curriculum was lacking. Sadie characterized the curriculum as "too vast," Lillian described the standards as "vague," Sarah as "never emphasized," and Carrie said they were too "skills based." In each of these instances, participants mentioned that they did not feel as though what they knew geography as a subject to be (or had heard it could be in the case of Sadie) was represented in what they were expected to teach students in K-12. In this way, geography education lacked geography. Discussion of lack in the curriculum prompted in-ways to discussing the interconnectedness between the lacking curriculum and participants' own knowledge and practices, and their subject positions.

Disconnects between the University and the K-12 Classroom

Carrie, for instance, talked extensively about the disconnect she experienced between the courses she took in geography during university and the type of curriculum she was asked to enact in the K-12 geography curriculum. Prior to her 10 years as a social studies teacher and enrolling in a social studies PhD program, Carrie had taken five geography classes in university as well as several other courses in other departments that focused on the importance of place and space. The bulk of her interactions with formal academic geography before teaching it herself at the K-12 level had centered on active geographic inquiries into events she described as relating to genocide, human trafficking, immigration, education, and food availability. She was taught to think about how to make sense of these events by using "different theories of space, and time, and place" and to think about how

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geographic "concepts applied to that particular event over time and space and place." Carrie said that these experiences in geography helped her learn that it was also important to consider the subjective nature of interpretations, particularly in "how people's perceptions of events also [shape] the social narrative." Ultimately, understandings of geography developed in these contexts gave her another "lens" with which to investigate events in the world.

Given these experiences with an engaging and robust geography education in university, Carrie relayed in her interview that she had been excited to learn that her student teaching at the end of her undergraduate program would involve teaching a geography class. Although she had not envisioned herself becoming a geography teacher - like the bulk of survey participants and data from literature on geography teachers - she had been inspired by the prospect of putting things she had learned in university classes into practice. Yet, the "remedial" geography class she was asked to instruct did not prove to be a place where she felt she had to freedom to mobilize exciting geographic content and skills. Instead of teaching about the world through what she called "events" and "processes" (the format by which she engaged with geography in her university classes), Carrie found herself bound to curricular standards that only ever asked students to "identify and locate." In other words, there were major discontinuities between the type of geography with which she had previously engaged in university, and what she was expected to enact as a student teacher. The geography she encountered in K-12 lacked what she understood as geography.

The ability to identify and locate that Carrie describes are rote skills, whereas learning through events and processes are more complex and exploratory learning activities. This disconnect put identifying and locating as "lacking" and "incomplete" when compared to the actions and explorations associated with working through process-driven inquiries.

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In these words alone (identify, locate, process, event), there are instances of movement related to the implied lack. The words "events" and "processes" are movement driven – they indicate change and ongoing flux. Processes are a type of movement that are central to the composition of the social world and that spaces that comprise it (Urry, 2007). The type of focus on process and flux that Carrie's understanding of geography was built upon invokes mobilities theorists' aim to "[track] the power of discourses, practices and infrastructures of mobility in creating the effects of both movement and stasis" (Sheller, 2011, p. 2). Her understanding extends beyond the stereotypical understanding of geography as a subject that solely deals with finding places on a map; a static interpretation of the field, lacking in movement yet promoted through the standards of "identify" and "locate." This idea of process and movement-driven inquiries about events, sits in opposition to Carrie's mentions of the K-12 curriculum focused on the standards of "identify and locate." These expectations, Carrie explained, were just "another way of saying memorization."

Memorization requires a static subject that can be learned and recited. Yet a *permanently* static subject/entity is impossible: "There is no stasis, only processes of creation and transformation. There is nothing before movement; movement expresses how things are" (Urry, 2007, p. 33). Even moorings, presumably stable or static spaces that have a type of fixing power (e.g.: a parking lot), are connected to the mobilities of things, and as such, are constantly becoming something else through the movement of entities in, out, and through them. There may be moments of stability or stasis, but this state is finite. While Carrie's words "identify," "locate," and "memorization" are active in a sense, they all assume a stable subject/place/entity that can be identified, found, remembered, and recited, something that mobilities theories would put into question as even possible. Inquiries into

movements and processes allow someone to identify and locate something. Yet, the way the standard is presented, as well as how Carrie described it and its expectations, does not prompt this type of engagement. This is not to say that all memorization is bad; rote skills, including memorization are often necessary to engage in active and exploratory forms of learning (Bonta, 2013). It simply cannot be the sole focus, which was what Carrie encountered in her first geography teacher experience. This sat in opposition to Carrie's university experience where the knowledge of location was mobilized to help make sense of processes and events that occur in that location[4].

Traveling to Destinations in Geography Education – Professionally and Within the Curriculum

Similarly, Lillian, a current student teacher at the time of the interviews found the geography standards she taught as part of the 6th grade social studies curriculum "vague" and "simplistic." Lillian discussed how she did not feel prepared to enact the prescribed geography curriculum in engaging ways given her lack of experience with the subject, and the simplicity of the standards she was to teach. In this way, the lacking curriculum was compounded by her perceived lack of geography knowledge. Lillian noted that if she were "preparing to be a geography teacher, [she] probably would have taken than one geography class." This quote indicates that had she planned on a different career destination, she would have moved through her university coursework in another way. She said that she took a "whole lot of political science classes" because she was "going to be a government

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[4] For example, finding Manhattan on a map is only one component of learning about it as an entity– by employing movement-driven inquiry, one could also investigate how the city's location played a major role in its development as a Mega-City, the ways that upward growth allowed for a large population to settle here, the connections between water quality, tourism, and industry, etc. etc. These are ideas that are entrenched in the processes and events related to Manhattan but are not accessed when students are solely asked to "identify" and "locate" it. Finding a place on a map can only tell someone so much. When the focus is solely on this type of activity, so much of what the geographic lens offers is left on the table.

teacher." She said that she took one geography class because she had to, but she "ended up teaching geography anyway" and that she imagines that is common amongst other people. Even in Lillian's use of the phrase "ended up" implies a forced type of movement connected to her lack of experience in geography, versus actively choosing a destination. This type of ending up is indicative of the way that lack creates borders that thereby disrupt movement and result in movement that is unintended, forced, and/or undesired. This "ending up" in geography was something that was compounded by standards that she felt were not invitational to examining processes but instead focusing upon fixed ideas.

For example, Lillian talked about how the curriculum was lackluster, and that it consisted of things like: "this is where the Rocky Mountains are, but nothing about … why things happen or what it means that they happened." This lack of focus upon action (Lillian's description of "why things happen") and a focus on simply "where" implies an undesired mooring in the curriculum similar to Carrie's experiences with a focus on memorization of facts and locations. This is like the idea of geography as a discipline versus a discourse that I introduced in Chapter 1. To conceive of the geography present in the described standard as a discourse would include a focus on where the Rocky Mountains are (the "where" component Lillian describes above), but would also consider why knowledge of this is relevant and important to students, and what implications the mountains' location has on different facets of daily life. Thus present in Lillian's statement above is an understanding that geography is not simply a conglomeration of static facts about places to be memorized but also a way of mobilizing different forms of knowledge to making sense of the world.

Lillian did not view the standards as connected to a type of geography instruction built around active engagement of why or employing the idea of geography as discourse.

Instead, they restricted the way she felt she could construct lessons and engage students; a restriction upon her desired intellectual movement through the curriculum and the way she could mobilize her own knowledge. The standards that Lillian described in effect produced a destination to which she must travel with her students. Traveling is about "*producing destinations*" (Crang, 2011, p. 211, emphasis added). One might consider education in the present American context as a form of traveling and thus, the production of destinations. The standards materially construct destinations to which one must travel. Travel to destinations (or *learning outcomes* as they might typically be described in educational contexts) requires specific "skills and knowledges…around what visitors may want" as well "the techniques to meet these needs" (p. 211). In the context of the classroom, this means that reaching a destination requires students (the visitors) to develop certain types of knowledge that allow them to travel to that destination. The destination thus produces a specific type of learning subject, a subject who comes to be defined in that space by the types of knowledge they must mobilize to reach the destination. For the identify/locate type of travel, there is a specific destination in mind, whereas for learning driven by inquiry and a focus on processes, the destination might be ambiguous. In effect, Lillian's interpretation of the standards produced her understanding of what the destination should look like for her students as well as the skills, knowledges, and techniques required to reach them. This represents a type of education present in K-12 geography in which the focus is on reaching a destination/learning outcome instead of dwelling in the process of sense-making.

The Perception of A Lacking Curriculum Produces Borders, and thus Regulation of Mobility in One's Teaching

While the standards and the curriculum they comprise produced specific destinations that both Carrie and Lillian were expected to travel to with their students, their lacking

nature created borders and boundaries that regulated their ability to smoothly reach the desired destination (Sheller & Urry, 2006; Urry, 2007). This existence of lack (or at least Lillian and Carrie's perception of lack) embedded within a curriculum built around "identify" and "locate" that both encountered is problematic because these types of standards are assumed by these participants to never extend beyond static ideas. When placed alongside the active nature of geography Carrie had encountered in university coursework, the curricular standards in K-12 geography were focused upon basic fact-based questions and were devoid of active inquiry into the process related to the *why of where.*

Lillian too recognized the problematic nature of the geography curriculum and questioned as to why there were no standards centered on asking why or what things mean. Lillian wished to delve into aspects of "why," and Carrie, investigations into "processes," but the standards focused on identification and locating. This produced a conception of the curriculum as lacking and thereby created a boundary for these two during their student teaching. This boundary restricted the movement of thought and movement through the curriculum – on both the part of the teacher and the student - that is necessary to engage with geographic ideas built around processes and events. This is not to say that Lillian and Carrie could not have engaged with their desired ideas, but that instead, their position in relation to the standards (contingent upon their subject positions, knowledge of geography, and related mobility) did not explicitly invite them to do so. The destinations, in effect, were the focus, not the (many) ways that one could potentially reach these destinations. While it is possible that someone could take these standards as an invitation to get creative with content, this invitation did not present itself to Lillian and Carrie. With this lack present in the standards, or at least the participants' perception of them as lacking, a boundary was created which they both felt they could not cross in their student teaching experiences.

Carrie described this initial experience in the geography classroom as "stifling" a
sentiment that is echoed in Lillian's feelings of being "trapped" by the curriculum. Carrie's
use of the word "stifling" and Lillian's use of "trapped" are connected to movement. The
word "stifle" can be defined as "making one feel constrained" (Oxford English Dictionary,
2015) and as such, constraint can be understood as something that restricts movement in
both the physical and the mental sense; a type of trap. In this way, lack stifled, constrained,
and restricted the ways that both Carrie and Lillian felt they could move in and through the
space of their student teaching placements. The imposed borders and subsequent forced
movement produced through their perception of the curriculum as lacking in comparison
made these two feel stuck because "where movement is coerced it can generate deprivation"
(Hannam, Sheller, & Urry, 2006, p. 11). This deprivation was present in Carrie's difficulty to
connect the K-12 curriculum to her past experiences with geography and in Lillian's
perception of how the K-12 curriculum seemed irrelevant to broader understandings and
purposes of social studies education.

Geography is Perceived to be Absent from Education

Sarah encountered a different interpretation of lack related to geography education
all together. Instead of the curriculum itself being lacking (i.e. a focus solely on the skills of
identify and locate portrayed by Lillian and Carrie), Sarah saw the lacking geography
curriculum as an actual absence of the subject across educational contexts. She said:

> I just think that overall, there's a lack of focus on geography in all areas of education.
> I don't think it's emphasized in middle or high school and I don't think it's
> something that's emphasized in college either. In going through the College of Ed in
> Social Studies, I don't really feel like that it was [emphasized] there either.

Movement is present in this quote when Sarah describes her education as a process of "going through." Different than the standards and the production of destinations, Sarah's mention of "going through" places the emphasis on the process by which one travels to reach a destination. Though the focus here in this quote is on the process, there is a still a presence of lack, a presence that describes how the describes processes of education do not allow someone to focus upon geography in educational contexts. When asked to discuss the content of the above quote further, Sarah connected this broad phenomenon of an absence of geography within education back to her own current teaching practices with her students. In her current teaching of AP World History, Sarah narrated how a lack of geography across the general education curriculum prohibited the ways that she was able to teach her classes in other social studies disciplines. As mentioned earlier in the findings section, lack across contexts often results in, or is in the very least connected to, a lack of mobility. Lack of mobility and its resultant borders cause "dimensions of exclusion" (Kenyon, 2006, p. 105); particularly isolation, difficulty of access, and disconnect from social networks.

Difficulty of access created through absence was prevalent in Sarah's narration of her perceived impact of lack of geography in the general education curriculum on her teaching of AP World History. Access in this sense refers to potential movement. It is "the range of possible mobilities according to place, time, and other contextual constraints… Access is constrained by options and conditions" (Kaufmann, 2004, p. 2). For Sarah, the context was an AP History Class and the conditions were students who lacked geography knowledge as an education system that lacked a focus on geography. This resulted in Sarah's own trouble in accessing the type of instruction Sarah wished to fulfill in her teaching of history. This lack of geography emphasis and resulting lack of mobility was connected to the ways that students had difficulty accessing the history curriculum. Sarah described that her students

struggled with the idea of the connection between knowledge of geography and sense-making in history.

When I asked Sarah why she felt that better understandings of geography would have helped her history instruction she replied:

I mean it really helps them contextualize what's occurring and how it's related to other things that are happening in the world. One of the most concrete example is on the multiple choice questions on the AP Exam, or on the essay, they'll say: …Discuss the changes and continuities that occurred in Southeast Asian political systems from 1450 – 1750. If they don't know what countries are in Southeast Asia, they cannot write that essay. They can't even begin to write that essay. I think that's always my panic mode at the end of the year, are they going to know what to write about if they're given these. And that's when I started to backpedal and go back, and try to fix that, I kind of started at the beginning of the year, but then again, you get so caught, that train starts moving and before you know it it's Christmas and then it's February, and then you're like, I'm not going to have time to get this in.

In this quote, Sarah expresses that knowledge of geography provides a mode of access for students to better understand history. She also indicates that when students can mobilize geography knowledge they can complete the task at hand. What she is communicating is that if they cannot, they "can't even begin to write that essay." The lack of student knowledge that Sarah implies in this quote forces her to move in certain ways, what she describes as the need to "backpedal and go back." This need to "go back" is not only a result of her students' lack of geographic understanding, but the time constraints that force her to push towards a specific curricular destination at a specific speed on "that train" that "starts moving" and keeps moving. This movement through the curriculum presses on even

when there may be a need to rest and dwell upon certain ideas and topics in the curriculum, ideas that might provide greater access or modes of travel to the desired destination.

Despite Sarah's report that that geography/geographic concepts were "never emphasized" or "mentioned explicitly," and that her students did not always recognize geography's connections to other curricular content, she nonetheless recognized geography's existence and importance across other social studies disciplines. Her descriptors of the importance of place in the AP World History curriculum for example, suggest that Sarah must have certain knowledge of place importance and geography to even recognize that geography was embedded implicitly in other curricular standards, demonstrated in the way she recognized that students' knowledge of *where* Southeast Asia was, was important to their understandings of historical processes and events.

Teachers Perceptions of Lack are Intertwined with their Knowledge(s) and Subjectivities

While Sarah demonstrated the knowledge to recognize geography in its implicit forms in other parts of the social studies curriculum, Sadie, a more junior teacher, felt constrained in her teaching of geographic concepts because of her own lack of geography knowledge. Her "not knowing much" about geography impeded the types of things she wanted to do with geography in the classroom and felt restricted by it.

> I want to teach them how to use geography but I can't because I don't really know
> how. And I don't have an opportunity to learn how. Besides talking to you. When
> you talk to me about the stuff that you consider geography…to me, geography is like
> maps, and like in your world it's so much more. But like it's hard for me to
> understand. I can't come up with those ideas. I don't see it like that, I need

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someone to show me how to see it like that. I don't get that anywhere besides talking

to you. For real. And like Julia.

In this quote, we see that Sadie has a desire to enact geographic learning, but her lack of

knowledge of the subject restricts her ability to mobilize geographic concepts and activities

in her classroom. Further, she expresses lamentation that she perceives that she does not

have access to learning more about geography content and instruction. This lack of

knowledge and lack of access to professional learning and development opportunities stifle

Sadie's ability to come up with "those ideas." In it, she is implicitly asking for help to

combat this lack that she faces in her instruction ("I need someone to show me how to see it

like that"). In this last statement though, we might infer that Sadie at least has the

recognition that she see geography as a discourse, a way of thinking, seeing, and sense-

making versus a static subject built around place identification. This is evidence through her

phrase "see it like that." Overall, given the content of this quote, Sadie's perception of her

lack of knowledge as well as her perception of herself as lacking something necessary for

geography instruction, has ultimately created borders and thus dimensions of exclusion.

This lack of knowledge, and her perception of her own knowledge as lacking, restricts her

ability to mobilize geography content even though she desires to do so.

Across the narrations of geography teaching, Sadie, Lillian, Sarah, and Carrie all were

limited by their various perceptions of lack as it related to geography education. These

various forms of lack and the related (im)mobilities limited are connected to available subject

positions. For instance, the fact that the curriculum that Lillian, Carrie, and Sadie

encountered early in their teaching careers was perceived as lacking, is compounded by their

subject position of student/inexperienced teacher. In this way, their position as student

teacher restricted potential movement; both because of its ties to a lack of power, as well as

their own (particularly Sadie and Lillian's) preoccupations with a perceived lack of geography knowledge.

Differing Knowledge Produces Different Subjectivities

The possession of different (levels of) knowledge provides access to different types of mobility (Kaufmann, 2004; Urry, 2006). Given that each individual possesses differing levels and types of knowledge mobility can be understood as a "resource to which not everyone has an equal relationship" (Skeggs, 2004, p.49). Deployment of knowledge is thus considered a type of mobility in the way that it allows or does not allow someone to know how to move through and in different situations. This interconnection could be evidenced in something as simple as knowing a bus schedule and thus being able to take the bus, to possessing an advanced degree that allows one to accept employment outside of their home country, and even understanding how to critically engage with ideas that might result in the changing of one's opinion(s). Knowledge is thus also related to access – access to ideas and how someone can connect that knowledge to act in certain ways. Thereby, knowledge and its connection to mobility are also tied to subjectivity.

Uteng and Cresswell (2008) argue that acquiring a new form of mobility is "often analogous to a struggle for acquiring new subjectivity" (Uteng & Cresswell, 2008, p. 2). Carrie struggled to acquire a new subjectivity as she moved into the space of her student teaching, a space in which she hoped to mobilize her understandings of geography in pedagogical practice. Yet, when confronted with a different reality of geography curriculum than she expected, she felt as though she lacked the ability to be a "good" teacher and mobilize an engaging curriculum built around her assigned standards. When discussing this idea she said:

I'm a geography teacher and I don't know where this is [(a location on map)],

because I can look it up in a book, you know what I mean? It's more looking at it,

it's a lot more visual and spatial and conceptual than memorization. So when I think

I was trying to teach this geography class [(the remedial geography course from her

student teaching)] that was identify and locate, I just didn't know how to do that.

In this quote, Carrie references different types of knowledge that are connected to different forms of mobility. Her reference to looking something up in a book is a type of movement that represents a skill that she has to be able to find answers to questions that she does not know. This type of knowledge (knowing how to look something up) is different than the knowledge possessed through memorization and prompts different types of movement and mobilization of ideas and skills. One set of ideas and skills is not necessarily better than the other, but they are certainly different. Further, Carrie's mention that she "just didn't know how to do that" implies another connection between knowledge and movement, one in which Carrie did not know how to move because of the disconnect she experienced between the geography she "knew" from university and the geography she was being asked to teach in her student teaching. In reflecting upon that experience, she said: "I mean I did a terrible job teaching geography I'm sure. Just terrible because I had no clue what I was doing or even like a framework that I was working within." In this way, Carrie struggled to acquire the mobility that could allow her to take on the subject position of successful geography teacher in the context of her student teaching.

Sarah, on the other hand, mobilized her knowledge of geography and related strategies to navigate the lacking curriculum and respective resources. This allowed her to take on a subject position in which she felt confident in her teaching of geographic concept.

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This is not to say that Sarah did not experience lack in a way that proved to be a challenge

for her geography instruction, for she explained that she did:

> And then again, lack of resources. I wanted them to buy me a wall map, you know
>
> those ones that are like a mural. It's like $200 online. I would crawl all over that
>
> thing, or talk about it, or point at it. They're like, "Oh you can just pull one up on
>
> Smartboard." But then I have to get online and pull it up. I just want a map that's
>
> right there that I can reference at any time.

In this quote, Sarah references a number of individual movements that she implies would

augment her teaching of geography. She would "crawl," "talk about," or "point" at this

resource if it were available to her. The presence of this wall map would provide her with

the opportunity to move through the geography curriculum in a way that she desired.

Lacking this item, and instead having to use a resource she feels is inadequate (the projected

image on the Smartboard). Later in the conversation, however, Sarah showed how she used

outdated curricular materials to prompt pedagogical engagements. In this way, lack was

productive for her. In response to the prompt to take a picture of a geography concept sent

out in the initial contact email about the interview, Sarah took a picture of an outdated globe

from her classroom (Figure 8).

Figure 8: Sarah's photographic representation of her interpretation of a geography curricular standard.

She said that this photograph was her representation of a National Geographic standard that read: People create regions to interpret Earth's complexities. She talked about how this particular globe shows a country called "French West Africa" and how the students "love it." Sarah's creativity emerged out of her own desire to not use her own money to bring in up to date resources. She bluntly said "I'm not gonna buy my own globe. But I do use it [the old globe], and I do use it to show decolonization, show how the political borders and what not have changed." In this quote, Sarah presents a type of savvy she possesses that allows her to navigate lack in other facets of the curriculum as well; as lack that she contextualized as being devoid of ideas with which students could connect. So while this lack of resources was connected to a lack of mobility in the ways that geography curricula might be utilized, the dimensions of exclusion actually could be sidestepped because of her knowledge.

As Knowledge Changes, So Do Subjectivities and Mobilities

While Carrie does not teach geography as a stand alone course that often any more, she explained that her understandings of geography have allowed her to employ place-based and spatial inquiries to her teaching of other social studies disciplines; a type of mobility and subjectivity that were perceived to be unavailable to her in her initial student teaching experiences. Her understandings afforded her a certain type of mobility where she can engage geographic concepts outside of their particular disciplinary home. In effect, she moved geography to other disciplines, as well as out into the real world. For example, Carrie shared that place is important in the AP World History curriculum even though it often goes unmentioned, a claim that echoes something that Sarah said about geography being absent despite AP World History being a "place-rich" course. Regardless, she talked about her commitment to bring in understandings of space, particularly by querying the maps available in the AP resources:

> I love looking at maps but really what I'm looking at is: what textbook did it
> come from? Who's the author? What is their purpose? Why did they create this
> map to do this? And what is not on it that would be helpful? And what is not
> needed on it? What do we not need on that map? Do you know what I mean? I
> guess, I don't know, I just don't think it's a lack thing,"

In this quote, Carrie's mention of "I just don't think it's a lack thing" acknowledges that there are many other factors circulating that contribute to the deficits she faced in her geography instruction. These other circulating factors are an excess emphasis on test-taking, regulations, and norms within education that have restricted her ability to take up geography in the ways that she described within the quote (e.g. the critical questioning of the map). These types of focus areas sit in opposition to Carrie's understanding of geography as a

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discourse, where the content is as important as asking questions of its generation, relevance, and perpetuation. This quote also demonstrates the ways that Carrie can mobilize her understandings of geography from other spaces to inform her own teaching of the subject. She recites a form of critical map inquiry that is connected to complex understandings and enactment of geography content. Her more complex understandings of the subject of geography allowed Carrie to move in ways that perhaps would have been impossible for someone with a less nuanced understanding, or in a lesser position of power (e.g. the student teacher or novice teacher).

Both Carrie and Sarah evidenced the ways that their thinking and resulting strategies work around the various manifestations of lack; their knowledge of geography privileges them a type of movement that is tied to their subject positions as experienced teachers. Their more complex understandings of the subject of geography allowed Carrie and Sarah to move in ways that perhaps would have been impossible for someone with a less nuanced understanding, or in a lesser position of power (e.g. the student teacher or novice teacher).

Difficulties Due to a Lack of Time

While the two veteran teachers had the knowledge to develop practices to actively navigate various forms of lack related to geography education, both Lillian and Sadie, the more junior teachers in the group, felt that the lacking curriculum was worsened by their own inexperience with geography and related lack of geography knowledge. These difficulties were compounded by what they both described as a "lack of time." So where Sarah and Carrie had developed practices and strategies to navigate lack, Lillian and Sadie had not explicitly done so. Both knew that they should employ practices to move beyond the lacking curriculum, but again, were constrained by what they perceived as a lack of knowledge and a lack of time.

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For example, Lillian mentioned that she knew that she should go "deeper" on topics related to geography in the 6th grade social studies curriculum, but the way that the middle school curriculum was set up restricted how much time she might spend on certain topics. She said,

> We have to get through so much stuff, and we had like history standards to get through, but the geography ones were all like 'locate these things' and no environmental issues. And we don't actually know anything about why they happen. It was just like, 'This is a thing, now we have to move on.'"

There is an abundance of movement present in this quote. Yet the movement present in Lillian's description does not appear to be desired movement. This negative view of movement is evidenced through her use of the phrases "we have to get through" and "move on." Latent in these comments is a desire to dwell upon specific aspects of the curriculum. Like the beach that Urry (2006) describes that beckons one to sunbathe and tan one's skin, there were instances in the curriculum that begged to be delved into in more meaningful ways. Lillian's desired destination was different than that produced through the standards. She instead felt the need to dwell in the process of traveling, a desired "dwelling-in-motion" (Urry, 2007, p. 37) instead of rushing towards the destination/learning outcome.

Similar to Lillian's cited struggled with a lack a time, Sadie felt that the lacking curriculum was not out of an absence of ideas, but conversely, an excess of content that she did not have enough time to cover. In her interpretation, the curriculum was lacking not because of what was or was not present in it, but because it was set up and expected to be covered in too short a period of time; something she had not yet developed the practices to combat. She expressed that she did not feel it was feasible to enact, and as such, was lacking

(lacking in being able to realistically enact it). For Sadie, the lacking curriculum was so not because of its content, but because of the lack of time she encountered to enact it:

> I just feel like I don't have enough time to do anything, and it's because I have this incredibly large list of standards. They take a test created by the county at the end of the year, and if those students do poorly on that test, then I am held accountable. They will come talk to me. It will be brought up in my evaluation… Because of that, I don't feel like I have time to do what was considered "enrichment activities" with geography… geography's not in my wheelhouse. I know I need to be doing more, but I just don't know how.

In this quote, particularly in the end, Sadie expresses a desire to enact practices that combat lack in the her teaching and to take her geography instruction beyond that of "enrichment." Yet, she presents a lack of confidence in her own ability to develop ideas of how to do this, particularly under her current time constraints, and the fact that her evaluations are tied to students' performance on history-focused standards. Thus, her movement is constrained and forced to focus upon the "incredibly long list of standards" that dictate the evaluation of her own teaching. Given that she understands geography as an "enrichment" activity or a subject that is extraneous to the important tested content, puts geography in a power-differential between itself and history. The power geometry between history and geography in Sadie's classroom results in her need to mobilize curricular activities for matters of history (the important tested subject) instead of geography (the enrichment subject).

In these two instances of Lillian and Sadie demonstrate that they wish to navigate the lack present in their geography teaching yet for a variety of possible factors, their strategy in dealing with a lack in geography is to simply avoid it. For Lillian, this means simply following the standards although she knows that geography is more than "identify and

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locate" while for Sadie, this means to not include it at all. This following is a type of movement, but one that is less self-directed and more directive and potentially "stifling." This strategy of avoidance sits in connection to their perceived lack of knowledge, and the understanding that a lack of experience in geography sets them up for failure. If they do not engage with the subject in robust ways, they cannot fail in their endeavors.

Lacking, But Not Devoid of Geography Knowledge

Despite Lillian and Sadie's perceptions that they lacked geography content knowledge and experience both Lillian and Sadie used the space of the interview to demonstrate budding forms of geography knowledge – knowledge that was embedded in real world contexts (Lillian) and in other subject areas (Sadie). For example, Lillian took a photograph as part of the pre-interview activity I requested in the invitation email. The photograph she took for the interview as well as her rich narration of the image and its connection to a geography standard was indicative of covert geography knowledge (Figure 9).

Figure 9: Lillian's photographic representation of a geography curricular standard.

Lillian said that this photograph of the dashboard on her car was representative of the
National Geographic Standard that centered on how human actions modify the physical
environment. Her narration of the image and why it is representative of her chosen standard
was as follows:

> I was mostly looking at the miles on my car, it's like 38k or something like that. I was
>
> able to go to all those places even though I haven't actually travelled that far. I can
>
> do that because I have a car, but there was a point when we couldn't do that, and
>
> things had to change in the landscape to make it possible to do that. We had to

build roads and drill for oil so we could have gas and that kind of stuff. Build

factories and all that. And also, suburbs have come up because we have cars because

people can live further from their work. So all of that happens because we have cars.

But those are the really big changes to just physical landscapes and landforms.

She said she chose this idea because it got her thinking "about how we have all of these

things now, and we have all of this stuff and we want to be able to go places, but stuff had to

change about the earth to be able to that. So I thought that was really interesting." In this

photo example and respective quote, Lillian is mobilizing her understandings of the formal

geography curriculum present in the standard and is connecting it to the world. In this

quote, she narrates the ways that the human (ability to travel vast distances because of the

car) and technological development (advent of the car) impact the natural landscape of the

world (digging for oil, creating road), as well as urban development (mention of "suburbs"),

and also how all these changes are tied to her own personal life and experiences. Although

Lillian's narration is fairly basic, her ability to connect something from her life outside of

school to a geography standard demonstrates at a least a budding form of geography

knowledge that extends beyond the skills related to identify, locate, and recite. With

provocation and support, Lillian could likely extend and complexify this type of narration to

make the standards in her 6th grade classroom more engaging for both herself and her

students; yet her inexperience, in conjunction with the lacking curriculum, and the amount

of time she perceive to have, created a border in which this type of movement does not even

register as possible to her.

Similarly, Sadie also expressed some knowledge of geography in other parts of the

interview. Despite her perception that geography was not in her "wheelhouse" she

described a number of processes in history to me that were steeped in rich description of

geography. For instance, when Sadie began to talk about things she had recently done in the classroom with her students she talked about a topic of particular interest to her and reasons why she was excited by history:

> You can see history even in like the way that cities are set up. For example, cities in Africa and imperialized countries are all centered around the ports because they were all about exporting whereas older cities are really compact and they grew up because they were built around the car. Or Atlanta, after the automobile, so it's like Sprawl-lanta.

Here Sadie is richly describing urban geography processes about the ways cities develop in relation to their relative location. What is interesting though is that it seems she believes she is simply speaking about history in this instance. Sadie does not appear to recognize that she is describing geographic processes and fairly complex ways; a similar issue I described in Chapter 1 where a lack of geography knowledge might not be the main issue, but instead the issue is of recognition. In this instances, Sadie's lack of experience in academic geography has made her think that she does not have geography knowledge even though she is mobilizing understandings of space to make sense of events in the history curriculum she enacts in her classroom.

Discussion

Lillian, Carrie, Sarah, and Sadie gained, developed, and refined their geography knowledge in various spaces. For Carrie, it was through formal and extensive coursework in geography at the post-secondary level and negotiated that knowledge and what she was faced with in the K-12 curriculum. It in the space of her own classroom that Sarah developed strategies for thinking about effective incorporation of geography into other subject areas, and created her own resources to counteract the outdated materials she was provided. Sadie

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identified peers as her only resource in learning about geography. This served as her space of geography teacher education because she had not taken geography since 7th grade in what one her school's classrooms located in a "stinky trailer." In these spaces, Carrie, Lillian, Sarah, and Sadie encountered geography as lacking in different manifestations (their own knowledge, a lacking curriculum/resources, etc.) that impacted their ability to mobilize geography curricula in what they felt were engaging ways. Carrie and Sarah had more nuanced ways of navigating this lack, while Lillian and Sadie used avoidance of the subject as their tactic.

Despite these varied encounters and navigations in spaces of geography teacher education, all of the participants used the interview as a space of geography teacher education. In each interview, there were moments in which the participants turned the conversation on me. They asked me questions about geography in terms of both content and pedagogy. This event potentially occurred because of the pre-existing relationships I had with the participants. While I cannot be sure, I think it would have been unlikely that other interviewees with whom I had no previous contact would have felt comfortable to turn the interview questioning on to me. Yet all of the participants in the interview spaces sought to gain greater understandings of geography. For example, Sarah asked me what I would "do with maps" and invited me out to her classroom if I ever wanted to come "help" her teach with these materials. Sadie asked me to clarify what I meant by geography being in "everything," and prompted a conversation about the three questions of geography (What is where? Why there? Why should we care) that she had never heard of prior, but was intrigued by nonetheless. Lillian asked how both Sarah and I understood a globe as a teaching tool. Carrie asked how my theoretical orientations in geography helped me in my research in education. In these questions, geography teacher education can be seen as an

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ongoing process that does not simply end when someone reaches the end of their teacher education or a professional development session, which reasserts the need to redefine what is *meant* by geography teacher education, and extend recommendations beyond the formal confines of geography education programs.

Conclusions

Through analysis of these interviews, it is evident that there are a number of ways that practicing teachers within this local context are encountering and navigating lack in the spaces of K-12 geography curriculum as well as in their own teacher education. This delving into lack provides more insight into the types of spaces that geography teachers (and teachers of courses with significant geography content) because of its connection to both mobilities and immobilities – two factors that are indicative the composition of spaces. In the interviews, Carrie, Sarah, Lillian, and Sadie showed that lack in the curriculum, time, their own knowledge, and their students' knowledge, created spaces in which geography content could be engaged or not, and to varying degrees of complexity. In each of these examples, lack was intertwined with participants' mobilities as well as their available subject positions. It created borders that prompted participants to move through, and mobilize the curriculum in ways that were not always desired.

CHAPTER 6

TEACHERS, TWITTER, AND ONLINE SPACES OF EDUCATION

I demonstrated in the two previous chapters that geography teachers are reporting to experience lack in various forms in their teaching of geography. Lack was perceived to be present in the geography curriculum, student knowledge, teachers' own knowledge, time, and resources. I bring up this finding to connect them to the content addressed in this chapter; the fact that large numbers of teachers have taken to the Internet, particularly social networking sites, to connect with other teachers and supplement the various forms of lack they experience professionally.

The advent of the Internet has afforded new forms of interaction that teachers are taking advantage of to combat the various forms of lack they may encounter in their teaching. One specific way that teachers are engaging with these practices is through the use of Twitter. This social media platform based around the idea of *microblogging* has been particularly popular amongst educators across contexts and grade levels as a way to construct professional learning networks (PLNs) that function as a way to share ideas, resources, and provide support to others (Carpenter & Krutka, 2015; Krutka & Carpenter, 2016). Given this general trend amongst educators, it is perhaps unsurprising that a large number of teachers are taking to Twitter to engage in weekly chats that center on conversations about geography teaching.

In this chapter, I present and analyze the content of three different Twitter chat sessions (#sschat, #worldgeochat, #globaledchat) that focused on some aspect of geography education. I wanted to find out how Twitter could function as a space of geography teacher

education. I offer an overview of what Twitter and its basic functionalities are, what

educational Twitter chats are, as well as a review of the literature available on teachers' use of

Twitter for professional development purposes. I then describe the methods used to

generate and analyze the data from these three Twitter chats. Next, I present an overview of

each of the three Twitter conversations including specifics about the focus of each selected

Twitter chat and hashtag, as well as the number of users, questions asked by the moderator,

number of tweets, and other pertinent data about each respective chat session. However,

rather than presenting an analysis of the content generated through these chats, I'll discuss

the limitations that prevented me from doing so. It is evident that teachers are choosing to

come to these online spaces and that they are doing so with enthusiasm, but based on what

gathered, I cannot explain why that is and I'll explain why in the analysis sections.

Context: Twitter and Teachers

What is Twitter?

Twitter is a social media giant based around the idea of microblogging.

Microblogging stems from the idea of weblogging (commonly known as *blogging*) in which

users broadcast media to the Internet. As the name might indicate, microblogging differs

from blogging in that the content broadcasted to the web is much smaller in content and in

file size. Whereas blog posts are generally long(er) narratives with no limit to length or file

size, microblogs are restricted to certain character lengths or file sizes.

Microblogging on the Twitter social media platform functions by having registered

users send *tweets*, short 140 character bursts of information, to the *Twitterverse*, a cyberspace

where tweets are compiled in what is called a *home stream*. The home stream is different for

each individual user depending on whom they follow; the content of the home stream is

comprised of tweets from those users they follow in chronological order (most to least

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recent). By default, tweets are public and available to anyone with an Internet connection. This means that anyone can view public tweets, even people who do not have a Twitter account. Users can choose to protect their tweets though so that only approved followers may view their account and its content. As of December 31, 2015, Twitter reported 320 million monthly users who write tweets to share written content, images, videos, as well as links to other cyberspaces (e.g. full-length blog posts, news articles, personal websites, etc.).

Beyond simply sending out tweets to the Twitterverse, users have a variety of ways they can interact with other Twitter users; they may also *retweet, favorite, reply,* or *mention*. When a user retweets someone else's tweet they move that person's tweet from the individual's page to their own; essentially reposting, sharing, and further circulating an idea to a larger set of followers. By favoriting someone else's tweet, one user is letting another user know that they especially like and/or the content of that specific tweet; the Twitter equivalent of a Facebook or Instagram "like." Users may also reply to others' tweets, as well as mention others in the body of their own tweets. A reply is just what it sounds like; a response to what someone else has written in a specific tweet or a direct, yet public message to another user. A reply is notated by a tweet beginning with another's username (e.g. I might tweet something like: @hjamesgarrett Did you see I finished my dissertation) whereas a mention places a user's name in the body of the text (e.g. Woo! I finished my dissertation! Thanks @cybermardi and @hjamesgarrett for your guidance!). While a reply is sent directly to another user (e.g. only @hjamesgarrett would be notified of the first example tweet and it would not appear on my home stream for my followers to see) mentions appear on the home stream of anyone who is following the user (not just the users who were mentioned). Users receive a notification on their Twitter home page whenever one of these interactions occurs (retweets, favorites, replies, and mentions).

As mentioned above, when a logged-in user visits Twitter.com, they are automatically taken to their home stream; a constantly updating flow of tweets from users they follow in chronological order of when tweets were posted. Yet this is only one way to access tweets and the vast amount of information they include. The brilliance of Twitter lies in its search functionality built around its employment of the *hashtag*. A hashtag - simply notated by what the pre-Twitter generation would call a pound or number sign (#) – is a type of metadata label used on social media networks to organize content on a specific topic. A hashtag is created by placing the # character in front of a word (e.g. #geography) or unspaced phrase (e.g. #worldgisday). Once a user places a hashtag in their tweet, that tweet can then be grouped with all other tweets that used that same hashtag. The search function allows users to see the previous 7 days worth of tweets with the hashtag, or up to 1500 tweets (whichever comes first). This presents the opportunity for users to search and find vast amounts of tweets (and respective data) related to specific ideas, content, users, and events.

For example, if someone were to search #geographyteacher on the Twitter homepage, the generated results page organizes tweets with that hashtag into categories for the user to peruse (see Figure 10).

Figure 10: An example of a Twitter search results page.

These categories include:

- Top Tweets: the most retweeted and favorited tweets using the hashtag, also includes tweets from users with the most followers (which means a greater reach and impact of their tweets)

- Live: the most recent tweets using the hashtag in chronological order (from most to least recent), browser can be refreshed as needed to follow chats based around a hashtag (explained in next section)

- Accounts: Users who most frequently use the hashtag and/or have the hashtag noted in their user bios

- Photos: The photos contained in hashtagged tweets in a gallery-type view

- Video: A stream of hashtagged tweets that contain videos

- More Options: Users can also choose to see tweets with a specific hashtag based around geographic location from where that tweet was sent, only from specific users/followers, from official news agencies, as well as more advanced search

options that allow users to curate their search results very specifically (e.g. Show me

tweets that contain the following hashtags from these users, near this specific place)

Further, it should be noted that people can use third party sites as well as the Twitter API

(application program interface: a type of programmed protocols, prompts, and routines used

to build software applications) to extract tweet and user data based around all of these search

components. Through Twitter's built in search functionalities, as well as its open data

system that can also be accessed through third-party sites and API, people have the

opportunity to generate and curate vast and varied data sets for any number of purposes. It

should be noted that full data sets of all tweets across time are only available for purchase;

previously through commercial vendors and now, directly through Twitter itself.

I highlight all of these Twitter functionalities not only as an introduction to the social

media site itself, but to also present the types of data that are generated and available

through these interactions. With 320 million monthly users sending 6000 tweets every

minute (Twitter, nd), Twitter has generated the largest social dataset to ever exist (Library of

Congress, 2015); a goldmine for researchers of all types. This dataset is not only comprised

of the content of tweets, but a number of other factors embedded in, and connected to, each

tweet, e.g. who tweeted what, about what, and to whom; a user's reach; retweets, favorites,

replies, and mentions; geographic location from where the tweet was sent; the number of

times a tweet was engaged; etc. Because of this data vastness and availability, researchers

have been able to engage a number of previously impossible projects ranging from virtually

tracking the spread of the flu and predict future outbreaks (Broniatowski, Paul , Dredze,

2013) to forecasting likely political affiliations based upon geographic location,

demographics, and personal interests (Rojas, 2013). I return to this idea of Twitter-

generated data when I discuss the Methods of Data Generation and Analysis later in this chapter.

What are Twitter Chats?

Hashtags not only open up the opportunity for elevated searching practices and data generation within Twitter, they also create an opportunity to organize and categorize tweets in such a way that a Twitter *chat* becomes possible. A type of moderator-guided conversation, Twitter chats have become popular amongst educators as a means to connect with other teachers and discuss ideas related to a variety of educational disciplines, grade-levels, and topics. Using a specific hashtag (e.g.#edchat, #sschat), users engage in conversation with other users about a specific topic. The general format of a Twitter chat (at least within education) is as follows:

1. A moderator creates a hashtag that each tweet in the chat will use (a way to organize and delineate the chat from other tweets). For the sake of this example, let's pretend that the chat is amongst graduate students writing their dissertation, and the hashtag for this chat is #dissertationchat.

2. Users interested in participating in this chat log on to Twitter on a specific time and day decided by the moderator, and search for #dissertationchat using the search page. On the search result page, users click on the "Live" tab to see all tweets (beginning with most recent) that have used that hashtag. Users refresh as needed to up to date with what tweets are shared in the chat.

3. To start the chat, the moderator generally asks users in attendance to introduce themselves. Perhaps in #dissertationchat, the moderator would ask users to talk about their position in their program, their institution, and their dissertation topic.

Users would then voluntarily[5] reply with something like, "Hi Everyone! I'm Stacey, a 4th year PhD Student at U. Georgia. My work is on geography education #dissertationchat." Users participating in (or lurking on) the chat would continue to refresh their browser to see all the responses that are generated through this prompt. Users *must* use the specified hashtag for their tweets to be included in the chat.

4. After a specific amount of time, the moderator poses the first question of the chat session. Chats generally have a specific theme for each session, and are comprised of a set number of questions. For example, this #dissertationchat session might center on writing strategies. Therefore, the moderator would have a series of questions that ask participants to engage with based around the topic of writing strategies. The moderator starts the conversation by posing a question using the Q1/A1 format. This means that the first question will be asked with "Q1" preceding it, and that every answer for Q1 starts with A1 in front of it. This keeps responses organized and lets other participants know to which question tweets are responding. This format is also helpful for those not present for the live-chat to come back to the chat at a later time and understand what has been discussed.

   a. As an example, imagine that the first question is as follows, "Q1: How do you start a new writing project? #dissertationchat."

5. Users would then respond to Q1 by tweeting something like, "A1: Organize sources, write an outline, find good quotes #dissertationchat." Users would continue to refresh their browsers to stay up to date with what has been said in the chat.

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[5] One need not participate to engage with the chat. There is always the possibility or option, that someone choose to "lurk" anonymously; watching the content that is generated through the chat, but not participating in it themselves.

6. Steps 4 and 5 would be repeated following a progression of Q1/A1, Q2/A2,

    Q3/A3, and so on, until the moderator is finished with their questions.

During each of these steps, users may also choose to favorite, retweet, reply, and mention

other users as a way to interact further with other participants in the chat, and by proxy,

involve more users outside of the chat in the topic at hand. The use of replies, mentions,

favorites, and retweets allows for side conversations and commentary beyond the formally

asked questions by the moderator, and also for the tweets in the chat to reach a larger

audience[6].

As a method of reaching larger audiences than simply those participating in the chat,

moderators often compile all tweets from a chat session into one document or webpage so

that users who missed the chat may review the content that was generated. This can be done

using a third-party website like, Storify, that creates shareable "stories" based upon events on

social media. Using Storify, for example, the moderator could set time-constraints for the

use of a specific hashtag to generate a story, e.g. Create a story of all tweets with

#dissertationchat that occurred from 7pm – 9pm on Tuesday, December 15. Then, the

story is populated with tweets containing that hashtag within that time frame and given its

own webpage within the Storify website. Anyone can then view all the tweets from a chat in

a format that resembles the Twitter home stream.

There are a number of interactive Twitter chat sessions that draw thousands of

teachers together for conversations about various topics relating to education that follow the

general format described above. These include chats on: broad education topics (e.g.

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[6] One tweet only reaches that user's followers or those following the hashtag. A tweet that is retweeted,
however, reaches the original user's followers, as well as the followers of the retweeter(s). This is the process
by which something has the ability to move "virally" or become "trending" on the Twitterverse– the repeat
process of followers sharing with their followers, thereby increasing the reach and movement of the post and
the networks within which the tweet can be found.

#edchat, #satchat), content areas (e.g. #sschat, #mathchat), grade levels (e.g. #mschat, #kinderchat), special topics (e.g. #pblchat, #digcit), and many others. Through these chat sessions and the use of their respective hashtags, teachers can form connections and expand their PLNs that prior to the advent of Internet and Twitter were impossible. Through these virtual connections, the conception of what constitutes a "colleague" has expanded from those within an immediate geographic surrounding (e.g. within a school, or perhaps county) to anyone, anywhere with a mutual interest. As such, the opportunities for collaboration (in its various forms) abound. The specific form of collaboration I will expand upon now, is how these chats, in addition to allowing teachers to expand their PLNs, also serve as a form of self-sought professional development. It is of note and worthy of investigation that teachers are logging on to Twitter in droves during their own time to share commentary of their practices, seek the advice of others, learn about resources, and form connections

Twitter as Professional Development for K-12 Teachers

Traditionally, professional development (PD) for K-12 teachers has occurred in a top-down format wherein an expert relays information to groups of teachers in various formats on different topics. The expectation is that teachers will later implement the relayed information into their practice. Although there are recorded successes with teacher-led (e.g. Stigler & Hibbert, 1999) and other alternative styles of PD (e.g. Wilson, 2013), the traditional hierarchical model has remained dominant to varying degrees of effectiveness (Carpenter & Krutka, 2015).

With the emergence of new media though, the possibility of what PD can look like in practice has changed. This has been attributed to the fact that social media and other web-based platforms can reach larger audiences for a fraction of the cost and allow more participant voices to be heard (Clinton, Jenkins, & McWilliams, 2013). For this reason, it has

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been argued that when used well, new media can allow for facilitation of PD that is "more participatory, grassroots and supportive of teachers' roles as professionals and intellectuals" (Carpenter & Krutka, 2015, p. 708). This possibility sits in opposition of how traditional PD is generally characterized and enacted.

Drawing upon Gee (2004), educational researchers have theorized Twitter, particularly Twitter chats, as *affinity spaces* because of the ways groups of users can connect and communicate through mutual commitments (Carpenter, 2015; Carpenter & Krutka, 2015; see also: Jenkins, Purushotma, Weigel, Clinton, & Robison, 2009). Affinity spaces created through Twitter chats "vary according to individual interests, needs, skills, and expertise, with some participants taking on active moderator and curator roles and others primarily benefitting from the resource and idea sharing common in such spaces" (Carpenter & Krutka, 2015, p. 211). Because of the interactions, as well as the presence of resource and idea sharing with the goal of improving practices, affinity spaces in the form of education Twitter chats can function as PD. Twitter chats are less hierarchical and structured, and are also not bound to geographic, time, or financial constraints like that of traditional PD (Carpenter, 2015; Carpenter & Krutka, 2015; Visser, Evering, & Barrett, 2014). For these reasons, access to potentially high-quality PD has expanded to larger numbers of teachers than ever before (Carpenter, 2015). Through the connections afforded through Twitter chats, all teachers with an Internet connection and access to a computer or mobile device have the opportunity to "take control over and personalize their professional development" (Carpenter, 2015; set also: Risser, 2013; Visser, Evering, & Barrett, 2014); a level of freedom previously unavailable to teachers.

Researchers have taken note of the phenomenon of teachers turning to Twitter to facilitate their own PD. Studies have extolled: the potential benefits of microblogging to

teaching and learning processes (Domizi, 2013; Junco, Heiberger, & Loken, 2011, Rinaldo, Tapp, & Laverie, 2011); the possibility for pre-service teachers to connect with practicing teachers and receive mentorship (Carpenter, 2015); the creation of spaces for emotional support and camaraderie (Hur & Brush, 2009); the opportunity for teachers to seek advice and support with anonymity, if desired (Hur & Brush, 2009); as well as a the ability to Twitter connections to offer the means to combat isolation and collaborate professionally (Carpenter & Krutka, 2015; Visser, Evering, & Barrett, 2015). Overall, Twitter has been lauded as a space that can facilitate new forms of interpersonal interaction that were not possible before its advent; a space in which people enjoy participating and feel as though they are benefiting from their online interactions. While the research demonstrates that teachers enjoy Twitter as a platform for learning and expanding their PLNs, but little is known about the types of ideas that circulate in these spaces, and by whom.

What lacks in this body of research then is content analysis of who is participating in these chats, and what is being shared within them. Therefore, it still remains a bit of a mystery as to whether Twitter-based PD is as high-quality as it is accessible, who is actually participating in it, and whether or not all of these chats geared towards educators can be characterized as PD. The remainder of this chapter aims to shed led on this dearth in the research literature to investigate how and if Twitter functions as a space of professional development as well as a space of geography teacher education.

Methods

I chose to investigate three different sessions from three separate Twitter chats geared towards geography teachers[7] and the teaching of geographic content: #sschat,

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[7] And as in line with the rest of this dissertation, teachers of courses with significant geographic content.

#globaledchat, and #worldgeochat. I selected these three chats because of their frequency and user participation amounts, as well as their direct connection to K-12 geography content and pedagogy. In the section that follows (Findings), I describe each chat and chat session respectively to provide more context.

Collecting Individual and Complete Twitter Chat Sessions

Moderators of each of the chats in this study use Storify to create stories of individual chat sessions. Thus, to generate the data for analysis, I visited each moderator's Storify page and looked through the available chat session stories. Once I had found the chats I was interested in further investigating, I downloaded each story that contained all tweets in the chat into a PDF. Then, I organized the content from each chat into individual Excel files, thereby creating three separate databases of the respective chat sessions. I initially kept each database simple with only two columns: username and tweet.

I expanded upon each database by adding a second sheet that included participants' username, gender, and their profession when possible. Gender and profession were determined by viewing each user's Twitter bio and making inferences. To complete this process, I looked at user's names, avatars, and written bios. I understand that assigning gender is a problematic practice, but to ignore gender altogether is potentially more problematic. Therefore, to assign gender I leaned on gender signifiers in user's names, avatars, and bios. Imagine that one of the participants was named Mary Lancaster and had the username @ms_lancaster with a bio that read: Teacher, Wife, Mother: Loving Life and Working in Atlanta Public Schools. In this bio, the name "Mary" as well as the words "wife" and "mother" would lead me to believe that the user identifies as a woman. Also, this user's mention of "teacher" would cause me to assign this user's profession as "teacher." If I was unsure about gender or profession, I noted so within the database. If the participant

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was categorized as a teacher, I made a note of what grade-level and discipline they taught, if reported somewhere in their Twitter profile. When possible and necessary, I also went to users' personal website if a link was listed in their Twitter profile. These websites served as another source of information about the user's gender, profession, grade-level, and discipline (if relevant). I make no claim to have complete accuracy in this portion of the data generation; these categorizations are inferences, not certainties.

To begin the initial analysis process, I ran basic quantitative measures. I calculated the number of tweets in each chat session, the number of individual users, the gender breakdown in each, as well as the participant professions. Then, I uploaded each database into Dedoose, a qualitative data analysis software. Once uploaded, I went through and tagged tweets. As I mentioned in Chapter 4, tagging is the process by which a number of comments/categorizations can be assigned to each piece of data. This allows one individual piece of data to straddle multiple categories and not just be relegated to one. I created tags as a means to describe and compare what was happening in the tweets. In total, I created 18 tags that ranged from describing the type of tweet (e.g. a reply, an introduction) to the content of the tweet (e.g. resource sharing). Some of the tags were only used once while others appeared more frequently.

In the Analysis section of this chapter, I delve into and theorize the appearance of the most often tagged items across the three chats that can be categorized into these three categories: resource sharing, complexity of geography content discussed, and promoted teaching practices. I later looked through the tweets and assigned tags to see how often certain tags were present and if there were themes across the different chats. The goal of this tagging was to gain a greater understanding of the type of content within the tweets that comprised the space of the different Twitter chats.

Generating Data to Create Context about the Twitter Chats and Hashtags

To gain a greater depth of understanding about the context of each of the Twitter chats, I employed the data generation tools available through the website, CartoDB and hashtagify.me. In the most basic sense, CartoDB is a web-based GIS service that can extract data from various web entities and create databases as well as digital maps. Through a set of protocols and parameter setting, I prompted CartoDB to extract all tweets and make individual databases for the hashtags #sschat, #worldgeochat, #globaledchat during a month long period (the longest available period of time through the service). Through these prompts, three separate databases were generated with all available data connected to the tweets with these specific hashtags. For example, the database included basic information like tweet content and usernames, but also included other embedded data invisible to the naked eye, like user's geographic location, their reach, and engagement with the tweet, amongst a number of other data points. Then, these data points were employed to create a number of heat maps that demonstrated where clusters of participants are located. Further, I also used the website, hastigify.me to generate data about each chat hashtag's popularity. I present these data representations in the next section to further illustrate the context of each chat before delving into the analysis of specific geographic-related content of individual chat sessions.

Findings

Twitter chats are sanctioned on a number of topics for teachers. They bring groups together that would have previously been unable to communicate and forge networks and connection across vast sections of time and space. I chose to analyze three chats sessions that one would expect to attract geography teachers – #sschat, #worldgeochat, and #globaledchat. Before delving into the analysis of each individual chat session, I first

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provide broad contextual information for each chat based upon data from a month period between January 29, 2016 and February 27, 2016. Specifically I note the cited goal of each chat (across time and sessions, not the particular topic of the analyzed chat session), number of tweets within a month period, number of unique users to use the hashtag in the month period, the geographic clusters of participants, relative popularity, and connected hashtags. As a reminder, the hashtags used for these chats can be employed by users at any time. Therefore, the data generated through the extraction from CartoDB includes all tweets during a month period, instead of just tweets from a month's worth of chat sessions. After providing the context for these chats broadly, I delve into specifics of the analyzed chat sessions: number of unique users, number of tweets, gender breakdown, and profession breakdown, and the questions asked in each session.

Context: #sschat

#sschat is a social studies focused chat that engages topics weekly on a variety of ideas related to social studies disciplines, methods, and content. Original moderators Ron Peck and Greg Kulowiec, started #sschat in 2010 after noticing the success of #edchat and wishing to extend Twitter-based education conversations to cover social studies specific topics. Described as "more than a hashtag" (#sschat, n,d), the #sschat group began as a Twitter chat and has since grown to an open group of educators across social media platforms "who aim to improve their personal, and … collective, teaching of social studies subject matter" (nd). The focus of these collaborations, specifically through the spaces of Twitter chats and use of the hashtag, is to engage social studies teachers "by helping to facilitate democratic collaboration where educators can challenge & support each other to grow in their craft and, consequently, offer richer learning experiences for students" (nd).

While anyone can use the #sschat hashtag at any time, moderated interactive chat sessions are held weekly on Monday from 7pm-8pm EST.

In the month period from January 29, 2016 to February 27, 2016, the #sschat hashtag was used in 6067 tweets by 2206 unique users. The #sschat hashtag has an international reach with hot spots appearing in all continents, but the largest hot spot is by far is in the United States (Figure 11). Within the United States, the largest cluster of users is within the Midwest to the East, although clusters are present in a number of Western and Mountain metropolitan areas as well (Figure 12). Out of the Eastern clusters, the hottest spot of users is along the Megalopolis corridor (from Washington, DC to Boston) (Figure 13). I infer that these hot spots are not only connected to the home-base of #sschat (it began in the U.S and is affiliated with the National Council for the Social Studies) but also higher areas of populations (and therefore higher instances of educators who may potentially use the hashtag/participate in the chats). Further, there may be higher instances of hashtag use on the East Coast because the chats occur at 7pm EST. This means that someone on the West Coast would have to log on at 4pm PST – a time that potentially conflicts with school-based duties and other afterschool activities.
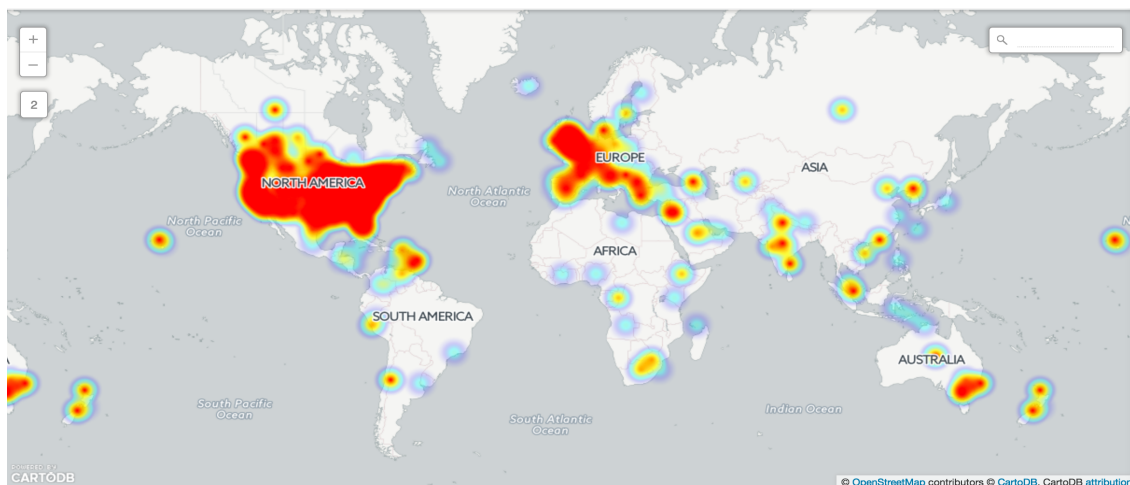

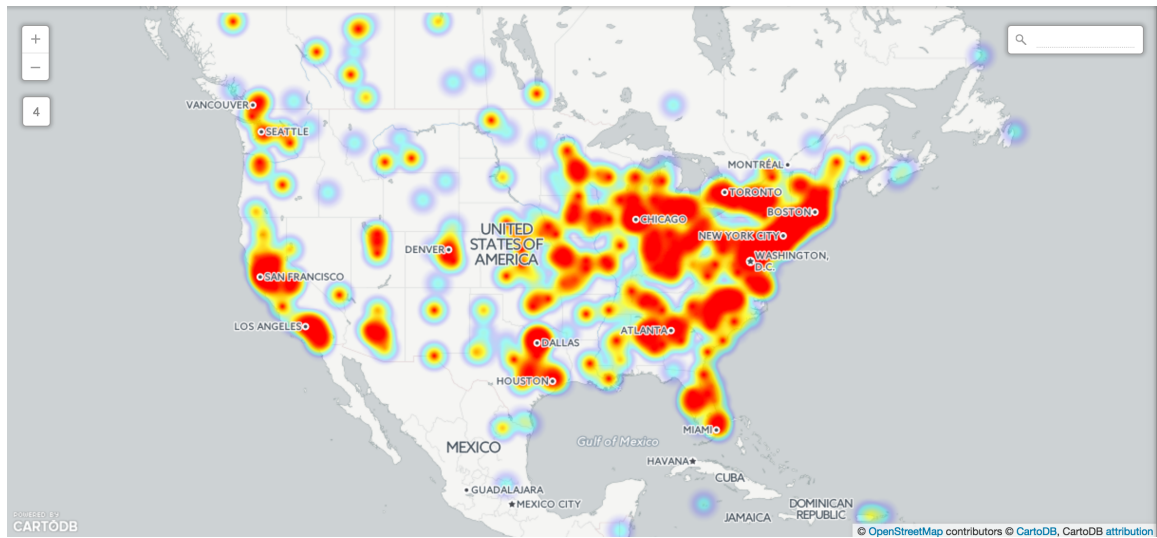Figure 11: A heat map of #sschat participants during a month-long period.

Figure 12: Heat map of #sschat hashtag users in North America from January 29, 2016 - February 27, 2016.
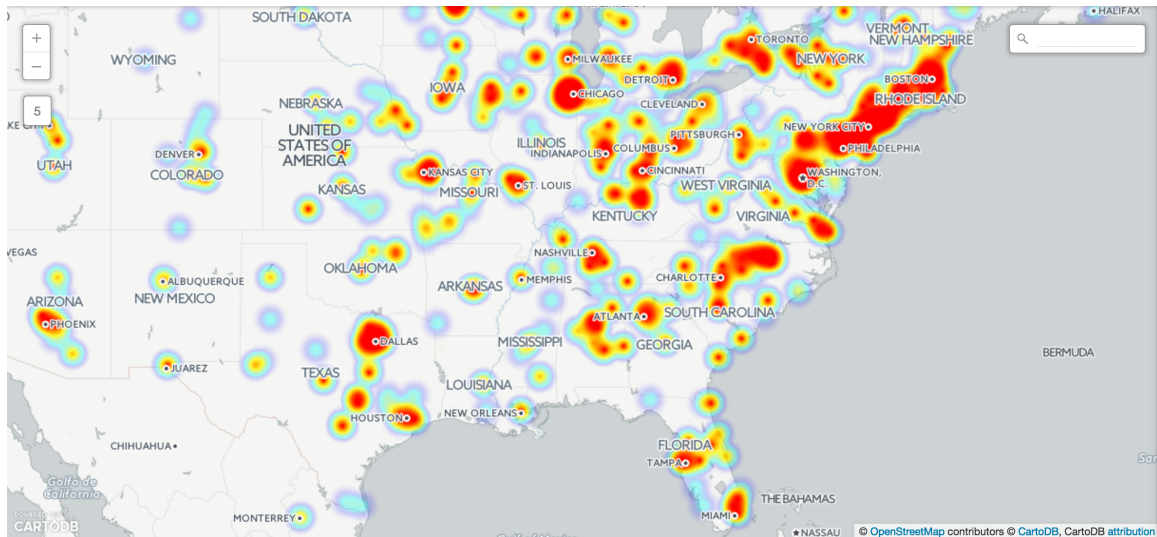
Figure 13: Heat map of #sschat hashtag users in the United States from January 29, 2016 - February 27, 2016

Over the past two months, the #sschat hashtag had a popularity rating of 51.3 (Figure 14). Hashtagify.me calculates numerical popularity based upon a relative 0-100 rating, whereby the most popular hashtag on Twitter would get a score of 100, and the least popular/non-existent hashtag on Twitter would get a 0. Out of the three analyzed hashtags (#sschat, #worldgeochat, #globaledchat) #sschat is the most popular.

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Last 2 months:

Figure 14: Popularity comparisons for the use of #sschat, #worldgeochat, and #globaled chat from December 2015 - February 2016
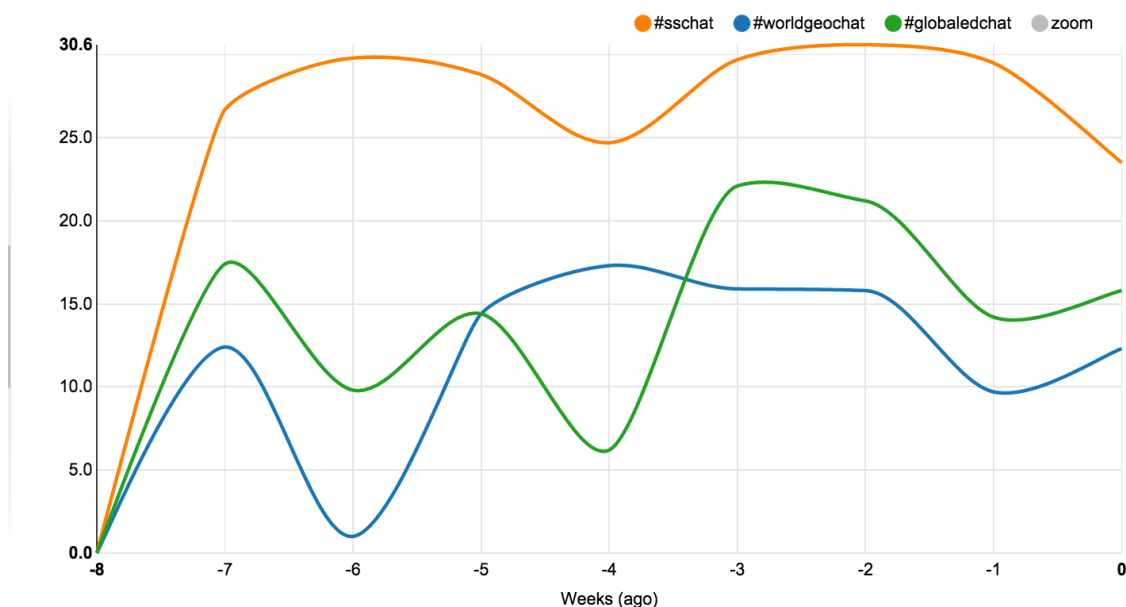
Analyzed #sschat Session, *Geography: More than Maps.* The interactive chat session I chose to analyze from the #sschat archives occurred on June 1st, 2015 and was entitled, *Geography: More than Maps.* I specifically chose this chat because it was the only archived #sschat session I could find that delved specifically and purposefully into geographic content. While conversations about geography occur often on #sschat in relation to other addressed topics (e.g. Teaching About Social Justice, Using Problem-Based Learning in the Social Studies Classroom), this was the only one centered on geography. In this chat that occurred over the period of one hour, 65 unique users sent 473 tweets. In terms of gender breakdown, the participants were: 23 men, 25 women, 11 that were not applicable (organizational/business accounts), and 6 that were unknown. For professions, the bulk of the participants were teachers (24). There were also: 6 businesses, 5 organizations, 4 professors, 2 retired teachers, 1 pre-service teacher, 1 curriculum specialist, 1

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administrator, and 1 software designer. Seven were classified as unknown. Details are

presented in Table 2.

Table 2. Participant information from #sschat chat session, *Geography: More than Maps*

Category	Frequency
Gender	
Women	25
Men	23
Not Applicable (e.g. business account)	11
Unknown	6
Profession	
Teacher	24
Businesses	6
Organization	5
Professor	4
Retired Teacher	2
Pre-Service Teacher	1
Curriculum Specialist	1
Administrator	1
Software	1
Unknown	7
Teachers' Grade-Level (when indicated)	
Elementary	2
Middle Grades	4
High School	17
Unknown/Not Listed	10
Teachers' Content Area (when indicated, if a teacher said they taught both history and geography, 1 was counted was <u>both</u> subject areas)	
History	14

Geography	6
Social Studies	12
Civics	1
Language Arts/English	2
Art	1
Math	1
Spanish	1
Unknown	6

Using participants' Twitter bios and personal websites, I was able to draw conclusions about the subject areas and grade-levels of all but 4 teachers. While my conclusions are drawn simply by teachers' own characterizations of themselves (e.g. they may not include all of the classes they teach), I thought it was important to note the subject area and/or grade-level with which they chose to affiliate and how they described this on their bios. The majority of teacher participants described themselves as high school teachers (17). There were also 4 middle grades teachers and 2 elementary teachers. In terms of disciplines, history was the strongest represented with 14 participants claiming to be some type of history teacher. This was closely followed by 12 teachers who broadly described themselves as social studies teachers. There were 6 geography teachers, 2 who taught English/Language Arts teachers, 1 civics, 1 math, and 1 Spanish.

Chat questions.

(1) Why does geography need to be addressed in all social science content areas?

(2) How do you teach geographic skills in your social science content?

(3) How can music or pictures be used to teach about place?

(4) Geography is so much more than maps, what do your students *do* to understand the world?

(5) What are some of the cross-curricular ways to bring geographic skills to your Ss?

(6) Look ahead to next year, what's 1 thing you'll definitely do to make your students more geo-literate?

Context: #worldgeochat

#worldgeochat is a hashtag and chat that focuses directly on topics related to geography education. While #worldgeochat has a website, it does not include information about the mission or goals of its Twitter chats. The website simply includes a repository of resources that have been shared through their various chat sessions. #worldgeo chat occurs weekly on Tuesdays from 9PM – 10PM EST. #sschat advertises the existence of #worldgeochat on their website but do not express explicit affiliation.

In the month period from January 29, 2016 to February 27, 2016, the #worldgeochat hashtag was used in 1213 tweets by 124 unique users. The #worldgeochat hashtag has an international reach but its use is centered predominantly within the United States, as indicated by the red hot spot in Figure 15. When zoomed in on this hot spot, it appears that users are generally clustered in the Midwest and Eastern parts of the United States (Figure 16), but the hot spots are much less clustered and concentrated that the #sschat maps of user locations. As indicated in Figure 14, #worldgeochat was on average the least popular of the three selected hashtags/chats, though, on one occasion, it did surpass #globaledchat. Hashtagify.me calculated #worldgeochat's popularity as 32.7 (on a scale of 0-100 where 100 is the most popular of all Twitter hashtags).
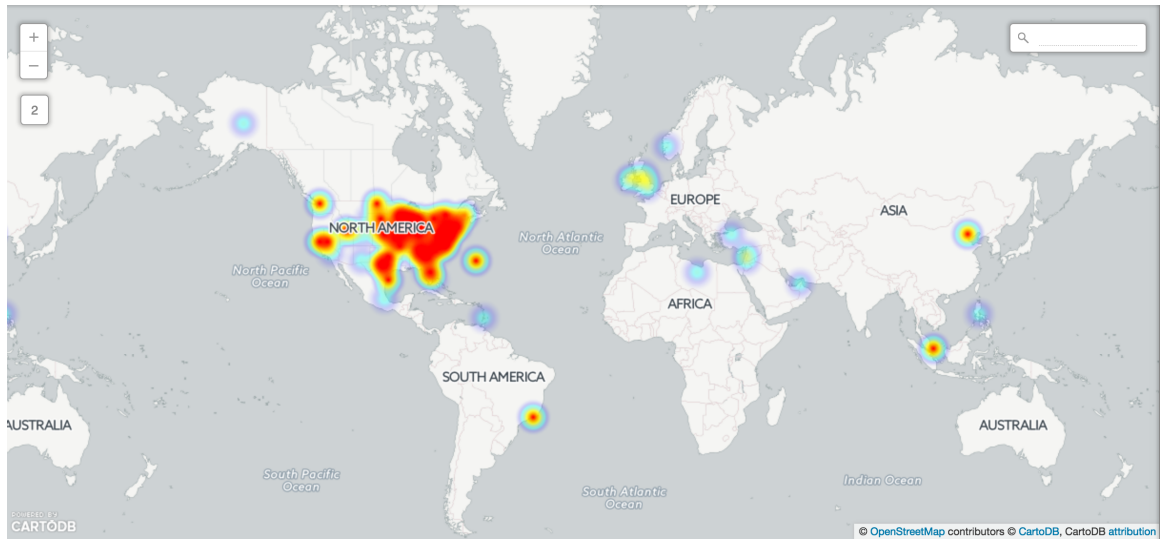
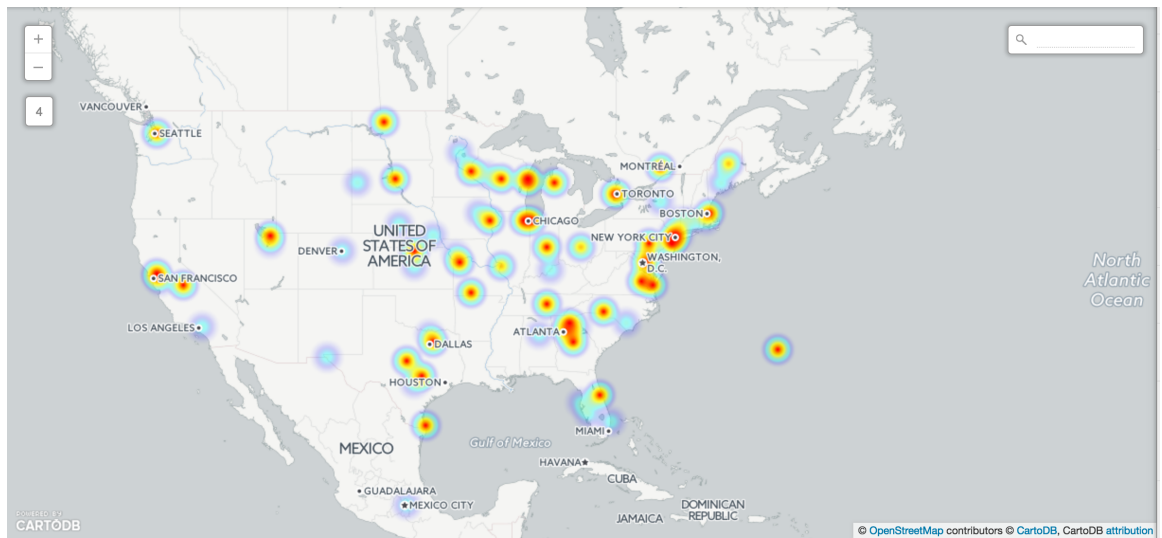Figure 15: Worldwide use of #worldgeochat from January 29, 2016 - February 27, 2016.

Figure 16: North American usage of #worldgeochat hashtag from January 29, 2016 - February 27, 2016.
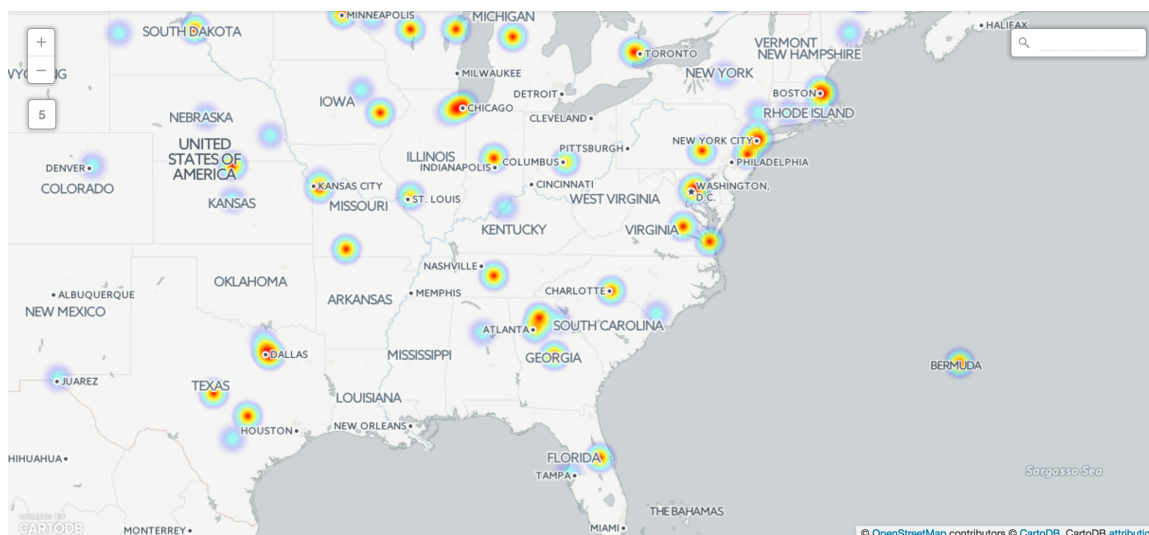
Figure 17: Eastern and Midwestern United States usage of #worldgeochat hashtag between January 29, 2016 and February 27, 2016.

Analyzed #worldgeochat Session, *Teaching Strategies.* After reviewing the Storify archive of #worldgeochat interactive chat sessions, I chose to analyze a session from April 21, 2015 that focused on geography teaching strategies. I chose this chat because of its focus upon pedagogy (a similar focus of the selected #sschat and #globaledchat chats) in specific relation to geography. Also, it seemed to be one of the chats with the most generated tweets and unique users out of those available on the archive.

The *Teaching Strategies* chat was comprised of 298 tweets by 28 unique participants. There were 13 women participants, 11 men, and 3 that were business/organizational accounts. Teachers were the dominant participants with 19 present. There were also 2 organizations, 2 professors, and 1 business, retired teacher, and curriculum specialist. There was only 1 participant that I was unable to identify in terms of their profession. In terms of grade-level, 9 participants were unknown, whereas 6 identified as middle grades teachers, and 5 as high school teachers. A total of 8 participants identified broadly as social studies teachers, 7 as geography teachers, 2 history, 2 language arts/English, 1 art, and 2 were unknown. Details are presented in Table 3.

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Table 3. Participant information from #worldgeochat session, *Teaching Strategies*

Category	Frequency
Gender	
Women	13
Men	11
Not Applicable (e.g. business account)	4
Profession	
Teacher	19
Businesses	2
Organizations	2
Professors	2
Retired Teachers	1
Curriculum Specialist	1
Unknown	1
Teachers' Grade-Level (when indicated)	
Middle Grades	6
High School	5
Unknown/Not Listed	9
Teachers' Content Area (when indicated, if a teacher said they taught both history and geography, 1 was counted was both subject areas)	
History	2
Geography	7
Social Studies	8
Language Arts/English	2
Art	1
Unknown	2

Chat questions.

(1) Why are varied teaching strategies important to the teaching of geography?

(2) What strategies do you employ to teach place geography? What works best for your students?

(3) Which vocab terms are important for students to use in geographic writing? How do you get students to use them?

(4) What questions should we begin asking in elem grades? How should that evolve over a student's academic career?

(5) What topics do you use to encourage debate/socratic seminars in your course?

(6) Brag time! Share your best geography teaching strategy.

Context: #globaledchat

#globaledchat is a hashtag and chat that centers on Global Education practices, pedagogies, and content. Global Education, while often considered an entity of its own, is steeped in geography content. Its goal is to prepare students to become socially aware and justice-oriented citizens of a globalized world by addressing interdisciplinary topics. This is simply a form of social studies focused geography education to me, but under a different name. Like the #worldgeochat chat, #globaledchat does not have its own webpage with information about its missions or goals as an entity. Weekly interactive chat sessions Thursdays from 8PM-9PM EST.

In the month period from January 29, 2016 to February 27, 2016, the #globaledchat hashtag was used in 2416 tweets by 429 unique users. Like the other two previously discussed hashtags, #globaledchat has an international reach, but again, its highest

concentration of users is within the United States (Figure 18). The hottest spot within the United States again occurs along the Megalopolis corridor (Figure 19). #globaledchat has a popularity rating of 34.0 making it slightly more popular than #worldgeochat, but still far less popular than #sschat (See Figure 14).
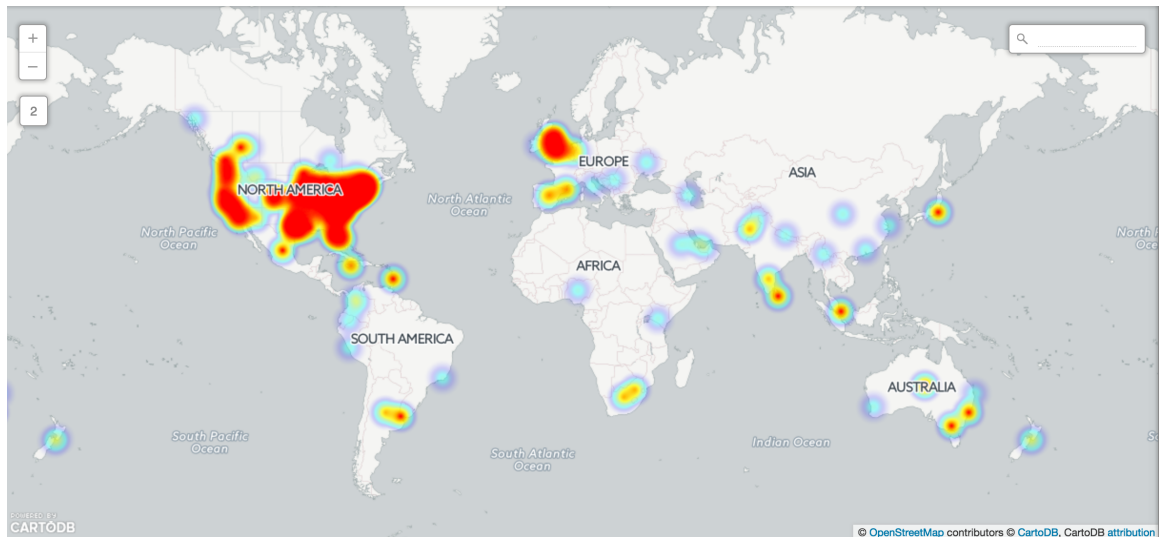

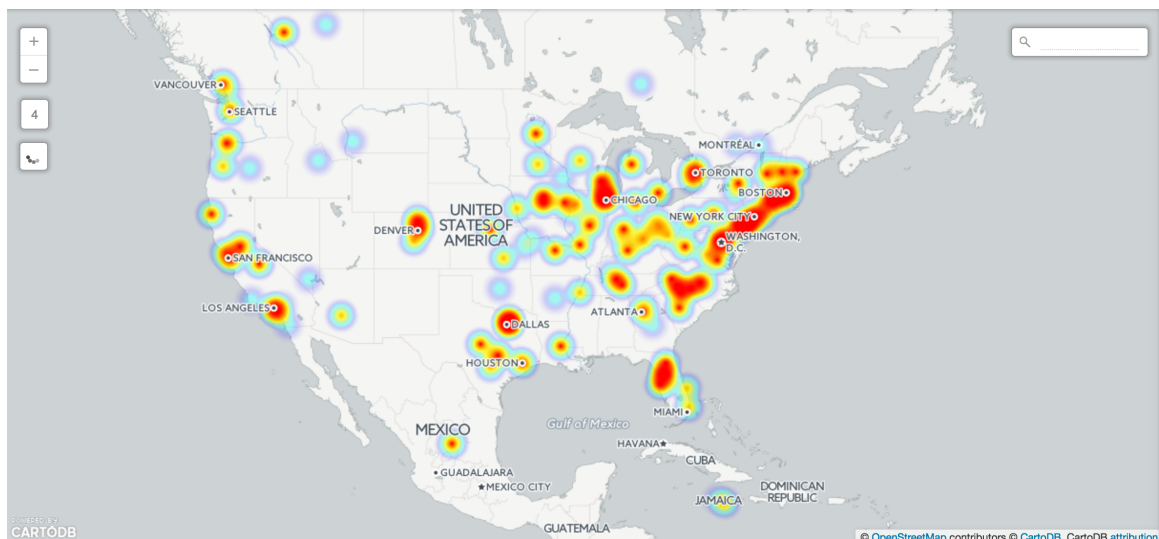Figure 18: Worldwide use of #globaledchat hashtag between January 29, 2016 and February 27, 2016.

Figure 19: North American use of #globaledchat hashtag between January 29, 2016 and February 27, 2016.
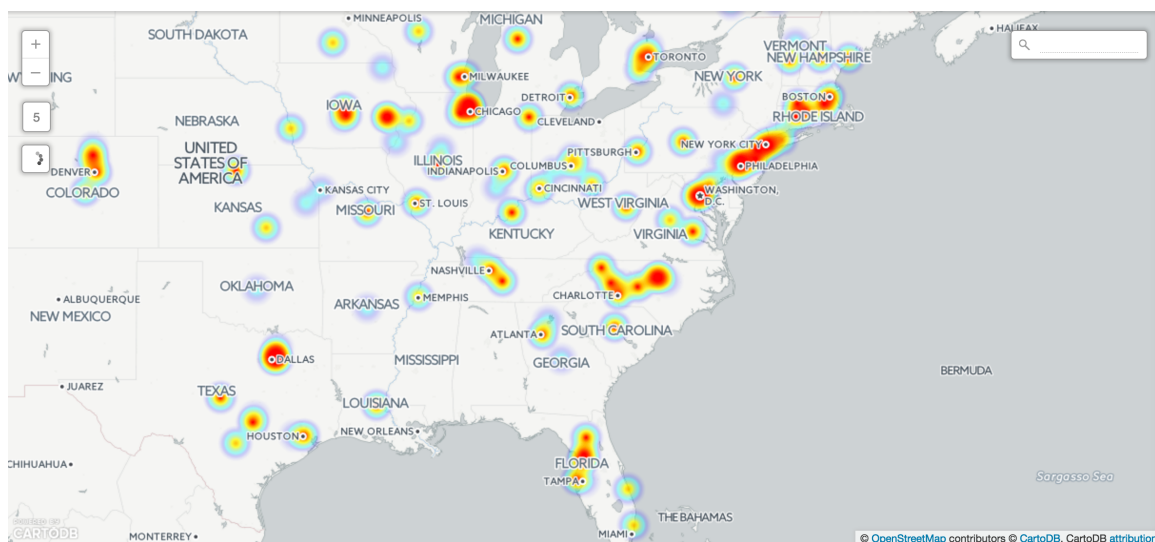
Figure 20: Close up on American clusters of #globaledchat hashtag usage from January 29, 2016 to February 27, 2016.

Analyzed #globaledchat Session, *Geography Awareness Week.* The chat I selected to analyze from the #globaledchat archives was a session held during Geography Awareness Week to draw connections between geographic content and skill, and global education initiatives. I chose this chat because it drew specific attention to geography content and pedagogy within the global education curriculum (although I argue global education is always intertwined with geography content).

On this chat session held on November 12, 2015, 245 tweets were shared by 32 unique users. The participants of this specific chat were the most varied amongst the three analyzed chats. There was an even split of men and women participating in this chat session with 13 each. Six participants were not applicable to this categorization because they were business or organizational accounts. The majority of participants were *not* teachers unlike in #sschat and #worldgeochat. On the contrary, most participants were involved in education but as business directors of educational/software companies, writers, and other related professions. Of the teachers present, there were 3 who identified as elementary teachers, 1

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as a high school teacher, and 4 that were unknown. The subjects taught by identified

teachers were varied as well. Details are presented in Table 4.

Table 4. Participant Information for #globaledchat session, *Geography Awareness Week.*

Category	Frequency
Gender	
Women	13
Men	13
Not Applicable (e.g. business account)	6
Profession	
Teacher	8
Business	2
Organization	4
Professor	1
Retired Teacher	1
Software Creator	2
Digital Media Creator	1
Business Director	4
Other Educator	1
Technology Specialist	2
Curriculum Specialist	1
Writer	2
Administrator	1
Pre-Service Teacher	1
Unknown	1
Teachers' Grade-Level (when indicated)	
Elementary	3
High School	1
Unknown/Not Listed	4

Teachers' Content Area (when indicated, if a teacher said they taught both history and geography, 1 was counted was both subject areas)

Global Education	1
Geography	2
Science	1
Spanish	1
Unknown	5

Chat questions.

(1) What do you emphasize when you teach cultural and/or human geography?

(2) What geography concepts overlap with those included under global education?

(3) How can educators use geography to teach for global citizenship?

(4) What are some of your favorite resources for teaching geography for global competence/citizenship?

(5) The Geo Awareness theme is the power of maps. Why is it important to incorporate maps into a discussion or presentation?

(6) Maps are not just for classroom use. What other use come to mind?

(7) Share a favorite or funny experience using maps.

(8) Finally, how can we showcase the power of maps and spatial thinking in a digital world?

Analysis

Initially, I read through transcripts of each chat to grasp the types of questions, comments, and interactions that took place. It was evident in this reading that each had a similar "feel." By this, I mean that all were related to geography education in some fashion and engaged participants (predominantly educators or those with an affinity to matters of education) in a series of questions over the period of an hour. Each chat followed the

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Question/Answer format and was led by a moderator who posed the questions. The questions garnered many responses from participants that ranged from written ideas or comments, to resource/link sharing. Sometimes participants retweeted or favorite others' tweets, but very rarely were there questions or requests for clarification that happened between participants. In effect, this initial reading made me think that the chats were less like conversations between participants, and more like a digital bulletin board in which people posted their ideas but did not interact much (if at all) with the ideas or comments of others. Once I established this basic information about the chats (what I just detailed in the previous paragraph as well as in the Findings section), I tagged tweets from each chat to see if there were any themes in the content being shared. I hoped that in the process of this, I could find evidence of whether or not the chats function as a form of PD. I did this because the literature has detailed that these chats do function as PD (Carpenter, 2015; Carpenter & Krutka, 2014, 2015; Risser, 2013; Visser, Evering, & Barrett, 2014) yet none of the studies analyze the content of the tweets that comprise the chats.

Through this tagging process, it was evident that ideas are moving through the space of the Twitter chats. Twitter chats, like other social media and digital technologies, make possible for participants to become a "spatial extension of the self" (Kellerman, 2006, p. 3). This means that the participants and their ideas exist and move in many spaces in an instant: from the brain of the participant, to the keyboard of their computer/phone, and finally to the homescreens of their followers and chat participants' Twitter feeds. For example, the moderator of the analyzed #sschat session first asked: "Why does geography need to be addressed in all social studies content areas?" This question prompted 36 tweet responses in which chat participants mobilized their own answers to the space of the chat. These responses represent the multitude of ways that participants make sense of a question and

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choose to communicate their idea in 140 characters or less. Some examples of comments were:

- Geography is not just a background to time & human interactions. It is in process/reshaped by human interactions over time

- Need the 'where' to support the 'why' and 'how' of human" behavior interaction

- Geog is more than state's and capitols, S's need to see movement of economics and people in all ss areas

- Because students in US currently are way behind on geography as compared to students in other countries

In these four answers alone, there is a representation of how different people choose to respond and mobilize their ideas in response to a specific question prompt within a specific space of those who share an affinity. In the first tweet above, the user answers the question: ""Why does geography need to be addressed in all social studies content areas?" by providing a definition of geography. The second user describes an interpretation of geography's role in social studies. The third user tweets an idea that works to dispel a misconception about geography, while the fourth talks about American student performance in geography. None of these answers are necessarily right or wrong, nor do they demonstrate the depth of the user's knowledge of geography or their abilities as a geography teacher. What these tweets provide though is access to many different people's ideas that were mobilized to the space of a chat after a specific prompt.

On the surface then, the Twitter chats seem to create an abundance of access – access to connecting with others who share an affinity, access to the plethora of information available on the internet and curated through the sharing of links and resources by other participants, and access to a space where one can see how others choose to communicate

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and make sense of certain ideas (within a 140 character limit). This abundance of access exists in opposition to forms of lack that teachers in the interview and survey chapters reported to encounter; lack that creates borders in their teaching and learning related to geography. Without this seeming lack and the resultant borders, participants in the Twitter chats (as well as their ideas) can flow from one space to another in a split second with little to no physical barriers or boundaries that would curtail, coerce, or force their movement to occur in undesired ways (unlike the borders that forced other forms of movement for Sadie, Carrie, Sarah, and Lillian).

While the space of the Twitter chats opens up a certain type of access to movement that teachers may not experience in their professional lives, this analysis did not yield any evidence that the chats, or the content of the tweets therein, are functioning as PD. In other words, I could not find any type of compelling evidence that would demonstrate that participants were learning about, or helping others learn about geography content and pedagogy. By reviewing the content of the chats and looking into the participant pool, I can claim that ideas are moving and that participants are moving to the online spaces of the Twitter chats in large numbers, but in review of the content of the chats alone, it cannot be known how and if (and how well) the chats function as PD. The most obvious limitation in terms of simply analyzing the content of tweets generated through the chats is that there are only 140-characters of information in each tweet. There is no justification required for tweeting something, nor does the tweet itself prove anything about the person who tweeted it.

For example, in response to the question that asked: "How can music or pictures be used to teach about place?" in the #sschat session, one user tweeted: "use Qs from a geo lens to observe & reflect when looking at images, political cartoons, audio-visuals, & maps."

In review of this tweet alone, one simply cannot know whether or not this person has a strong knowledge of geography content or pedagogy, or how the information that they present is received (or not) from other participants in the chat. All that can be said and evidenced from this data is that someone presented an idea in a tweet that was prompted through a moderator's question. This tweet was favorited twice and retweeted once. Thus, there is evidence that this tweet moved beyond the bounds of the user's own homescreen to the Twitter feeds of others, but it cannot be known why the tweet moved in this way. One might infer that someone found the idea interesting and wished for others to see the content of the tweet, but there is no evidence that this is the reason why. When a tweet is retweeted or favorited, one cannot know what that tweet does, or did for others who saw it, if anything at all. All that can be said with any certainty is that ideas (and the tweets that house them) are moving – from the keyboards (or phones) of participants to the feeds of other participants, and if retweeted to the feeds of those participants' followers. Through reviewing the Twitter chats alone, it cannot be known what this movement does or does not do.

Discussion, Implications, & Conclusions

It is undeniable that the advent of Twitter chats has resulted in new spaces for teachers to engage with each other and to form new relationships in ways that were previously impossible. It is quite amazing that thousands of Twitter users with an interest in social studies and geography education are gathering around a set of hashtags to talk about matters of education outside of formal school contexts. In these three analyzed chats, it is also undeniable that participants tweeted ideas and interacted with each other in the space of the Twitter chat. Yet, without further study it cannot be said one way or another if these chats are functioning as PD. In the review of the hundreds of tweets across the three chats,

there is simply no evidence that what is happening here can and should be characterized as PD for teachers. Obviously there is a major limitation in analyzing just three chat sessions, and I do not claim that these Twitter chats are not functioning as PD; they very well could be. Yet, the format is not without its challenges, and it cannot be assumed that just because teachers are joining together in one space, that professional development type conversations and activities are occurring.

The analysis echoes what has been established in the research literature available at present: teachers are using Twitter, they seem to enjoy this use, and this use affords them the opportunity to expand their PLNs. Yet, the research does not provide evidence, nor could I find any in my own analysis of three chats, that Twitter chats function as PD. By simply reviewing a collection of 140 characters bursts of information, one simple cannot know what someone else knows about geography. Further, this same review does not allow one to judge the value of a participants' contribution to the chat, or what another participant might do with that product of that participation. One must then be careful to not equate feelings of "goodness" with achieving the goals of professional development - e.g. intellectually engaging with a (new) idea, improving one's teaching, or complexifying of knowledge - when there is no evidence to support that these events are taking place.

It does not appear that Twitter chats are losing any popularity amongst educators. More than 150 education-focused chats take place every week and the number of users who participate continues to grow (Carpenter & Krutka, 2014). Thus, Twitter chats for educational purposes require much more study before any claims of their effectiveness as PD can be made. First, it would be of interest to see how, if, and why ideas mobilized through the Twitter chats move *beyond* the space of the chat(s). Given the content of the analyzed chats, one could make the claim that Twitter chats open up the access that teachers

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have to information relevant to pedagogy, education, and disciplinary content. But, research must be done to see whether or not this increase in access actually results in any changes or improvements in one's instruction. Some possible research questions might be: How do ideas move from the space of the Twitter chat to the space of the classroom? Does the open access nature of the chat and the information/resources/ideas therein help teachers make instructional decisions? Do teachers begin to understand ideas about content differently (or better) after participation in Twitter chats? Do teachers put the resources they learn about in Twitter chats into practice? These questions might be answered in many different ways, but it is likely that to gain more information about how Twitter chats may function as PD, researchers must look beyond the content generated in the chat sessions, as well as beyond personal accounts of how participants makes people feel. While both of these factors could certainly be important in creating a well-rounded point of view about the experience and value of Twitter chats, observation, assessment, interviews, and other measures must also be used and accounted for critically if any claim are to be made that Twitter chats function as PD.

CHAPTER 7

TEACHING ABOUT AND WITH GEOGRAPHY: INTERVENTIONS IN A

TRADITIONAL SPACE OF GEOGRAPHY TEACHER EDUCATION

The interventions presented and analyzed in this chapter were enacted in the space
of a Teaching Geography course; a traditional space of geography teacher education. I
developed these interventions with the wonder of what teaching *about* and *with* geography
might offer for spaces of geography teacher education. The idea of teaching about and with
geography sits in opposition to the ways that geography education was established as existing
(through the literature review, survey, interviews, and twitter) in other geography (teacher)
education spaces in which geography education tends to lack geography. Through the use of
two different interventions in the form of walking activities (mapping pedagogy and a
dérive), pre-service teachers learned about topics from academic geography by mobilizing
the formal curriculum of the classroom out into the space of our university's campus as well
as a nearby neighborhood. In this mobilization, I taught *with* geography by having pre-
service teachers engage with questions of space, through mapping activities, and other
related geography skills. I found that by teaching with and about geography, pre-service
teachers had the opportunity to exercise spatial thinking and reasoning, question the
composition and construction of spaces and their ties to potential movement, and
experience the ways their movement was tied to their subjectivity as well as the construction
of spaces; all essential components of critical spatial literacy.

In this chapter, I first introduce the context, a Teaching Geography course, within
which the interventions occurred. Then, I present the conceptual frames that guide the

creation and enactment of the interventions – walking pedagogies, and mapping. Next, I present a description of the enactment of these interventions and the findings of their analysis. I demonstrate that the two interventions offered students the opportunity to (further) develop critical spatial literacy in which they: used spatial thinking and spatial reasoning, critically questioned the composition and authoring of neighborhood and campus spaces, and assessed how the movement they have available to them in these spaces was encouraged, discourage, restricted, coerced, or forced depending upon the composition of neighborhood and campus spaces. Finally, I discuss how the findings of this relate to the overarching research questions for this dissertation, and what their implications are for the field of geography teacher education.

Context of Interventions

The Course

These interventions took place in a mixed undergraduate and graduate social studies education course focused on geography pedagogy that I designed and taught. There were 19 enrolled pre-service teachers; most of who had intentions of pursuing a career as an educator. The demographics of the class are described in the Table 5. My overarching goal for this seminar, and the two interventions in particular, was to teach not only *about* but also *with* geography. This means that I incorporated the formal curriculum of K-12 and university-level geography into the course, but that we also investigated the ideas in the curriculum using spatial orientations and theories, mapping/map creation, and other related parts of the geographer's toolkit. I did this in the hope that pre-service teachers might develop more robust understandings of geography, and thus critical spatial literacy; things that are not only important for potential geography teachers, but also for any informed citizen. These understandings and skills allow for an analytical orientation towards concepts

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relevant to life in today's world: globalization, cultural diversity, geospatial technologies, the importance of location, climate change, energy use, national and international security, the environment, the connection between the infrastructure of cities and the lives of those within them, and resource management (see Grosvenor Center for Geographic Education, 2009).

Table 5: Demographics of Course Enrollees

Total Number of Enrollees	**19**
Gender Breakdown, TCs identified as:	13 women 6 men
Racial Breakdown, TCs identified as:	1 Hispanic 6 African American 12 White
Degree-Level:	12 Undergraduates 7 Masters
Major:	2 M.A.T in Social Studies Education 5 M.A.T in Middle Grades Education 12 B.S. Ed in Middle Grades Education

As shown in Table 5, the majority of pre-service teachers were enrolled in a middle grades education program although there were two students who were enrolled in the social studies education M.A.T program. The pre-service teachers were mostly white women, and there were seven students of color and six men. Similar to the results of the survey I conducted, almost all had taken a geography course at the post-secondary level. Yet, as similarly indicated in the survey results, most pre-service teachers had only taken one course because as one person explained in a class discussion, "most [of the class] took one of the 101 geography classes because it's known to be an easy A and fulfills the [university's] social

science requirement." It was unsurprising considering the results of the survey, that only two pre-service teachers had taken another course beyond the social science requirement.

In addition to demographic and education information, pre-service teachers were also asked why they decided to enroll in the course. While individual phrasing of responses varied, 13 out of the 19 expressed a lack of confidence in their geography knowledge. These 13 narrated a worry about their ability to enact a middle grades social studies curriculum, most of which is related to geography content in the state of Georgia. Yet, similar to the story of the comedy skits I told in Chapter 1, what pre-service teachers understood as geography knowledge was at odds with my own conceptions of it. This was confirmed when I had the class complete a variety of pre-assessments to gauge their understanding of geography.

The pre-assessments varied from traditional map-reading and place identification questions (typical components of K-12 geography where the focus is on the skills of identify, locate, and recite facts), to writing responses about the relevance of space in things like art, society, their everyday lives, and personal histories. Similar to the respondents in the comedy skits, pre-service teachers performed terribly on the map-reading, place identification, and fact-based questions. Many were able to place the majority of U.S states on a blank map of the United States, but no one was able to even correctly place at least one quarter of countries in the correct location on blank maps of South America, Europe, Africa, and Asia.

While the pre-service teachers did indeed lack this type of geography knowledge, it became clear to me in review of the other parts of the pre-assessment (questions about space in everyday life, art, etc.) was that most demonstrated at least a budding understanding of space and its connection to the social aspects of their lives. For instance, one pre-service

teacher narrated the ways his immigration from Central America to the United States was deeply connected with his gender, race, economic status, level of education, and country of origin. He described the ways these subject positions impacted the level of difficulty he had crossing the border and gaining legal access to residency, post-secondary education, and employment. Another pre-service teacher described the way her hometown in rural Georgia was racially segregated. She narrated her understanding that this segregation affected the economic, social, and cultural prosperity of those who lived in different neighborhoods. Through this story, she described her understanding that where someone lives is deeply connected with the opportunities one receives.

These types of narrations circulated throughout many of the pre-service teachers' pre-assessments and in other initial interactions in the class. The presence of these narrations was similar to the ways that participants in the surveys and interviews expressed varying degrees of latent geography knowledge. It was not that pre-service teachers did not understand geography and the way that it works in and on the world; it was instead that most pre-service teachers did not have the formal language to make these thoughts clear in an academic sense. This lack of experience and language created a border, which fooled many of the pre-service teachers into believing that they were incompetent in geography. In effect, as has been demonstrated in other parts of this dissertation, the problem was not wholly comprised of a lack of geography knowledge, but more so a lack of ability to *recognize* geography in its various manifestations. Thus, I developed these interventions to build critical spatial literacy of students, and as part of that, begin to recognize the presence of geography in spaces beyond the formal classroom.

<center>**Conceptual Frames**</center>

In this section, I introduce the conceptual frames that guide the creation and enactment of the two intervention activities. I first describe how walking has been used in educational contexts to function as a form of pedagogy. I highlight several studies to illustrate that ways that specific types of walking in certain places can prompt participants to new understandings. Then, I introduce Deleuze and Guattari's (1980/1987) concept of *mapping* and demonstrate how an extrapolation of this term can inform forms of walking pedagogy.

Walking as Pedagogy

Walking as a "conscious cultural act" (Solnit, 2001, p. 218) rather than "a means to an end" (p. 218) has documented roots in 18th century Europe. Since then, there are records of artists, poets, philosophers, theorists, and planners using walking as a form of inspiration and provocation (for a broad overview of the history of walking as a cultural act, see Solnit, 2001). Within education, walking has also been studied as a form of pedagogy that incites provocation and inspiration. While there have not been any studies that explicitly connect the action of walking with the definition of critical spatial literacy I previously outlined in Chapter 2, there are several studies from within educational research that connect walking with: the use of spatial thinking and reasoning, the ability to prompt new understandings of (the composition of) space, and reading authorship into spaces. In this section, I delve into three studies that demonstrate how purposeful walking contexts can promote a variety of learning outcomes that can be related to geography teacher education.

Claudia Ruitenberg (2012) conducted a case study that examined the educational possibilities of leading youth on walking tours through familiar neighborhoods. In this particular study, youth completed seven walks with different leaders in one neighborhood of

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Vancouver, British Columbia. Leaders shared neighborhood-specific information about assets in the area ranging from visual art to historical events. Ruitenberg discovered that having the youth in the study follow the same route many times while highlighting concepts from different disciplines added depth and richness to their understandings of space; both within the neighborhood and in general. In addition to helping students gain knowledge about the assets in a neighborhood, she also found that the walks provided youth with an understanding of how they might intervene and participate in public spaces. Ruitenberg showed youth could exercise a type of resistance and claimed what Lefebvre (1968) designated *the right to the city* simply by walking through public spaces, especially those not made specifically for youth. This type of walking that goes beyond necessity (e.g to get to school, or to the bus stop) is what David Pinder (2005) calls *deliberate pedestrian participation* in the city; a type of walking "in order to become aware of the city in which one walks" (Ruitenberg, 2012, p. 270). This type of walking moves beyond routine into "attentive engagement with the city" (p. 270), which in and of itself is a form of intervention and resistance (Pinder, 2005; Ruitenberg, 2012). Ruitenberg argued that participation in public spaces on the "pedestrian level" (p. 269) provided youth with different understandings of place as well as an opportunity to exercise a form of civic engagement. Overall, this case study demonstrated how walking as a pedagogical method need not be confined to exploring new places. Instead, walking through familiar spaces builds an awareness of the presence of the multitude of networks at play in a space. Highlighting specific aspects of a place and layering those ideas along side others can be especially productive in learning about places and acts of citizenship available to youth.

Keith Bassett (2004) explored how undergraduate geography students used a systematized walking activity in Paris, France to learn about and interact with urban structure

and planning. In preparation, Basset situated the activity within the history of dérives and other forms of "critical and aesthetic" (p. 398) walks. He separated students into groups and assigned each group a different neighborhood of the city. Each group then used specific prompts to guide their movements through their assigned neighborhood. Students recorded their experiences using audio recordings and photography. Bassett found that the walking activity allowed students to translate "theoretical ideas into practical strategies on the ground" (p. 408). For example, students had previously learned about how different spaces can be gendered through course readings and lectures. Through their walking activity, groups were able to delve into the makings of a city space and look for "visual and other clues" (p. 407) that made spaces more or less welcoming to women. They came to these understandings by considering not only from what they saw on the street, but the ways that different members of the groups (all groups were mixed gender) chose routes and movement strategies, as well as how the different people in the groups responded or felt about certain places. Ultimately, this type of experience of walking in the city gave students a strong foundation "to criticize and comment" (p. 408) upon theoretical ideas they had previously explored in written texts, such as the gendered nature of spaces. Bassett noted that walking provided the opportunity for students to link real-life instances of phenomena with textual sources. Further, he noted that participation in this type of walking activity through Paris served as a way of "raising consciousness of urban places" (p. 408) and prompted students to consider the intentionality of planning and how this planning impacts people's negotiations and experiences in a space. He specifically noted that this walking activity provided his class the opportunity to think about how a city is read and understood, and also how that city and the spaces within it can be represented cartographically. Thinking about how a city is represented is important because "all maps embody their authors'

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perspectives, assumptions, and biases" (Segall, 2003; see also: Monmonier, 1991). Knowing this about maps is an important part of spatial literacy; particularly when negotiating the connections between representations and movement on the ground.

From the realm of art education scholarship, Rita Irwin (2006) describes how she used walking as a form of self-investigation, and invites others to partake in learning of self through the form of a walking pedagogy built of the concept of a currere (Grumet & Pinar, 1976). Walking, for Irwin, is "a steady heuristic action offering spiritual, sensory, and perceptual awareness to everyday experiences" (Irwin, 2006, p. 77). This awareness, she argues, is a type of "active pedagogy of self" (p. 75), which affords one the ability to intentionally experience, perceive, and receive sensations related to freedom, transformation, and flow in their everyday travels and movement. Irwin provides an example from her own experiences to demonstrate this idea. For Irwin, a walk across campus on an autumn day resulted in an interaction with the beauty of a changing maple tree. This interaction - where the tree caused her pause, to which she decided to photograph it - helped her to open up her "imaginative potential to understand the complexity of curriculum and to care for [herself] aesthetically and spiritually as [she] fully engage[d] her senses in experiencing the excursions and recursions of currere" (p. 79). This interaction and the resulting photographs (things that could be understood as both mundane and everyday) actually prompted her to new works in research, photography, and painting. Irwin presents this form of self-study and experience to demonstrate how a walking pedagogy might illuminate the connection between our everyday experiences and insight into self and our connections in and with the world. This type of introspection, and understanding between self and world Irwin considers particularly important because the self, especially that of an educator is often "neglected" (p. 75) in order to "focus their care on others" (p. 75).

Each of these studies provides insight into how walks, specifically in the ways they are structured, can allow participants to read authorship in the different aspects of spaces while moving through them. Across these works, it is clear that there is a connection between using walking as a mode of recognizing theories and concepts at work in the movement in everyday life – a key component of beginning to recognize authorship in spaces. Walking in these studies seems to have the ability to prompt new understandings, and to build awareness to the types of networks present in spaces. Even though none of these articles specifically use the term spatial literacy to define the goal or outcome of their walking activities, I find that each one, in its own way, helped participants further develop their own mobilities-focused spatial literacy by thinking about the construction and authorship of spaces, and in turn, the types of mobilities available within the spaces. For Ruitenberg (2012), it was the highlighting of different community assets and physical structures while walking with participants that allowed them to see the ways spaces were often authored in ways that implicitly discouraged youth from political or civic engagement in public spaces. In Bassett's (2006) study, it was the way students gained awareness of authorship in space by actively looking for the connections between the decisions urban planners made in certain neighborhoods, and the resulting lived experiences by those on the ground in those spaces. With Irwin (2006), it was the acknowledgement and demonstration through self-study that everyone, in their own travels, is actively involved in the authoring of certain spaces through movement and actively considering one's interior and exterior lives. I use these studies as a departure to think about the construction of spaces and how those spaces are recognized and experienced by students in my own class who participated in these interventions.

Mapping as a Theoretical Concept

A map, for Deleuze and Guattari (1980/1987), is not a stable, fixed representation of a place like that of a paper map, but is instead a type of diagram that is productive, performative, in flux, and has multiple entryways. Most simply, this type of map can be understood as a "set of interacting lines" (Deleuze, 1995, p. 33). It may be "drawn on a wall, conceived of as a work of art, constructed as a political action or as a meditation" (Deleuze & Guattari, 1980/1987, p. 12). This means that a map does not have to take on the form of how one might conceive of a map, nor does it even have to exist physically. As the quote above indicates, a map can be another type of text (e.g.: a photograph, writing), a conversation, an encounter, and even all of these things together. Deleuzoguattarian mapping does not aim to represent places like a traditional map might, but instead functions as an invitation to think differently about something. In other words, these maps do not chart what is, but instead play with what might be. When making a Deleuzoguattarian map, one considers the discursive, material, and social relations and formations to create "possible realities" (p. 12). Mapping in this sense then, presents the opportunity to chart and test the boundaries of thoughts and practices in various spaces, and in turn, "produce new kinds of social practices" (Watson, 2009, p. 11).

Maps invoke Deleuze and Guattari's *logic of and* which is prevalent throughout their body of work. This logic illustrates how places, processes, and other entities are not just "this" or "that" but can instead be many things at once. The multiple nature of the map places it in opposition to what Deleuze and Guattari (1980/1987) call a tracing, something akin to a traditional map, which aims to organize, stabilize, and neutralize. Tracings always "come back to the same" (p. 13) whereas maps are "oriented toward an experimentation in contact with the real" (p. 12) and are "open and connectible in all of its dimensions" (p. 12).

Martin and Kamberelis (2013) explain that tracings are fixed and stable representations of what something or somewhere is perceived to be. Conversely, maps are concerned with transformation and change, not the static (Watson, 2009). Actually, maps must always change over time and should be "subject to constant modification" (Guattari 1979, p. 17). This is because these mappings are "never meant to be read as still images, but as momentary snapshots" (Watson, 2009, p. 11). This is an important point that reiterates the constant flux and change present in all spaces, processes, and entities that one interacts with in the world. This is similar to how mobilities theorists understand spaces; never as stable entities, but as systems of networks that are continually in flux.

Even though tracings focus on what is perceived to be, and Deleuzoguattarian maps chart what might become, Martin and Kamberelis (2013) explain that tracings should be placed on the map to reveal "the dominant discursive and material forces at play" (p. 671) as well as those "forces that have been elided, marginalized or ignored altogether and forces that might have the power to transform or reconfigure reality in various ways" (p. 671). In other words, maps must contain the static conceptions of tracings to become exploratory in their existence. Deleuze and Guattari's (1980/1987) ideas about mapping do not get rid of traditional maps as we know them because the tracings are always put back on the map. Instead, these traditional maps and tracings become part of a larger mapping project that seeks to accommodate the flux and possibility that exist in every context. Simply, mapping and tracing work together in tandem. Through this combination, mapping provides an opportunity to see and understand space at work. Maps in this sense are *invitations* (rather than representations) that allow us to access and discuss understandings and ways of thinking about issues we face in our daily lives.

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Mapping as Pedagogy

Mapping does not simply function as a theoretical concept; its ideas can be extended in conceiving of a type of pedagogy that allows for a thinking about and with geography. Mapping, and its orientation towards experimentation, investigation, and modification, provides inspiration for an active pedagogy that functions to create learning encounters as well as build knowledge. Bonta (2013), in his discussion of Deleuzean-inspired education, explains the difference between learning and knowledge. Learning, he argues, should be conceived of as an explorative and collaborative activity "undertaken as a partnership of equals" (p. 61) between student and teacher, while knowledge "signifies the memorization of facts and technical abilities relayed from an authoritative source" (p. 61). In this sense, learning and knowledge can be equated to mapping and tracing respectively; they do not function in isolation of each other, one is always informing and infusing the content of the other. While these ideas work in tandem, the focus should always be on learning/mapping because of its active and explorative nature, versus that of knowledge/tracing, which just reiterate things already understood as well as rote skills.

Therefore, a type of pedagogy built out of the concept of mapping both prompts encounters that promote learning (e.g.: exploring geographic concepts in the real world) while simultaneously building and refining knowledge (e.g.: learning how to extract geographic coordinates from the metadata of a photograph for GIS mapping purposes). This might sound similar to experiential learning, but a Deleuzean/Deleuzoguattarian approach extends these ideas by equating learning as a strategic encounter with the other. In this encounter, the learner is met with signs and must form some type of response (Bogue, 2013). As such, the teacher - or what Bogue (2013) calls the "master-apprentice" (p. 22) because of their role as both student and teacher - creates the conditions upon which

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learning and the use of knowledge can occur in tandem. In this way, spaces, and the curation of them, become important to consider as pedagogical foci. Paired with this, is what understandings of mobilities theories offer in terms of identifying the systems present in spaces and how those spaces, and the systems and networks that comprise them, are continually in flux.

A mapping pedagogy embraces ambiguity present in Deleuze and Guattari's (1980/1987) *logic of and*, where things are not simply right or wrong, but potentially many things at once. This idea is important in the teaching of both geography and social studies at large. Historical events, cartographic representations of space, and political processes should not be defined as right or wrong, but instead, must be understood as complex and fluctuating systems, that can be thought about, gazed upon, and participated in from a multitude of perspectives and orientations. While geography education is often equated with place naming, a robust geography education centered on developing critical spatial literacy prepares students for being critically-oriented citizens. Mapping pedagogy, through its connection to both learning and knowledge, allows student skills and knowledge to be put to use (thinking with geography), while also learning about the ways in which the processes of the world affect our the spaces of our day-to-day lives, as well as how our day-to-day lives affect the spaces of world (thinking about geography).

Ultimately, mapping pedagogy provides the *tools* to experiment, produce, and interrogate new ideas across contexts, disciplines, and spaces. This is similar to how some of the best teachers teach. They help students construct and mobilize their own toolkit to make sense of the world, instead of providing a list of instructions. This relates to Massumi's (1987) thinking on Deleuze and Guattari's (1980/1987) use of inventive concepts, including mapping. Massumi writes that for Deleuze and Guattari, their concepts function as bricks

that "can be used to build the courthouse of reason" (p. xiii) or "thrown through the window" (p. xiii). In the context of mapping pedagogy, students and teachers might use the same materials, or bricks (readings, photographs, and walking) to build their own understandings and interpretations; understandings and interpretations that might look very different student to student. In short, mapping pedagogy helps us understand that we do not necessarily need *new* tools to make changes in geography teacher education as *The Road Map* and other literature in geography teacher education might insist. Instead, we may simply need to use our available tools or bricks, in different ways, ways that map new possibilities for enacting geography education that teaches about and with geography.

Walking and Mapping Pedagogies as Intervention

This section puts the theories and concepts described above into action. I demonstrate how pre-service teachers in the class participated in two different walking activities aimed at prompting a thinking *about* and *with* geography. The first intervention is the mapping pedagogy activity where pre-service teachers combined photography, a neighborhood walking tour, a webmapping activity, and discussion to learn about a set of urban geography concepts. The second intervention described is a dérive that asked pre-service teachers in the course to follow a series of prompts as they walked through the space of the university campus.

Enacting a Mapping Pedagogy Activity

In the intervention that used mapping pedagogy, pre-service teachers used reading, photography, traditional mapping, and a neighborhood tour to engage in both Deleuzoguattarian tracing and mapping. The goal was to learn about geography concepts (a type of mapping) while simultaneously using/further developing knowledge and skills related

to geography (a type of tracing). The mapping undertaken throughout the assignment is multifaceted and layered and occurred at different scales.
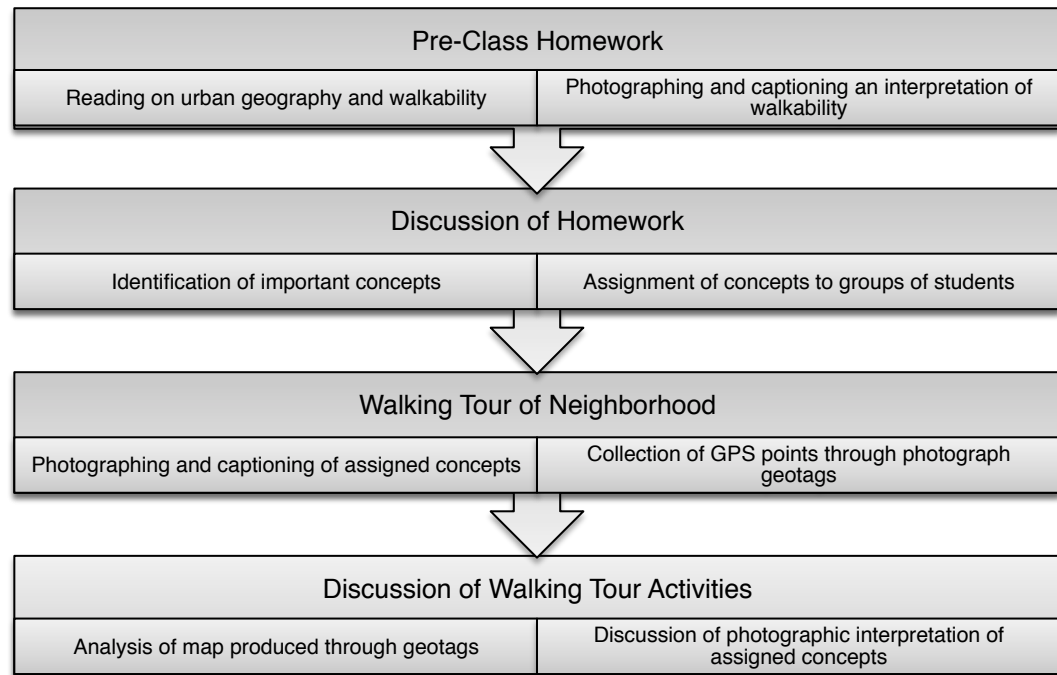
Pre-Class Homework	
Reading on urban geography and walkability	Photographing and captioning an interpretation of walkability

Discussion of Homework	
Identification of important concepts	Assignment of concepts to groups of students

Walking Tour of Neighborhood	
Photographing and captioning of assigned concepts	Collection of GPS points through photograph geotags

Discussion of Walking Tour Activities	
Analysis of map produced through geotags	Discussion of photographic interpretation of assigned concepts

Figure 21: The step-by-step process of mapping pedagogy used in the Teaching Geography course.

Pre-class homework. In preparation for this assignment, pre-service teachers read several chapters from Jeff Speck's (2012) book, *Walkable City: How Downtown Can Save America, One Step at a Time.* This was part of the initial teaching *about* geography because the text introduces ideas about urban planning and how mobility within a city (transportation, walkability, bikability) impacts the way people exist in and experience a place; components of the formal curriculum in secondary A.P Human Geography and World Geography. Speck's analysis provides an accessible baseline introduction to new and complex geographic concepts. The pre-service teachers were asked to focus specifically on Speck's (2012) required factors for walkability. Speck argues that for people to want to walk, a walking route must be useful, safe, comfortable, and interesting. Further, he stresses that the walking route ideally passes through mixed-use areas where there are both residential and

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commercial zones. These concepts from the reading served as a framework (or what might also be considered the tracing) that provided a baseline for the exploratory and experimental aspects of the assignment (mapping).

Following the reading and concept identification, pre-service teachers partook in a variation of a photomission (Castro, 2012). First, pre-service teachers were tasked with finding a concept related to walkability within the scope of their daily lives. Next, they had to compose a photograph that could be representative of the concept. Photomissions are directly related to the Deleuzoguattarian ideas of mapping and tracing in that they invoke Castro's (2007, 2012) concept of *constraints that enable*. Constraints that enable "provide enough structure to be recognizable and provide sufficient focus while also providing enough disorganization or chaos to provoke new possibilities within complex systems" (Castro, 2012, p. 156). In this way, constraints can be understood as the tracings that provide the structure upon which the experimental nature of the map (or in this case, the pre-service teachers' photographs) can be produced. Pre-service teachers were constrained by the prompt that asked them to take a photograph of something or somewhere they felt represented walkability based upon what they had read, yet this constraint enabled them to both investigate and think deeply about their daily interactions with walkability; a thinking *with* geography.

Through the concept identification in the reading (tracing), and the photographing (mapping) in the photomission, pre-service teachers created a cumulative class map. These photographs created a map in both the Deleuzoguattarian and traditional sense for several reasons. First, experimenting with understandings in the act of photographing in that it asks pre-service teachers to question and explore how they and their peers think about and represent their ideas. This allows for new social practices to potentially emerge (e.g., learning

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from a peer of how to take a more aesthetically-pleasing photo), while also demonstrating the multiplicity of ways someone might interpret and represent an idea. Second, all photographs taken during this part of the assignment were done some with mobile devices with enabled location services. As such, the photographs' digital metadata contained geographic coordinates that could be plotted using a geographic information system. In our case, we used Flickr® to both house and map the photographs, which allowed us to produce a traditional-looking map that simultaneously included the fluctuating nature of a Deleuzoguattarian map (see Figure 22). Third, while pre-service teachers were in the process of completing the assignment, the map was constantly modified as pre-service teachers uploaded, edited, and added captions to their photographs; taking on the persona of a Deleuzoguattarian map that is open, connectible, and continually in flux.

Discussion of Homework, and Walking Tour. The class met outside a historic building in one of the local neighborhoods near the university – one that I had identified as walkable according to Speck's (2012) parameters. At this time, pre-service teachers discussed their findings from the reading and qualified their understandings with both me and other members of the class. This discussion could be considered both a form of mapping and tracing in that pre-service teachers could have reaffirmed and stabilized their understandings (tracing) or potentially altered them through interaction with others and their ideas (mapping). It also serves as another example in which pre-service teachers though about and with geography.

As a group, we then identified the critical components from the reading, the photographs, and important elements of a walkable space. The class identified that the concepts of usefulness, safety, comfort, interest, and mixed-use zones were the most important to walkability. Pre-service teachers also argued that the idea of access was

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important. While access was not explicitly named in the reading, pre-service teachers felt Speck (2012) alluded to access without explicitly naming it. As such, they thought that this concept was relevant to what made an area walkable or not. Further, pre-service teachers discussed and that idea that the demographics of an area was also important when considering walkability. I understand the request for these additional concepts as a form of mapping in that pre-service teachers connected and extended what they had read to experiences and knowledge they had built in their everyday lives. At this point, small groups of pre-service teachers were assigned a concept (usefulness, safety, comfort, interest, mixed-use, access, or demographics) and were tasked with taking photographs of the concepts as they saw them during the walk; essentially a class photomission.

As we walked through the neighborhood, pre-service teachers s completed their group photomissions while I introduced them to various aspects of the neighborhood. I highlighted geographic content related to both walkability and *Geography for Life National Geography Standards, Second Edition* (Heffron & Downs, 2012) which I would consider a type of tracing. For example, we discussed how the historical aspects and use of the local land impacted the proximity of houses, the width of streets, and the style of buildings. This discussion was prompted by and connected to the *Geography for Life* Standards 17 and 18: How to apply geography to interpret the past; and How to apply geography to interpret the present and plan for the future. In relation to these standards, TCs were surprised to learn that the wide boulevard that dominated the area was that width because the neighborhood had once been home to a streetcar that transported residents between the local factory where many worked, their homes, and the downtown where many of the shops and services were once located.

In addition to discussing the historical impact on the neighborhood's geography, I also introduced pre-service teachers to the current demographic figures (another type of tracing), which is related to *Geography for Life* Standard 9: The characteristics, distribution, and migration of human populations on Earth's surface. We examined how these demographic factors were connected to the space of the neighborhood and the ways in which these ideas were related to walkability. Providing pre-service teachers with greater context of the space we explored allowed them to make sense of their assigned concept at play in the real world and also provided information that structured our debriefing of the walking tour (a type of mapping).

Discussion of walking tour activities. Once the class had explored the neighborhood, found concepts as they saw them in real life, took photographs, and uploaded them to our Flickr group, we had a large photographic data set and an interesting map that displayed real life evidence of the geographic concepts from the reading; further evidence of pre-service teachers simultaneously thinking about and with geography. The data set was rich in several ways: first because it contained point data that the geotags generated through the taking of photographs (a type of tracing), and secondly, it was a collection of aesthetic images that represented pre-service teachers' understandings of concepts in space as well as their narration of these concepts (mapping). When we returned to the classroom for analysis of the photographs and the Flickr map (Figure 22), pre-service teachers had another opportunity to think with mapping. Through viewing the Flickr map of their photographs, the class interpreted the spatial connections between the different concepts and where they occurred and how different people in the class interpreted the same (or different) concepts in the same space (again, instances of thinking with and about geography). In the final portion of the intervention activity, small groups of 5-6 students, pre-service teachers

discussed where and why their assigned concepts were photographed, identified clusters of photographs, and viewed our walking route through the trail of photographs.

Figure 22: A dynamic webmap made by geotagged photographs taken by pre-service teachers

Enacting a Dérive

A dérive is a purposeful walk that aims to elude typical movement (e.g. on a human made path that connects one location to another destination) by providing walkers with a set of prompts, rules, or protocol. For example, walkers could agree to take their first left, third right, and second left for the span of one hour, or even simply seek things of beauty within a certain city or neighborhood for the span of a day. Those participating in the dérive might then engage in conversation, writing, artistic practice, or even nothing after completion. There is not one right way to complete a dérive; the goal is simply to walk in ways that resist imposed patterns of familiarity (Debord, 1969; O'Rourke, 2013). These activities, no matter what their protocol, can be put in opposition to walking in familiar places along familiar

paths. Walking in familiar patterns, while often safe, useful, and efficient, allows people to

maintain a "selective gaze" (O'Rourke, 2013, p. 5) that makes it easy for someone to only see

what they expect to see. Dérives, on the other hand, rewire an individual's perceptions by

forcing them to move through a space in ways that are not typical or familiar to them

(O'Rourke, 2013). Often, the walk undertaken on a dérive follows a set of rules and

prompts for a predetermined amount of time. The resultant non-intuitive movement allows

for a "detachment" (p. 5) that permits individuals to see old, familiar spaces anew and

critically engage and analyze components of the space. This detachment that pre-service

teachers might not otherwise encounter can prompt keen engagements with the composition

of a space, like how Grumet (2009) writes about the importance of creating distance to

understand and see theory at work. For these reasons, dérives are often regarded as a "tool"

(p. 13) that can teach individuals about spaces (O'Rourke, 2013) and I argue, the authorship

therein; an essential component of building critical spatial literacy.

The dérive in this study took place in the final week of class. At this point in the

semester, pre-service teachers had worked with geographic concepts in classroom, online,

and community settings. In all of these spaces, they mobilized formal geography content

found in theoretical writing and content standards from the *Geography for Life National

Standards,* the *Georgia Performance Standards* related to geography (Social studies for K-7 and

World Geography offered in Grade 11)*,* as well as the *AP Human Geography Standards,* to the

spaces outside of the classroom. In addition to engaging in the first intervention activity, the

class also, for example, watched an episode of Anthony Bourdain's (2013) *Parts Unknown*

where Bourdain visits Myanmar. Students critically watched this episode using a set of

prompts I provided and looked for evidence of globalization in Bourdain's narration and

video of his travels and interactions in the Southeast Asian country. Students mobilize the

content of what they saw, read, and heard in the episode about globalization with what we had read about in an article on globalization in *The Atlantic* written by Richard Florida (2015), portions of Steger's (2003) *Globalization: A Very Short Introduction*, as well as standards on globalization in both the *Georgia Performance Standards* and the *National Geography Standards Index.* Given these types of experiences throughout the semester, I felt the class was primed to participate in a dérive that would ask them to walk around a familiar place in unfamiliar ways, in search of new spatial understandings of a place that was not new to anyone enrolled in the course. I hoped that through this activity, the class could move beyond their selective gaze to critically observe the space of campus and the geographic concepts and networks therein to think about the geography present in the space. I imagined that this thinking *about* geography would occur in tandem with their use of thinking *with* geography concepts and skills we had focused on through the semester.

To engage in this class dérive, student pairs and small groups used the browser-based application on the website Dérive App to guide 45-minutes of walking around our university campus. When a user accesses the website and clicks *Start a Regular Dérive* on the website's homepage, Dérive App sends a digital prompt to the user's mobile device. For example, a prompt might read: "Identify a group of people. Walk towards them and loiter around for a bit," or, " Follow something white." There are hundreds of prompt cards that users can access. Many of the prompts are vague or ambiguous, and as such, encourage interpretation and creativity on the part of the participant. This ambiguity, as well as the randomness of the cards, ensures that every dérive is unique to the individual users.

While students were away enacting their pair/group dérives, I remained at the starting point and followed their movements by viewing and refreshing our class Flickr page. From there, I could see what pictures, captions, and short videos students in the class were

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uploading as they completed the dérive. When the 45 minutes were over, students returned to the starting place and drew their routes on a printed campus map. Through these maps, I was able to see where the dérive had taken students and in some cases, with certain annotations, what students had done in those places. Once everyone returned to the starting point and had completed their map annotations, the class had a discussion about the experience of the activity.

Data and Methods of Analysis

Given that pre-service teachers embarked on both of these intervention activities in pairs or small groups and that I was not present for the entirety of their individual journeys, I asked them to take geotagged photographs and/or videos (that could then be used to create a GIS map), write captions of their photographs/videos, and upload their photographs/videos and respective captions to a class Flickr page. At the end of the dérive, each pair or group charted their path on a printed map of campus so that I could see where they had traveled. A similar map was created through the mapping pedagogy activity in which geotagged photographs were used to create a GIS map on Flickr that demonstrated where all of the photographs were taken during the activity. This data provided insight into the types of movement individuals and groups made as well as their interpretations and representations of various moments that occurred during the two activities. I also asked one pre-service teacher to wear a GoPro so that I may have a glimpse at the types of conversations, movements, and experiences her pair had during the dérive. I also recorded personal notes before, during, and after the activities – some in written form, and others as voice memos.

In review of the data, I looked for instances that could be demonstrative of moments when pre-service teachers were both thinking about and with geography. What I found in

these moments were cases of pre-service teachers exercising and/or developing forms of critical spatial literacy, e.g.: using spatial thinking and reasoning, questioning the composition of spaces and their connection to (potential) movement, and experiencing the connection between the authorship/composition of spaces, potential movement, and subjectivity. Evidence of these different actions and experiences were important because it not only allowed me to see how/if/when pre-service teachers were using critical spatial literacy skills and knowledge, but they also provided a glimpse at students moving beyond the "selective gaze" (O'Rourke, 2013, p. 5) of their familiar movement patterns on campus and on the neighborhood walk. Getting beyond a selective gaze is important, especially in educational contexts, because it prompts people to observe the space around them in critical and engaged ways; an important component of developing and enacting a critical spatial literacy. This can be put in opposition to routine movement in and through a space where it is not uncommon for someone to simply see what they expect to see (O'Rourke, 2013).

Findings

By teaching about and with geography in this space of geography teacher education, pre-service teachers had the opportunity exercise and further develop their critical spatial literacy. Participation in the mapping pedagogy and dérive activities that involved thinking about and with geography led to the following:

(1) Pre-service teachers used spatial thinking and spatial reasoning

(2) Preservice teachers recognized the connection between spaces and movement

(3) Preservice teachers experienced the connection between movement, subjectivity, and the authorship of spaces

In the subsections that follow, I highlight moments from both of the intervention activities that demonstrate the ways that pre-service teachers did (and did not) engage in the three intertwined facets of critical spatial literacy.

(1) Pre-Service Teachers Used Spatial Thinking & Spatial Reasoning

In the completion of the two intervention activities, pre-service teachers engaged various forms of spatial thinking and spatial reasoning. This included a number of moments where pre-service teachers were prompted to think *about* and *with* space as they walked through campus during the dérive and in the local neighborhood for the mapping pedagogy activity. In this section, I highlight four features that demonstrate how pre-service teachers exercised spatial thinking and spatial reasoning through: mapping routes during the dérive, reorienting themselves after becoming turned-around because of the dérive's prompts, finding curricular concepts in out of classroom spaces, as well as recognizing and interpreting the authorship of spaces during the neighborhood tour.

Mapping routes during the dérive is an exercise in spatial thinking and reasoning. Spatial thinking and spatial reasoning together constitute traditional understandings of spatial literacy (Bednarz & Kemp, 2011). Spatial thinking is about identifying, explaining, and finding meaning in spatial concepts, patterns, and relationships. As such spatial thinking and reasoning involves tasks like way-finding, as well as recognizing geographic concepts in the spaces in which they occur in the world. These tasks might be done through simple observation, by interpreting and constructing representations like a map, or in the case of these interventions taking photographs, and writing captions. In both of the intervention activities, pre-service teachers utilized both spatial thinking and reasoning to complete the task(s) at hand.

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The most explicit examples of pre-service teachers using spatial thinking and spatial reasoning occurred during the dérive activity, particularly because it gave pre-service teachers practice in connecting their own movements to a map. Pre-service teachers acknowledged that moving along new routes as prompted by the dérive forced them to not just go on autopilot, but to also instead consider things like the cardinal direction in which they walked, and how that route would be later be marked down on a map. This type of response speaks back to O'Rourke's (2013) claim that walking in unfamiliar patterns allows for an engaged orientation to movement and helps participants get beyond their selective gaze. Pre-service teachers remarked at how much more difficult mapping was than they had anticipated it would be. It was not only recalling where they had been that students found to be difficult, it was then knowing which way they actually had moved in reference to the map. This event speaks to several of the components I discussed previously related to spatial literacy.

For instance, students had the opportunity to practice spatial thinking skills related to thinking *about* space like navigation, map reading, and map making. Figure 23 is an example of a type of map that students created upon completion of the dérive.
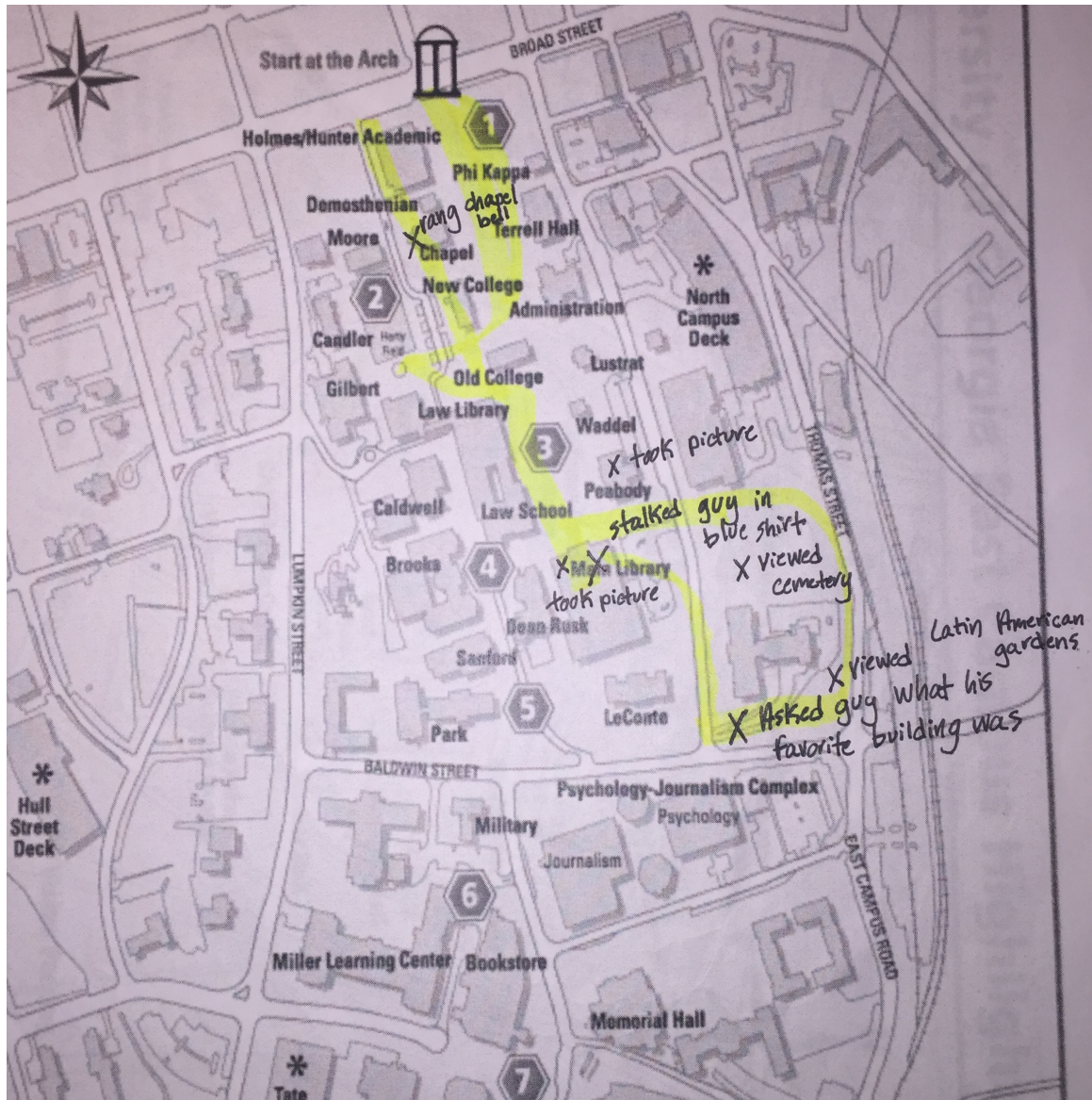
Figure 23: A hand annotated map completed by a pair of pre-service teachers upon completion of the dérive.

The only prompt that students were given in this part of the in-class activity, was to make a map that depicted their experience on the dérive. This particular group whose map is featured in Figure 23, marked their route on the map indicated by the solid black line and chose to represent certain moments of their dérive with an asterisk. Given the context of the map creation and knowledge of the types of prompt given by Dérive App, I believe those asterisks mark where the pre-service teachers followed certain prompts. For these

events to make it on to the map, we are given insight into the important moments that pre-service teachers experienced in the dérive that were memorable enough to include on their authored map. This type of map annotation is a practice in spatial thinking because it forced the student to recall their movements around campus and mark those movements on a piece of paper. Researchers have noted that this type of recall and representation requires a certain type of knowledge and orientation (Bednarz & Kemp, 2011).

The dérive is disorienting: New routes and new perspectives. Beyond the map annotation seen in the example in Figure 23, this type thinking about space was also evidenced with the pair of pre-service teachers who wore the GoPro. In the video footage, Kenzie and Jolene discussed how they seldom, if ever, walked around campus without a specific route or destination in mind. The application prompted a different sort of purpose for their movements; movements that were not about getting from one place to another, but instead about exploring a space in a new way as a requirement for a class. They could not plan ahead and did not know what was coming next. Uncertainty in walking route was something Kenzie and Jolene experienced while on their dérive. The pair was temporarily turned around on campus at one point; something was as evidenced through the verbal exchange noted below.

After following a prompt that asked them to "walk towards the nearest tall building," Jolene and Kenzie arrived at the campus chapel, an iconic building on campus. At this point, they "found" themselves. Seeing the chapel in a place that they had not expected prompted they to have the following exchange:

Kenzie: *(looking at the chapel)* Huh! I don't usually come at it from this way!

Jolene: Has this always been *here*?

These types of utterances, where the familiar was seen in new ways echoes O'Rourke's (2013) findings that dérives had the ability to provide walkers with a new perspective even on the most familiar of spaces; a way to get beyond what she calls a "selective gaze" (p. 5) that is often coupled with moving through familiar places and only seeing what one expects to see. Because Kenzie and Jolene's normal travel through campus served a specific purpose along a specific, they found that they had to reorient themselves and their navigation through the campus because their movements were at the mercy of application. In addition to the quote above, this is evidenced by a remark made by Kenzie in reference to Jolene's question of the building's location. In reference to the rope that hangs down that students pull to ring the chapel bell (often in celebration) Kenzie asked: "has it always looked like that?". The pair did not come along their normal route to see this building, and in turn, were able to see the building and parts of the building (i.e. the bell rope) in a new light; a light in which they did not completely recognize it.

At another point in their dérive, when given the prompt "Walk southwards. Find evidence of a recent encounter," Kenzie said to Jolene, "South is which way?" They both spun around in a circle, and paused for a moment. Jolene then said after looking at her paper map (Figure 24), "I think South would be any way that way, right?" What is interesting though, and a definite limitation of the independent nature of this activity, is that the pair actually traveled westward after this prompt without ever turning south. Without someone or a tool (e.g. a compass, or a compass application on their smartphones) to correct their reading of direction, Kenzie and Jolene unknowingly traveled in a direction that was not south. If we look at Figure 24, it is possible to interpret the types of infrastructure in the space of this moment that might have had an impact on the Kenzie and Jolene's chosen movement in a non-southerly direction. Take for instance the posts and chains

present on the threshold between the grass and the paved walkway. The presence of these items implies a certain type of rule in this space – one that says, "Do not walk on the grass. Stay on the paved path." While someone could easily step over these low-hanging chains, they are not necessarily meant to keep someone off the grass by restricting access, but simply by suggesting they take another path. These chains and posts may have directed Kenzie and Jolene's walking to stay on the paved paths. The chains and posts, as well as the actual presence of paved paths tell those present in the space where to walk and the follow the paths. We can also see that the path at the base of the stairs runs east/west, while an offshoot of the main paths runs in a northwest/southeast direction.

From where Kenzie and Jolene stood, there was no infrastructure that would have allowed them to easily follow their prompt to walk south. For the pair to travel south, they would have had to first travel in another direction before reaching another segment of path that ran north/south. As I watched footage of their dérive, I expected them to move either east or west first so that they could eventually turn south. Yet, they never did. They continued along the path that ran due west. Although Kenzie and Jolene discussed which way was south, and also referenced the map, they still did not travel in a southerly direction. While it does not exactly *matter* that they did not walk south, it is still important to note that their knowledge of cardinal directions, at least in this context, was at best limited, and at worst, simply wrong, or perhaps misdirected by the implicit rules of the infrastructure in the space (paved paths, posts, and chains).

In the future, I would consider incorporating more activities in a course like this that touch on developing geographic skills like knowledge of directions and navigation using them. Better basic geographic skills help someone become more spatially literate in the traditional sense (Bednarz & Kemp, 2011). It was certainly an oversight on my part to

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assume that students would have solid knowledge of their directions, particularly in a place that was familiar to them and with the assistance of a map. In this way, the activity helped *me* see a familiar space in an unfamiliar way as well. One in which I assumed that most people familiar to the space, and insiders within it, would have a solid knowledge of which directions is which; particularly with the assistance of map upon which a compass is drawn.

By seeing a student's perspective in this activity, I was able to better understand the types of "real world" understandings pre-service teachers have of geography as well as spatial thinking and reasoning. This lack of knowledge should not have been surprising to me; particularly in a world where many use Google Maps and other applications to travel almost anywhere. Nonetheless, to hear Kenzie and Jolene have this exchange and then travel in the wrong direction completely was unexpected.
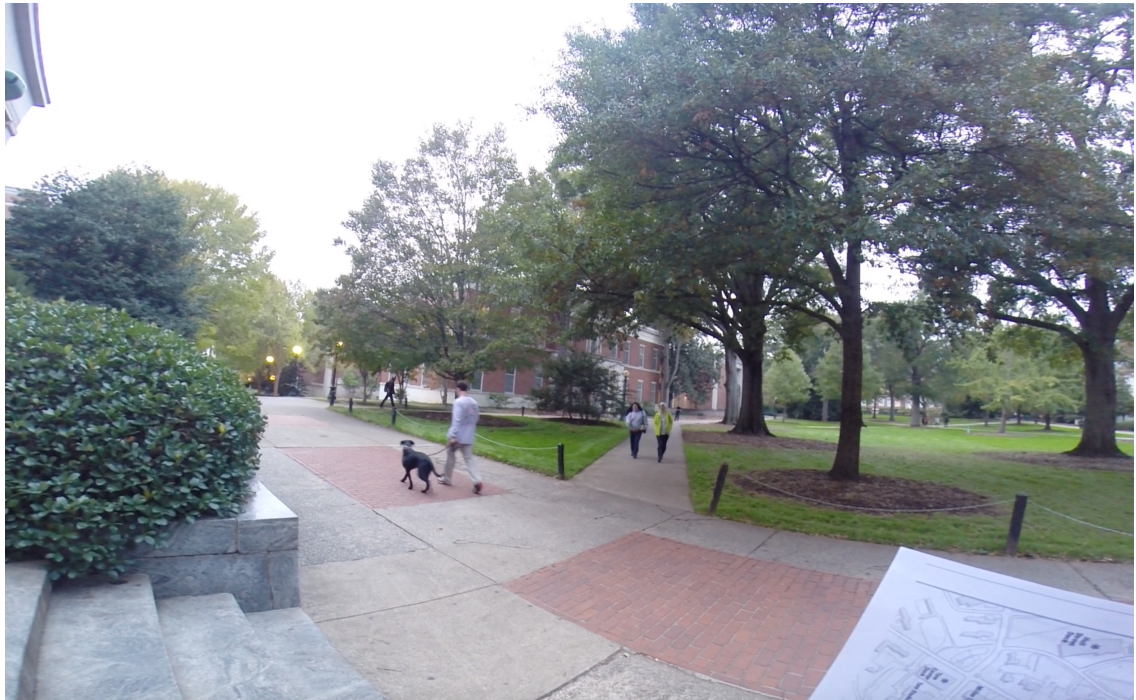

Figure 24: Kenzie and Jolene examine their paper map.

Finding curricular concepts and questions in the space of the dérive. While a

dérive, at least in this context, might not necessarily be a good method for developing

explicit navigation skills, it was successful in building other components of spatial literacy.

In particular, the dérive offered pre-service teachers the opportunity to think *with* space by

identifying geographic concepts in real life. For example, Elliott took a photograph of a

statue of the founder of the university. His caption read: "Abraham Baldwin – founder of

[the university], when the school was all male." Later, in the class debrief when asked to

discuss the types of geographic concepts they noticed during the dérive, Elliott described

how he felt this statue was related to issues of gender and space because of the university

only enrolled men while the man feature in the statue was president. He also shared how he

"stumbled upon" the statue by way of Dérive App's prompts and had not know this part of

the university's history prior to seeing the statue and reading its plaque. In a sense, this

activity, situated as it is within this particular course, made space for Elliott to gain a

(different) view of this statue, and in turn, the university's history, as well as the connections

between spaces and gender. The awareness of these connections is a form of a mobilities-

focused spatial literacy. Elliott was prompted to share questions of spatial authorship by

asking questions about who "gets" a statue and who is remembered and idolized, especially

in a prominent place on campus during our class discussion. These types of questions get at

an awareness of the presence of certain networks in a space. In this case, some of the

present networks that Elliott acknowledged through his comments might have been those

related to gender, lasting historical legacy, and infrastructure, to name a few.
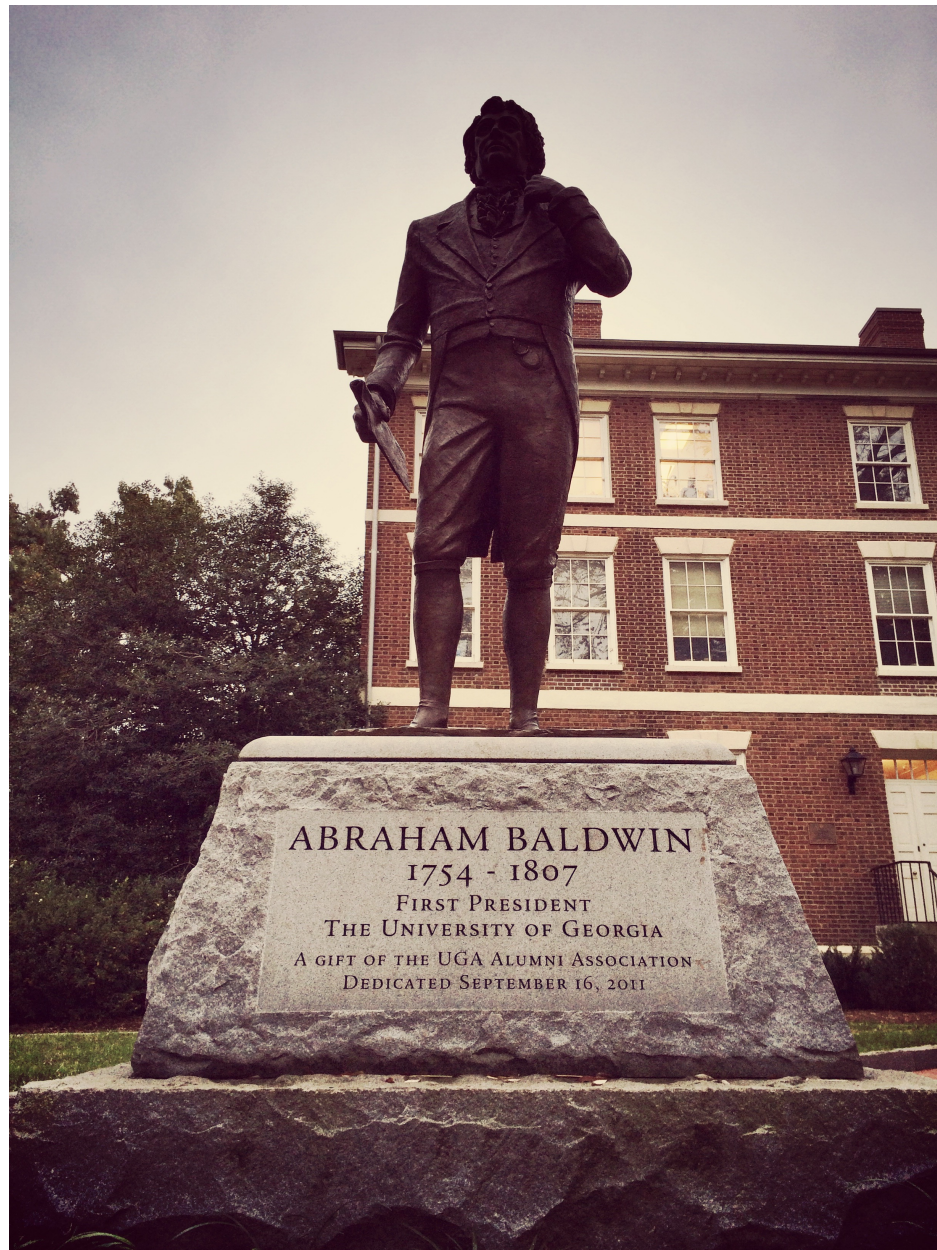
Figure 25: Elliot's photograph depicting gender and space.

Another group of students, Trianna, Tyler, and Christian, found themselves in the student multicultural center by way of Dérive App's prompts. The center, whose ceiling is adorned with flags from all over the world, was a place that this group of students felt was connected to issues of space, race, and migration. They took a photograph of the different flags present in the center (see Figure 26) and captioned it: "International diversity at the [university] – bringing together races from across the world." In the class debrief, the group described the types of movement made possible across borders through international enrollment and how this movement resulted in greater racial diversity than was potentially possible in the past.

The photograph of this center and the students' designation of this center as one that represents race and migration, is indicative of the students' awareness of geographic concepts in the real world, and in turn, the networks present in such a space; networks to globalization, the movement of people across borders, the transportation networks that make these movements possible, and the social ties that create the knowledge of knowing how to enroll in an international university. Additionally, the students mentioned that though they had seen the hall before, participation in the dérive gave them an "excuse" to linger and investigate the space in a different way than they had previously. To me, this excuse is representative of a type of invitation that dérive extended to the students; an invitation to a space where one is prompted them to think more about the university's role in the networks of space, race, and migration present in the spaces of campus.

Figure 26: A photograph of the student multicultural center that Trianna, Tyler, Christian thought was representative of the geographic concepts of race and migration.

Another way to look at the photographs in Figures 25 and 26, and the events surrounding them, is to acknowledge that this noticing (of gender and space, as well as migration, race, and space) occurred when students were asked to move in a particular way, in a particular space, in relationship to a particular assignment. In Figure 25, look at how Elliott chose to portray this statue as representative of gender. In the image, the statue and figure of Abraham Baldwin takes up the upper third of the framing and seems to have a looming presence, one looking down upon the viewer. The statue's face is in the shadow and Elliot has chosen a filter that darkens this shadowing instead of lightening it (any easy adjustment he could have made that would have given a completely different effect to the picture and something that was discussed formally in class because photography was such a major component of the course). We might guess that this choice in filter sets the tone for the type of story that Elliott wants to tell with this photograph, one perhaps of a university's past shrouded in dark times. When I look at this image and read Elliott's connection of this statue as a representation of an understanding of gender and space, I am prompted to questions of access; an important part of mobilities theories because of the ways movement into a space can be restricted, prompted, coerced, or forbidden depending on the type of access of the space. When I see how this statue represents a founder of a school who for many years did not allow the enrolment of women and people of color (as seen through Elliot's caption of the photo as well as the plaque at the bottom of the statue), I think about what the presence of the statue says about this space, and the type of networks embedded in it. Networks related to access and questions of who got to go to the university then, and who gets to go there now? Now, look at the dates on the plaque. Its description tells that it was donated within the past five years and as part of the alumni association. As such, we might infer that this founder, his principles, and his legacy are something still valued by

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attendees of the school. A statue of this person is a choice and plays into the type of space the university and the alumni association wishes to create on this part of campus.

Now consider the image in Figure 26. The photograph shows close to 100 flags that are representations of countries from all over the world. When I look at this image I am prompted to think about the types of movement that must occur for students from these countries (both far and near) to matriculate at the university. These flags are indicative not only of flows and networks of people, but also of capital (e.g. tuition dollars from home countries, remissions sent to families); technology (e.g.), and transportation (e.g. the networks in place that allow students to travel between university and home easily and potentially on numerous occasions throughout the year, no matter where "home" might be located). All of these networks are situated within the space of the United States and the networks that comprise the space of this nation. The upper right-hand corner of this photograph serves as that reminder. If you closely to the last row of flags, there is a flag that hangs lowers than the rest with red horizontal stripes. This is an American flag, and although it is at the back of the picture, it is still visible and recognizable because it is larger than all of the other flags in this image.

In the two groups' images, I infer that pre-service teachers recognized geographic concepts through participation in the dérive and its invitation to engage and observe aspects in spaces. The noticing that took place in the derive - where pre-service teachers moved beyond a selective gaze, engaged in observation of the space, and actively looked for geographic concepts – are all important components of a mobilities-focused spatial literacy. Knowing now that dérive can prompt attentive forms of noticing I would explicitly draw students attention to elements of *critical* spatial literacy in the future; ideas related to the authorship of spaces, the acknowledgement of the networks present in those spaces, and

how certain types of movement undertaken by certain people and entities can replicate or dissolve those spaces.

Recognizing and interpreting authorship in the space of the neighborhood tour. During the mapping pedagogy activity, two groups of pre-service teachers encountered and interpreted the authorship of the same space during the walking tour in vastly different ways; a form of exercising critical spatial literacy by mobilizing their understanding of a geographic concept into a real world context. When one pre-service teachers (a white woman) explained her group's photograph (Figure 27) in small group discussion, she expressed that the neighborhood watch sign indicated safety and the type of neighborhood she could see herself living in. This sentiment is also represented in her choice of photograph filter. She commented that she wanted to give a "dream-like" quality to the photograph because that was how comfortable this space made her feel. Conversely, for one of the pre-service teachers in the other group who identified as African American, the sign represented mistrust for people who "looked like him." His group chose a dramatic black and white filter to show what he understood to be conflict in the space between white and black people within the neighborhood[8].

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[8] Unfortunately, these discussions of choice in representation of the neighborhood watch sign did not occur in a whole group setting – these comments happened at different times in different small groups. In retrospect, I should have brought the whole group back together to illuminate explicitly how vastly different the two group's interpretations and photographic choices were. Had I highlighted these contrasting photographs, we could have expanded our ongoing semester discussion about the entanglement of personal histories, race, socioeconomic status, and gender, and how these factors influence how someone comes to interpret and experience a space (certainly, a form of mapping).

Safety Measures.   Is this neighborhood accessible for everyone? Who or what are they on watch for?

Figure 27: Contrasting photographic representations of the same neighborhood watch sign.

Both photographs in their unique choices in photographic representation, give us insight into how different people's understood and organized their recognition of a geographic concept in an entity within a neighborhood space. The photographs provide the viewer with a visual prompt to thinking about "potential organizations of reality" (Martin & Kamberelis, 2012, p. 671) in the pre-service teachers' daily lives and understandings of geography "rather than reproducing some prior organization of it" (p. 671). In this way, there is no simple answer to how a neighborhood watch sign *should* be understood, interpreted, and encountered. By looking at these photographs with mapping as a theoretical concept in mind, it is possible to see the ambiguity of such a sign – how it does not just represent a group of people who have decided to keep a neighborhood safe, but instead, can mean safety or distrust to the different people that encounter it and in essence, how spatial literacy allows for different interpretations of the same spaces. This is the importance of exercising and developing critical spatial literacy – so that when pre-service

teachers encounter difference, they can navigate and negotiate the multitude of ways that someone might think about and with geography.

These two photographs functions as maps (in the theoretical sense) in their own right because they chart possibilities of how we might understand a concept because they do not "merely illustrate, but […] also create and produce" (Watson, 2009, p. 10). In this instance, these photographs as maps created and produced provocations in thinking about the complex nature of spaces, something that is especially important when learning about the world through geography and social studies. Further, as maps, these photographs display "the relations between forces which constitute power" (Deleuze, 1988, p. 36). In this sense, the neighborhood watch sign signaled power in a variety of ways. On a simple level, it demonstrates how a sign on the side of the road, has the power to produce a response from those who encounter it, and author the space in a certain way. For one white female pre-service teacher, the encounter prompted thoughts of a safe and comfortable space, while for the other, it represented a space that was mistrusting.

(2) Pre-Service Teachers Recognized The Connection Between Spaces & Movement

Participation in the dérive and the mapping pedagogy activity also prompted pre-service teachers to identify and interact with the various interconnections between the construction of spaces and the types of movement possible therein. By walking in specific ways through the spaces of campus and the local neighborhood pre-service teachers: recognized and represented the connections between the built environment and a place's walkability, discovered how spaces possess implicit rules that guide one's movement in a space, and encountered a feeling of awkwardness that signaled when they "broke" the rules of a space.

Recognizing and representing walkability in city spaces. During the two

intervention activities, there were also a number of instances in which pre-service teachers,

in varied ways, recognized the connection between the composition and authorship in

spaces, and the types of movement they had available. In the pre-class homework

component of the mapping pedagogy activity, pre-service teachers explicitly explore the

connections between the space of our city, and the types of walkable (or not walkable)

movements that they had available to them. This use of a mapping pedagogy helped

highlight a number of instances in which pre-service teachers recognized the ways that their

movement was connection to the composition of a space.

For example, in the photomission homework one pre-service teacher characterized

our city as a walkable place. She uploaded a photograph (Figure 28) to the group Flickr page

that featured a sidewalk downtown. Its caption read: "Athens is an extremely walkable city!

I walk everywhere I need to go :)." In this photograph, we see two young women posed in a

way that indicated they are joyful, or at least pretending to be joyful in their walk through the

downtown. They appear to be holding hands and posed in such a way to make them both

look as though they are in motion. Around them are other walkers utilizing the walkable

space of the downtown that this pre-service teacher has chosen to represent in their

photograph. In terms of infrastructure, the picture also features a devoted pedestrian path

that indicates where pedestrians should be able to walk safely (the brick path in the photo).

Figure 28: A photograph taken by a pre-service teacher to represent the city's walkability.

Many other photographs taken for the pre-class homework mimicked this type of narration. In total, seven of the nineteen pre-service teachers took photographs showcasing the walkable nature of the downtown area of Athens, while six pre-service teachers used their photographs and captions to praise the walkability they experienced in their daily lives on and around campus. In particular, one took a photograph (Figure 29) of a crosswalk sign on campus and captioned, "This picture represents the walkability of our campus. There are many crosswalks around [the university]. Many students prefer to walk to class rather than catching a crowded bus to walkable places. Sidewalks and crosswalks promote this preference." What is interesting about this photograph though is that there are no people in the image. In a photograph that is meant to depict walkability, it is odd that there is no one walking in the image. The pre-service teacher could have taken this picture at any point in time and in any space of the city, yet he chose this image to be the one to upload for his homework on the class page. Also, if we look in the lowest part of the frame, there is a

Figure 29: A photograph representing walkability.

black space that I infer to be the inside of a car. So while this pre-service teacher chose to take a picture of this specific space, at this specific time to represent walkability, he did so from the passenger seat of a vehicle. In this image, the pre-service teacher is using the presence of a sign and a nearby sidewalk to stand-in for evidence of walkability instead of featuring an image of people walking. This indicates a recognition of the infrastructure of space that coerce or encourage different types of movement (i.e. walking) even when there is no one present to demonstrate this.

While the majority of the class chose to focus on the walkability of Athens, several pre-service teachers' photographic depiction of the same city were quite different. In four cases, pre-service teachers presented a counterpoint to above-mentioned photographs by taking photographs that depicted Athens as a city with many unwalkable areas. One pre-service teacher chose to take a photograph of the entrance to a gated community (Figure 30). In this picture we see the dashboard of the pre-service teachers car from where he is sitting. This illustrates that he is in his car to take the photograph and not walking; an implicit message about the lack of walkability he aims to showcase. Further, the picture features large gates in iron and brick that serve as a barrier between the outside world and a gated community; a place marked by limited access. In discussion of the photograph, the pre-service teacher said his wished to focus on the "other parts" of Athens where there is limited access to sidewalks, public transit, and safe roads for biking. He said that he wanted to showcase an area outside of the downtown and the university where walkability was low or non-existent, and where the structure of roads and transportation presented a major issue for those without a car. In this way, he is demonstrating knowledge of the way that the composition of space is connection to walkability; without sidewalks and appropriate infrastructure, certain types of movement become dangerous and in many cases impossible.

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Figure 30: One of the "Other" Parts of Athens characterized as unwalkable by a pre-service teacher.

Similarly, two other pre-service teachers used their photographs in the pre-class homework to question the features of city planning and its impact on walkability throughout the city. One took a photograph (Figure 31) from the driver's seat of her car looking forward to a seemingly endless line of traffic. She wrote: "I wonder how different this would look if the city was designed in a more walkable fashion." Again, like Figure 30 and 31, the fact that this pre-service teacher also took a photograph from her car which also illustrates a lack of walkability alongside the scene she aims to photograph. In this photo, there is no movement. She appears to be stuck in this traffic which sits in opposition to the free-flowing nature that walking in the context of Speck's (2012) work extolls.
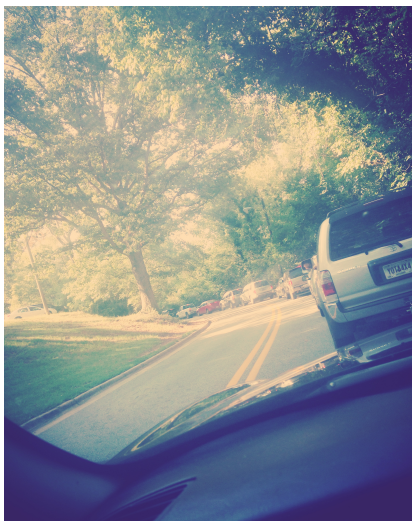
Figure 31: Another photograph depicting a lack of walkability.

When these two different types of photographs (walkable and unwalkable) from the homework photomissions were put side by side with each other on the Flickr map, pre-service teachers had the opportunity to view how others chose to represent walkability in Athens. This creation and viewing of the map invited pre-service teachers to discuss how people in the same class and in the same city encountered and interpreted that space in such different ways. In the sense of this portion of the assignment, a number of maps were working simultaneously at different scale to prompt this type of discussion to occur. In this case, each photograph functions as a map because it charts a possibility of how someone interprets and represents a concept; the same essential function of a Deleuzoguattarian map and also serves as a representation of students exercising critical spatial literacy by mobilizing geography content out into spaces beyond the formal classroom.

Recognizing rules, recognizing available movement. During the dérive activity, one way in which the recognition of the intertwined nature of space and movement occurred was when pre-service teachers butted up against the implicit rules of a space; rules that they had not recognized as existing until prompts from the dérive required them to move in ways

that they would not have previously. Generally, pre-service teachers expressed a form of

discomfort and awkwardness stemmed from using a space in ways that was different than

how it was *meant* to be used. This type of recognition can be related to the type of

movement prompted by the dérive; many prompts that explicitly asked students to move

through a space, use a space, or interact with other entities in a space, in ways that were not

typical to students' normal movements.

In a space where he normally felt comfortable, one undergraduate student, Jeremy,

remarked that the dérive and its uncertainty, made him feel "awkward." Jeremy described an

instance during the dérive in which the application asked him to "linger just outside of a

group." When asked to describe this prompt and his feelings about it in the class discussion,

Jeremy talked about how lingering just outside of a group would not necessarily always lead

to a feeling of awkwardness. He talked about how waiting for a bus, for example, might lead

to a similar interaction. Yet, he remarked that when he had to do this without a good

reason, caused him feel anxious about his actions.

Another undergraduate student, Miguel, received a prompt that asked him to "Take a

picture of the View from Tallest Nearby Building" (see Figure 32). He chose to go to a

study room where he said he spent a lot of his time. Miguel's caption of the photo did not

reveal much about this experience as it simply read, "Tallest Building View." Yet, in the

class debrief, he talked about the feelings of awkwardness that stemmed from following this

seemingly simple prompt. He remarked how he felt different being in the study room with a

different purpose than his normal activities of studying, doing homework, or working on

something school related. He voiced his discomfort in wondering if people were curious as

to why he was taking a picture out the window – something he might not have worried

about had he been just sitting and studying, or specifically, using the space in a way it was

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intended to be used. Beyond Miguel's recounting of this experience, there is evidence of the

awkwardness he experienced in his photograph. As a class, we had previously talked about

elements of photography and style as a class and students had been tasked with assignments

to assess these factors many times throughout the semester. When I reviewed Miguel's

photographs on the class Flickr page, it appeared he had implemented these ideas in most of

his photographs for class. Yet, there is a stark contrast between Figure 33 and the other

photographs he took throughout the semester. This photograph is far lower in quality in

both clarity and composition.

Figure 32: Miguel's photo taken of the view from the highest building.

Unlike Miguel's other photographs, this one does not show any indication of

planning or editing. I infer because of the context and the resulting image, that this

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photograph was taken hastily – so hastily in fact that the image is not even focused;

something that Miguel did in all of his other photographs throughout the semester. This

blurriness is indicative a several types of mobility present during the time of the photograph:

the pressure of time to take the photograph quickly so that others using the space "properly"

do not see him taking a photograph for no apparent reason, moving in/through a space and

using it for reasons other than its implicit rules, a present desire to finish the assignment

within the allotted 45 minutes (Miguel was always very studious in class), or perhaps a lack of

interest in taking a good quality photograph when the major goal of the dérive was to simply

re-explore campus using unfamiliar routes.

I can also see other types of movement and mobility in the image that tells more

about the space of the campus. Although the image is blurry, there are still a number of

indicators of mobile networks at play in the space of the photograph – the football stadium

in the upper left-hand corner of the image which draws hundreds of thousands of people to

the space of campus and the stadium itself during many Saturdays in the Fall for watching

NCAA football; the presence of a university bus that serves to transport students around

campus that is supposed to require a university student/faculty/employee card for use, but is

also used freely/unofficially by those in the community; the road that runs down the center

of the image that is only usable by university buses between 8am and 4:30pm; and, the

Student Center seen on the right-hand side of the image that draws thousands of students

and employees through its doors and to its various amenities every day. These three

explicitly present mobility networks are all connected to the overarching networks related to

access, and further related to structural concepts like race, gender, and class; and also

connected to the "awkward" experience Miguel had when taking the photograph that

encompassed these ideas.

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What remains interesting about this interaction and photograph is the degree to which Miguel felt awkward for being prompted to take this photograph as part of his dérive. Thinking about this awkwardness through mobilities theories might mean connecting this sentiment to the broad theory of the *principle of least net effort*; an explanatory concept for thinking about movement on multiple scales and contexts – from the individual to the infrastructural (Cresswell & Merriman, 2011). Although this principle stems from theories in mathematics, physics, and computer science, it has been put to use by geographers to think about movement through space. The principle suggests that that there is a "general drive to reduce the amount of effort spent in moving from place to place" (p. 3) and that entities, machines/computers included, will choose the path of least resistance to accomplish a task. Miguel's feeling of awkwardness might stem from the fact that he was *not* following the path of least resistance to complete this task (the dérive); awkwardness related to knowing what the path of least resistance is, and having to deny it all the same because of a class activity.

Another form of awkwardness related to Miguel's movements might have stemmed from a potential shift in subject position. When prompted by Dérive App to take this photograph, Miguel moved from insider of the study space who used it for its express purpose of doing schoolwork, to one of the outsider who is not using the space "properly." The ties between movement and subjectivity are discussed more in depth in the following section, but for now, it is important to note that there are connections between occupying an awkward subject position and how one moves through the world. The connections between awkwardness and movement can also be tied to a general desire to belong (e.g.: Baumeister & Leary, 1995; Ostermann, 2000). People tend to move in ways that are geared towards affiliation than alienation, as a way to avoid awkwardness (Clegg, 2012). This must have

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presented a predicament for Miguel since he knew the proper way to move as a means to be affiliated but instead had to put himself in a position of (potential) alienation.

Awkwardness indicates an acknowledgment of the implicit rules of movement in a space. In the class debrief that took place after the completion of the dérives, I asked pre-service teachers why they thought that the prompts caused them to feel awkward. They theorized that this feeling of awkwardness stemmed from using a space and moving through a space in ways differently than for what it was designed, as demonstrated in Miguel's experience detailed above. To further exemplify this theorizing, consider the case of Kenzie, Jolene, and the GoPro. After leaving the library after entering it for a 3rd time in a span of about 5 minutes, the application prompted them to "Follow someone wearing blue" (see Figures 33-35). Figure 33 is screenshot of Kenzie and Jolene leaving the library for the 2nd time in a short period of time. We might imagine the awkwardness of leaving and entering this space in a short period of time by the sounds and movement of the automatic doors, and the likelihood of people lingering outside the library; a popular meeting place among students as well as a common spot for library users to take a phone call.

Next, look at Figure 34. This image is a screenshot of the moment right after Kenzie read this prompt aloud, to which Jolene responded, "Oh, that's awkward!" At this point, the pair turned around while only making it to the steps outside the library to follow a young man who happened to be walking into the library. We see Jolene several feet behind him. In the image, we also see the man opening up the center door. What is potentially interesting here is that this man chose to walk through a door that did not automatically open, perhaps as a way to hold the door for Kenzie and Jolene. Both doors on the outside open automatically, and might be considered the more obvious choice for library entry. Although in the video, we see Kenzie and Jolene following close behind, trying to be subtle

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and go unnoticed, as perhaps denoted by their marked silence (something that did not happen often in the footage), the young man acknowledges their presence by opening the door for them, without turning around. Kenzie and Jolene walked through the door, and once the man was out of earshot, Kenzie said, "I guess that guy knew we were following him because he opened the door for us! I was not expecting that!"

This type of exchange prompted by the dérive highlights both feelings of awkwardness and surprise; feelings associated with brushing up against and breaking the implicit rules of a space and mobilizing a critical spatial literacy. The implicit rules of the library are that it is not a space to be coming and going from many times. It is a space to be entered to study within, the checkout of a book, to use the bathroom, or perhaps to buy a snack at the convenience store located inside. There are a plethora of movements that could be "allowed" or "promoted" through entry in the library; but there is something about coming and going multiple times that is definitely discouraged and something that Kenzie and Jolene noticed and felt awkward about by way of following their dérive's prompts. Perhaps it had something to do with the presence of the detectors outside the doors (to notify patrons/staff that a book had not been properly checked out), or the fact that the front desks where some of the library staff are situated - staff members that include those who check out books, as well as those who are employed for security measures. Therefore, it is perhaps not surprising that as Kenzie and Jolene entered the library for the 3rd time in a very short span and thereby "breaking" the implied rules of the space, that Kenzie remarked: "People probably think we're crazy! We've been in and out of there like seven times!"

What might I infer through these comments is Kenzie's recognition of the implicit rules of this library space; authorship of a space that outlines how one should not walk in and out of the space of the library so many times, especially without a familiar or

recognizable purpose, nor should someone follow someone, especially based on something as simple as clothing color. This meant that their walking in and out of the library multiple times was not something that someone *should* do on campus. When Kenzie said, "People probably think we're crazy!" coupled with a smirk of embarrassment and her "pretending to look down at [her] phone" (see Figure 36), she recognized there was a way that the space prompted one to act, and how their sense of self felt different when they went against that rule. We see in the background of this screenshot from the video, one of the staff members, who is likely included in Kenzie's collective "people." When she says "people" one might wonder who exactly she is referring to, or if the "people" she refers to are those who are staff at the library, those who have the power to explicitly uphold certain rules and norms of the space; rules and norms that Sarah recognized they were not following. From where Kenzie and Jolene are standing in this screenshot – and in the video, they do not go any further than this – it is likely that the only "people" that can see them are the staff standing behind the main desk. The "people" Kenzie speaks of could also be other students; who in their knowledge of the implicit rules of the library space, can also uphold the proper types of movement simply through their observations and probably knowledge of how one *should* act in the space of the library. A type of gaze that has power to make someone feel as though they are not using a space in the proper way.

In this instance, while it is possible that some studying students may see the pair from the wings of the building, it is more likely that the distance from studying places as well as a number of pillars would preclude them from easily seeing Kenzie and Jolene's multiple entrances and exists from the library. Kenzie and Jolene's awkwardness in this situation serves as an example is in which unfamiliar movements through space and resulting awkwardness, as well as rule awareness, worked as a way to recognize the connections

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between movement and space, and further challenge and develop critical spatial literacy skills. This was because the understandings they had previously built about the space of the library came under attack when they had to move in and through that space in ways different than their norm.

Across both of the intervention activities, pre-service teachers were prompted to recognize the ways that their movement in and through a space was connected to the construction of a space. In the mapping pedagogy activity, pre-service teachers noticed how factors in the built environment were connected with what made an area walkable. These ideas were visible in the photographic representations they created that served to illustrate what was walkable and what was not. In the dérive activity, it was through moments of awkwardness and discomfort that pre-service teachers began to recognize the implicit rules of spaces. It was only when they were asked to move in ways different than their norm (i.e. through Dérive Apps prompts as part of this assignment) that they were confronted with understandings of how one implicitly learns/knows how to act and how to move in a space.

Figure 33: Kenzie and Jolene leave the library for a 2nd time after prompts from Dérive App.

Figure 34: Kenzie and Jolene enter the library for a 3rd time in 5 minutes after Dérive App prompts them to "Follow someone wearing blue."

Figure 35: Kenzie smirks and pretends to look at something on her phone to avoid being "found out" by the person in blue they followed based on their prompt.

(3) Experiences with the Connections Between Subjectivity & Movement

During the interventions, pre-service teachers expressed the ways that the movement available to oneself in certain spaces were connected to their subjectivity, and that spaces in many ways encouraged, discourage, restricted, coerced, or forced certain types of movements. The type of subject positions one has available is directly connected to the types of movements one is afforded in the world (Urry, 2007, Urry & Sheller, 2006; Cresswell, 2006; Cresswell & Merriman, 2011). Specifically, mobilities theories acknowledge that patterns of movement influence, and in many ways even structure how social lives, spaces, and institutions are created and changed. In the context of these interventions, this meant that the structures in the spaces of campus could be read in ways that taught someone how they should move to take on the subject position of student, or faculty, or visitor. In particular, pre-service teachers recognized how movement was connected to their feelings of self, and they also noticed how different types of movement forced and also allowed them to take on different subject positions than their norm.

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Initial recognitions of the connection between movement and subjectivity.

The connections between movement and subjectivities manifested in the following two ways: The class discussion that stemmed out of talking about "awkwardness" during the dérive took a turn towards recognizing the connections between movement and subjectivity. At first, when asked how infrastructure and the built environment might be related to movement, pre-service teachers discussed how planners of spaces (from urban settings to university campuses) may knowingly dictate/restrict citizens' movement through a city based upon where and how building, streets, parks, and other physical structures are placed. This conversation was also extended to include the space of a classroom, and how different ways that classrooms are arranged can function as implicit sets of rules.

For example, one pre-service teacher commented that a classroom with desks grouped in pods might implicitly tell students it is okay to talk to their peers, while placement of desks in rows might instead tell students to keep to themselves. These comments can be demonstrative of the ways that students interacted with what mobilities theorists assume to be the interconnected nature between the social world, infrastructure (e.g. paths, roads, etc.), and the mobilities that the connections afford (Urry, 2007). When I prompted the class to discuss the connection between movement and feelings of self, I recognized that students acknowledged that their actions and movement through and within the space of campus were guided by their reading of the implicit rules of the space – rules that, upon their arrival to the university, taught them to move in specific ways that they had forgotten they ever learned. Thinking with mobilities theories, we might consider these rules as patterns that develop through the interactions between the systems and networks that comprise spaces (Urry, 2007).

Many students also agreed that moving throughout campus in a way that did not follow the expected pattern made them feel as though they were breaking rules. When asked whether these rules were explicit, students remarked that while there are not specific or explicit codes of how someone *should* walk around campus, there is an unspoken understanding of how someone should use and move through the space; an implicit curriculum of the campus space (earlier demonstrated in Miguel's photography, as well as Kenzie and Jolene's multiple entries and exits from the library). These movements, students contended, are what allow them to identify insiders and outsiders of the school's culture.

Moving from insider to outsider. This sentiment was exemplified through the remarks of an undergraduate, Jarrod, who commented that participation in the dérive prompted a definite change in his feeling of self – from being an "insider" who is familiar and welcome in the space of campus, to feeling like an "outsider" who moves through campus in ways that are different than those of the insider; similar to the experience of Miguel and his photograph of the "Tallest Building View." When prompted to discuss the insider/outsider dynamic in the space of campus, Jarrod said:

> I just know when someone goes to UGA. They don't stand out. But when like someone off the streets is walking around campus, you know it. They might be dressed like a student. They might even have a book bag, but they don't get it. They're not a part of the crowd and they stand out. It's like watching freshmen when they first show up. They don't know where to go or how to get there. You can spot them from a mile away. They fit in soon enough, but at first, it's obvious who's who.

In the excerpt above, Jarrod makes several nods to both movement and the subjectivity. Jarrod mentions movement in his use of words like: goes, stand, walking, show up, where to

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go, how to get there, fit in. Connections to subjectivity can be found in his mention of: I, someone off the streets, student, they, part of the crowd, and freshmen. In his statement, we can see that the subjectivity of the freshman Jarrod speaks of is linked to the way his/her movement through and in space, particularly in how this person would "not know where to go or how to get there." Jarrod implicitly puts this in opposition to an insider who goes unnoticed in their movements and cannot be "spot[ted…] from a mile away." An implicit othering occurs here in which someone who does not move through a space in a specific way is not an insider of the space. Jarrod's comments related to subjectivity and movement might be attributed to mobilities theorists' idea that movement is central to how we understand and experience the world (Cresswell, 2006; Cresswell & Merriman, 2011). One might see an example of this in Jarrod's description of the movements of a freshman. Imagine being that person and how your movement in that space is directly tied to your experience in that space; the potential discomfort of not knowing the location of a desire destination, the eyes of a judging upperclassmen, the jerky movements undertaken while moving along unsure paths. "Movement expresses how things are" (Urry, 2007, p. 33); subjectivities included.

Thinking with mobilities theories, Jarrod's statement makes a particular kind of sense because of the ways that movement and subjectivity are deeply linked (Urry, 2007). Movement then, is considered the "spatialization of subjectivity" (Fenwick et al., 2011, p. 145). In other words, the subject positions available to an individual are dependent upon the systems of which that individual is a part and how those systems emerge, interact, and change. These different subject positions come into being through the shaping of spaces by way of physical movement (e.g.: walking down a street) and moorings (e.g.: waiting for a bus at a bus stop), as well as other types of mobility like movement of thought while reading a

book, or a teacher's/students' movement in, through, and around a curriculum. Jarrod's statement about insider/outsider types of movement on campus was met with comments from other students who agreed that how someone walks around campus, the paths they walk on, and the direction they move in are all indicators of someone's subjectivity.

Going against routine as a form of freedom. In another instance during the dérive, Maddie experienced a type of freedom by moving through campus in unfamiliar ways and taking on a different subject position via these movements. This interaction occurred when Dérive App prompted a pair to "take a picture of something rebellious" (see Figure 36).

Figure 36: Maddie, a self-proclaimed "goody-two-shoes" poses for a "rebellious" photograph.

During our discussion after the dérive, Maddie said she felt a "rush" by doing something she knew was not normal or expected. In the photo above, we see the self-proclaimed "goody-two-shoes" has climbed upon a statue that in other representations and interpretations (e.g.

Elliott's photograph) has a certain air of formality, tradition, and history. In this climbing and close embrace of the statue, this statue takes on a much different feel than how Elliott chose to portray it in his photograph. Here, Maddie's interaction with the statue is light, comical, and "rebellious" (to use her words and that of her peers as well as Dérive App's). The photographer, Kelly, has taken the picture at such an angle that the statue does not appear to be as dark, large, or looming as Elliott's portrayal. Maddie's act of rebellion might be considered as such because it mocks the formality generally associated with this statue and what it represents.

Mocking a figure that has a prominent and important part of the school's history (at least prominent and important enough that it warrants a permanent statue) would not necessarily be considered what one *should* do, which by effect, makes it possible to consider it as an act of rebellion. On another level, we see that Maddie has also been rebellious by breaking an implicit rule of this type of statue by climbing upon its base (while at the same time obeying the rules of Dérive App's prompts). While other art installations might encourage climbing and movement in the space of the piece, we know from prior interactions with this type of installment, that it is not intended to be climbed upon. The implicit rule of this type of statue is that it is to be looked at, the plaque to be read, and the importance of the figure portrayed in the statue considered. Therefore, by breaking these rules on multiple levels, Maddie felt that her actions were rebellious, or that of a rebel; a subject position that might sit in opposition to her normal "goody-two-shoes." Further, she felt that because of the application's prompts, she had an excuse to act in ways that could be perceived as odd by someone not participating in the dérive.

When a classmate said, "Ya! We saw you up there and were wondering what you were doing!", Maddie simply shrugged and smiled. This different type of movement prompt

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created a space where she might try on acting in a different way, even if just for a short period of time. It might be inferred that Maddie's normal day-to-day interactions and movements on campus maintain and uphold the rules that comprise. Her movements, and in turn, her subject position of student insider who both knows and follows the rules of the space, helps uphold the construction of the campus space. Yet, this space shifts when people use the space in ways outside of the rules; like Maddie who used the statue in a different way because of the prompt. Because spaces find their meaning relationally (Sheller & Urry, 2006; Urry, 2007), this new form of movement comprised a new space; one in which pre-service teachers could question their typical movement on campus and become aware of the type of rules they were unknowingly following.

Another way to interpret the space creation during the process of this dérive is to think about how different forms of movement prompted by the dérive is indicative not only of pre-service teachers' subjectivity, but also relatedly, their *motility capital* (Kaufmann, 2002, 2004; Urry, 2007). First off, motility can be understood as the *potential* for movement. Motility capital refers to the types of movement that someone has available to them based upon things like their physical abilities, their accessibility to transportation and communication, their knowledge, their subject position, as well as the permissions or licenses they possess to occupy certain spaces. In their normal movements throughout campus, pre-service teachers as insiders generally have high motility capital. Their level was altered though as they moved in ways atypical to the flow of campus. For someone like Maddie, it might be inferred that her motility capital was increased through the dérive, particularly when she was prompted to do "something rebellious." The dérive offered her an invitation to move in a way that she may not have considered otherwise, thereby increasing her motility capital. Other students though had less motility capital because they

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perceived to not possess the same permissions in the space of campus. This might be because they were going against the suggestions of the campus space curriculum (e.g. Miguel's use of the study room for picture taking, not studying; Kenzie and Jolene walking in and out of the library multiple times; Maddie standing upon the statue instead of looking at it). This is of significance because they had the opportunity to experience, at least for a moment, what it feels like to have restricted movement and to be marginalized through this; a different type of multiple perspective. The students were able to read this authorship into the spaces of campus and exercise this particular form of spatial literacy by questioning assumptions about movement, permissions, and what types of movement and subjectivities are prompted by the networks present in spaces.

Discussion

The process thinking *about* and *with* geography through reading, taking photographs, drawing maps, moving through campus and neighborhood spaces, interrogating and inquiring about point clusters on a map, discussing ideas with classmates, and forming new and different understandings were all actions that came together during these intervention; all actions that required students to exercise critical spatial literacy and thereby use spatial thinking and reasoning, recognize the connection between the composition of spaces and movements, and experience the intertwined nature of space, movement, and subjectivity.

Through these interventions, pre-service teachers had the opportunity to experiment with and disrupt the apparent continuity and stability presented in traditional maps and in familiar walking routes through the making of their own by way of using spatial thinking and reasoning. These photographs, their captions, and pre-service teachers' interpretations of them are just one set of many data connections that indicate the types of critical spatial literacy knowledge and skills that pre-service teachers had to exercise to complete the

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activity. This act of mapping allowed us as a class to acknowledge the many entities, processes, and discourses that go into the creation of a space and someone's interaction with it. Like the pairs who interpreted the neighborhood watch sign in different ways, the answers (if we can even call them that) in the two activities were not this or that, but instead this and this and that: *a logic of and* purported by Deleuzoguattarian concepts like mapping.

By prompting pre-service teachers to think *about* and *with* geography, the interventions allowed for members of the class to exercise spatial literacy and recognize geography beyond its limited conceptions that pre-service teachers had experienced in their K-12 education. Beyond learning via exploration and photographing of concepts in a space outside of school (a type of mapping, and a thinking *with* geography), the assignments also presented opportunities for pre-service teachers to engage in a variety of disciplinary skills and content related to geography (a type of tracing, and a thinking *about* geography). In particular, participation in this assignment allowed the class to acknowledge and discuss the many entities, processes, and discourses that go into the creation of a space and someone's interaction with it. Pre-service teachers recognized that the structure of spaces influences the movements available to those who exist within it. These structures are then experienced and interpreted by the different people who encounter and make up the space.

The interventions also prompted pre-service teachers to exercise a mobilities-focused spatial literacy focused on gaining awareness of the authorship of space. In each of the findings detailed above, there are instances of the connection between spatial authorship, movement, and the ways ones experiences the space and availability subjectivities within the space. This type of work demonstrates that there are many new things that can be learned from spaces that we are already familiar with. This presents the idea that with different perspectives, new ideas can be uncovered; something central to the goal of geography and

social education. This builds critical spatial literacy by asking students to think about and with space by paying a different kind of attention to the space they explore. These different kinds of attention resulting from different mobilities are connected to the findings detailed above: using spatial thinking and reasoning, recognizing the relationship between space and movement, and encountering new subjectivities borne out of new mobilities.

The interventions additionally offered the class ways to think *about* and *with geography* to build understandings of geography content in the real world. After reading about certain concepts, pre-service teachers' movement during the mapping pedagogy activity and the dérive put them in relationship to "seeing" various geographic concepts at work in the world (e.g. Elliott's encounters with gender through photographing the statue; Trianna, Tyler, and Christian's acknowledgment of migration through their exploration and photography of the multicultural student center; the different conceptions of the neighborhood watch sign). The interventions and their prompted mobilities accomplished a type of pedagogy that put pre-service teachers in a position where they could directly acknowledge their relationship with the outside world and how their movement in the world is connected and imbricated in those relationships. They created a space that critical educators seek in their work with multiple perspectives where one is offered an opportunity to "think without already knowing what we should think" (Ellsworth, 2004, p. 54). Moving in unfamiliar ways and in unfamiliar places allowed students to get beyond their selective gazes and instead find instances of authorship that are connected and engaged with relationships and how they understand and act in those relationships.

In addition to reinforcing geography content learned throughout the semester, participation in the interventions also allowed the class to experience, document, and discuss the ways in which their subject positions were intertwined with their types of movement. In

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discussion, members of the class noticed how the shape of sidewalks, the height of buildings, the width of roads, the placement of trees and parks, are all markers of the constructed nature of certain spaces, and how these aspects all function together to form a space that forms an implicit curriculum; one that teachers a person within a space how to move and act when present there. Walking by way of Dérive App's prompts, for instance, offered students a way to acknowledge and in many cases resist the rules imposed by the space's implicit curriculum; something that exercising a form of critical spatial literacy allowed them to notice. When pre-service teachers were prompted to move through a familiar space in unfamiliar ways (or in the case of the mapping pedagogy activity, walking through a new space) they were able to access critically examine spaces and the ways that their movement was connected to their experience in the space, and the types of subject positions they had available to them.

Conclusion

The want for explicit instructions (or tracings) is a constant challenge in teacher education. Pre-service teachers are often frustrated because they want teacher educators to give them, or trace for them, specific pedagogical methods. They want to know what sorts of lessons and resources they can use in a classroom that will make them feel successful and promote learning amongst their students. While this is certainly a component of teacher education, a total emphasis on specific pedagogical methods is not practical in the long run, just as a tracing alone will never be as productive as a map. We want to help pre-service teachers build the confidence to think for themselves so that when they are met with new and challenging situations in their classrooms, they can use critical thinking to map out resolutions, instead of reaching for a pre-fabricated method. These interventions based upon thinking *about* and *with* geography in a space of geography teacher education offer pre-

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service teachers the opportunity to develop critical literacy skills and knowledge while learning through exploration of concepts in the world; whether that world is an outdoor class session at the university, or a class in a typical K-12 school.

While it is important for pre-service teachers to have geography content knowledge and in turn, critical spatial literacy, it is even more important to have knowledge of how that content exists in the real world so that they may communicate the relevance of topics in geography to their future students, and use their own critical spatial literacies to make sense of, and solve problems in the spaces of their daily lives. Understandings of how the connections between space, movement, and self are connected to that of the curriculum of space - while perhaps not explicitly connected to geography pedagogy - can be useful tools for educators in the creation of classroom communities, engaging lessons, and positive relationships with students.

In conclusion, the interventions demonstrate that geography teacher education certainly occurs in formal spaces (e.g. in the university classroom), but can also takes place in spaces outside of classrooms, or any other space potentially where pre-service teachers are prompted to engage in certain activities. In these interventions, geography teacher education occurred while pre-service teachers were on their own taking photographs of walkability throughout the city, during a tour of a neighborhood, when looking at others' photographs on their mobile devices, as well as in a variety of campus spaces; most of which were *not* classrooms. What is important is the connections that exist between these spaces – a link was created between the formal curricula in the classroom when it was mobilized to out of school contexts, thereby creating relevance and context for content in the curriculum. Like the participants in the surveys and interviews, when prompted, the pre-service teachers were able to navigate, negotiate, and engage with geography content in complex ways. While their

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knowledge of "traditional" geography content (e.g. map identification questions) was lacking, their participation in the interventions demonstrate that they have developing critical spatial literacies in which they utilize geography skills and knowledge to exercise spatial thinking and reasoning, recognize the connection between movement and space, and encounter the intertwined nature of space, movement, and subjectivity. In these negotiations, pre-service teachers had the ability to mobilize formal geography content into the space of the real world. In other words, when prompted, pre-service teachers can and *do* recognize geography as existing beyond the bounds of its lacking presence in K-12 education. These findings again, like in previous chapter, reassert the idea that recommendations for improvement in geography teacher education need not just be made for formal spaces of geography teacher education, but can and should be extended to other curricular areas (e.g. the general teacher education curriculum).

CHAPTER 8

CONCLUSIONS, CONTRIBUTIONS & IMPLICATIONS FOR THE FIELD

Summary & Implications

In this dissertation, I have investigated and intervened in spaces where preservice and practicing teachers develop, gain, and refine their knowledge of geography content and pedagogy. I have demonstrated that geography teacher education occurs in different ways in different spaces for different people; all to varying degrees of effectiveness and engagement. One of the major problems throughout geography teacher education is the presence of lack. Lack of geography teacher knowledge is the most often-cited reasons for poor geography education in the research literature, yet, in the analysis of the survey and interviews, geography teachers themselves reported lack to *also* exist in curricular materials, resources, access to professional development, time, and student knowledge/engagement. Thus the idea that circulates amongst geography teacher education literature (that geography teachers are the root cause of poor geography education) must be challenged. The findings from the studies I conducted in this dissertation offer evidence as to why. Regardless of where lack is present though, its presence alone creates boundaries and border that limit, force, or coerce undesired types of movement.

In Chapter 4, I used a survey to learn more about geography teachers and the spaces where they learn(ed) to become geography teachers as well as indicators of the types of knowledge teachers gained in these spaces and how it was connected to their geography pedagogy. The survey generated a large and diverse sample of data about geography teachers, their pedagogical practices, and their knowledge of geography. Some of the

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findings supported established data from the field of geography teacher education: that geography teachers rarely reported that their geography teacher education occurred in geography-specific programs, and that very few geography teachers set out to become geography teachers initially. It challenged the traditional literature though by highlighting that for most participants, learning how to be a geography teacher occurred through: social studies education programs; on the job learning; developing practices to navigate a lacking curriculum, personal/student knowledge; interactions with colleagues; professional development; and something through professional development. Essentially, geography teachers who took this survey were largely inexperienced and unprepared in academic geography before teaching it themselves, with the bulk of participants only taking one course in post-secondary geography and very few taking any courses on the teaching of geography. Further, the majority of participants were prepared to become geography teachers in the space of social studies education programs.

An implication of this is that social studies education should be considered one of the main spaces where geography teacher education occurs. This sits in opposition to how geography teacher preparation practices are framed in the formal geography teacher education research literature and helps make the point that geography should be included more frequently and in more engaging ways during the social studies teacher education process. While it has been recognized in the formal literature and found again in this survey, recommendations for the improvement of geography teacher education are continually made without considering how these recommendations connect and can be implemented in the space of social studies education programs. Also it helps demonstrate that the issue of poor geography education implementation cannot solely be blamed on teachers. While supports for teachers can be improved at the pre-service and in-service levels, further research should

also occur about the spaces in which geography education takes place to paint a better picture of how lack circulates within these spaces and impacts the types of geography education that can be mobilized.

In Chapter 5, I presented the survey results to prompt conversations with four teachers about their own experiences and practices in teaching geography. In these interviews, I used mentions of movement (both implicit and explicit) to make sense of how the idea of "lack" (so common amongst survey and interview data) was imbricated in participant's mobilities, knowledges, and subjectivities. In the analysis of the interview data, I theorize that Sarah, Lillian, Carrie, and Sadie all mobilized their various knowledge bases to create their own forms of geography teacher education to supplement that various forms of lack they encountered in the curriculum, amongst their students' knowledge, in their own knowledge, and in the amount of time they had for instruction. What was also clear was that Lillian and Sadie, the two novice teachers in the group, perceived themselves as having a lack of geography knowledge, but actually had at least budding understandings of the role of the spatial on their (social) lives. This perception of lack and the lacking curriculum created a boundary that made it difficult for them to mobilize this varied type of knowledge into practice in geography teaching. Their strategy when faced with implementing geography in the classroom was to avoid it. While they were not confident in the formal geography curriculum, they still had developed understandings of space that allowed them to make sense of processes in the real world (e.g. Lillian's description of the intertwined nature of her car and the natural environment) and in the teaching of other subjects (e.g. Sadie's use of geographic concepts to explain events in history). Ultimately, it was evident that all interviewees both encountered and navigated lack in the K-12 geography curriculum as well as in their own teacher education. This created an open space for those who had the

knowledge to mobilize different understanding of geography to strategize against the various

forms of lack (e.g. Sarah), as well as a stifling one for those who did not have geography

knowledge to mobilize into practice.

In Chapter 6, I investigated the emergence and presence of a new space where

geography teacher education is reported to exist; the online space of Twitter chats. I

examined the types of conversations that took place in three different chat sessions to see

how different ideas about geography education were mobilized amongst different

participants. In it I found that Twitter chats were open spaces where anyone with a Twitter

account from anywhere in the world could participate and interact with others who had

mutual interests. Further, this type of open space allowed teachers to expand their PLNs

and form connections with others that would have previously been impossible. Despite

these positives, I found no evidence that these chats do (or do not) function as professional

development. While Twitter chats offer the opportunity for large numbers of teachers to

engage with each other and expand their PLNs, the space of these Twitter chats as a form of

PD must be further investigated and studied. Ultimately, Twitter serves as space that is a

greater connector between educators in different places and contexts, but the education

community should be wary that these chats can and do function as high-quality professional

development and ongoing education for teachers.

In Chapter 7, I engaged pre-service teachers in two interventions that taught *about*

and *with* geography through the enactment of two walking-based activities. In these

activities, pre-service teachers connected formal geography curricula and content we had

read about to the space of real world contexts, thereby exercising and further developing

forms of critical spatial literacy. They mobilized their understandings from a written text on

walkability into the space of a local neighborhood where they identified, photographed, and

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mapped concepts from the reading as they saw them in real life and also moved beyond their selective gazes to critical read spaces as texts. In these interventions, the learning of geography occurred in formal classroom settings and in the real world as ways to supplement and inform each other. In both of these activities that straddled various spaces, pre-service teachers disrupted the apparent continuity and stability presented in traditional maps, curricular materials, walking routines, and connected subject positions. The active nature of these interventions encouraged pre-service teachers to learn through explorations and experimentation, while simultaneously developing skills and knowledge (learning *about* and *with* geography) through the exercising of critical spatial literacy. These interventions demonstrate how geography content can be more than place identification and instead something more complex and relevant to daily life as well as a tool for sense-making. This is significant because knowledge of geography is important not only for geography teachers. Understandings of space can augment nearly any academic discipline for nothing exists outside of the spatial.

Significance to the Field

This dissertation study and its findings are significant to the field for a number of reasons. First, it demonstrates what one can learn about geography teachers and geography teacher education if the focus is inquiry is upon the spaces in which these people, and entities exist. Through the use of mobilities theories, I established that geography teacher education does not just occur in geography education specific programs, but primarily in social studies education programs, and in other non-traditional spaces – like online in Twitter chats, in conversations between peers, in professional development, and in personal navigations of the available (albeit often lacking) curriculum. While the complexity and integrity of the types of education that exist in these spaces is varied, it is important to note

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that geography teachers are not learning how to be geography teachers in the spaces typically defined within the literature. Thus, this dissertation study demonstrates where future research might focus their attention and to consider the contexts where geography teacher education is *actually* taking place. This was only found out by focusing upon the spaces of geography teacher education – to simply focus on phenomena, the backgrounds of teachers, practices, and processes without considering space leaves out a whole host of possible understandings of the ways in which geography teacher education occurs.

Further because most teachers do not set out to intentionally become geography teachers (as demonstrated in the survey and interview data), teacher education courses, particularly those within the field of social studies, could benefit from including activities where pre-service teachers can learn about ways to teach geography, especially in ways that counteract act the idea of geography as a subject simply about map identification and fact recitation. As such, I see the types of interventions presented in Chapter 7 that are based on encounters in the real world where pre-service teachers mobilize and further develop existing skills and knowledge, as a compelling model for teaching about and with geography to pre-service teachers, especially within the current structure of teacher preparation practices where there are minimal sessions devoted to geography as a discipline. While knowing where places are, and how to navigate from Point A to Point B are important skills, it is also important that we extend geographic thought and curricula beyond these bounds and have the opportunity exercise and develop critical spatial literacy.

When teacher educators have such a short time to discuss geography in typical methods courses, it requires that they make a large impact quickly. By working with the knowledge that pre-service teachers already have as well as experiences and skills with which they are familiar, like I did in the interventions, invitations to thinking *differently* about

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something might be easier. Instead of working from the assumption that pre-service teachers are devoid of geography knowledge (something indicated through the pre-assessments described in Chapter 7, as well as Lillian and Sadie's narrations of geography concepts, and responses throughout the survey), perhaps it is the work of the teacher educator to tap into pre-service teachers' prior knowledge and experience through untraditional tasks and assignments. In other words, simply because someone cannot name the capital of Chile does not mean that they do not have geography knowledge.

While these interventions happened in the space of a Teaching Geography class they are connect to a whole host of context related to education broadly and might serve as ways to assuage the lack reported and present in the surveys, interview, and Twitter chat investigations. These assignments could be easily adapted to a wide range of educational settings because in addition to thinking with geography, they also explored the political, social, historical, and economic aspects of schools, communities, and students' lives. Overall, different mobilities, as prompted through these interventions can catalyze a rethinking of how spaces are constructed and used, and what implicit authorship they possess; critical literacy skills and knowledge. These prompted movements can allow people to critically question why someone is expected to move in certain ways, along certain paths, and what happens when they do not follow those rules.

While a teacher educator could go out and recreate these intervention activities with other pre-service teachers, this is not my intention. I instead wish to show how one might go about teaching geography using the skills and knowledge that pre-service teachers already have to prompt them to new and complex understandings of space and place; what teaching *about* and *with* geography can make possible. Making things relevant to pre-service teachers is important and impactful on their daily lives and their future roles as teachers. If teacher

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educators can work with pre-service teachers to do away with some of their narrow preconceptions of the field of geography (the were mobilized and particularly present in the Twitter chat), we might have the opportunity to have more thoughtful and critically-engaged geography instruction and learning at the K-12 level, teacher education, and geography education at large.

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