INVESTIGATING ADOLESCENTS' INTERPRETATIONS AND PRODUCTIONS OF THEMATIC MAPS AND MAP ARGUMENT PERFORMANCES IN THE MEDIA

By

Nathan Charles Phillips

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Approved:

Professor Kevin M. Leander

Professor Rogers Hall

Professor Pratim Sengupta

Professor Jay Clayton

Professor Cynthia Lewis

To Julee

and

To Jenna, Amber, Lukas, Isaac, and Esther

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The painting above (Figure P-1) hangs in the Senate Wing of the United States Capitol.[1] The painting depicts Abraham Lincoln reading the Emancipation Proclamation for the first time to his cabinet in 1862 as imagined by painter Francis Bicknell Carpenter, who completed the painting in 1864. Alexander Hay Ritchie subsequently created a steel engraving of the image so that it could be copied and distributed throughout the country, and Abraham Lincoln ordered the first copy. Some 30,000 prints were made, wearing out the original plate, and the image was

[1] I am entirely indebted to Susan Schulten, professor of history at the University of Denver, for this story. I first heard it from her, and I summarize it here from her account in *Mapping the Nation: History and Cartography in Nineteenth-Century America* (2012) as well as from Francis Bicknell Carpenter's *Six Months at the White House* (1866).

displayed in schools and courthouses throughout the country into the twentieth century (Neely, 1995). The steel engraved version also appeared on the cover of Doris Kearns Goodwin's (2005) bestselling Lincoln biography *Team of Rivals*. While working on the original painting, Carpenter lived in the White House for six months and observed and recorded his experiences, which he later published in a memoir, *Six Months at the White House with Abraham Lincoln: The Story of a Picture* (1866).

An easy-to-miss detail in the painting is the map that rests on the leg of a chair in the bottom right corner of the canvas. The map depicted in the painting, titled "Map Showing the Distribution of the Slave Population of the Southern States of the United States" (Figure P-2), was published in September 1861 by the US Coast Survey and was one of the very first of its kind in the United States and a "landmark cartographic achievement" (Schulten, 2012, p. 120)—a genuinely new way to view information. The map displayed the slave population of the Southern States, county by county, utilizing a new method of visually shaded regions of graduated darkness displaying statistical quantities over geographic areas. The map was reproduced and distributed widely during the Civil War, including in a pamphlet published by the *New York Times*, and it ushered in a new era of thematic and statistical cartography that expanded after the war.

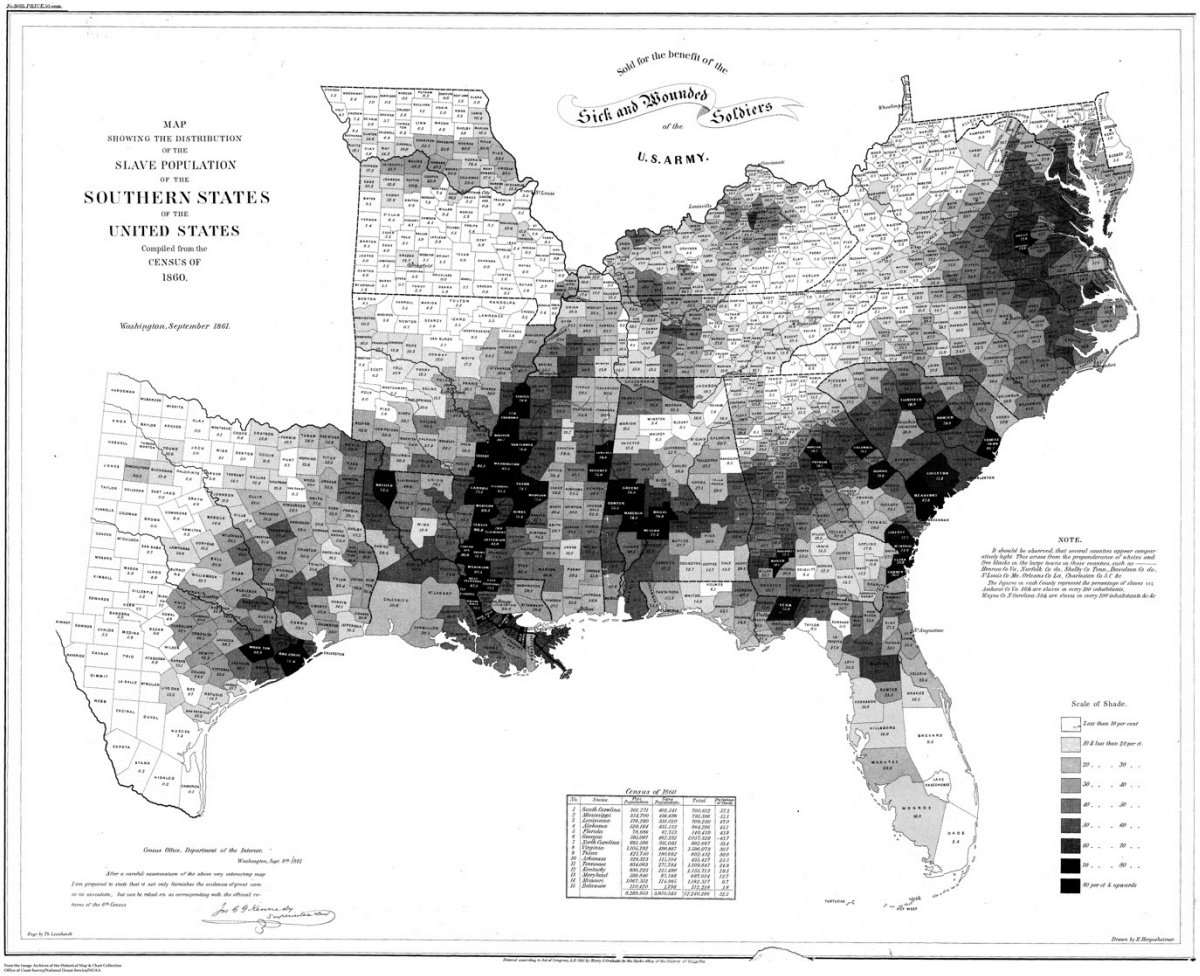

Figure P-2. "Map Showing the Distribution of the Slave Population of the Southern States of the United States" created by the US Coast Survey, September 1861. Retrieved from http://memory.loc.gov/cgi-bin/query/D?gmd:1:./temp/~ammem_0EvC::. Francis Bicknell Carpenter saw this map many times leaning against a desk or table in Lincoln's Executive Chamber during Carpenter's time living in the White House in 1864.

Carpenter included this map in the painting, painstakingly recreating the details of its graduated shading so that it would be recognizable, not only because of its popularity at the time but also because Carpenter saw it in Lincoln's Executive Chamber, "usually leaned against a leg of his desk or table, and [bearing] the marks of much service" (Carpenter, 1866, p. 216). Carpenter also witnessed Lincoln poring over the map many times, using it to connect Union

troop movements to his goal of emancipation. As one example of Lincoln's close reading of the map, Carpenter wrote that in order to accurately reproduce the details of the map in his painting, he once borrowed the map without Lincoln's knowledge and brought it to his studio "for some time" (Carpenter, 1866, p. 216). Shortly after Carpenter took it, Lincoln came into the studio to see the progress on the painting. Carpenter reported that Lincoln paid such visits often as relief from his daily stress. This visit was during the week of Union General Judson Kilpatrick's cavalry raid on Richmond, Virginia. When Lincoln saw the map, he said,

> "Ah! *you* have appropriated my map, have you? I have been looking all around for it." And with that he put on his spectacles, and, taking it up, walked to the window; and sitting down upon a trunk began to pore over it very earnestly. He pointed out Kilpatrick's position, when last heard from, and said: —"It is just as I thought it was. He is close upon — County, where the slaves are thickest. Now we ought to get a 'heap' of them, when he returns." (Carpenter, 1866, p. 216)

CHAPTER ONE

INTRODUCTION

This dissertation is about young people interpreting and doing things with maps of a certain kind—*thematic maps* (i.e., maps that show the spatial distribution of a concept, phenomenon, or theme; Dent, Torguson, & Hodler, 2009; Kimerling, Buckley, Muehrcke, & Muehrcke, 2009). It is also about what those same maps make possible in interactions with people and with places—how thematic maps-and-humans-in-interaction change one another and affect the ways we (humans) and they (thematic maps) act in the world. The study I report on is grounded in classroom contexts of teaching and learning the interpretation and production of thematic maps through, in part, practices I have come to call *map performances* (i.e., interacting with, reading, interpreting, playing with, remixing, and creating thematic maps and media presentations of thematic maps that involve humans interacting with maps for the purpose of making arguments). The dissertation reports on data gathered from November 2008 to May 2012, and is mostly focused on analysis of data from the Local County High School design experiment (Phase 3 below), which took place from 5 April 2012 to 15 May 2012. Research involved three phases:

1. collection and analysis of video recorded news broadcasts produced for adolescents (Channel One News) and adults (CNN News) featuring *map argument performances* (i.e., segments of news or other media produced to make arguments or tell stories and including bodies and maps in interaction)

2. first iteration of a classroom *design experiment* (Brown, 1992; Cobb, Confrey, diSessa, Lehrer, & Schauble, 2003) investigating methods for teaching and learning thematic map interpretation and production as part of a spatial analysis curriculum at an in-residence summer course for high school students at a university; I will call this setting Summer Enrichment Course (SEC)
3. second iteration of a classroom design experiment investigating methods for teaching and learning thematic map interpretation and production in a public high school media production classroom; I will call this setting Local County High School (LCHS)

Map performance emerged as the central construct of the study, and I will flesh out this construct in analyzing focal episodes from video recordings of students participating in two design activities—the "John King remix" (Chapter 4) and the "make your own map argument performance" (Chapter 5). *Performance* is a theoretically and popularly laden term that has been adopted, most often metaphorically, across a range of scholarly disciplines that work to theorize human behavior and interaction (Dolan, 2001; Thrift, 2000). And yet many of its meanings are applicable. I came to see interpretive and productive actions and activities connected to thematic maps as *performative*. By performative, I mean, primarily, to evoke the linguistic—and cartographic—concept of words/texts/images/embodied interactions that *do* something in the world (Austin, 1962; Wood, 2012) and that bring about change. But, additionally, I mean that the activities that young people engaged in—and, really, any reading of a thematic map or a *map argument performance* (i.e., any media segment that includes a map and a body in interaction with the purpose of making a case of some kind or of telling a story; for example, a news anchor's analysis of a future election based on historical data displayed on a thematic map)—is

also an embodied identity performance as understood in performance studies (e.g., Bauman & Briggs, 1990; Lewis, 2001), which view all social action within a framework of performance. And, also, these interpretive and productive activities evoke theater studies in that they put participants "on stage" in an embodied, dramatic way as with a performance such as a concert, recital, or theatrical presentation (Dolan, 2001; Schechner, 2006).

To introduce central themes related to interpreting and acting with thematic maps and to begin to develop core conceptual categories of analysis—categories of map performance that emerged during observations of young people interacting with maps, I want to briefly stick with the historical example that opened the dissertation: Abraham Lincoln reading and interacting with one of the earliest thematic maps produced in the United States (Figure P-2). As observed by Francis Bicknell Carpenter, Lincoln's engagement with the map of slavery exemplifies complex and burgeoning new literacies practices. Lincoln was engaging with a new textual form that he "quickly noticed … for its ability to reveal what traditional maps could not" (Schulten, 2012, p. 155). But he was also engaging with a new textual form born of the political and social turmoil that surrounded Lincoln at the time.

Although statistical cartography—the mapping of data across geography—was growing in Europe by the 1830s, thematic maps had not been produced or published in the United States prior to 1861. Schulten (2012) argues that the appearance of thematic maps in the U.S. at that time was directly connected to political efforts to combat Southern secession, to frame secession as connected to slavery, and to suggest potential areas of Union support among parts of Southern states that were not highly populated with slaves. Among the lead cartographers at the US Coast Survey, which produced Lincoln's slavery map and others like it, were German immigrants who had participated in experiments with new forms of cartography in Europe—namely, using

shading to depict data and not just topographical features on maps. These immigrants were intensely opposed to slavery (Schulten, 2012). The US Coast Survey—"the most important federal scientific agency prior to the Civil War, which employed approximately one-third of the nation's scientists" (Schulten, 2012, pp. 121-122)—mostly focused mapping efforts, prior to the war, on topographic maps that would aid military planning. That the Coast Survey took the immense time and effort to map the population density of slavery amidst this war planning indicates the rhetorical power and important purpose that the map's producers believed it had:

> Whatever the initial motive for its creation, the [slavery] map of the Southern states is remarkable for its ability to depict an immense body of information in a new manner. Its minimalism and absence of decoration and color suggests neutrality and transparency: it appears simply to translate population data into graphic form. Yet the very decision to map the relationship between slaves and the general population reflects a belief that slavery was behind the rebellion. And…the map enabled Lincoln to follow the progress of his military, which after January of 1863 had officially become an army of liberation. In each of these ways, the map deployed its power in a slightly different way. (Schulten, 2012, p. 139)

I describe this historical map, the context of its creation, and Lincoln's relationship to it for two reasons: (a) because it exemplifies the genesis in the U.S. of authentic new literacies practices with thematic maps that have expanded with new technologies (e.g., GIS, large and easily accessible online databases, free mapping software) and are today pervasive in everyday media streams and (b) because of an essential mystery that Schulten (2012) points out as she closes her account of the map: "How [Lincoln] *looked* at the map at any given time is impossible

to determine—as mysterious as how individuals read novels or watch films" (p. 155; emphasis original).

For literacy scholars who are deeply invested in understanding not only how individuals read novels or watch films but also how we might productively teach young people to engage with these kinds of texts (e.g., novels, films, images, textbooks, reports, magazine articles, billboards, television commercials, and many other textual forms) in critical and meaningful ways that support their productive action and involvement in the world, the mystery related to the teaching and learning of thematic map reading largely remains. And it remains, as well, for learning scientists, math educators, geography educators, and media literacy educators. How do young people read and understand the thematic maps that now swirl around them in print and online, in news and other media productions on television, and even in advertising? How do they make sense of the statistical information embedded in these maps and used to make arguments about politics, history, commerce, and science? As Schulten asks of Lincoln, how do they *look* at the map? And, how can they learn to look?

If we don't know exactly how Lincoln looked at the map, we do know the import of his looking—his reading and interpretation—and we know some of the import of the production of this map for the world and for the history of the United States. With that knowledge, and I rely on Carpenter's (1866) observations of Lincoln with the map and Schulten's (2012) historical reporting for that knowledge, I can imagine Lincoln reading the map. Here I pose some of the kinds of questions Lincoln might have asked himself as he looked at the map: How are statistical data represented on the map? How were the data derived? Who created this map and for what purpose? What spatial patterns do I see that will have an impact on my life and my decisions? Are people visible in the map? What kinds of people and what are they doing? What elements of

topography and geography are visible or hidden on the map? Where do I see myself represented (or not) in the map? What imagined futures are made possible through reading this map? What is the scale of the map? What do others see in the map? When I talk with others about or with the map, what new knowledge do we come to together? How does the map impact the way I think about the war and about success in the war? What do differently shaded areas represent? What does the map hide or not show? What stories does the map tell? What points of view are represented in the map? Which points of view are missing?

Imagining Lincoln in this way, reading the slavery map and asking himself questions as he reads, makes possible the brief description of two interwoven conceptual categories central to and constitutive of practices that Lincoln engaged in when reading the map—categories that are central to any map performance: the *performative semiotic aggregate* and *imaginative geographies*. I briefly introduce these categories here, reading them through Lincoln and the slavery map. Later in this chapter I will more fully explicate them. I came to see and theoretically develop these conceptual categories through analysis of young people reading and doing things in engagement with thematic maps while participating in classroom activities as part of the design experiments. These two conceptual categories of practice both account for learning and engagement within map performance activities in the design experiments and also emerge during participation. Performative semiotic aggregates (adapted from Scollon & Scollon, 2003) describe the layers of semiotic systems involved with embodied performances with maps (e.g., map symbols; statistical data layers on the map; geographic base layers on the map; embodied interactions with the map from television news anchors including gestures, gaze, and inscriptions drawn on the map). *Performative*, here, also articulates the critical geographical concept that maps act in the world—that they bring about change and instantiate borders,

nationalities, behaviors, and states (see, e.g., Crampton & Krygier, 2006; Kitchin, Perkins, & Dodge, 2009; Pickles, 2004; Wood, 2012). In my imagining of Lincoln's reading, the questions he might have asked himself that are described by practices related to performative semiotic aggregates are the following: How are statistical data represented on the map? How were the data derived? What elements of topography and geography are visible or hidden on the map? What is the scale of the map? What do differently shaded areas represent? What does the map hide or not show? What stories does the map tell? (As a way of further describing these conceptual categories of practice, see Figure 3 for a comparison of Lincoln's imagined questions, divided into the two categories: performative semiotic aggregates and imaginative geographies.)

Thematic map reading and map performances, as I have come to conceptualize them through analysis of data from the design experiments, always involve an interplay of performative semiotic aggregates and imaginative geographies. The layering is one that allows for systems of representation to productively interact with processes of cultural performance and identity construction. Lincoln reading the slavery map would have recognized and acted on the layers of symbols *performing* in the map—positing realities in geographic space via the two-dimensional surface of the map: borders instantiated by outlines of states and counties, census data represented in shaded regions of various darknesses, topographical features such as rivers identified with squiggly lines of various thicknesses. But Lincoln would have also been actively (re)forming his identity and the identities of the Union, the Confederacy, the army, soldiers over whom he had charge, identities of statehood and nationhood as he read and took action based on his readings of the slavery map. These acts of identity articulation in concert or counterpoint with thematic maps, something that was surprisingly evident to me in analyzing the video record of the students interacting with thematic maps in the design experiments, I have called *imaginative*

geographies after the well-developed concept in critical geography (see, e.g., Driver, 2005; Gregory, 1995, 2004, 2009; Said, 1978). Imaginative geographies are representations of self and Other formulated in connection and contrast across geographic space: "imaginative geography and history help the mind to intensify its own sense of itself by dramatizing the distance and difference between what is close to it and what is far away" (Said, 1978, p. 55). But, as I will argue below, not just the mind; imaginative geographies describe images of self and Other produced in embodied interactions with thematic maps, self, and others. For Lincoln, then, in my imagination of his reading of the slavery map, he might have asked the following questions that describe practices of imaginative geographies: Who created this map and for what purpose? What spatial patterns do I see that will have an impact on my life and my decisions? Are people visible in the map? What kinds of people and what are they doing? Where do I see myself represented (or not) in the map? What imagined futures are made possible through reading this map? What do others see in the map? When I talk with others about or with the map, what new knowledge do we formulate together? How does the map impact the way I think about the war and about success in the war? What points of view are represented in the map? Which points of view are missing? (See Figure 1-1 for a comparison of Lincoln's imagined questions while reading divided into conceptual categories of practice: performative semiotic aggregates and imaginative geographies.)

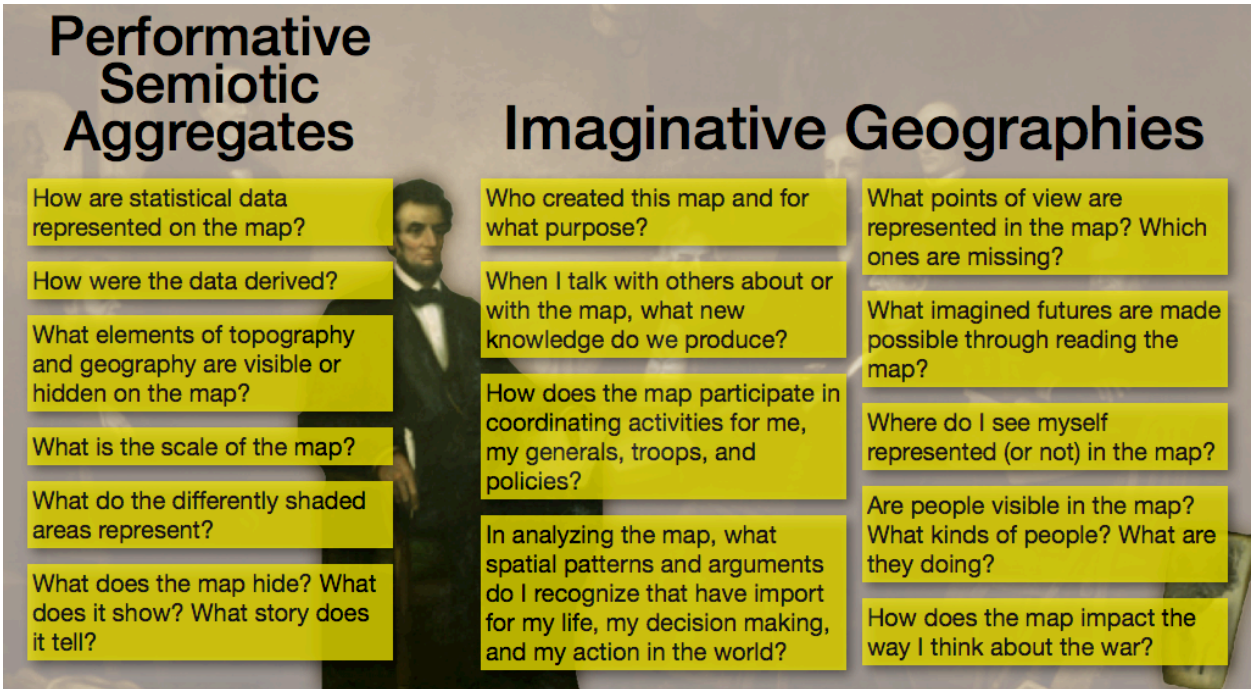

Figure 1-1. In Abraham Lincoln's reading of the slavery map (Lincoln and the map are highlighted against the opaque image of Francis Bicknell Carpenter's *First Reading of the Emancipation Proclamation of President Lincoln* [painting], 1864), as I imagined it, the questions he might have asked himself are divided into conceptual categories of practice: *performative semiotic aggregates* and *imaginative geographies*.

I move now away from the illustration of Lincoln's imagined reading of the slavery map as a way to introduce two central conceptual categories of map performance that emerged in analysis of students' interactions with thematic maps during designed activities, to a further explication of those two categories: performative semiotic aggregates and imagined geographies. I[2] developed these constructivist grounded theoretical categories (Charmaz, 2006) in a reflexive

[2] I mostly use the pronoun *I* throughout the dissertation in talking about myself as the designer, researcher, data collector, and analyzer of data. However, throughout every phase of this research I was supported, helped, and influenced by my adviser, Kevin Leander, by Rogers Hall, co-PI with Kevin on the NSF grant that funded my research, and fellow doctoral students on our Space Learning and Mobility (SLaM) research team: Ty Hollett, Jasmine Ma, and Katie Headrick Taylor. I take responsibility for what I report in the dissertation, but many of the ideas in design and in analysis came from or were heavily influenced by others on our team.

and iterative process of analysis that began with observations of students in the contexts of both classroom design experiments. In those observations, and in subsequent analyses of the video record, I identified two general practices of map performance that I first thought of as (a) "practices with map attributes" and (b) "practices of identity construction of self and others." Both were clear to observe, both in the classrooms as the activities unfolded and in video analysis. As I viewed and analyzed video, I wrote theoretical memos based on my observations and began to seek out literature from geography, critical cartography, literacy studies, media literacy, and learning sciences to better describe and explain these two broad categories of practice. Through that process of data analysis and investigation of literatures, I have arrived at (a) performative semiotic aggregates and (b) imaginative geographies. In Chapter 3, I explain the process of data analysis in more detail. Here, I will describe each of the conceptual categories of practice. To ground the description in data and to aid in illustrating each conceptual category, I include short excerpts from the group exit interviews at LCHS. Students were organized into groups for the focal activities at LCHS (they remained in the same groups to complete projects throughout the study) and a member of the SLaM team conducted a final interview with each group at the conclusion of the study. These excerpts come from those interviews. For each interview, I first include a brief introduction and then transcript of the interview. That is followed by a description of the interview and then explication of the theoretical category using the excerpt as an illustration. Names of groups, names of students, and names of interviewers throughout the dissertation are all pseudonyms unless otherwise noted.

SLaMmers also hauled cameras, set up mics, conducted interviews, led activities, and answered questions. I recognize and am grateful for all of that.

Performative Semiotic Aggregates

Interview excerpt: Map argument performance as an ecosystem[3]

This video recorded exit interview was conducted on 1 May 2012 with the group of students I will call Political Zoo. I asked the group what was the most important thing to tell someone else about how to read thematic maps that they see in the media. Keith was the second student to respond. Below is a transcript of Keith's response and two accompanying images. The first, Figure 1-2, is a video still from the interview and shows each participant's position for the duration of the interview. Participants are labeled. The second, Figure 1-3, includes line drawings that isolate Keith. In video stills used to create these line drawings, Keith's arms were sometimes hidden by Brian's head. In those cases, I added lines to depict the position of Keith's arms and hands.

[3] I use the following transcript conventions throughout the dissertation (adapted from Ochs, 1979): Numbered lines are turns at talk for identified speakers. Circled numbers u note word spoken at the moment depicted in a corresponding image. [Overlapped speech] across turn boundaries is bracketed. A hyphen- marks a word left hanging by the speaker or interrupted by another speaker. Le::ngthened syllables are noted with repeated colons. Latched talk across turn boundaries ends and begins with an =equal sign. Unclear or unintelligible speech will be in single parentheses ( ). *Stress* is in italics. ((Non-linguistic sounds)) are described in double parentheses. {Descriptions of nonverbal activity} are in curly brackets. Short untimed pauses are indicated with two . . periods. Longer untimed pauses with three . . . periods. Angle brackets identify comparatively <slow> and >rapid< speech. Comparatively LOUD speech is in all caps and *quiet* speech between asterisks.

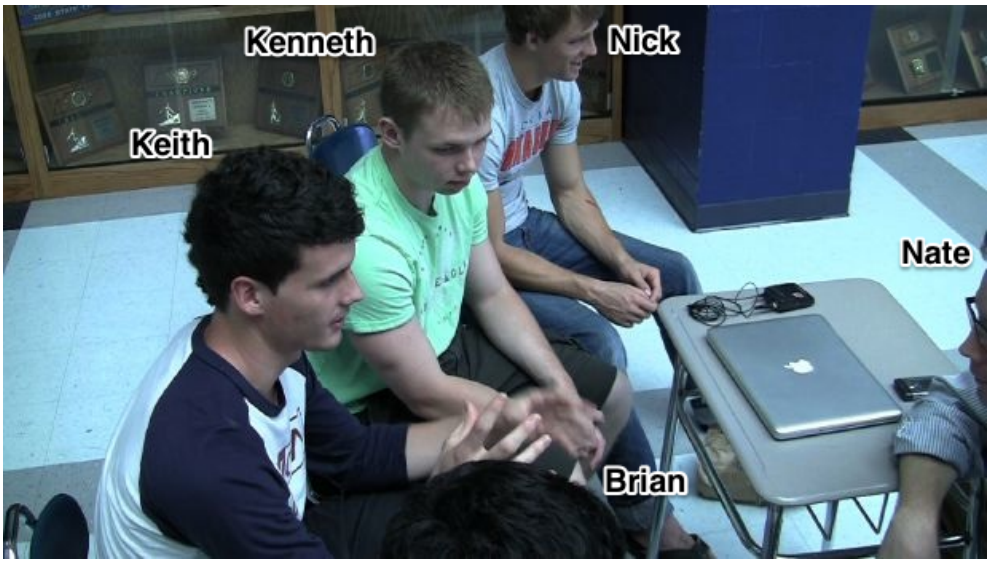

Figure 1-2. Exit interview with the Political Zoo group. Group members' names are labeled. I conducted this interview. Isolated line drawings below (Figure 1-3) are of Keith.

1. Keith: I know- I know it sounds like an odd comparison, but like . . you know how he said that there's a lot of things going on at ❶*once*, it kind of reminds me of like an ecosystem. How there's like a *million* different things like . . in the ❷same- Cuz like there's like . . numbers ❸here, numbers ❹here, dude ❺pointing, other guy ❻talking. And I just I don't know. I didn't think that there was like *that* many things going on.
2. Nate[4]: OK. So as a viewer, how do you like attend to the whole ecosystem? What do you gotta do?
3. Keith: I would tell them to like . . just focus in on one thing and like kinda ❼dissect it.
4. Nate: OK.

[4] When I use my name in transcripts throughout the dissertation, it is not a pseudonym.

5. Keith: Because the- if you- you try to like . . ❽*take* all that in you're probably not gonna get it.

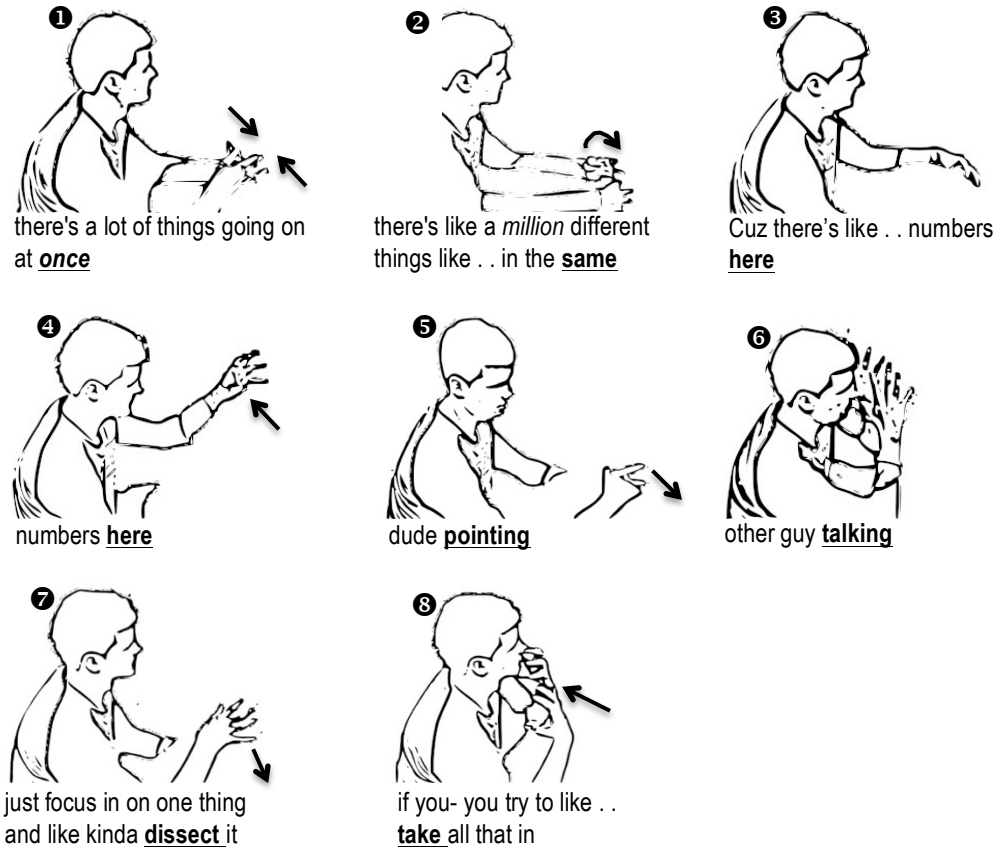

Figure 1-3. Keith's gestures as he described a map argument performance as an ecosystem. Numbers correlate to the transcript. **Underlined bold** words were said at the moment depicted in each image. Arrows indicate movement immediately before or during the moment shown in the image.

Description of the interview excerpt. Keith described the components of a map argument performance (again, a media segment with the purpose of making an argument or telling a story that includes thematic maps and humans in interaction) as an "ecosystem" made up of many different things. This term *ecosystem* is not one that was ever used during instruction about thematic maps or map argument performances. Tellingly, Keith identified elements of the

ecosystem (e.g., numbers, gestures, speech) through his gestures, which moved rapidly from one element of the ecosystem to another, delineated in space by his hands, voice, and body. In other segments of the interview, when Keith was responding to questions, he did not employ these same rapid-fire gestures. Instead, he would talk with his hands resting in his lap. Keith began his response here by agreeing with Brian that there is a lot going on at one time in a media segment that includes humans interacting with maps. The word *once* is marked with his hands cupped and close together, fingers spread. The system he described is both contained, as he seems to hold it all together with his hands, but also complex and varied—each of his fingers spread out so as to seemingly represent unique and separate elements within the ecosystem (line 1).

As Keith described the large number of parts that make up the ecosystem, he said, "there's like a *million* different things like . . in the same-" (line 1). On the word *same*, Keith's cupped hands, positioned much as they were when he said "once," now rotated around each other like gears operating together in a machine. Keith didn't conclude this sentence with a word. Instead, his gesture described the importance of the elements of the ecosystem operating together—not merely existing in isolation. Keith then identified elements of the ecosystem, each with a gestural complement: numbers (on the screen or on the map), news anchor pointing, another news anchor asking questions. He concluded his description by identifying something he had learned during the design study: "I didn't think that there was like *that* many things going on" (line 1).

I followed up by asking him how to help a viewer to attend to all of the elements of the ecosystem (line 2). He said one strategy is to focus on one element and "dissect" it (line 3). As he said the word *dissect*, his hand came forward, his fingers spread, and in a chopping motion, he marked two beats. The first beat was the second syllable of di-*sect* and the second beat was the

word *it*. As with *ecosystem*, *dissect* is not a term that was used instructionally.[5] Keith explained that without focusing on one element of the ecosystem and dissecting it, viewers probably can't "*take* all that in" and probably aren't "gonna get it" (line 5). He gestured with both hands towards himself as he said "take," highlighting the receptive demands inherent in the ecosystem—that there is a lot coming at the viewer and a lot expected of the viewer to make meaning, to "get it."

Discussion of interview excerpt and description of performative semiotic aggregates. In his response to my question about best methods for reading maps used in the media, Keith identified the following:

1. these *map argument performances* (note that this is my analytic term and not one used in instruction or by Keith) include multiple interdependent systems of meaning making
2. these systems of meaning making involve multiple modalities (e.g., written text, gesture, talk, and statistics)
3. viewers of these segments might be overwhelmed in their efforts to make meaning from the multiple semiotic systems and modalities
4. critical viewing that focuses on specific elements for close interpretation (e.g., "dissection" or close reading) can aid understanding
5. methods of critical viewing can be learned

[5] However, in work with Rogers Hall and Jennifer Kahn, we have used the term *dissect* with students in discussing the critical viewing of a "motion chart argument." Similar to a map argument performance, a motion chart argument involves a human talking and gesturing over a dynamic display that includes a dynamic multivariate chart with elements that shift and move over time (see, for an example, Hans Rosling's TED talk at the US State Department in June 2009: http://www.ted.com/talks/hans_rosling_at_state.html).

In addition to Keith's verbal observations, I find his movements and gestures during this excerpt, particularly in comparison to other parts of the interview during which he didn't gesture with the same volume, variety, and speed, to also be telling: these map argument performances, as Keith observed them, as he reflected on them, and as he participated in designed activities related to playing with, thinking about, and creating them are embodied and performative. In other words, Keith's gestural complements to his observations about the ecosystem of the map argument performance are not incidental. They are essential. His response illustrates the ways in which map performance involves reading, responding, and producing in ways that are performative and laden with multiple sign systems.

As I considered the nature of students' engagement with map performance activities, I noticed these elements of the segments that Keith points out as well as the elements of response from students engaged with these segments in the activities that were part of the design studies. Often, but not always, students' engagement involved these same kinds of gestural and performative aspects that I see in Keith's response to my question. I have come to view this interplay of viewer and media segment in the context of the designed activities that students engaged in during the study as a performative semiotic aggregate.

Scollon and Scollon (2003) conceptualized the *semiotic aggregate* as "the many discourses which fall together in a single place" (p. 175; for other examples and discussion of this concept, see Hall & Thomson, 2010; Jones, 2012; Leander, Phillips, & Taylor, 2010; Nichols, Nixon, & Rowsell, 2009). Their analytic project, *geosemiotics*, introduced in *Discourses in Place* (Scollon & Scollon, 2003), calls for and provides examples of analyses that take into account the embeddedness of language and other sign systems in the material world. Because bodies, discourses, and things circulate in contexts that are different around the world,

actors in those different places read and make meaning in ways that are situated and that involve overlapped semiotic systems in simultaneous operation. An important part of the semiotic aggregate is the many forms of the *interaction order* (Goffman, 1983), the organization of people in social interaction.

One example Scollon and Scollon (2003) cite of the semiotic aggregate is a shopping area. The shopping area is identifiable by signs for different shops, by certain kinds of people acting in certain ways as they move through the area, by traffic signs placed in and around the area by the government. All of these semiotic systems are read together by a visitor or viewer to form an understanding about the kind of place this is, what kind of shopping is done there, and what kinds of social interactions might be engaged in. In my observations of young people interacting with each other, with thematic maps, with computer applications for creating thematic maps, with background information read online or on their smart phones, with the desks and computers around them, with audiovisual equipment and technologies (e.g., "green screen" materials and technology) used for recording media segments for broadcast, or with map argument performances produced by large news agencies in the United States, the formulation of a semiotic aggregate is as observable and analytically available as in Scollon and Scollon's (2003) description of the shopping area. But I want to argue further that map performances of the kind I am describing produce a semiotic aggregate of a particular kind, the performative semiotic aggregate.

It is certainly true that a classroom, as with nearly any place, is a semiotic aggregate that can be read for the swirl of signs, bodies, and material objects that participate in reading the place and in understanding how social action is organized there. However, I want to argue that (a) the semiotic aggregate is productively formed in the case of the designed activities that I call

map performances and that (b) it has the unique characteristic of performativity. First, as to the productive possibility of the semiotic aggregate in map performances, I mean that learning is made possible and is observable as young people interact with each other while reading, producing, and playing with thematic maps during map performance activities. In other words, a new semiotic aggregate, one that has unique characteristics (e.g., introducing distant or local places as analytic objects in conversation and interaction) separate and apart from the classroom space before and after, is formed by these activities. Second, as to the performativity of these semiotic aggregates, I do not mean that performativity is unique to these semiotic aggregates *exclusively* and is not found as an element of semiotic aggregates in other places. To the contrary, Scollon and Scollon (2003) show that all kinds of *interaction units* (Goffman, 1971) are potentially at play in semiotic aggregates including *platform events* or *watches*, which they (Scollon & Scollon, 2003) define as a single person or small group performing for others to watch.

What is unique about the semiotic aggregates formed during map performances in classroom settings is that they seem to produce performance and performativity on several fronts:

1) A small group of participants in map performance activities will perform for each other and others outside the group (see Goffman's, 1974, *theatrical frame*) in the sense that they are creating something that is intended to be broadcast or on display for others (i.e., a remix of a segment of CNN News's on-air analyst John King's map argument performance presented as part of CNN's "The Situation Room" show (hereafter, I call it Situation Room), or a map argument performance in which group members create their own maps and perform a coherent story or argument associated

with these maps in front of a green screen in a media segment to be broadcast or otherwise shared with classmates and others).

2) During the production of the final products described above (i.e., the remix and the map argument performance production), young people perform for each other in surprisingly improvisational and embodied ways. That is, without necessarily preplanning or scripting, young people participating in these activities, while preparing their projects, step into roles (not unlike Wortham's, 1994, *participant examples*), voicing characters and moving in ways that are visibly and audibly evident as improvisational performance.
3) As young people work together to create and then display their map performance projects (i.e., the remix or the map argument performance), they perform identities of/for themselves and others (Butler, 1997; Lewis, 2001; Wortham, 2006). In the case of map performances, these identities are articulated in a process of imaginative geographies that I will describe later.
4) In concert, in a map performance, which includes not only the final projects described above (i.e., the remix or the map argument performance) but also the process of creating these projects, the constituent elements of the semiotic aggregate *perform* a particular world (or, perform the world in particular ways). This concept of performativity comes from critical cartography (e.g., Crampton & Krygier, 2006; Wood, 2012) and is based on the idea of performative utterances (Austin, 1962), which are words that *do* something. I describe this notion of performance immediately below.

This final kind of performance, performativity in the critical geographic sense (Wood, 2010, 2012), is a central descriptor of the ways in which performative semiotic aggregates operate uniquely to do work in the world of the classroom and in the world outside the classroom. As foundation for thinking about the ways in which maps perform, Wood and Fels (2008) describe the *propositional logic of the map*. They propose that the map, what they would call the *cartographic sign plane*, which means, simply the map proper and not, for example, the paramap elements that surround the boundaries of a map (e.g., title, supportive graphics, complementary inset maps, other text, etc.), is made up of linkages "among conditions, states, processes, and behaviors conjoined through territory" (p. 26). And that these linkages are realized through *postings*. Postings are fundamental spatial/meaning propositions—ways of saying *this* is *there*. For example, in Lincoln's slavery map (see Figure P-2), the county boundaries, state boundaries, and river locations, as drawn on the map, are postings. Their work is to identify a type of something, a *this* (e.g., a county boundary), and put it *there* (across a certain territory): "Through the posting, *this* acquires *thereness*, a quality or condition of being somewhere, as *there* acquires *thisness*, a quality or condition of being something" (Wood & Fels, 2008, p. 29). Elsewhere, Wood and Fels (1986) have proposed ten codes, or systems of signification utilized by maps, that take postings as a fundamental unit organized to create different meanings for different purposes.

A key element of Wood and Fels's (2008) description of postings is that the map is a social construction that depends on assent to its propositions by readers of the map for its apparent factuality. Wood (2012) furthers this argument, describing how the map is not only socially constructed but socially *constructs* the world. Here, he utilizes Austin's (1962) delineation of *constative* and *performative* utterances. Constative utterances (from *constate*, "to assert positively"; Mish et al., 2001) are either true or false (e.g., it is raining, I am 22 years old,

my daughter is shorter than you). Performative utterances, however, do not describe or assert anything. Rather, the utterance is the doing of an action. Austin (1962) uses the following examples of performative utterances: a ship's christening (i.e., "I name this ship the *Queen Elizabeth*"), saying "I do" in a marriage ceremony, or a promise made in a will to give some property to a relative.

Wood (2012) argues that the historical understanding of maps was always that they were constative—they stated facts and represented the physical world. However, he argues that maps are not constative but performative:

> In drawing political boundaries maps are incontestably performative. Though doubtless responsive to the wills of those drawing them, boundaries represent nothing on the ground. Only in their postings to maps are boundaries brought into being: they less *correspond* to facts than *constitute* them. Once posted to the map boundaries may assume material form on the ground, but the signs, fences, walls, guard posts—all are after the map. (p. 295; emphasis original)

Wood (2010) argues that even topographical features are performed by the map. That is, a mountain, for example, does not acquire thingness as a mountain until it is named in a map by the conceptual category *mountain*: "Maps do not establish facts: they perform namings, claimings, and so on. Maps are performative *tout court*" (p. 270).

For the purposes of identifying the performativity of the semiotic aggregate in play during designed map performance activities, it is not only the map that is performing in this way: it is also the map reader/viewer. Moretti (1998) writes that "mapping [something] is not the conclusion of geographical work; it's the *beginning*. After which begins in fact the most challenging part of the whole enterprise: one looks at the map, *and thinks*" (p. 7; emphasis

original). Via performative semiotic aggregates, maps make arguments and propose theories that are taken up, considered, and reconsidered by readers/viewers, which is why Koch (2011) calls maps "workbenches on which we craft our theories about . . . things" (p. 12). Wood and Fels (2008) point to this element of the performative semiotic aggregate when discussing meaning making at the map:

> In the end, of course, the map's meaning will be constructed by the map reader. This construction, however, is by no means free. It is grounded in the signs and the codes that govern them, and is constrained by the map's propositional logic. It unfolds, furthermore, in a dynamic process easier to exemplify than characterize. (Wood & Fels, 2008, p. 32)

In addition to the role of performativity in the unfolding meaning of a thematic map, Wood and Fels (2008) also describe above the constraints on meaning making—the signs and codes that govern meaning construction. Koch (2011) calls these codes a "geographical matrix" that "assert[s] potential linkages among mapped attributes located on the page in relation to each other" (p. 14). Or, "put another way, mapping is a method of assemblage within which ideas are constituted and then argued about specific experiences" (Koch, 2011, p. 13).

While young people in the design studies exhibited a great deal of creativity in the way they played with and utilized the sign systems in the map argument performances they remixed and created, there is important evidence here that they learned about the functions of the sign systems and the ways in which meaning is constructed through the unfolding semiotic aggregate of maps and humans in interaction. Returning now to Keith's interview excerpt (see Figures 1-2, 1-3, and the transcript above), there is evidence of his understanding that the ecosystem of the map argument performance includes elements ("numbers here, numbers here, dude pointing,

other guy talking"; line 1) that perform meaning and are read in a dynamic process of interpretation ("just focus in on one thing and like kinda dissect it"; line 3).

In the above section, I have tried to flesh out the conceptual category of performative semiotic aggregates as a theoretical construct that emerged in the activities of young people doing map performances. I see the performative semiotic aggregate as a way to describe what Keith called the "ecosystem" of the map argument performance as it interacts with young people viewing, reading, playing with, and creating thematic maps and map argument performances. The performative semiotic aggregate is formed by the intersections of semiotic systems related to map argument performances with bodies in interaction, classroom technologies, and performances of maps and people. As an analytic tool, it can help in describing what is observable in the data I collected and will share in Chapters 4 and 5. But it is also an emergent meaning making composite that is a part of any map performance. As I described above, we can imagine Abraham Lincoln making meaning from the slavery map (Figure P-2). As he studied the map on the day of Kilpatrick's cavalry charge on Richmond while sitting in Francis Bicknell Carpenter's studio, Lincoln's determination that slaves will be set free in a certain county can be described as a notion that is produced as an essential element of an emerging performative semiotic aggregate that forms in the moments of his reading and includes the attributes on the map, themselves part of a performative semiotic system (Wood & Fels, 2008; Wood, 2012); the social context of the map's production by German immigrants working for the US Coast Survey; the novelty of thematic cartography and complex spatial information available seemingly at a glance; and Lincoln's more recently formulated ideas about slave liberation as a goal of the war.

I move now away from performative semiotic aggregates towards an explication of a second theoretical construct central to map performance: *imaginative geographies*. I will proceed

as I did with performative semiotic aggregates in illustrating imaginative geographies with an excerpt from an exit interview with another one of the LCHS student groups.

Imaginative Geographies

Interview excerpt: A map argument performance as "something really personal"

This video recorded exit interview was conducted on 1 May 2012 with the group of students I will call the Protesters. The interview was conducted by Ruby (a pseudonym). Figure 1-4 is a video still that shows the participants in this interview and their positions throughout the interview. To start the interview, the group watched their final project on a laptop sitting on the desk in front of them. The final project was a make your own map argument performance (i.e., media segment involving an argument or story expressed via human interaction with thematic maps the group had created) in which Talisa had been the lead commentator (adopting the role that we, together in the class, thought of and called the "John King person," after the CNN commentator) with Cole introducing her and asking her questions (adopting what we called the "Wolf Blitzer person" role, after John King's colleague and CNN television host). As context for this interview segment and the group social dynamics, group members mentioned their friendship with each other—a friendship that existed inside and outside of class—at different points in the interview. They said they have worked on other group projects together. They were also seniors and, therefore, likely had been together for four years in this class, though I did not individually confirm that with the group members. Additionally, in my observations as they interacted together throughout my time in their classroom, they seemed to get along well, often laughing and joking and spending time together when not engaged in "official activities" in class (e.g., before class or during breaks in activities in class).

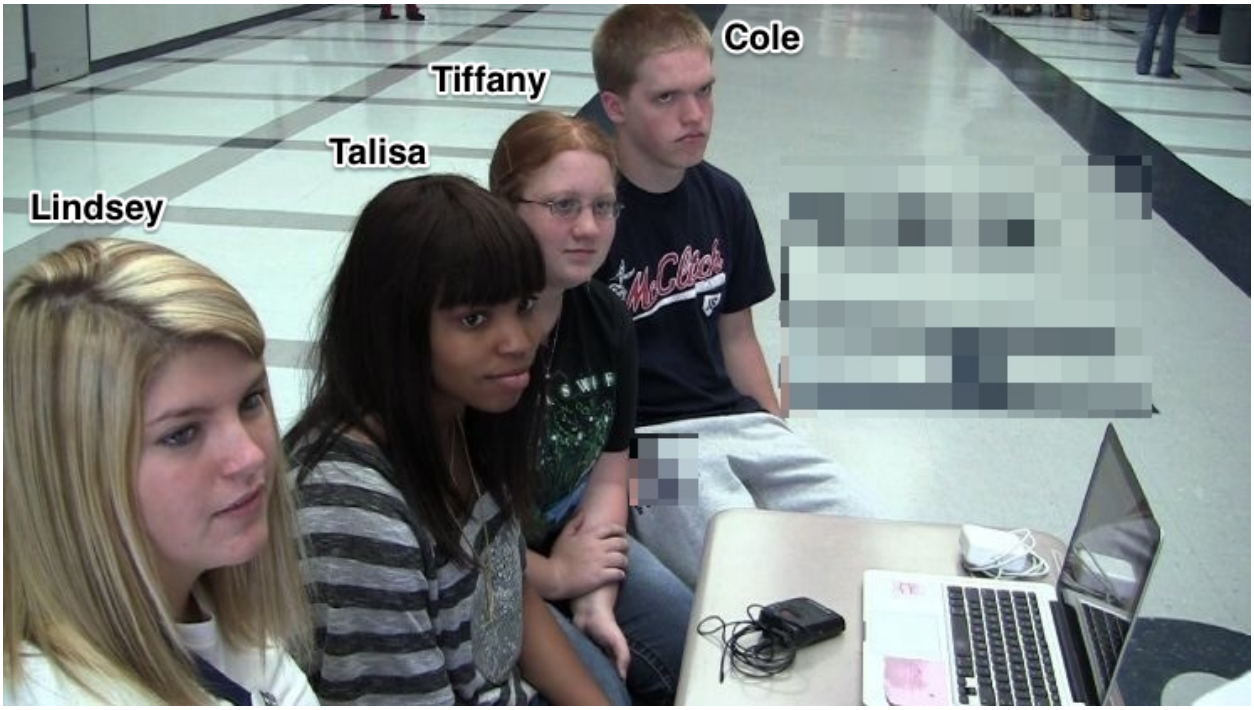

Figure 1-4. Exit interview with the Protesters group. Group members' names are labeled. This interview was conducted by Ruby, who is out of the frame to the right. I have edited the image to blur potentially identifiable writing or images.

In their map argument performance (see Figure 1-5 for two video stills from the Protesters' map argument performance final project), Talisa and Cole made the case that unemployment rates are currently, and have historically, been higher for Blacks than for Whites in a specific part of the country. They created maps using census data across the last 20 years and zoomed into state and county level data while making their case. In order to make the video, they stood in front of a green screen, with the map projected behind them but not visible as they recorded. They could see the map in a monitor that was positioned to the side of the green screen and visible to Talisa.

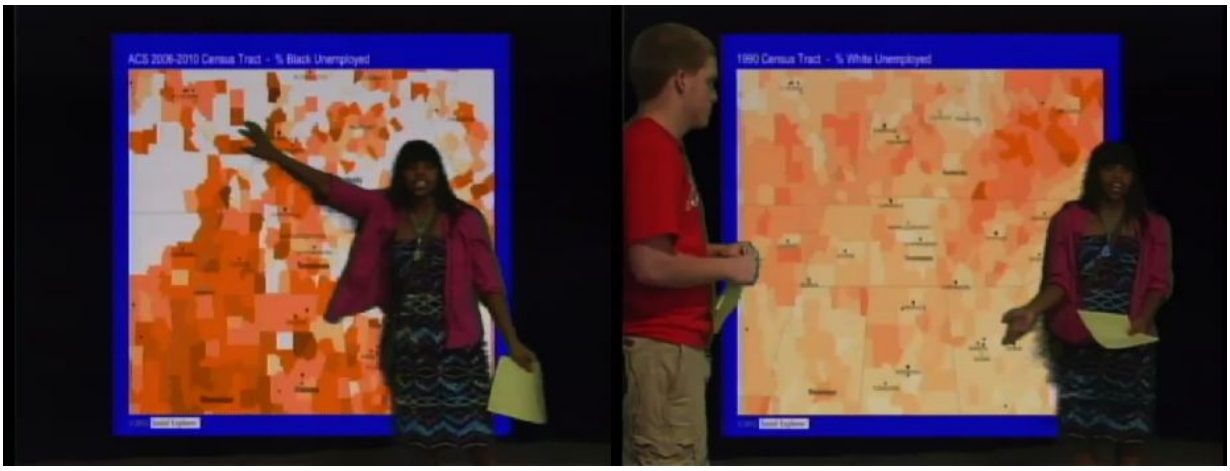

Figure 1-5. Two video stills from the Protesters' final project, a map argument performance in which they made the case that there are differences in unemployment rates by racial category, specifically focusing on a comparison of unemployment for Blacks and Whites. Talisa provided the main analysis, while Cole introduced her and asked questions during the presentation.

After watching their video at the beginning of the interview, they discussed their project together, with Ruby asking what they did well, what the story was that they were trying to tell, and what they noticed analytically about their production. After this discussion, Ruby asked some questions about the process of creating the map argument performance. The transcript below of this segment of the interview begins with the first of these process questions. Below the transcript, Figure 1-6 shows still images captured from the video record at the moments noted in the transcript.

1. Ruby: U::m. Ok. So first of all . . why did you choose the topic? And how did you decide . . on the topic as a group?
2. Talisa: {claps hands together once softly} ❶I honestly wanted to choose the topic because I have been trying to get a job for*ever*. ((laughing)) And I cannot [get a job.]
3. Lindsey: [And we always] hear her talk about how she's ❷Black. I'm sorry.

4. Talisa: ((laughing))

5. Lindsey: [I know I shouldn't say that.]

6. Tiffany: [She does. She goes on] and on about it.

7. Lindsey: She likes being Black. She just [acts like she doesn't.]

8. Talisa: [((laughing))]

9. Talisa: And I coulda- I was like you know what "Black" and "unem"- ❸ "Black race." "Unemployment." Go. ((claps hands once)) There we go.

10. Ruby: OK.

11. Lindsey: That was basically it.

12. Talisa: [((laughing))]

13. Tiffany: [Yeah.]

14. Ruby: So . . something- it was something really personal for you?

15. Talisa: Yeah.

16. Ruby: And then-

17. Lindsey: I've always been interested in it like [different]- I mean because Talisa's my ❹friend. {extends her left hand, palm up, motioning to Talisa} And I hate hearing her talk about it=

18. Talisa: [Yeah.]

19. Talisa: ((laughing)) {places her hands over her face}

20. Lindsey: =❺because it really just upsets me=

21. Talisa: {both hands covering her face} *Because I can't find a jo::b.*

22. Lindsey: =that she can't find a job.

23. Lindsey: *So yeah.*

24. Talisa: {slides hands off of face and holds them together beneath her chin} Def-

Off- ❻I officially think it's cuz I'm Black. ((laughing))

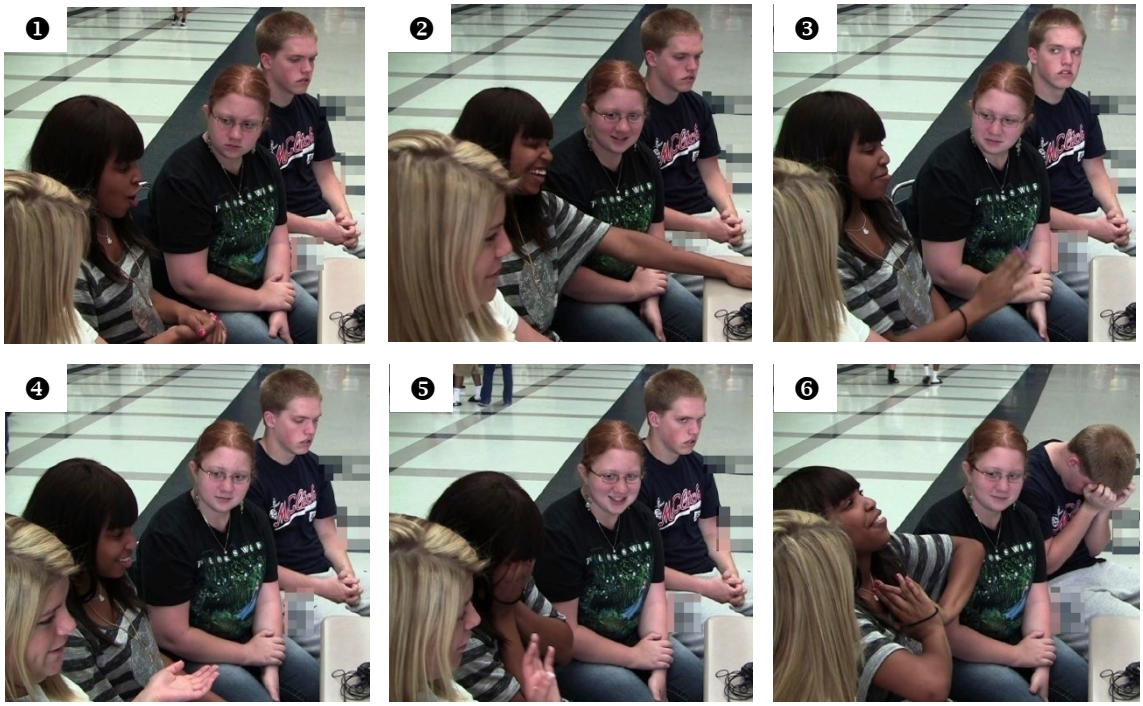

Figure 1-6. Video stills from the exit interview with the Protesters. Numbers correlate to matching moments in the transcript above. Each still has been edited to blur images or text that might identify the name of the students' school.

Description of the interview excerpt. When Ruby initiated this section of the interview, she asked about their topic choice and how they decided on a topic "as a group" (line 1). As Ruby completed the question, both Lindsey and Tiffany turned to look at Talisa (❶). Cole did not turn to look at Talisa. Throughout the interview Cole seemed disengaged. He didn't smile or acknowledge his group mates, and he only responded briefly to questions that were posed directly to him. From my observations, Cole's lack of engagement in the interview was atypical. He was usually talkative and engaged. At one point during the interview, Tiffany explained Cole's behavior as compared to his usual outgoing demeanor. She said that Cole had a headache and didn't feel well.

As Tiffany and Lindsey turned to look at Talisa (❶), she immediately began to answer Ruby's question. In answering, she used the first person *I* despite Ruby's question about their planning "as a group." In her response, Talisa noted her personal connection to one of the key census categories that informed their map argument performance production: unemployment. She said, "I have been trying to get a job for*ever*. And I cannot get a job" (line 2). Immediately, even overlapping with the end of Talisa's statement, Lindsey identified Talisa's personal connection to the other key census category informing their map argument performance production: Black as a racial category.[6] In identifying Talisa's connection to this category (Talisa is Black), Lindsey also distanced herself from the category, both in her self-identification and in a critique of what she perceived as Talisa's prominent attention to this topic: "And we always hear her talk about how she's Black" (line 3). Image ❷ shows Lindsey staring straight forward, not at Talisa, as she said this, distancing herself from Talisa in an embodied way—not connecting with Talisa by looking at her. As Talisa laughed, Lindsey said, "I'm sorry. I know I shouldn't say that" (line 3, line 5). But her apology seemed to be directed at Ruby, the interviewer, to whom her gaze was directed, and not at Talisa. Tiffany agreed with Lindsey's assessment that Talisa "always" talks "about how she's Black" (line 3): "She does. She goes on and on about it" (line 6). Lindsey then made a statement not only about Talisa's talking about this topic but about Talisa's feelings about herself and her identification as a Black person: "She

[6] The United States Census Bureau (2012) reports that it collects racial data based on responses to a question about race in the census. Racial categories are self-reported by census respondents. The categories "generally reflect a social definition of race recognized in this country and not an attempt to define race biologically, anthropologically, or genetically. In addition, it is recognized that the categories of the race item include racial and national origin or sociocultural groups" (para. 2). The U.S. Office of Management and Budget, which sets guidelines for the collection of racial data on the census requires the following five minimum categories: White, Black or African American, American Indian or Alaska Native, Asian, and Native Hawaiian or Other Pacific Islander.

likes being Black. She just acts like she doesn't" (line 7). As before, Lindsey avoided eye contact with Talisa, though she smiled and rolled her eyes slightly.

Talisa did not respond in a negative way or attempt to defend herself or appear offended. Instead, she continued explaining her choice of the topic: "I was like you know what 'Black' and 'unem'- 'Black race.' Unemployment.' Go. There we go" (line 9). Here, "Black race" and "unemployment" are census categories available in the Social Explorer online computer application that the group used to create their maps. Because she stopped in the middle of her statement and rephrased "Black" as "Black race" (line 9), Talisa seemed to recognize that she wanted to be clear she meant "Black race" as a census category and not as an identifier of another sort. When she said, "Black race," she gestured with her hand in a sort of loose chopping motion, hitting "race" on the beat (see ❸ in Figure 1-6 above) and, with a movement of her hand to the left, she hit "unemployment" on a beat. This statement seems to indicate that the choice of categories was simple because they were categories that connected to her: in other words, the choice of a topic was an easy and quick one.

After Lindsey and Tiffany confirmed to Ruby that Talisa's account of choosing the topic for their project was accurate, Ruby followed up: "So . . . it was something really personal for you?" (line 14). Talisa agreed, and Ruby seemed to direct her attention to the rest of the group to gauge their interest and engagement in this topic—why they chose to go with Talisa's suggestion: "And then-" (line 16). Lindsey immediately interrupted and identified her connection to the topic: "Talisa's my friend. And I hate hearing her talk about it because it really just upsets me" (line 17, 20). As she said "friend" (see ❹ above), Lindsey this time recognized Talisa, motioning with her left hand towards Talisa. As Lindsey said, "I hate hearing her talk about it" (line 17), Talisa covered her face with her hands (see ❺ above). Talisa kept her face covered as

she softly said "*Because I can't find a jo::b*" (line 21). However, Talisa uncovered her face (see ❻ above) before she said the final line in this excerpt, connecting the two categories of their map argument performance in her own biography: "I officially think it's cuz I'm Black" (line 24).

Discussion of the interview excerpt and description of imaginative geographies. In this brief segment of the exit interview (the excerpt is 49 seconds in duration), Talisa was positioned as the central character in her group's process of creating their final map argument performance project. Much like *participant-denoting discourse* (Wortham, 2003), Talisa played two roles in the group's telling: (a) she was the student and friend, Talisa, who was working in a small group with her friends to accomplish a task assigned to them by the instructor; and (b) she was also Talisa, the unemployed Black teenager, who appeared as a statistically generated census category in a shaded region on the maps her group created and also as a body before them. Talisa's two roles were sometimes discretely separated in the talk and action of her group members. For example, when Lindsey said (of Talisa), "And we always hear her talk about how she's Black" (line 3) and "She likes being Black" (line 7), Lindsey did not acknowledge Talisa. She did not look at her, motion towards her, or otherwise recognize or ratify her presence. Here, Talisa seemed to act as a census category for Lindsey. Unrecognized as a friend or group member but recognized as fitting a group—"being Black"—that was outside of Lindsey's experience or empathy.

In other places in the conversation, Talisa's roles were more hybridized and not as discretely articulated in the group's talk and action. For example, when Ruby asked Talisa about this topic as "something really personal for you" (line 14) and then seemed to look for an explanation for other group members' interest in the topic, Lindsey said, "I've always been

interested in it like [different]- I mean because Talisa's my friend. And I hate hearing her talk about it=" (line 17). Here, "it" is the topic of their map argument performance—connections between racial categories and unemployment. Lindsey said she was always interested in the topic (i.e., the statistical nature of the argument—the connections between Black race and unemployment as census categories) "because Talisa's my friend" (line 17). Talisa's friendness and her categoriness blend here. It was also at this point (see image ❹ above) that Lindsey acknowledged Talisa-as-friend by motioning towards her with her left hand as she said "friend."

And while Talisa's Blackness was foregrounded by her group members in this excerpt, their Whiteness was not commented on. Although the group's final project included maps that depicted unemployment in the area where they live for both Whites and Blacks, none of her group members expressed their connection to the topic—even though at least one of them, Lindsey, explicitly mentioned that she also did not have a job. What I see in this interview excerpt is an uncomfortable (to me as a viewer) process of simultaneous othering and identification that appeared again and again in map performance work that students engaged in during the design studies. As with performative semiotic aggregates, it is not that identity work of this kind is only found within map performance activities of the kind I designed for students in the studies. However, the activities do seem to uniquely produce opportunities for this kind of identity work by bringing into conceptual space, with groups of students, the resources, tools, and technologies (e.g., bodies, discourse, texts, representations, computer applications, maps) for performances and negotiations of identities. I came to see this identity work within a framework of *imaginative geographies*.

Literary critic Edward Said (1978) introduced the term *imaginative geographies* in his landmark post-colonial critique of Orientalism. Taken up in the field of human geography

(Driver, 2005; Gregory, 2009), imaginative geographies refer to representations of other places, cultures, and peoples that shape one's perception of the world and of possibilities for acting in the world. The perceived power structures, fears, anxieties, fantasies, and desires that a person sees in representations of difference across geographic spaces prompt perceptions of and actions in the world that Said (1978) saw as sustaining unequal relationships. An important element of imaginative geographies is the inherent interplay of social and individual. While imaginative geographies are social and material constructions formed over time—beyond individual subjective perception or cognition—and among representations available in cultures (e.g., images, conversations, technologies like passports, media productions, texts, conceptual categories like childhood), "these imaginative geographies help to shape our sense not only of the reality of places, but of our most intimate sense of our selves (Valentine, 1999)" (Driver, 2005). In this way, imaginative geographies operate as a dialectic, producing otherness while simultaneously producing the identity of the viewer (Gregory, 2009).

Said (1978), citing the French philosopher Gaston Bachelard (1964), described the process of our conceptualizations of places—the emotional and rational sense we make of them—as a poetic endowment "whereby the vacant or anonymous reaches of distance are converted into meaning for us here" (Said, 1978, p. 55). The example Said used, from Bachelard (1964) was the inside of a house which, based on our experiences with it, can feel secure, intimate, haunted, prisonlike, or magical: "The objective space of a house—its corners, corridors, cellar, rooms—is far less important than what poetically it is endowed with, which is usually a quality with an imaginative or figurative value we can name and feel" (Said, 1978, p. 55). The formation of these figurative values, of what comes to be seen as "our space" and "their space" (Gregory, 2009; Massey, Allen, & Sarre, 1999) across geographic distances micro and macro, is

built in the material world. Driver (2005) used the example of the passport to make the point that imaginative geographies have material consequences for a person's identity and mobility. But Gregory (2009) argued that other kinds of cultural texts less obviously connected to a person's identity (e.g., novels, paintings, films, travel writing, museum collections and exhibitions, academic geographies, intelligence reports) "become sedimented over time to form an internally structured and, crucially, self-reinforcing *archive*" (p. 371; italics original).

In the same way that maps have performative power that is visible/touchable in the material world (e.g., fences along national borders; Wood, 2012), the archive of collective identity imagination about places, cultures, peoples, or natures "shapes and legitimizes the attitudes and dispositions, policies and practices of its collective audience, so that in this way imaginative geographies spiral into and out of a sort of cultural paradigm of 'otherness' that has the most acutely material consequences" (Gregory, 2009, p. 371). The process of othering and self-identification via imaginative geographies is also enabled, paradoxically, by the material technologies (e.g., the Internet, satellites, global transportation networks) that make it possible to connect—ever more readily—to disparate places around the world. One might have expected that with media flows that connect us visually and aurally to distant cultures would come a flattening of difference, a blurring of boundaries, a softening of sedimentation; however, Gregory (2009) argues that imaginative geographies install differences via these same global flows because they are "doubled spaces of articulation": "their inconsistent topologies are mappings of *connective dissonance* in which connections are elaborated in some registers even as they are disavowed in others" (p. 256). This building and legitimizing of worlds, the performing of "fact" and "truth" over time via cultural engagements across global flows are "a

string of normalizing practices and judgments . . . which meshes with what 'we already know' and makes it difficult to think outside of them" (Massey et al., 1999, p. 45).

If we return to the exit interview excerpt with the Protesters, the articulation of these imaginative geographies is accountable in process. Lindsey's formulation of Talisa's Blackness was an othering and a self-identification that clearly established identification boundaries both for herself and for Talisa. This process occured across geographic space, though it is not exactly the distances described in Said (1987; West and East—Europe and the Orient) or Gregory (2004; West and Middle East—the United States and Afghanistan, Palestine, and Iraq). The distances in the classroom contexts I studied, and in the case of Talisa and Lindsey in this interview, are more like the everyday, local, spatial negotiations described by Valentine (1999) in her analysis of the imaginative geographies of food and eating. Present in Valentine is the space of bodies in interaction, the social, moral, and physical positioning of bodies in space in relation to others and in relation to our own intentions and beliefs. Something very similar is taking place via the imaginative geographies of young people in classrooms who are participating in map performance activities. In Valentine's study, it is the practice of eating and the materiality of food that initiates these imaginative moves, positioning bodies in relation to distant others via international cuisine, or positioning bodies in relation to a dinner-mate sitting inches away at a restaurant, or imaginatively positioning one's own body in space as fat or thin.

Similar local/global interactions and imaginations are present in this exit interview. Lindsey's body position as she constructed Talisa's Blackness is important here. She looked forward, eyes on Ruby, who was conducting the interview, not acknowledging Talisa. Though Talisa's body was present, she was unacknowledged in the initial moments of this excerpt as a person, as a "friend," and, instead othered as a race-based census category. This othering occurs

not only in the observable context of the video record of this interview but also in the social, historical, and demographic context of this school. Local County High School's (LCHS) student body is 77.0% White, 13.3% African American, 5.5% Hispanic, and 4.1% Asian/Pacific Islander (Tennessee Department of Education, 2012; as I write these statistics, I am aware of the way in which they too are imaginative constructions with incredible power in the world). It is also located in a part of the Southeastern United States with a history of racism, segregation, and slavery. Consequential Civil War battles were fought within a few miles of LCHS, and historical placards, Union soldiers' gravestones, piles of dirt built up as protection by Union troops, and war monuments are all close by. For Lindsey and Talisa, their identity constructions in this interview and in map performance activities, generally, cannot escape sociocultural constructions of Blackness and Whiteness that are sedimented in the people, cultures, and histories that surround them. When Talisa pointed to racism as an explanation for why she thought she could not get a job (line 24: "I officially think it's cuz I'm Black"), the troubling ease with which she could make this accusation and laugh about it suggests an imagined past that haunts her present interactions every day. Tiffany's remark that Talisa does go "on and on about it" (line 6), Lindsey's interpretation that Talisa "likes being Black" but "acts like she doesn't" (line 7), and even Cole's silence amidst those comments all point to constructions of imaginative geographies that implicate Talisa in a way that simultaneously exposes the taken-for-granted Whiteness-as-normative that undergirds social interactions in and out of LCHS.

In the case of map performance activities in the design studies, imaginative geographies operated as described above to generate social distance and to other. Similar to the way Allen (1999) described in his brief introduction to imaginative geographies, at LCHS, "they take the form of situations and knowledges where, for example, the dramatization of distance between

people or the proximity of relationships and the connections drawn can only be made sense of through a restricted number of meanings" (p. 45). In the same way that Lincoln's world view of emancipation forwarded by the war effort was reinforced as he looked at the slavery map (Figure P-2), young people in the design studies reinforced their views of others and the world as they took the material and technologies provided as part of the design studies and created products (e.g., the remix of John King) and performances (e.g., the make you own map argument performance media segment). But the imaginative geographies at play in the design studies also made possible *imaginative counter-geographies* (Gregory, 2009) in the way that classmates were positioned, at times, in ways that they could undo delineations of "our space" and "their space."

In the section above, I have tried to describe the concept of imaginative geographies as it was observed and unfolded in map performances with thematic maps in the design studies. As I came to see them, the performative semiotic aggregate and imaginative geographies operated in layered and sometimes hybrid ways across young people's map performances. Specifically, imaginative geographies were formed and reformed within the apparatus of postings, linkages, embodied interactions, and textual elements of the performative semiotic aggregates that arose as students participated in activities as part of the study. These two conceptual categories of practice—performative semiotic aggregates and imaginative geographies—will emerge in focal episodes of data from SEC and LCHS that I will share in Chapters 4 and 5. Before that, however, I briefly provide a rationale for the study; review three analytic terms central to the background of the study: *interpretation*, *thematic maps*, and *map argument performances*; and review literatures that informed the design of map performance activities (Chapter 2). This is followed by a description of settings, participants, and methods of data collection and analysis (Chapter 3). After the findings (Chapters 4 and 5), I conclude with discussion and implications (Chapter 6).

CHAPTER TWO

BACKGROUND AND RATIONALE

In this chapter, I (a) introduce thematic map use in map argument performances in broadcast media; (b) introduce and explore three analytic terms central to the background and design of instruction at SEC and LCHS: *interpretation*, *thematic maps*, and *map argument performances*; (c) briefly review relevant literatures that informed the design of instruction at SEC and LCHS; (d) briefly describe how those areas of literature specifically informed a three-part analytic model that I introduced to students during instruction at LCHS and that they operationalized to analyze and critically consider map argument performances that they encountered during the study there; (e) provide a rationale for this dissertation study; and (f) conclude with research questions.

Thematic Maps and Map Argument Performances in News Media

As an introduction to thematic map use in broadcast media, I begin with two narratives describing the use of thematic maps and map argument performances in news media coverage (one type of coverage intended for adolescents and one intended for adults) of the 2008 presidential election. The first comes from media intended for adolescents (Channel One News) and the second from media intended for adults (CNN). Both were collected as part of Phase 1 of the dissertation study and of our SLaM research team's efforts to document the use of thematic maps in media during the 2008 presidential election cycle. I include these narratives at the outset of this chapter in order to introduce map argument performances, to foreground the real-world context for the dissertation study, and to implicitly argue that young people are interacting with

and will increasingly continue to interact with these kinds of complex spatial and social productions in the media.

Throughout this chapter, including in these two narratives, the example maps that I cite are election- or civic-engagement-related maps. There are many other kinds of thematic maps available in the media that are not related to politics or civic engagement, but for the purposes of the study, I focus on these kinds of maps for several reasons: (a) these kinds of maps are and will be important for the civic engagement of adolescents now and in the future; (b) during presidential election cycles, these kinds of maps are pervasive and offer a local/national complexity of scale (e.g., state-by-state voting totals compared with county-by-county totals); (c) as I explain in more detail later, the students in the public high school (LCHS) media production class where I conducted the third phase of the research (i.e., the second iteration of the design experiment) were earning journalism and broadcasting credit for taking this course: therefore, the focus on election maps in the news media aligned with the curricular expectations for the course.

Channel One News

Channel One is a 12-minute news program (including commercials) broadcast every weekday to "nearly six million teens in approximately 8,000 middle schools and high schools across the country" (Channel One, 2009). During each United States presidential election cycle since 2000, Channel One has held a mock election, with student viewers nationwide voting. The results of the mock election in 2008 (between candidates John McCain and Barack Obama) were aired in a Channel One episode titled "One Vote," broadcast on 29 October 2008, six days prior to the national presidential election.

Two minutes into the show, in a 20-second segment, anchor Jessica Kumari explained the Electoral College system by discussing the "electoral weight" of different states in the United

States. As Kumari began, on screen was a planimetric view (or overhead view) map of the United States, with all states colored white and state boundaries outlined in black (see Figure 2-1).

Figure 2-1. "One Vote" maps: Planimetric view of the United States with state boundaries in black and states colored in white

Kumari said, "*This* is a normal looking map of the United States, but when you size each state according to the electoral *weight* it carries, you get a *very* different picture." As she said the word "weight," the map dynamically transitioned to an *area cartogram* (Kimerling, et al., 2009), with each state's size proportional to its electoral weight rather than representing geographic area. During the transition, some states grew in size while others shrunk. States were still colored in white and outlined in black. Each state maintained its contiguous borders with surrounding states, but in most cases the states' outlines now only vaguely resembled their original shapes (see Figure 2-2).

Figure 2-2. "One Vote" maps: Contiguous area cartogram of the United States, with states sized proportionally according to electoral weight

With the area cartogram (Figure 2-2) as the on-screen visual, Kumari said, "Each state has the same number of electoral votes as it does members of *Con*gress." The screen then returned to the map with state sizes represented by geographic area, but this time two states, Montana and California, were colored yellow (see Figure 2-3).

Figure 2-3. "One Vote" maps: Planimetric view of the United States with California and Montana colored yellow and all other states colored white

The map then transitioned to an area cartogram again, dynamically performing the same shrinking and expanding movements as before. California and Montana maintained their yellow

colors (see Figure 2-4). During the transition, Kumari said, “That’s why Montana nearly *dis*appears and California more than *doub*les.”

Figure 2-4. “One Vote” maps: Contiguous area cartogram of the United States with states sized proportionally according to electoral weight and Montana and California colored yellow

Kumari concluded the segment by explaining that which states a candidate wins can be more important than how many states are won. As she said this, the yellow color disappeared from Montana and California, but the area cartogram (with all states colored white) remained on screen.

After Kumari’s explanation, the bulk of the show was devoted to showing “One Vote” election results from different regions of the country along with video of students from different parts of the country explaining their votes. The show’s anchors delivered these results in front of a live audience at a high school gymnasium in Pennsylvania. Each time the results were announced, states within each region were colored either red (for a state in which John McCain received a majority of the votes) or blue (for a state in which Barack Obama received a majority of the votes). After delivering all of the results, and now ten minutes into the broadcast, Kumari reiterated the explanation of the Electoral College, but this time with the election results from the “One Vote” student election. First, the on-screen image was a map of the United States with

states that McCain had won in the “One Vote” election colored red and states that Obama had won colored blue (see Figure 2-5).

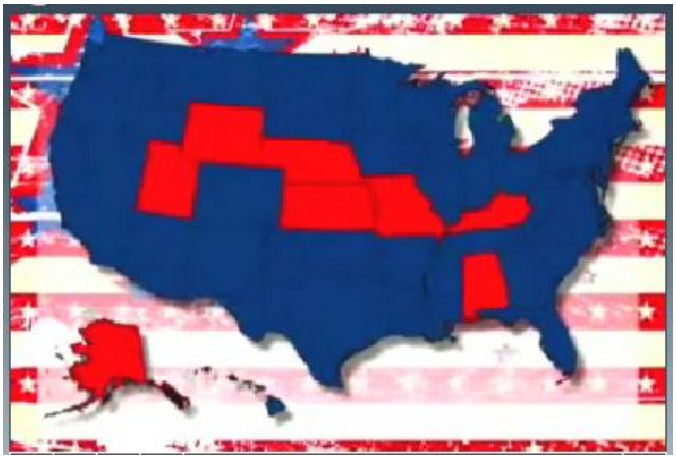

Figure 2-5. “One Vote” maps: State-by-state “One Vote” election results, with states won by McCain colored red and states won by Obama colored blue

Kumari reminded viewers that which states a candidate won was more important than how many states. She then said, “So let’s *switch* the results to reflect each state’s ele::ctoral weight,” which prompted the dynamic shift in the map from the planimetric view of the United States to a contiguous area cartogram, with states maintaining their red or blue colors (see Figure 2-6).

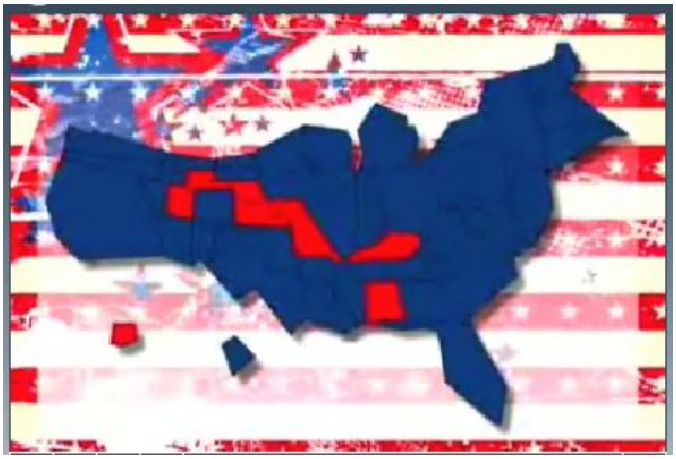

Figure 2-6. “One Vote” maps: Contiguous area cartogram of the United States with states sized proportionally according to electoral weight and colored according to “One Vote” election results (red for McCain, blue for Obama)

Discussion of Channel One News narrative. The implicit argument I am making with this narrative and with the CNN narrative to follow is that young people encounter complex

thematic maps and map argument performances in their everyday media streams and will continue to encounter them. Further, young people's interpretations of these maps and map argument performances have import for their participation in civic and political processes. But I also want to use these opening narratives to explicitly connect real-world thematic map argument performances with analytic terms and categories that emerged through the research I report here. In comparison to each other, the Channel One News and CNN narratives provide some basis for considering the following: *interpretation*, *thematic maps*, and *map argument performances*.

Why focus on these three terms? First, as to interpretation, a thrust of this dissertation is an effort to consider the complexity for readers of a particular kind of text—the thematic map—within a mediated setting that it is often found—the map argument performance. Map argument performances are, at once, common and cutting edge. They can be found on nationally broadcast television news, on websites, in advertising, and in print publications, and they are used in the distribution of arguments and stories across a wide array of interest areas.[7] But these maps also utilize, as Keith described it above, a complex ecosystem of sign systems that challenge readers who work to make meaning with and from them. Identifying some of these challenges with interpretation and investigating ways to teach young people so that they can actively and critically interpret thematic maps and map argument performances is a central focus of the dissertation. Second, as to thematic maps, this is a category of texts that is central to the dissertation project. In recognizing and describing their complexities and challenges for

[7] I have begun to curate an online archive of thematic maps and map argument performances that are available in popular media: http://www.scoop.it/t/maps-are-arguments. At this website, I link to and comment on thematic maps available on the web and in other places. My small (but growing) collection includes maps that could be categorized as representing the following academic disciplines or areas of interest: agriculture, climatology, economics, education, finance, geography, history, linguistics, literature, music, nutrition, politics, social justice, sports, tourism, transportation, urban planning, and weather.

interpretation, it is also helpful to define what they are. What are the elements and defining characteristics of thematic maps? Through the discussion of the Channel One and CNN narratives, I try to do that. Finally, as to map argument performances, this is also a crucial category for the dissertation project and one that deserves defining. I believe map argument performances are relatively recent phenomena—at least the kind that can be viewed in broadcast media. With so little having been written or researched about these rhetorical and multimodal ensembles, I begin, in the sections that follow, to outline their characteristics and to consider the challenges associated with reading them and the possibilities for learning and teaching associated with interpreting and producing them. Below, I connect the Channel One News narrative to these three analytic terms and categories. Following that, I describe the CNN narrative and then its connection to the terms and categories.

Interpretation. In the 2008 "One Vote" episode of Channel One News, anchor Jessica Kumari structured the opening and closing segments of the episode as, in part, map argument performances that taught the role of electoral weight in U.S. presidential elections. Couched in the format of a lesson, her argument was clear: because of electoral weight (i.e., the number of electoral votes given to a particular state depending on its population in comparison to other states), the important question was not *how many* states a candidate had won, but *which* states. To *interpret* what I have called a "clear" argument requires analytic tools that may or may not have been readily available to young people who encountered this map argument performance. There was the matter of understanding Kumari's narrative (e.g., knowing the meaning of "electoral weight"), but that was only part of her lesson and argument. Interpreting what Kumari was teaching additionally required following a complex and changing display of visual information in the form of several different kinds of maps and transitions among maps. Most

importantly for considering interpretation, the segments from these episodes required viewers to make meaning in the interactions among visuals, sound, and movement (e.g., when Kumari says "That's why Montana nearly disappears and California more than doubles" while the visual was a transition from a planimetric view reference map with Montana and California colored yellow to a contiguous area cartogram with resized and reshaped states—but with Montana and California still colored yellow).

Thematic maps. What's *thematic* about the maps included in this episode? Throughout the dissertation and in my thinking about thematic maps, I conceive of these kinds of maps as having a base layer with some kind of geospatial reference information. Added atop that base layer are layers of cartographic conventions for signifying different kinds of data. For example, the first map in this segment of the "One Vote" episode (Figure 2-1) was a reference map that displayed a base layer of information that would be utilized as a foundational underlayer (or, alternatively, a comparative reference layer) upon which additional data layers were added. In this map (Figure 2-1), the location, relative size, and shape of the states in the United States were displayed (for Alaska and Hawaii, only relative size and shape were depicted but not location).

In contrast to this reference map (Figure 2-1), the thematic maps present in this episode included qualitative and quantitative thematic maps. As examples of these thematic maps, consider the state-by-state "One Vote" election results (Figure 2-5), which was a qualitative thematic map. In this map, the quality of red or blue (representing a majority of votes at the level of the state for John McCain or Barack Obama respectively) was depicted as a layer atop the reference map showing the states in the United States (Figure 2-1). The contiguous area cartogram with all states colored white (Figure 2-2) was a quantitative thematic map, displaying the magnitude of difference in state population by resizing states according to population (with

larger state population depicted by a state having more area relative to a state with smaller population). The final thematic map in the episode (Figure 2-6) displayed two themes: first, the magnitude of difference in state's populations relative to each other; and second, the quality of a state "going for" one candidate or another based on a majority of voters choosing that candidate.

Map argument performances. Here, I want to briefly denote the elements of a *map argument performance*. Note that this is a term I have not seen in any existing literature and one goal of the dissertation is to develop map argument performance as an analytic category and a subset of the kinds of map performances people engage with regularly. I use map argument performance to identify a particular "multimodal ensemble" (Jewitt, 2008)—one that is a configuration of some or all of the following: thematic map(s); human voice; human actions, movements, and/or gestures over a map or in interaction with a map; camera movements that visually highlight different parts of the map and/or human acting with the map; map movements and transitions whether prompted by visible human interaction or in the form of the map moving or changing independent of visible human interaction. In the case of "One Vote," the map argument performance can be identified by the interactions among Kumari's vocal narrative and dynamic transitions among different maps.

Here, I intend the term *performance* in map argument performance to carry with it the same multiple connotations for performance I described in Chapter 1. Map argument performances are (a) performative in that they act in the world (Austin, 1962; Wood, 2012) and bring about change, instantiating and categorizing groups of people and creating arguments, theories, and stories; (b) they involve identity performances (Butler, 1997); and (c) they are theatrical (Dolan, 2001; Goffman, 1974), involving performers and audiences. Included in the performative semiotic aggregate that gives life to any map argument performance are

incorporated elements encompassed within the broad concept of *multimodal ensemble* (Jewitt, 2008) within multimodal research (Jewitt, 2009a). In map argument performances, semiotic resources are deployed for communication and meaning making. In the "One Vote" episode, the map argument performances seemed to be scripted, pre-produced, and packaged as informational and instructional units. However, across the corpus of Channel One uses of map argument performances, they were sometimes more improvisational, with anchors interacting with each other and an unseen audience in ways that appeared (though may not have been) unscripted.

CNN

During news coverage of the 2008 presidential election in the United States, the television network CNN unveiled a large interactive digital monitor dubbed the "magic wall" (Farhi, 2008). In episodes of the nightly Situation Room show hosted by Wolf Blitzer, CNN political analyst John King would stand in front of the magic wall and touch its surface to interact with information, maps, video clips, and charts. Though it could be used for other purposes, the magic wall most often operated for John King as an interface for interacting, arguing, and performing with maps. This narrative describes the initial 30 seconds from one of these Situation Room segments. This segment was recorded on 28 October 2008, seven days before the general election. Wolf Blitzer initiated the segment with John King by posing a question:

> How significant in *Penn*sylvania where he's speaking right now >and in Florida later tonight< where they'll have a *joint* event uh the Bill Clinton factor for Barack Obama in these final days? *You* know the . . state of Pennsylvania. You know the state of Florida. And you know Bill Clinton.

As John King began his analysis, the screen initially showed a map of the U.S., with election results from the 2004 election—states that went for George W. Bush were colored red, while states that went for John Kerry were colored blue (see Figure 2-7).

Figure 2-7. John King at the magic wall: Nationwide 2004 election results colored by state

As King said, "Let's come out to Pennsylvania," he tapped his knuckle on the state of Pennsylvania, colored blue, and it expanded out to take up the entire screen, only now county election results were shown instead of simply the state-wide result—the state was colored almost entirely red now with some blue on the far eastern and western edges of the state (see Figure 2-8). King pointed at a graphic in the upper right hand corner of the screen depicting the percentage of votes that went for John Kerry and George Bush in Pennsylvania in the 2004 presidential election. King said, "John Kerry did win this state last time. Not since 1988 has it gone."

Figure 2-8. John King at the magic wall: 2004 election results by county in Pennsylvania

Next, King transitioned in time to the recent Democratic primaries: "But remember the primaries. How significant is Bill Clinton? These are the Democratic primaries." As King said the word "these," he pressed his finger on the outer edge of the screen and primary election results appeared, showing light blue for counties won by Hillary Clinton and darker blue for counties won by Barack Obama (see Figure 2-9).

Figure 2-9. John King at the magic wall: 2008 Democratic primary election results in Pennsylvania.

King said, "The light blue is Hillary Clinton. These are your more conservative blue collar voters." This time, on the word "these," King drew two green lines on the map with his fingers, indicating the area of "blue collar voters" partial to Bill Clinton. Next, King said,

“Bill Clinton has appeal to them because he won this state quite handily back- we'll go back as far as 1996 and look at the state.” As he said “1996,” King pressed the edge of the map again and displayed election results from the 1996 presidential election in which Bill Clinton swept the state of Pennsylvania. The entire state turned blue and the green lines remained drawn over the map (see Figure 2-10).

King continued: “Look at the state. I mean he just won the state. He swept the state 49-40 over Bob Dole with a little bit of help from Ross Perot in that race.” As King said this, he gestured over the map with the back of his hand to the map and his palm open, waving his hand up and down as he said “swept,” then pointing to the vote percentages in the top right corner as he said “49-40 over Bob Dole.”

Figure 2-10. John King at the magic wall: 1996 presidential election results by county in Pennsylvania with area of “blue collar voters” marked by green parallel lines.

King next touched the right side of the map and it collapsed back to an image of the United States. He said, “Now you’re talking about Florida.” He quickly touched Florida, and it expanded to fill up the screen with county-by-county election results from the 1996 election (see Figure 2-11).

Figure 2-11. John King at the magic wall: 1996 presidential election results by county in Florida

Discussion of CNN narrative. In connecting the CNN narrative to the analytical vocabulary that emerged from the study, I follow the same pattern as in the summary of the Channel One News narrative, focusing on a consideration of John King's performance at the magic wall from the categories of *interpretation*, *thematic maps*, and *map argument performances*. In doing so, I build on the summary of the Channel One News narrative while also using Channel One as a comparison in developing these terms.

Interpretation. In this segment, John King argued that Bill Clinton's support for Barack Obama in the final days of the election could have an impact on voters there. King made the case that voters in Pennsylvania, including "conservative, blue-collar voters," may choose to vote for Barack Obama because of Bill Clinton's influence. In developing this argument, King moved through four historical narratives (i.e., 1988 U.S. presidential election, 1996 U.S. presidential election, 2004 U.S. presidential election, and 2008 Democratic primaries for the U.S. presidential election), which were each signaled vocally and/or visually.

Visual signaling included King's gestures on top of the map's surfaces (e.g., pointing to the names of candidates who competed in a past election in the map's legend). In addition to

John King's vocal narration, gestures, and movements, the magic wall (again, an interactive surface for the performance of maps during news broadcasts) displayed maps, map layers, and transitions that made visual arguments of their own (Wood, 2010). Maps and map layers included the following: statewide results for the 2004 presidential election (Pennsylvania was blue); county-by-county results for 2004 (Pennsylvania was mostly red with some blue on the eastern and western edges); county-by-county results for the 2008 Democratic primaries in Pennsylvania (counties were mostly colored light blue with a few counties colored dark blue in the middle of the state); county-by-county results for the 1996 U.S. presidential election (Pennsylvania was entirely blue with no visible county lines). An additional visual layer was John King's hand-drawn lines on top of the map (two green parallel lines outlining a section of the state with "conservative blue collar voters"). The magic wall also displayed nonmap information (e.g., the vote totals for candidates within a state for a particular election) and buttons to be used by King for navigating through maps and map layers.

The segment from CNN included interpretive demands noted from the Channel One episode. Here, as there, King's vocal narration included vocabulary that required interpretation within the context of U.S. presidential elections (e.g., "primaries," "conservative," and "blue-collar"). Unlike Channel One, King's body was also visible as he interacted with the map. This meant that his gestures and movements added a layer of meaning to the intersections of vocal narration and maps. For example, King's declaration about Bill Clinton's victory in Pennsylvania in 1996 included the following spoken narration: "Look at the state. I mean he just won the state. He swept the state 49-40 over Bob Dole with a little bit of help from Ross Perot in that race." These words were accompanied by an image of Pennsylvania that was entirely blue while King swung his hand back and forth over top of the map and then pointed to the results in

the top right of the magic wall (results included statewide vote total percentages for Ross Perot, Bill Clinton, and Bob Dole). To interpret these six seconds of video, viewers must simultaneously consider sometimes competing visual and vocal information (e.g., a nine-point percentage victory described as a "sweep" and depicted by only one color on the map) in the context of King's overall argument structure about Bill Clinton's connection to Barack Obama's chances in the 2008 presidential election.

Thematic maps. As with the Channel One narrative, the bulk of this CNN segment included a base layer with several different thematic layers added in sequence as King worked through his argument. The base reference layer, though never depicted without a thematic layer, was a close up, planimetric view of the state of Pennsylvania with county boundaries drawn. Thematic layers atop this base layer included the following: county-by-county election results for the 2004 presidential election (Figure 2-8), county-by-county election results for the 2008 Democratic primaries (Figure 2-9), and county-by-county election results for the 1996 presidential election (Figure 2-10).

Unlike the Channel One segment, this CNN segment only included qualitative thematic maps. None of the maps depicted magnitudes. Instead, each of the thematic layers showed the quality of red, blue, or light blue (representing a majority of the votes within each county going for one of the candidates involved in that election). As in Channel One, there were maps in this episode that depicted two themes. Both the 2008 Democratic primaries map (Figure 2-9) and the 1996 presidential results map (Figure 2-10) were shown with King's drawn-on green lines. These lines demarcated an area of the map with a particular demographic feature ("conservative, blue-collar voters") in addition to the historical election results layers.

Map argument performances. In comparison with the elements of a map argument performance identified in the Channel One episode, the CNN performance included more than narration and transitions among maps. Many visual human-performance elements were added that were not present in Jessica Kumari's vocal narrative. These included John King's facial expressions, gestures, interactions with the touch screen, ability to leave lasting marks on the surface of the map when gesturing (i.e., the green parallel lines), and movements back and forth in front of the screen. This performance also included map transitions that were not present in Channel One (e.g., historical layers, scale changes). As a performance in some way comparable to a dramatic production, King's movements and interactions with Wolf Blitzer and with the audience showed elements of scriptedness, pre-production, and rehearsal mixed with improvisation and a breakdown in routine (e.g., King momentarily fumbling while attempting to locate the correct on-screen button to move to the next map). As with the "One Vote" episode, King's performances at the map were packaged in informational and instructional units. Here they were bookended by Blitzer's commentary, which introduced the segments at the map and concluded them, transitioning to another element of the broadcast.

Intersections of Media, Maps, and Audiences in Channel One and CNN

These two segments of political analysis make it clear that the hosts and producers at Channel One News and CNN take for granted their viewing audiences will be able to make sense of these complex presentations of thematic maps and map argument performances. I did not choose these segments for their particular difficulty. In the case of Channel One, the use of thematic maps in election coverage was routine, although the area cartogram is not a map that showed up in any other episodes of the show during the 2008 presidential election cycle. Still, the area cartogram is used here both as a pedagogical illustration and as evidence for an

argument about how elections work in the United States. Its use is not commented on or singled out in any way that would signal the producers or hosts thought it was out of the ordinary or needed to be explained. Rather, like the other thematic maps used throughout the "One Vote" episode and across election coverage on Channel One, the area cartogram was used in the framework of arguments and lessons about presidential elections in the United States.

In the case of CNN, the segment I describe here is typical for the program, and, over the course of the election process in 2008, hours of King's performances in front of the magic wall were seen by viewers who had never before seen such rapid-fire interactions with maps, possibly had difficulty following King's transitions, and certainly were never taught in school how to interpret or produce such a map.

In both cases, there are many questions we could ask about the intersections of media, maps, and audiences: For example, What did audiences understand about the arguments being made with these complex thematic maps? What were producers hoping to argue and teach and what was learned? What are the cognitive demands for spatial thinking when modes are integrated and speech, text, and image are interrelated in new ways? How do intersections and interactions among learning trajectories and histories of viewers, new technologies and new representations in the media, and performances of news media analysts operate together to create meaning? How do rapid changes in representational forms (e.g., the movement between the planimetric view map and the area cartogram in Channel One or the zoom into county level election results from aggregate statewide results in CNN) afford and constrain the deployment of semiotic resources to make meaning in complex spatial and social productions? What are the practices of scaling particular to new visions of map-based work, and how can they be identified, practiced, and taught?

In an effort to move forward on finding answers to questions like these, which I have not found in related literatures, this dissertation aims to empirically flesh out *map performance* as a central construct, a category of practice, that emerged in observations of young people participating in designed learning activities. I also aim to flesh out related theoretical categories that emerged in observations of young people participating in map performance activities: *map argument performance*, *performative semiotic aggregate*, and *imagined geographies*. This theoretical work emerged from efforts to design and test methods for teaching the interpretation of thematic maps and map performances to young people, and reports on those efforts are embedded throughout the dissertation. Such a project rests on a sociocultural perspective of learning as participatory (Lave & Wenger, 1991; Moje & Lewis, 2007) and meditated by tools including language, material resources, people, and technologies (Cole, 1996; Vygotsky, 1978). Teaching in this context involves the deliberate design of activity structures that support learning.

Brief Reviews of Relevant Literatures

In order to situate my study within the broader terrain of maps, media, adolescence, learning, and teaching and to provide relevant theoretical frameworks for fleshing out the category of map performance as well as frameworks that informed the design of activities for the teaching and learning of thematic map and map argument performance interpretation, I move now to a brief review of relevant literatures. The literature review is organized into two sections. First, I review educational studies that consider the teaching and learning of thematic maps with young people. The purpose of this section is to identify gaps in this literature that point to a need for studies like this. The second section of the literature review has a different purpose. There, I very briefly identify four bodies of scholarship, with related but distinct frameworks useful in

developing the concept of map performances, in identifying interpretive challenges that adolescents face in regards to thematic maps and map argument performances, and in building a conceptual and theoretical framework for the teaching and learning of interpretation. The second section suggests the foundations for a methodology for interpreting map argument performances and it represents the material that informed the design of activities that I will analyze in practice in Chapters 4 and 5.

Educational Studies With Thematic Maps and Young People

In educational research literatures, the rise of thematic mapping has not been followed by an increased attention to pedagogical issues surrounding the interpretation and production of thematic maps by young people. Thematic maps are powerful representational objects that have supported important historical decisions and discoveries (Harley, 1987; Koch, 2011; Schulten, 2010, 2011). And thematic maps make spatial analyses of certain phenomena easier for professionals (e.g., geographers, planners, historians, archaeologists, biologists) and lay people, but educational researchers have recognized that they can also be challenging and complex objects to interpret (Wiegand, 2003). And we know very little about how they are interpreted, understood, and read by those who use them—particularly young people (Wiegand, 2003) and, especially, secondary school students (Wiegand, 2006).

Although map interpretation as an area of formal instruction in school dates to the sixteenth century (Edney, 2009), it has significantly decreased in importance in geography classes in schools. Wiegand (2006) and S. Dixon (personal communication, February 17, 2012) suggest that many geography teachers today view map interpretation as unproblematic for learners, despite any evidence to that effect. Further, map interpretation as it is taught in schools relies on decades-old thinking about cartography and does not include any student work with

digital maps (Wiegand, 2006). If map interpretation itself is little taught, even less attention has been paid to the teaching and learning of *thematic* map interpretation in schools (see, however, Michaelidou, Filippakopoulou, & Nakos, 2007; Mosenthal & Kirsch, 1990; Schulze, 1996; Wiegand, 2002a, 2003). For example, in the nearly 100-year publishing history of the *Journal of Geography*, the journal of the National Council for Geographic Education, only 33 total articles (including book reviews) address the teaching of thematic maps. I base this finding on my own search for the term *thematic map* in the digital archives of the journal. As further evidence for the lack of focus on teaching thematic map interpretation across the formal educational spectrum, one study (Gillen, Skryzhevska, Henry, & Green, 2010) found that in 17 textbooks intended for undergraduate courses in map interpretation for geography majors, only six (35%) covered the interpretation of thematic maps. In studies that do address the teaching and learning of thematic maps, nearly all focus on discrete skills (e.g., choosing appropriate color variables for shading choropleth maps, identifying symbols) rather than critical thinking about how maps work or the arguments being made with thematic maps (Wiegand, 2006). It seems clear that, generally, students' abilities to interpret thematic maps are taken for granted in school and that "for many school students interpretation may be more problematic than has hitherto been recognized" (Wiegand, 2006, p. 63).

Despite the paucity of research on the teaching and learning of thematic maps in schools, two recent books (Milson & Alibrandi, 2008; Wiegand, 2006) provide both research and resources for teachers. Milson and Alibrandi's (2008) edited collection of research and pedagogy is focused on digital geospatial technologies in the context of social studies classrooms in K-12 schools in the U.S. Generally, schools have been slow to integrate Geographic Information Systems (GIS) and Global Positioning System (GPS) technologies into curricula (Alibrandi &

Baker, 2008; Wiegand, 2006), but Milson and Alibrandi's (2008) book takes a positive approach in highlighting researchers, teachers, and learning sites with a history of successful uses of these technologies.

Several chapters include content specifically related to the teaching and learning of thematic maps in schools. I will focus on three (e.g., Edelson, Smith, & Brown, 2008; Kerski, 2008; Radinsky, 2008). All three clearly address the critical use of geospatial technologies in secondary school social studies classrooms. That is, technologies are integrated into curricular units with a focus on students becoming critical observers of the world, able to analyze historical or current data in order to make arguments or decisions about events, ideas, and concepts that have affected or will affect them in the world. Kerski (2008), for example, identifies web-based GIS tools that can be used to analyze existing data (historical and current) and student-produced data through the creation of thematic maps.

In terms of the teaching and learning of thematic map interpretation and production, a limitation of these three chapters is their focus solely on geospatial technologies for working with thematic maps in classrooms. It makes sense, given this book's (Milson and Alibrandi, 2008) focus on digital geography in social studies classrooms, that there would not be any attention to reading and producing hard copy maps, but two of the chapters (Edelson et al., 2008; Kerski, 2008) also fail to address the demands of reading and interpreting thematic maps in the process of problem solving.

Radinsky (2008), however, addresses the need to learn to read visual data to solve problems. In observations of students utilizing *GIS for History*, a web-based learning environment which packages curricular units intended to be used in high school social studies classes with thematic maps and documents related to historical topics (e.g., "U.S. Expansion,"

"Slavery in America," "The Great Migration"), Radinsky notes that students developed nuanced abilities to consider thematic map layers and make arguments based on their analyses. He does not, however, provide any specific data describing how this happened other than to point out that the teacher modeled the kinds of close observation he wanted to see from students while reading maps.

Wiegand (2006) brings together empirical research and pedagogical possibilities for teaching and learning with maps in K-12 school settings in the UK (though he anticipates an international readership). Wiegand's book is noteworthy for its map-centricity. That is, Wiegand is explicitly focused on the teaching and learning of maps and on problematizing the interpretation and use of maps by students in K-12 settings. This book is also not explicitly tied to the use of geospatial technologies in the same way that the chapters in *Digital Geography* (Milson and Alibrandi, 2008) are. The book includes surveys of research regarding map learning and teaching with young people, outlines of relevant learning theories, and descriptions of instructional activities that teachers can do with young people. Wiegand devotes several pages to thematic maps, and includes interpretation and production activities (utilizing ArcView) that students can engage in as they work to understand thematic maps.

While the presence of these books points to an interest and expertise in the teaching and learning of geospatial concepts (including thematic map reading and production) and geospatial technologies (including those that can easily be used in school-based teaching and learning around the interpretation and production of thematic maps), both books also make clear that the uptake for these, even in geography classes, is very small. In the early 2000s, only one percent of U.S. high schools included GIS technologies as an element of the school's curriculum (Kerski, 2001, 2003), and the numbers are almost certainly not much higher today (Alibrandi & Baker,

2008), despite ongoing efforts to encourage schools to take up the teaching of spatial thinking generally (National Research Council, 2006) as well as geospatial technologies specifically (Nielsen, Oberle, & Sugumaran, 2011).

A final consideration in regards to the teaching and learning of thematic maps in schools is a disciplinary problem. In a middle or high school, whose job might it be to teach thematic map interpretation and production? Relatedly, where should students learn with geospatial technologies? The National Research Council (2006) report on learning to think spatially recommended including GIS across a range of subjects in the K-12 curriculum, while others have proposed a stand-alone course on spatial thinking to include geospatial technologies (e.g., Nielsen, et al., 2011). But it's safe to say that few, if any, content areas at the secondary level in the U.S., outside of geography, see explicit instruction and learning with maps as an important element of the curriculum. And even in geography, the incorporation of GIS in high school classes is not universally mandated. In fact, as of 2008, only 13 states required high school geography students to analyze geographic information using technological tools (Milson & Roberts, 2008). Of course, geography classes at the elementary, middle, and high school levels could include thematic map interpretation without integrating technology, but there is little evidence that there is any instruction in reading or producing hard copy (paper) thematic maps, despite the fact that they are "extremely common in school atlases and geography textbooks" (Wiegand, 2006, p. 63) and, presumably, appear on state and national standardized tests.

Certainly, geospatial analysis and technologies including the interpretation and production of thematic maps and map argument performances in media are relevant to content areas outside of geography, including history, the natural sciences, psychology, reading, composition, media studies, and political science. As only one example, every secondary level

(grades 6-12) of the Common Core State Standards Initiative (2012) standards for language arts includes something like the following: "Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue" (Standard RI.6.7, 6th grade "Reading: Informational Text"), a standard that could certainly be satisfied by the use of GIS generally and thematic map interpretation and production specifically. Still, there is, thus far, almost no evidence of uptake in any of these content areas (see, however, Milson & Alibrandi, 2008 and Acheson, Bednarz, & Bednarz, 2006 for some examples in various sub-fields in social studies). Regarding GIS specifically, Wiegand (2006) suggests some reasons for the lack of adoption, which include the following: a shortage of appropriate, classroom-ready software; a lack of teacher training programs; and a lack of hardware and/or technical support in schools.

In literacy studies, I did find one article advocating for the inclusion of instruction about the interpretation of thematic maps in language arts and literacy classrooms. As part of a yearlong series of columns in the *Journal of Reading* focused on "dealing with some of the most common types of reading materials in civilized societies," Mosenthal and Kirsch (1990) devoted a column to understanding thematic maps. They argue that thematic maps have received little instructional attention despite their importance in modern society, and they include several instructional activities that could be used in classrooms to teach hypothesis testing with thematic maps.

Although I did not locate any other work in literacy studies specifically connected to the interpretation and/or production of thematic maps in schools, thematic maps and map performances are clearly multimodal ensembles of interpretive interest to literacy teachers and scholars. In initiating this study, a goal was to investigate how scholars and educators might best

employ interpretive frameworks or grammars of thematic map and map performance conventions that can be taught and learned within the context of literacy instruction. These frameworks and conventions depend on an understanding of literacy that is multimodal. But they also must build on work in media literacy and cartography that has established elements of media productions and maps that can be identified, analyzed, and utilized for interpretation and production.

The second section of the literature review, which follows, introduces relevant literature from historical and critical cartography, multimodality, and media literacy that, when layered together suggest frameworks for considering the interpretive challenges of thematic maps and map performances while also identifying possible analytic and interpretive structures that can be used when reading these kinds of maps. These fields and literatures informed the design of instruction at SEC and LCHS. Presented here, they describe a past (i.e., informing the design studies) and anticipate a future (i.e., pointing to possible next steps or sites to revisit in new iterations of the design work). With regard to the past, each section of the review below (i.e., development of thematic maps, critical map interpretation, multimodality, media literacy) describes an area of study that informed design of instruction for the second iteration of the design study (Phase 3) at LCHS.

For each section, incorporation into instruction included the development, by me, of a three-part analytic system that I taught to students and that we reiterated in instruction and activities throughout the study—in formal instructional settings and in informal settings. This is obviously not the only way that these literatures informed instruction; the analytic system is a very small part of the design of instruction at LCHS. However, I describe the analytic system below because it is a good example of the ways in which these fields of literature specifically

influenced the instructional design work. The analytic system was designed to operate as three categories of questions that students could ask themselves while interpreting thematic maps and map argument performances. As part of instruction at LCHS (which is described fully in Chapter 3), each class and I would view and analyze together segments of map argument performances from the media. For example, together, we watched the John King and Wolf Blitzer segment from CNN's Situation Room (described above) about the 2008 presidential election possibilities in Pennsylvania.

Typically, I would divide the class into three groups if we were analyzing something all together, with each group taking one category of questions and paying particular attention to that category during viewing and analysis, and then sharing their findings with the class. In smaller groups, each of three individuals might be assigned one of the categories to focus on. The three categories were *Mappy*, *Recipe*, and *Media Critic*. Within categories, Mappy analyzers paid attention to the elements of the map (e.g., base and data layers, mathematical and statistical data represented in the map). Recipe analyzers paid attention to the "ingredients" of the entire map argument performance or thematic map (e.g., image, sound, color, gesture, gaze, written text, music) and the interactions of ingredients. Media Critic analyzers paid attention to critical elements regarding the segment as a whole (e.g., its point of view, the commitments of the creators of the segment and their purpose in producing it). What follows are the three categories with related questions for analysis within categories that I incorporated into instruction throughout the LCHS study (and presented here exactly as they were shared with and utilized by students):

1) Mappy Questions
    a. What's the base layer?
    b. What are the data layers?
    c. Where do data layers come from? How are mathematical and statistical data represented in data layers (e.g., through color, size of an object on the map, gradations in color)?
    d. What are questions this map can answer? What are questions it cannot answer?

2) Recipe Questions
    a. What are the ingredients of this map or pap performance (e.g., image, sound, color, gesture, gaze, written text, music)?
    b. How are those ingredients interacting together?
    c. What new meanings are formed from interacting ingredients?

3) Media Critic Questions
    a. Who created this map or map performance?
    b. Why was it created? What is its purpose?
    c. How might different people understand the message of this map?
    d. What points of view are represented in the map? Which ones are missing?

In the review below, then, I conclude each section (i.e., development of thematic maps, critical map interpretation, multimodality, media literacy) with a brief explanation of how that category of literature specifically informed this three-category model that I introduced to students and that we operationalized in our activities together throughout the study at LCHS.

Interpretive Frameworks for Thematic Maps and Map Argument Performances

Development of thematic maps. I have attempted, in the summaries of the Channel One and CNN narratives, to briefly describe the cartographic convention of the thematic map. Here, I more carefully define thematic maps and describe their development as tools for data analysis. These descriptions and histories are important for the project of building the conceptual category of map performance, for considering the thematic map as a literacy object requiring new interpretive apparatuses, and for identifying some of the interpretive challenges associated with interpreting thematic maps and map performances. The development of thematic maps is a story of the development of new methods for making arguments and new methods for interpreting

social and spatial phenomena in the world. These developmental trajectories point to the further development of map argument performances (those like John King at the magic wall on CNN News) for making arguments and understanding phenomena in current media and suggest a way of seeing and thinking about thematic maps and map argument performances—as rhetorical ensembles of (at least) spatial, visual, geographical and quantitative information that require readers to develop new frameworks for interpretation across these multiple modes.

For cartographers, there are two broad classes of maps: *thematic maps* and general purpose or *reference maps* (Dent et al., 2009; Kimerling et al., 2009). Reference maps are tied to locations in the world and are intended to represent features of the world (e.g., a standard road map, a globe, a map of subway routes). Thematic maps, on the other hand, layer data on top of geography. They illustrate the geographic distribution of physical or cultural phenomena (Dent et al., 2009). Kimerling et al. (2009) describe a thematic map as functioning "like an essay on a particular topic. Like a well-written theme, a map can focus on a specific subject and be organized so that the subject stands out above the geographical setting" (p. xx). An obvious and familiar example of a thematic map is a blue-and-red presidential election results map like those in the news segments described earlier in this chapter. Other examples include a map showing transportation patterns within an urban area, the average annual rainfall in a particular state, or the distribution of people living in poverty in a city.

Although reference maps date to the fifth or sixth century B.C. (Dent et al., 2009), thematic maps were first introduced by cartographers in the United States only in the mid-nineteenth century (Schulten, 2010). They were available in Europe by the sixteenth century (and widely available by the early nineteenth century)—primarily in the context of efforts to identify and combat the spread of infectious diseases (Koch, 2011; Schulten, 2011). Most famously, a

map drawn by John Snow in London in 1854 (see Figure 2-12) made it possible to identify the source of a cholera outbreak (Schulten, 2010).

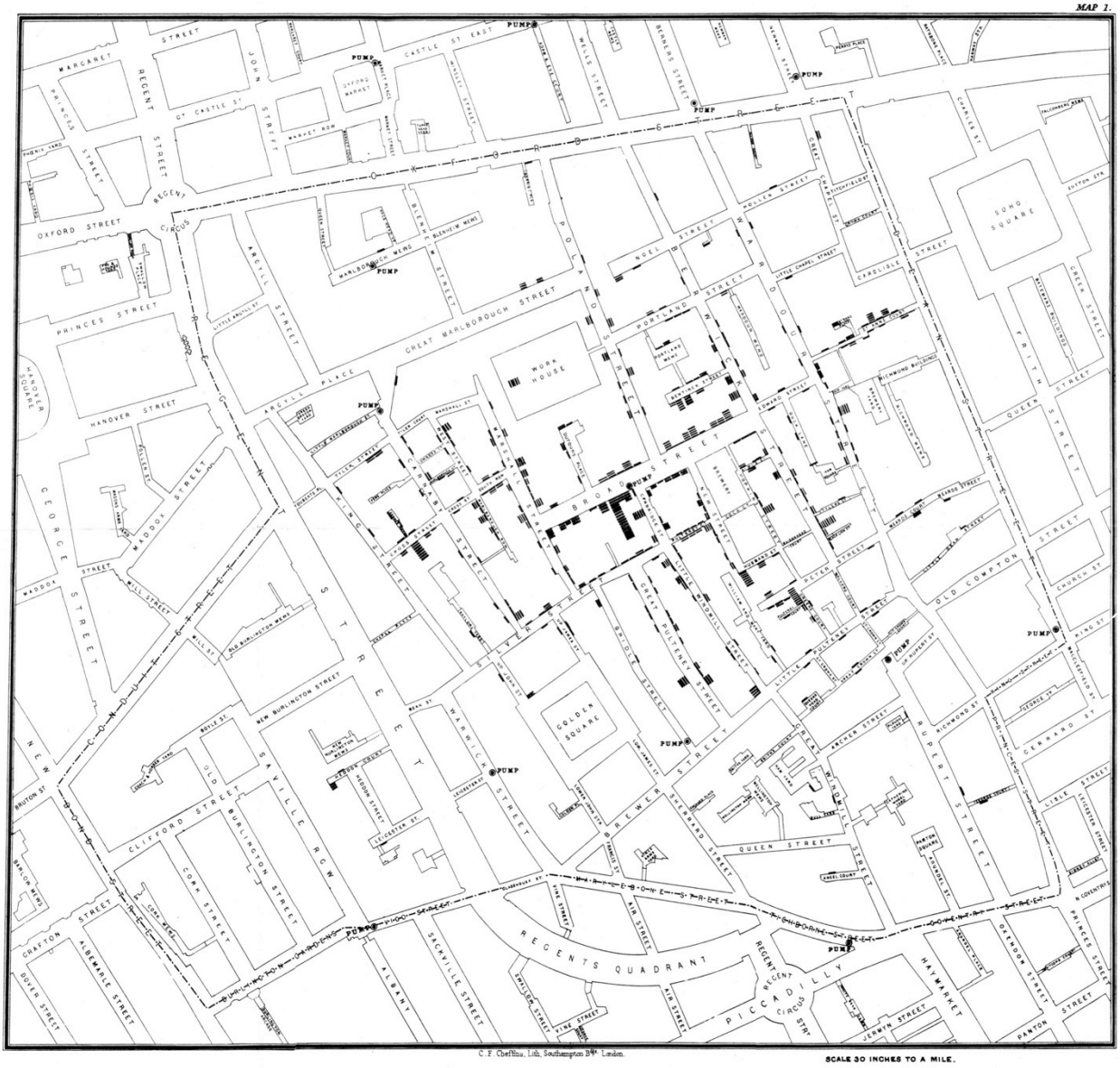

Figure 2-12. Map by John Snow showing instances of cholera during a London 1854 outbreak. By creating this map, Snow was able to identify the source of the outbreak as the public water pump on Broad Street.

As described in the Prologue, Schulten (2010) details the importance of one of the first thematic maps in the United States, the 1861 map produced by the US Coast Survey showing the distribution of the slave population of the southern states (see Figure P-2). The map was one of

the first cartographic representations of census statistics in the U.S. and "represents a turning point in the graphic representation of information" that "initiated a trend of statistical cartography that exploded after the Civil War" (pp. 6-7). Elsewhere, Schulten (2011) has noted that "thematic cartography constituted a seismic shift in the organization of information in the nineteenth century" (2011, p. 56). Maps were, for the first time, "specifically designed for inquiry, analysis, and interpretation" (Schulten, 2012, p. 8).

In the last thirty years, as technologies have rapidly advanced, maps of all kinds have moved from only being available on paper to now wide availability in digital formats and with interactive functionality on the internet (Monmonier, 2009; Wiegand, 2006). Base maps like the ones described in the Channel One and CNN narratives, which are reference maps upon which thematic layers can be added, are difficult to produce, but they are now readily available as is data that can be displayed on thematic maps (Dent et al., 2009). All of this makes it possible for easily accessible Geographic Information Systems (GIS) and Global Positioning System (GPS) technologies—including free online tools like Google Maps, ArcGIS Explorer, and US National Atlas Map Maker—to allow anyone with a computer and an internet connection to explore and/or produce complex thematic maps.

In this current "era of thematic mapping" (Dent et al., 2009, p. 3), the historical trajectory of thematic map development suggests that one interpretive challenge for adolescents with regards to thematic maps is a necessarily analytic stance when viewing these maps. That is, they are intended for analytic purposes. Adolescents need to come with questions in order to effectively read these representations. This historical literature also points to frameworks for considering thematic maps and map performances as semiotic systems for making arguments. Further, the advances in technologies that make possible the easy production of thematic maps

point to production as a key element of what may become (and for some already is) everyday work with thematic maps. Technological advancements in production also point to the possibility of production acting as a key element of the assessment of knowledge related to thematic map interpretation and of the teaching and learning of thematic map interpretation in the same way that production is seen as a central element of learning to critically interpret in media literacy scholarship (Buckingham, 2003), which I describe more fully in a section below.

Development of thematic maps in the design of instruction. The literature regarding the development of thematic maps primarily informed the Mappy analytic category. The questions within this category were intended to support students in focusing on the cartographic elements of the map and map argument performances that they analyzed. The terms *thematic map*, *base layer*, *thematic layer*, and *reference map* were formally discussed and used by me and by students throughout our analytic and productive work together. Exit interviews show that many students learned to talk about thematic maps as layered objects with base layers that could include spatially referent information (e.g., state outlines, rivers, major cities, county boundaries, etc. but no thematic information) topped with multiple, changeable data or thematic layers.

Critical map interpretation. If the developmental trajectory of thematic maps points to these maps as particular kinds of objects—multimodal rhetorical ensembles—that demand new frameworks for interpretation, one possibility for theoretically positioning this new interpretive project is a line of theory and research in map reading that departs from traditional work on map interpretation that considers only the intentions of the map producers and argues for critical and cultural readings (Edney, 2009) that recognize that maps are always positing arguments.

A foundational principle of critical map interpretation is the understanding that all maps are partial (meaning both that they are subjective and also that they are not complete) and

involve selection and abstraction (Adams, 2009). Wood and Fels (1986) wrote the most influential account of critical map reading, an analysis of a North Carolina road map. They foreground the importance of relationships (e.g., human, cultural, intertextual) in the production and interpretation of maps, something also foregrounded by Harley (1987) in his history of cartography. Wood and Fels (1986) posit a systematic semiotic reading of maps, identifying both the sign systems operating with *intrasignificant* codes, those that operate at the level of cartographic discourse (map signs) and *extrasignificant* codes, those operating at the level of social and political discourse (maps as signs). Wood and Fels argue that any map is a cultural artifact making a "coherent and purposeful proposition" (p. 87) and that its meaning depends upon "*a cycle of interpretation* in which it is continually torn down and rebuilt" (p. 88; emphasis original). As I described in Chapter 1 and as I will show in Chapters 4 and 5, I came to see these cycles of interpretation as layers of semiotic performative aggregates and imaginative geographies.

Building on Wood and Fels (1986), Koch (2011) describes the methods of argumentation employed by thematic maps (he is thinking specifically about maps of the spread of diseases, but the observations also apply more generally). He describes maps as assemblages of potential linkages among mapped attributes. These maps (and linkages) create, of rows of data, a unified visual exposition. Mapped attributes are organized in a way that "permits questions to be asked and theories first to be generated and then tested" (p. 14). Using red-blue election results maps from the 2004 U.S. presidential election (including cartograms) as his examples, Wood (2010) makes the case that all maps are arguments "and the mapmaking is a rhetorical exercise" (p. 43).

In fleshing out this point, that the map itself advances propositions and makes arguments, Wood (2010) refers to any map as a "performance of the real" (p. 52). As described in the

summaries of the Channel One News and CNN narratives, I intend to include within the concept of map argument performances not only the intersections of human and map for the purpose of making arguments in the media but also Wood's use of performance to describe the work of the thematic map as always presenting data within an interpretive frame (and in that way performing rather than representing reality).

Critical map interpretation in the design of instruction. Critical map interpretation literatures informed the overall perspective of the three-category analytic model—that maps are arguments and can be analyzed for their evidentiary properties. In the instruction in LCHS about thematic maps and in designed activities with thematic maps, the underlying assumption was that maps are assemblages that do argumentative work. This idea was stated explicitly in instruction in which students were taught that "maps are arguments" and was implicitly reiterated throughout all of the designed activities and in particular with the two activities that will be the foci of the findings chapters—the "John King remix activity" and the "map argument performance production." In those two activities, students were asked to produce reinterpretations or original productions that "told stories" or "made arguments" using existing (in the case of the remix) or newly created (in the case of the map argument performance) thematic maps.

Multimodality. My conception of the possibilities for the teaching and learning of thematic map and map performance interpretation and production are founded on the principal idea—present in the development literature and in the critical map interpretation literature—that argument-making with maps (both in map performances and in the creation of thematic maps) involves rhetorical structures (some discursive, some cartographic). But these perspectives only paint a part of the picture. As I tried to describe in the Channel One News and CNN narratives

that opened this chapter, map performances as I conceive them are not static presentations of sophisticated maps. They involve the complex interactions of multiple modes, including the body and gesture.

One framework for considering these additional modes in relationship to the argument structures of the map is multimodality studies. Jewitt (2008) argues that a central element of contemporary communication, which could be said to be differentiated from communication in previous eras by its global, fluid, and networked nature (Jewitt, 2008; Leander, Phillips, & Taylor, 2010), "is the reconfiguration of the representational and communicational resources of image, action, sound, and so on in new multimodal ensembles" (p. 241). Researchers have studied the emergence of these ensembles from the perspective of theories of multimodality within literacy studies that assume that meaning is created and interpreted in and through multiple representational and communicative modes (Jewitt, 2009a; Kress & van Leeuwen, 2001). These modes, or "organized sets of semiotic resources for meaning making" (Jewitt, 2008, p. 246), include image, sound, gesture, gaze, body posture, music and written text. In multimodal analytic frameworks, meaning making is understood as a social process, where the interpretation of signs and the deployment of semiotic resources occur within social contexts (Jewitt, 2009a).

From the perspective of multimodality within communication and literacy studies, thematic maps and map performances are collections of semiotic resources that make arguments that are interpreted based on readers' and viewers' analyses of those collections. Multimodality offers the possibility of establishing an inventory of the semiotic resources deployed in modes that are at play in thematic maps and map performances and a way of considering how those resources are interacting across modes (Jewitt, 2009a). For example, in the narrative from CNN's

2008 U.S. presidential election coverage, modes present include color, gesture, gaze, voice, image, and space. And semiotic resources at play include the magic wall; John King's actions, vocal quality, and words; maps preloaded into the magic wall; text on the magic wall and framing the screen; and specific magic wall tools or functionalities such as the ability to draw markings on the map.

***Multimodality in the design of instruction*.** The multimodality literature primarily informed the Recipe category. The questions in this category guided students to consider map argument performances as made up of many "ingredients" and interactions among ingredients. I intended the cooking metaphor as a way to support students in (a) seeing a map argument performance as multimodal, as always involving multiple modes or ingredients; and (b) identifying the modes that made up map argument performances.

Media literacy. Identifying the semiotic resources involved in thematic maps and map argument performances and considering the ways those resources interact to make meaning allows for a detailed descriptive account of map argument performances and is central to the project of building the conceptual and analytic terrain of map argument performances. A key interpretive challenge associated with reading and interpreting thematic maps and map argument performances is identifying the meaning made across modes. But these maps are also delivered, as multimodal ensembles, across media channels and in the context of media productions that have social structures and argument frames to be considered in addition to the elements of multimodality.

A key critical framework that can connect multimodal analysis to the social and rhetorical structures of media broadcasts is media literacy studies. The rise of thematic maps and geospatial technologies coincides with a rise in young people's interactions with media, both as

consumers and producers (Ito, et al., 2010). Young people spend more time each day with media (e.g., television, movies, music, video games, magazines, online social networking) than in involvement in any other activity except sleeping (Buckingham, 2003; Livingstone, 2002). Media literacy educators argue that given the ubiquitous nature of the media in the lives of today's young people, teaching young people how to analyze and evaluate the construction, distribution, context, and purpose of media messages is essential (Bruce, 2009; Buckingham, 2003; Kellner & Share, 2007; Schwarz, 2005).

Although the exact definition of *media literacy* has been somewhat contentious (Schwarz, 2005), most media literacy educators argue that it should involve "the reading of and writing with various media" (Bruce, 2009). In other words, teaching and learning with media should "develop *both* critical understanding *and* active participation" (Buckingham, 2003, p. 4; emphasis original). In today's "participatory culture" (Jenkins, 2008) of new media consumption and production (Ito, et al., 2010), researchers have argued for the necessity of young people developing media production skills and competencies in order to participate fully in civic dialogue and literacy practices in the 21st century (Alvermann, Moon, & Hagood, 1999; Jewitt, 2008; Kafai & Peppler, 2011; Kellner & Share, 2007; Kress, 2003). Kellner and Share (2007) argue that *critical* media literacy affords the possibilities of empowering young people to actively participate in a democratic society by focusing on "ideology critique and analyzing the politics of representation of crucial dimensions of gender, race, class, and sexuality; incorporating alternative media production; and expanding textual analysis to include issues of social context, control, and pleasure" (p. 8).

Media literacy in the design of instruction. Media literacy literatures informed the design of activities at SEC and LCHS by foregrounding not only instruction focused on

interpretation and analysis, but also including production as a key component of the design. These literatures also obviously were the primary influence for the Media Critic analytic category within the three-category framework developed for instruction at LCHS. The questions within this category were intended to support students in considering the construction, distribution, and purpose of map argument performance media segments as well as the points of view represented (and not represented) within these segments.

Conclusions: Interpretive frameworks for thematic maps. The purpose of this second section of the literature review has been to identify layers of theoretical frameworks that can be used to identify interpretive challenges associated with thematic maps and map argument performances, flesh out the concept of map argument performance, and point to foundational theoretical and critical frameworks to used in building an interpretive apparatus for thematic maps and map argument performances. Like physical lenses that can be layered together to form a clearer, sharper, or more magnified field of vision, the layering of these theoretical lenses from historical and critical cartography, multimodality, and media literacy form a sharper, synthetic view of thematic map and map argument performance interpretation that I used to build into an interpretive system that could be taught to and learned by young people. They also point to possibilities for future iterations of design work that could improve upon what I developed for LCHS.

Rationale for the Dissertation Study

As evidenced both implicitly by the Channel One News and CNN narratives and explicitly by literature noting the increasing prevalence of thematic maps and geospatial technologies for the production and analysis of thematic maps, young people will increasingly encounter complex thematic maps and map performances in settings that will have import for

their participation in the public domain. Admittedly, these encounters do not currently include sophisticated productions of thematic maps by nonprofessionals for conducting their own analyses. However, the rise of geospatial technologies and the infusion of these technologies in all aspects of daily life (from using cell phones and car GPS devices to watching a weather broadcast or checking out an interactive map accompanying a news story on the *New York Times* web site) lead to questions about new knowledge young people might need in order to interpret and act on this kind of information and also open up new possibilities for civic engagement (Bennett, 2008; Levine & Youniss, 2009). What can educators and schools do to better understand (new) demands on learners for interpreting and interacting with complex maps and map argument performances? And how can that knowledge be leveraged for the teaching and learning of interpretation and production?

Existing fields of inquiry, as reviewed here, have something to offer to these questions:

From educational studies with thematic maps, we know that young people can learn to analyze and act on their understandings of thematic maps. But what about the process of this learning? How is it that young people come to understand the semiotic systems and argument structures of thematic maps or to make decisions based on their analyses?

From histories of cartography, it is clear that thematic maps make possible new understandings of phenomena in the world and can afford entirely new ways of viewing and understanding the world. Does the addition of human interaction with maps, both personally (e.g., while investigating neighborhood crime rates utilizing publicly available, government produced thematic mapping tools) and in public settings (e.g., John King at the magic wall), similarly afford new understandings and new ways of viewing the world?

From critical map interpretation, the social construction of map interpretation is a powerful insight, but how might we leverage this knowledge in teaching young people how to interpret thematic maps they encounter in the world? And, relatedly, how could researchers capitalize on knowledge about the social construction of map interpretation and the rhetorical nature of maps to understand young people's interactions with maps of this nature?

From multimodality within literacy studies, we know that multimodal ensembles make meaning through the relationships and interactions of modes and semiotic resources. But what are the specific semiotic resources utilized in the interpretation and production of thematic maps and map argument performances? And once these semiotic resources have been identified, how can we rethink literacy and learning with thematic maps and map performances? How does a multimodal perspective afford ways of thinking and interpretation that benefit young people in coming to engage critically with these kinds of representations as they participate in civic life?

From media literacy, the importance of learning to critically read and to compose with multiple media is well articulated. But how does a young person go about learning to read new media productions that incorporate interactions with maps that include rapid rescalings and temporal shifts in data displays (e.g., election results from four years ago to election results from a recent primary, to possible future election results)? And how can teachers facilitate students in learning to compose thematic maps and map performances?

Research Questions

I pursued answers to these questions across the three phases of the dissertation study. Here, I distill the questions above into three research questions that guided the design and analysis of the dissertation study:

1. What are some of the interpretive challenges that young people face with respect to thematic map performances as made evident in analysis of a selection of broadcast media? (Phase 1)
2. What are some of the interpretive challenges that young people face with respect to thematic map performances as made evident in analysis of data from a classroom-based design experiment? (Phases 2 and 3)
3. How is the interpretation of thematic map performances learned, and how could it be taught explicitly? And how might moving beyond interpretive learning to thematic map production as well as participation in map performances impact the learning of interpretive strategies and methods? How are interpretation, production, and performance connected as practices of learning and teaching with thematic maps? (Phases 2 and 3)

In the following chapter, I describe those three phases of research and the settings, participants, and methods of data collection and analysis.

CHAPTER THREE

METHOD

Early History of the Dissertation Project

The genesis for this dissertation project was a series of conversations over Skype during the spring semester of 2008. I was in the second semester of my first year of doctoral studies. Rogers Hall, who I had not yet met in person, was in California as a fellow at the Center for Advanced Study in Behavioral Sciences at Stanford University. And Kevin Leander, my adviser, invited me to have a conversation with him and with Rogers about a question they were interested in investigating: What kinds of maps are used in the media? The question was part of our larger interests in people's day-to-day spatial thinking and analysis. Initially, the question was a taxonomic one: we hadn't yet learned about thematic maps or started to consider the demands on readers for interpreting thematic maps. We just wondered what was out there. Because we were interested in young people and learning, we wanted to include a corpus of media segments that were explicitly directed at an adolescent audience. But we also wanted to collect instances of maps in media intended for adults. With that in mind, I started to record daily episodes of Channel One News, which were available via the Internet, while Jasmine Ma recorded segments of CNN News. Below is a brief account of our exploratory efforts as a SLaM research team to categorize instances of maps used by these two news media producers across a small period of time. I report on these efforts here in the Methods chapter, including our findings, because they played an essential role in the development of the dissertation project. In other words, the story of the study design of the dissertation cannot be told without starting here,

where we started, with a question about the kinds of maps that were being used in media for young people and for adults and with our search to find answers to that question.

Analysis of Types of Maps in Channel One News and CNN

Our team focused initial and exploratory analysis on a comparative set of episodes of Channel One News and CNN News's nightly Situation Room program during the 10 days leading up to and immediately following the 2008 U.S. presidential elections. For the purposes of coding these episodes to determine the kinds of maps that were being used in media intended for young people as compared to the kinds of maps being used in media intended for adults, we analyzed three episodes of CNN's Situation Room (approximately three hours of air time per episode; nine hours total) and 10 episodes of Channel One News (approximately 10 minutes of air time per episode; one hour and 40 minutes total). Specifically, we analyzed the following CNN Situation Room episodes: October 29, and November 4, 5; and we analyzed the following Channel One News episodes: October 27, 28, 29, 30, 31, and November 3, 4, 5, 6, 7.

As a team, we developed interpretive codes, coded individually and in teams, and cross-coded episodes (i.e., coded episodes that had been previously coded by another researcher). After development, we used InqScribe video transcription software to code for the following: (a) start and stop time of topic units that involved maps, (b) map base types, (c) map layer types, (d) any dynamic map movement, (e) talk about the map by a news anchor or narrator, (f) human interaction with or on the map, (g) context of the topic unit, and (h) a brief summary description of the topic. It was sometimes difficult to identify a start and stop time for a *topic unit*. We determined that a topic unit was a media segment that involved one "story"—typically this began and ended with definable verbal or visual cues (e.g., an anchor asking an analyst a question, a new graphic with a story title, a camera movement to a new part of the studio). See Figure 3-1

for an example of our coding template and Figure 3-2 for an example of one completed coding segment (from 5 November 2008 CNN Situation Room). Note that choices within codes—for example, map layer "how" types: attribute, 3D area, isoline, dasymetric, choropleth, etc.—have technical cartographic names that we learned after observations and initial coding development by consulting Kimerling et al. (2009).

<start time of topic>
<base type?>{image, planimetric, area cartogram, seating chart, brain, football field, …};
<layer type?>{<how>(<what>)};
<how>{attribute, 3D area, isoline, dasymetric, choropleth, dot map, linear cartogram}
<what>{city, state, popular vote, electoral vote, tropical storm, hurricane, rain, wind speed, …}
<dynamic?>{N, pulse, pan, zoom, re-scale, change(z)};
<talk about map?>{N, Y, notable transcript};
<human acts on map?>{N, repr-gesture, interface};
<context?>{election, storm, other};
<topic description?>{brief summary};
<stop time of topic>

Figure 3-1. Coding template for analysis of maps in news media episodes of Channel One News and CNN Situation Room. The SLaM research team developed these codes through initial observations of episodes and group discussions and coding. We utilized InqScribe transcription software as a tool for coding video episodes. Items <between angle brackets> are coded categories (e.g., map layer types). Items {in curly brackets} are possible responses within coded categories (e.g., "how" types of map layers). N means the coded category was "not present" (e.g., no presence of talk about a map in the segment); Y means "present" (e.g., there was talk about the map in the segment).

[00:21:49.21]
<base type?>planimetric;
<layer type?>choropleth(electoral vote);
<dynamic?>zoom, change(election year);
<talk about map?>Y, JK: Another state I want to look at is right down here. This is the most important part of Florida. Wolf, you know this area very well. Democrats, the further south you go, the further north you are, is what they say. [...] The challenge for Obama now is to govern in a way that keeps it blue, not red.;
<human acts on map?>repr-gesture, interface;
<context?>election;
<topic description?>JK zooms in to show FL, outlining two important areas. He goes to 2004, 2000 and compares these FL areas in those times, zooming in on Orange County, then zooms out again to shift to Gore, then again to Obama.;
[00:22:41.15]

Figure 3-2. Codes analyzing maps from one topic unit in CNN's Situation Room broadcast from 5 November 2008. For explanations of symbols and coding structure, see Figure 3-1. Note that start and stop times for topic unit are within [square brackets], which are used by the InqScribe transcription software for time codes. I coded this segment. It was cross-coded by a second researcher and codes were reconciled together.

Jasmine Ma compiled our final, reconciled codes into an Excel spreadsheet to tabulate results from our exploratory coding efforts. Here, I report on a selection of those results. On average, 14% of air time per episode of Channel One News involved topic units that included maps. In CNN Situation Room, results were similar, with 15% of air time per episode involving topic units that included maps. The most prevalent kind of map was a planimetric base with a choropleth layer (i.e., colored or shaded regions depicting qualitative or quantitative data on the map). However, there were other kinds of maps within the Channel One and CNN corpus. Figure 3-3 includes still frames captured from video showing six types of maps found in Channel One and CNN. These include an area cartogram, an image map (with a base layer that is a photograph or other type of image), a football field as a base, a Congressional seating chart, and a globe. All but the choropleth were atypical examples found, with the image map the second most prevalent across both Channel One and CNN. Note that some of the atypical examples are debatably "maps" (e.g., football field). Our team discussed, at length, what we thought of as a map and

determined to include maps such as a football field base with data layered on top of it or a "map" of the brain, an fMRI image that appeared on CNN on 4 November 2008.

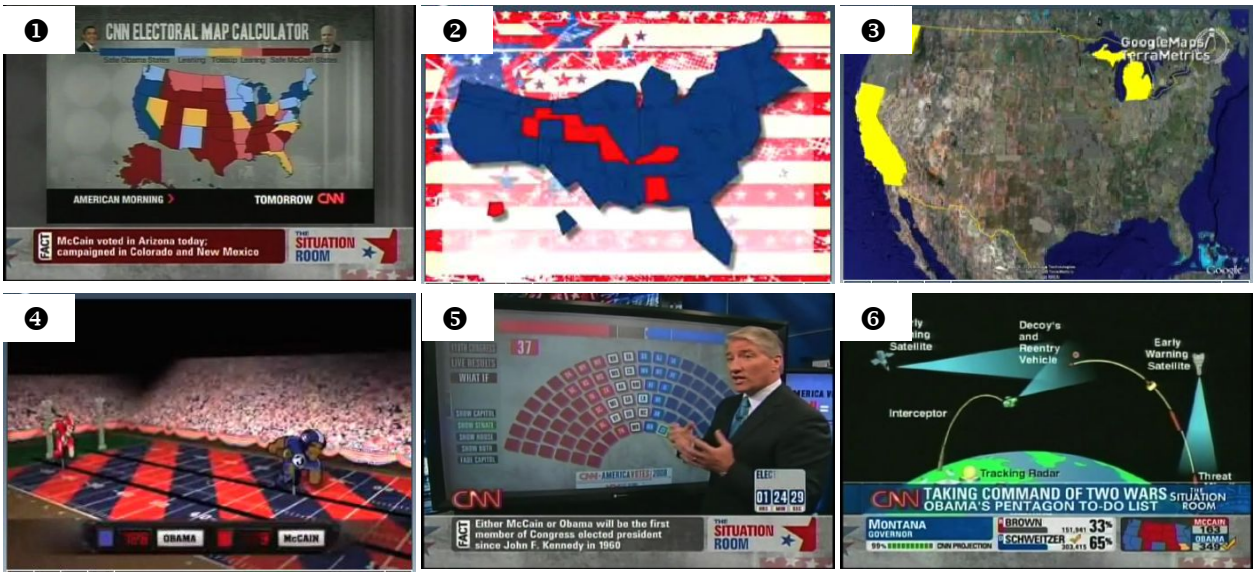

Figure 3-3. Still images of captured video from Channel One News and CNN Situation Room showing examples of types of maps found. Most prevalent was ❶ Planimetric base with choropleth layer (exactly half of all total topic units with maps included a choropleth map like this one from CNN, 4 November 2008). Other types included the following: ❷ Area cartogram (Channel One, 29 October 2008); ❸ Image map (in this case a satellite image as a base, Channel One, 28 October 2008); ❹ Football field (Channel One, 29 October 2008); ❺ Seating chart (CNN, 4 November 2008); ❻ Globe (5 November 2008).

Our coding work was difficult and we approached it carefully and thoughtfully. However, we coded a very small corpus of data representing a particular window of time that may, in fact, have been map-heavy both at Channel One and CNN because of the election. I include our discoveries here not to make any general statement about maps in the media. Rather, I include them to show that in the window of time that we studied, maps were quite prevalent. Young people and adults would have most likely experienced thematic maps (e.g., choropleths, area cartograms) and map argument performances in these media streams and in others at that time (late October and early November 2008). Also, and most importantly for this dissertation report, the initial foray into maps in the media convinced me that complex thematic maps in everyday

media were quite common and that these maps were being presented by media producers as if readers and viewers should be able to read and interpret them easily.

As shown above, it was also through this data collection and analysis that we first encountered the "squishy map" (Channel One) and the "magic map" (CNN) in October 2008. What we initially called the squishy map was the area cartogram that I described in Chapter 2 (see Figures 2-2, 2-4, 2-6)—the map that dynamically changed from a planimetric view of the United States in which state size and boundary were representations of geographical features to an area cartogram in which area represented population (and also electoral weight). We called the map a squishy map because of its dynamic shape shifting, the way it apparently "squished" in the middle when changing from reference map to area cartogram. When we initially encountered it, we had not yet learned the correct technical cartographic term for these kinds of maps (i.e., area cartogram). As far as the magic map, along with all U.S. television viewers, we were seeing CNN's magic map for the first time during the 2008 presidential election cycle. The technology was new enough and its exclusive use on CNN peculiar enough that it was even spoofed on the television show Saturday Night Live (SNL) in October 2008 in a segment featuring SNL comedian Fred Armisen playing with the features of what they called the "Weekend Update Mega Pixel Giant Touch Map" (see Figure 3-4).[8]

[8] This segment was part of a special Thursday night episode of Saturday Night Live called "Saturday Night Live Weekend Update Thursday." Three of these Thursday night prime time half-hour episodes aired prior to the 2008 U.S. presidential election. This episode was the third of these special episodes and aired on 23 October 2008. The episode was retrieved from www.hulu.com/watch/40678

Figure 3-4. The television show Saturday Night Live spoofed CNN's magic wall technology in this skit featuring comedian Fred Armisen that aired on 23 October 2008, 12 days prior to the 2008 U.S. presidential election. This image is a still from the episode, retrieved from www.hulu.com/watch/40678.

It was quickly apparent to us that the thematic maps we found in our collection of segments from Channel One News and CNN News and others like them, couched in media presentations that involved human interaction (including vocal comments, gestures, and taps and swipes on the map's surfaces) and dynamic map movements (e.g., scale changes, changes in historical time, zooms in and out, multiple changing thematic layers) were representative of text types that had not previously been studied. Further, as I described in Chapter 2 in the narratives from Channel One and CNN, these thematic maps and map argument performances were presented as commonplace methods for making arguments in the media. There was no special consideration for the challenge on viewers, presumed to be nonspecialists, to interpret these

maps and map argument performances or consideration for what might be new and/or different about these kinds of texts as compared to other kinds of texts.

We saw the investigation of maps in the media as part of our larger contribution to the development of theories of embodied mathematical cognition that was the goal of an NSF-funded project[9] that began in Fall 2008 with Kevin Leander and Rogers Hall as co-PIs with researchers from two other campuses. The investigation of maps in the media was a case of spatial practice directed toward broad publics via mass media distribution. The study designs for our NSF investigations intentionally moved from "cases to classes." In other words, what we learned in ethnographic cases was intended to inform design of instruction in classroom learning contexts. My dissertation study, reported here, followed a similar trajectory. The overall study design was, broadly, as follows: (a) identify and describe thematic maps and map argument performances as used in the media and (b) design instruction for young people to support learning the interpretation of thematic maps and map argument performances. As I wrote in Chapter 1, the study had three phases across this trajectory:

1. Collection and analysis of video recorded news broadcasts produced for adolescents (Channel One News) and adults (CNN News) featuring *map argument performances* (i.e., segments of news or other media produced to make arguments or tell stories and including bodies and maps in interaction).
2. First iteration of a classroom *design experiment* (Brown, 1992; Cobb, Confrey, diSessa, Lehrer, & Schauble, 2003) investigating methods for teaching and learning thematic map interpretation and production as part of a spatial analysis curriculum at

[9] NSF Award Number DRL-0816406: "Tangibility for the Teaching, Learning, and Communicating of Mathematics" from the Division of Research on Learning in Formal and Informal Settings. See http://www.nsf.gov/awardsearch/showAward?AWD_ID=0816406 and http://www.sci.sdsu.edu/tlcm/

an in-residence summer course for high school students at a university; I call this setting Summer Enrichment Course (SEC).

3. Second iteration of a classroom design experiment investigating methods for teaching and learning thematic map interpretation and production in a public high school media production classroom; I call this setting Local County High School (LCHS).

Below, I describe each of these phases of research including settings, participants, and methods of data collection and analysis.

Phase 1: Analyses That Informed Design Instruction

The purpose of Phase 1 of the research design was three-fold: First, I wanted to identify and describe thematic maps and map argument performances as used in the media. Research questions include the following: What are thematic maps and map argument performances? What are the elements and structures that make up map argument performances? How are thematic maps and map argument performances used in broadcast media for adults and for young people? The second purpose of Phase 1 was to utilize what I learned about the elements of thematic maps and map argument performances as used in the media to identify interpretive challenges facing readers and viewers. Third, I wanted to take what I learned regarding maps and map argument performances as used in the media and what I learned about inherent interpretive challenges with these kinds of complex multimodal ensembles (Jewitt, 2008) and use that information to support and inform instructional design. In previous sections of the dissertation, I have reported on some of this three-fold work. Specifically, in Chapter 2, I extensively considered narratives from segments of Channel One News and CNN as a way of describing and fleshing out the categories of thematic maps and map argument performances. Also, in Chapter 3, in the section immediately above where I have described our early exploratory coding work, I

detailed some of the elements of thematic maps and map argument performances that we observed and articulated in our coding (i.e., map base, map layers, map dynamism, talk, gesture).

In that material, I also described our method for collecting and analyzing map argument performances from Channel One and CNN. I did not, however, describe the method for collecting the two segments included in the narrative in Chapter 2. Both of those segments were collected in October 2008 during the data collection described at the beginning of this chapter. I captured the Channel One episode described in the narrative (from the "One Vote" mock election broadcast on 29 October 2008) using iShowU screen capture software. At the time, Channel One posted all episodes online on their website (http://www.channelone.com/) and left them up for two weeks. I played each episode on my computer in real time and recorded it using iShowU. Jasmine Ma captured the episodes of CNN Situation Room through her DVR.

Below I include another complementary analysis of the Channel One "One Vote" segments described at the beginning of Chapter 2. This analysis was completed prior to designing instruction for SEC and LCHS and fits within the two purposes of Phase 1 described above; that is, (a) the analysis aids in describing and identifying thematic maps and map argument performances as conceptual categories and (b) the analysis informed instructional design. As with the coding results that I reported above, I include this brief analysis here, in the Methods chapter, because it frames an instructional history of design work completed at SEC and LCHS. In other words, the story of the study design is a story that includes this brief analysis. After this analysis, I discuss the ways in which all parts of Phase 1 informed instructional design for Phases 2 and 3.

Four Analytic Perspectives on the Channel One "One Vote" Episode

Below, I report on a multiple-perspective analysis drawing on work from multimodal

analysis within literacy studies (Jewitt, 2009a; Kress & Van Leeuwen, 2001; Norris, 2004; Phillips & Smith, 2012), complementing that work with other theoretical and methodological lenses described in the literature review in Chapter 2: historical and critical cartography and media literacy. In addition to serving as a history of my dissertation project (i.e., a history of efforts that informed the design of instruction at SEC and LCHS), reporting on this analysis also offers to literacy studies methods for describing and understanding extant complex media forms and the demands on adolescents to interpret them.

Here, I have explored the map argument performance excerpts from Channel One News described in the Channel One narrative at the start of Chapter 2. In order to articulate the complex demands placed on viewers of this episode of Channel One in interpreting thematic maps and map performances in the reporting of election results, I analyzed the two segments described in Chapter 2 (the initial lesson regarding "electoral weight" and the reporting of the "One Vote" election results with a reiteration of the electoral weight lesson) utilizing four perspectives: a multimodal perspective, a cartographic perspective, a media literacy perspective, and, finally, a spatial thinking perspective. The first three analytic perspectives were developed out of the bodies of literature described earlier in the dissertation, while the spatial thinking perspective offers a new analytic layer that is developing out of our SLaM research team's work but that is still nascent. The purpose of such a four-pronged, layered analysis was to consider various ways of describing the structures, codes, and conventions being utilized in these maps, allowing each perspective to foreground elements of thematic maps and map argument performances that are not evident from the other perspectives. Taken together, these four analytic perspectives provided a multidimensional view on map argument performances that informed the design of instruction at SEC and LCHS.

Multimodal analysis. In order to "understand the principles of use and modal resources available in [this particular] multimodal representation" (Jewitt, 2009a, p. 22), and to consider how visual and other modes are "configured and put to work for the purposes of society" (Jewitt, 2009b, p. 4), I draw on multimodal analytic frameworks, in particular Kress and van Leeuwen's (2006) grammars of visual design and Jewitt's (2009a) theoretical assumptions underpinning multimodality (i.e., that meaning is made through many modes, that each mode realizes different communicative work, that meaning is orchestrated through the selection and configuration of modes, and that meaning is social; see pp. 14-16).

In these two segments from Channel One, verbal and visual modes were marshaled to tell a story utilizing *narrative representations* (i.e., representing processes of change; Kress & van Leeuwen, 2006) and *conceptual representations* (i.e., representing "more or less stable and timeless essence"; Kress & van Leeuwen, 2006, p. 79). The narrative at play was that states have different electoral weights, but this narrative was presented against the stable conceptual background of the political geography of the United States. Channel One producers utilized both "carrier" and "possessive attributes" (Kress & van Leeuwen, 2006) in displaying the maps. That is, the elements of the maps "*fit together* to make up a larger whole" (Kress & van Leeuwen, 2006, p. 50) with the carrier representing the whole (e.g., the shape of the United States) and possessive attributes representing the parts of particular maps (e.g., geographical state boundaries).

But in moving from a thematic map (Figure 2-5) representing election results (i.e., red and blue colored states on a familiar *planimetric* view map—the planimetric view is two-dimensional)—to an area cartogram denoting the states' electoral weights (Figure 2-6), modal changes across the representations signaled a radically changed semiotic system (i.e., the area

cartogram) being built upon the same signifying operation used to portray state-by-state election results in the planimetric map.

Across both representations (Figures 2-5 and 2-6), contiguousness and color were constant, but state shape and size change, as did Kumari's discourse (from "how many" to "which"). In the semiotic system of the cartogram (Figure 2-6), state size and shape no longer referenced geographic area and global position but a proportion of electoral weight relative to other states.

Cartographic analysis. Drawing on methods in cartography for producing and interpreting maps (see, e.g., Kimerling et al., 2009), a thematic map is seen as a base map with added attribute layers. Thematic maps, in this framework, display statistical data by laminating layers of attributes atop a particular base. Analysis and interpretation can proceed from base to layers, considering, first, the geospatial context of the base layer and, subsequently, the statistical data represented in each laminate layer. From the cartographic perspective, the first map in the "One Vote" episode (Figure 2-1) was actually not thematic. Rather, this map was a reference map, intended to identify pertinent features in a spatially accurate way. In this map, an attribute layer of state boundaries was added to a planimetric, or two-dimensional, base outlining the borders of the United States.

The second map (Figure 2-2) was a quantitative thematic map known as a contiguous area cartogram in which the base layer displayed state sizes as proportional to the number of electoral votes possessed by each state. In the area cartogram from the conclusion of the episode (Figure 2-6), a choropleth layer was added to the area cartogram base. With a choropleth, areas are shaded or colored according to the statistical measurements being displayed on the map. In the case of this map (Figure 2-6), the states were shaded according to statewide election results,

with red representing that a majority of the popular vote in the state went for the Republican candidate (John McCain) and blue representing a majority of the popular vote going for the Democratic candidate (Barack Obama). This map was qualitative because there are no gradations in the data presented. Each state has the quality of being red or blue as a representation of a majority of the votes going for McCain or Obama respectively.

Media literacy analysis. Methods for conducting analyses within a framework of media literacy that account for the social context of media messages vary, but one method of close analysis, intended for classroom use, involves guided textual analysis (Buckingham, 2003) that focuses on the audience and purpose of the message, the way the message is contextualized and delivered, and the points of view represented by the message (see, e.g., Hobbs, 2011).

In this episode of Channel One, the "One Vote" results were announced in the format of a high school pep rally, with the show recorded in front of an audience of students sitting in a gymnasium. A band played, cheerleaders performed, and the school's ROTC students marched into the gym. The intended audience for this message was clearly high school and middle school students. Within the gymnasium, students representing different candidates were interviewed. They each briefly explained why they cast a vote for one or the other of the presidential candidates. Throughout the episode, students from across the country were shown explaining their votes. These students appeared to have filmed themselves with web cameras.

These elements of the broadcast were intended to make the "One Vote" process and participation in presidential elections generally appear fun and truly democratic—students from all over the country could participate. But they hide the commercial nature of Channel One and the fact that only schools that have contracts with Channel One were actually participating in "One Vote." And these social and commercial contexts have import for an interpretation of the

map. What was truly represented in the maps that depict final results? How many students voted in the election within each state? Were these students and schools representative of the high school and middle school population in those states? What social contexts about young people were not represented in the map because of the commercial nature of the show?

Insights from spatial cognition and analysis. Our recent ethnographic work in professional settings where complex spatial analysis and modeling are routine practice has identified the interrelations of scale and modalities as key features of spatial analysis (Hall, Leander, Ma, Taylor, & Phillips, 2010). Although this isn't apparent from the narrative description and images (Figures 2-1, 2-2, 2-3, 2-4, 2-5, and 2-6) above, in the Channel One broadcast under analysis, the movement from the planimetric view map to the area cartogram was a dynamic process of rescaling, in which statistical data layers placed atop the geographic base changed as the scale was changed.

These changes in scale and the representational function of the modalities associated with the changes in scale afforded different learning: in the show segment that comes at the conclusion (i.e., displaying results of the "One Vote" election), space, scale, and modality represented and afforded different statistical data than they did in the rescaled movement to the cartogram. Here, not only was the object of the scale important (i.e., the different measurements represented by changes in size and shape of states), but also the process of scaling was important. During the speedy rescaling, viewers of the map were called on to reconfigure an interpretive apparatus capable of considering the changes in data representations being presented by and following the movement from one map to the next.

Analyses of Maps in the Media (Phase 1) Informed Design of Instruction (Phases 2, 3)

Above and previously in the dissertation, I have analyzed and described thematic maps and map argument performances in the media. Specifically, I have engaged in the following description and analysis: (a) in Chapter 2, I considered narratives from segments of Channel One News and CNN; (b) in Chapter 3, above, I described exploratory coding work of our SLaM research team of 13 television news episodes (10 from Channel One News and three from CNN); and (c) also in Chapter 3, immediately above, I briefly engaged in a four-perspective, interdisciplinary analysis of two segments from the Channel One "One Vote" episode broadcast 29 October 2008. These three sections of the dissertation articulate analyses and discoveries that specifically informed the design of instruction at SEC and LCHS. Previously, I have described the way that literature reviews and textual analyses impacted the three-part analytic framework that I taught to students in LCHS (i.e., the Mappy perspective, the Recipe perspective, and the Media Critic perspective on map reading). Here, I detail four specific discoveries from Phase 1 that informed instructional design broadly and briefly discuss, for each discovery that informed instruction, the ways that instructional design was impacted:

1. *Discovery that informed instruction:* Thematic maps can be viewed and constructed as base maps with thematic or data layers.

   Impact on instructional design: This discovery informed the design studies by providing me with a vocabulary and structural framework for talking about thematic maps with young people. This idea—base and layers—was a metaphor central to our early observations of maps in the media, and it held throughout the design study as a powerful and sensible way of talking about thematic maps with students. As evidenced by exit interviews at LCHS, it seemed to be a way that students understood and thought about thematic maps both interpretively (as they read maps or thought

about how best to teach others to read maps) and also constructively (as they built maps or thought about how best to teach others to build maps).

2. *Discovery that informed instruction:* Maps are arguments that permit different interpretations and require questioning and interrogation to determine multiple potential meanings.

   Impact on instructional design: The overall critical framework of the design studies—that maps should be questioned—comes from the concept central to critical cartography that maps make arguments. From the outset, I treated maps as objects of study, of inquiry, and of critical interpretation. The opening day at LCHS included a focus group discussion (each class was split in two, with Kevin Leander leading one focus group discussion while I led the other discussion) of a segment from CNN News Situation Room I had recorded a month before this discussion. Questions in the focus group discussion included the following, which attempted to frame maps as arguments that could be interrogated: How are the maps used to make the point John King is trying to make? Do you think there were important parts of the map that were not part of the story being told by John King? Could people understand the map differently than John King does or tell different stories with this same map? What are other stories that could be told? Or, what are other main points that could be made? (For a complete list of questions from the focus group discussion, see Appendix E).

3. *Discovery that informed instruction:* Thematic map layers "show" and "hide" numerical and statistical data.

   Impact on instructional design: In group analysis with students and in their production activities, we worked to support the idea that readers and viewers needed

to move past the "at-a-glance" sense of the map to question thematic layers. The following questions were considered explicitly in group analysis sessions and implicitly as students investigated census data via the Social Explorer online application for building thematic maps: Where did the data layers originate? How was data collected that supports statistical evidence as represented in the map? In what ways are qualities or quantities turned into colors, shaded regions, or differently sized area units? And how does this move to color or shading or size change the way the qualitative or statistical information is understood?

4. *Discovery that informed instruction:* Map argument performances are multimodal ensembles comprised of multiple layers of sign systems interacting to create meaning. *Impact on instructional design:* This finding informed instruction in the way that we approached analytic tasks as involving the observation of "ingredients" of the map argument performance. In focusing students' attention on the ways in which multiple modes (e.g., image, sound, color, gesture, gaze, written text, music) layered to form meanings, we hoped to support their interpretive and productive efforts. Keith's "ecosystem" metaphor from Chapter 1 of the dissertation, which he shared in the exit interview, is a good indicator of the ways in which students came to see map argument performances as complex, multilayered, and multimodal. The multimodal nature of map argument performances also led, in part, to a commitment with the design of instruction to production as a means for young people to learn about and from thematic maps.

Having described the ways in which Phase 1 of the study impacted instructional design, I move now to the setting and context of the design experiment phases of the dissertation. Below, I

separately introduce the settings, participants, instructional design, and methods of data collection for Phase 2 (SEC) and Phase 3 (LCHS). Following that, I describe methods of data analysis for both phases.

Phase 2: Design Experiment at a Summer Enrichment Course

Phase 2 was the first iteration of a classroom *design experiment* (Brown, 1992; Cobb, Confrey, diSessa, Lehrer, & Schauble, 2003; Cobb, Zhao, & Dean, 2009; Sandoval, 2004) investigating the teaching and learning of thematic map and map argument performance interpretation and production as part of a Summer Enrichment Course (SEC) devoted to spatial thinking. Design experiments are concerned with ecologies of learning and with developing domain-specific theories that attend to the processes of learning as well as the means of supporting learning (Cobb, et al., 2003). The goal is to make these theories practical and applicable across learning contexts. Viewing the interpretation and production of thematic maps and map argument performances with young people as a domain to be investigated, and one that has not been researched, the purpose of this phase of the study was to test theoretical conjectures regarding the design of instruction in this domain.

Summer Enrichment Course (SEC)

Setting and participants. As I described at the outset of this chapter, this second phase of my dissertation study fit within the larger project of our research team to investigate cases of professional workgroups doing day-to-day spatial thinking and analysis as a way of identifying principles that could be taught in the context of K-12 learning in formal and informal settings. We called this move from ethnographic cases to pedagogical contexts "cases to classes." One "class" was a Summer Enrichment Course that we taught together as a team in the summer of 2011 (June 20 – June 30). Participating in our class were 12 students, all rising ninth and 10th

graders, who lived in university on-campus housing at a large urban university for two weeks while taking the course. Students had volunteered to take the course from among several other choices and traveled to attend from several states in the Southeastern United States. Some students were returning to the summer enrichment program, having participated in previous years. However, this was their first time taking this class and the first time the class had been offered.

We viewed SEC as a design experiment testing and developing theories of learning within the domain of spatial thinking. We designed and taught the course together as a SLaM research team, embedding instructional activities, course readings, and assessments based on literature that had influenced our thinking (e.g., Hägerstrand, 1970; Nespor, 1994; Wood, 2010) and findings from our ethnographic studies regarding the learning and teaching of spatial thinking. The curriculum for the course included three main areas of instruction and investigation: mathematics of space and motion, maps in the media, and mobilities. Our class typically met for six hours of instruction each weekday during the two-week session (54 total hours of instructional time). For the purposes of this phase of my dissertation study, the relevant area of instruction was "maps in the media," which included approximately 7 total hours of instructional time (see Table 3-1 for a rundown of instructional activities from SEC related to maps in the media). Kevin Leander and I designed and led instruction for all maps in the media sessions. Maps in the media sessions occurred in three different locations. We had a small, "home base" room where we could hold discussions and small group activities. However, there were no computer stations in that room. We utilized two computer labs for activities in which students needed access to the Internet or to GIS applications—one was located across the hall,

only a few feet away from our home base room; the other was in a library several buildings away (about a five minute walk).

Table 3-1

Schedule and Brief Description of "Maps in the Media" Instructional Activities from Summer Enrichment Course

Date	Time	Brief Description of Instructional Activities
June 21	1.5 hrs.	Introduction to maps in the media, Channel One "One Vote" group viewing, *NY Times* map hunting activity in small groups
June 22	3 hrs.	Map vocabulary (e.g., thematic map, choropleth, dot map), thematic maps as base plus layers, introduction to GIS software (ArcGIS Explorer), group discussion of example thematic maps found online, small group analysis and presentation of Internet thematic maps (see Appendix A for instructions students were given for this assignment), small group and whole class analysis of CNN Situation Room segment, introduction to and preparation of "John King remix" (see Appendix B for students' instructions for conducting the analysis and for completing the John King remix and Appendix G for a transcript of the CNN Situation Room segment that students used in preparing their remixes)
June 23	1 hr.	Complete, share, and reflect on "John King remix"
June 24	1.5 hr.	Create and share map argument performance (see Appendix C for instructions students were given)

Instructional design and rationale for design. The instructional activities listed and briefly described in Table 3-1 were our first attempt at teaching and investigating the interpretation and production of thematic maps and map argument performances. Here, I briefly explain our instructional design and rationale for design. This setting for instruction was unique in many ways and that had an effect on the way Kevin and I conceived of and carried out teaching and learning. For example, we were committed to connecting across the variety of content across disciplines and fields related to spatial thinking as a domain. During and after the "maps in the media" sections of the course, we wanted students to actively connect to other

sections in the course (i.e., the mathematics of space and motion and mobilities). We did not want students to think of any portion of the course as isolated or disconnected. Therefore, as we involved students in activities such as the *NY Times* map hunting activity from a lesson intended to introduce maps in the media on June 21, we explicitly made connections to an activity they had participated in the day earlier when they learned about many different kinds of maps. Although our focus in the "maps and the media" sections of the course was on (a) thematic maps (as distinct from other types of maps—e.g., maps used for wayfinding or for identifying the spatial distribution of things) and (b) maps in popular media (including print newspaper, online, and on television), we also saw our students as developing important general concepts related to maps and mapping that would show up in other parts of the course (e.g., when they created maps that displayed their personal mobilities at home or when they considered the representational value of maps by ground truthing maps of the university campus).

Because students spent six instructional hours each day with us, another unique element of this course was the flexibility in our schedule and the large chunks of time that were available for instruction and activities. These large amounts of available time made possible the scheduling of lengthy discovery or production activities. Further, students could move from a demonstration to an experiential opportunity without having to wait until the next day for class, as might be more typical in a standard high school or middle school schedule. The schedule also included established half-hour daily study halls (this was true of all classes offered as part of the residential summer enrichment program). During this time, we most often assigned readings for students. "Maps in the media" readings that connected to thematic maps and map argument performance were excerpts from Wood's *Rethinking the Power of Maps* (2010) and excerpts

from a human geography workbook that took a map-centric perspective (Pearce & Dwyer, 2010).

Beyond the unique structural aspects of the course that affected our instructional design, we were also influenced by the discoveries that informed instruction from Phase 1 of the dissertation study. The four discoveries I outline above had clear connections to content in the seven hours of instruction at SEC: For example, thematic maps as "base maps plus layers" was evident in the way we conceptualized and talked about thematic maps as we introduced them. This was true both for the interpretation of content as well as for the production activities. For example, when students analyzed maps from the Internet in small groups, they shared their observations about the base map and about the data layers. And when students learned how to use ArcGIS Explorer before and during the creation of their map argument performances, they utilized the logic of the software, which was to choose base maps and layers.

Because of the second discovery that informed instruction above (i.e., maps are arguments that permit different interpretations and require questioning and interrogation to determine multiple potential meanings), we built in multiple opportunities for students to analyze and question thematic maps both as a whole class and in small groups. Additionally, the Wood (2010) reading introduced his perspective that maps make propositions rather than represent. As students found, for example, sample thematic maps from the Internet, they described the various interpretations that were made possible by each map.

The mathematics of space and motion was one of the focal domain areas of the course. As such, there were clear connections between the third discovery that informed instruction above (i.e., thematic map layers "show" and "hide" numerical and statistical data) and our design of instruction for "maps and the media." Specifically, as students interrogated maps together and

in their small groups, we pointed to the numerical data presented and asked questions about it: Where did these data come from? How do we know? How are they represented on the map? What's hidden, misrepresented, or questionable about the numerical or statistical data? Additionally, the readings in the human geography textbook (Pearce & Dwyer, 2010) included sections devoted to the function of data in the design of thematic maps. For example, the following paragraph explains the kinds of data best depicted in a choropleth:

> For example, a correct choropleth shows **proportional data**, such as percent of population—or per capita—or per square mile. What if you wanted your map to show the total number of Muslim people in each country? Number of people is **count**, rater than proportional, data. For that type of data, the choropleth is not necessarily a good choice. (Pearce & Dwyer, 2010, p. 96; bold is original)

As for the fourth discovery that informed instruction above (i.e., map argument performances are multimodal ensembles comprised of multiple layers of sign systems interacting to create meaning), our instructional design included analytic and productive activities focused on attending to this discovery. For example, our initial introduction of a segment from John King's Situation Room (a longer version of the CNN narrative in Chapter 2) included dividing viewers within groups into three different areas of focus: one student was to focus on John King's body, one on his vocal narration, and one on the map. Dividing viewers' focus in this way, which was a precursor to the three-part analytic model I introduced at LCHS and that I described in Chapter 2, supported them in conceiving of the map argument performance as multimodal. Additionally we thought the "John King remix" activity, which asked students to create a new vocal track over top of a segment from CNN Situation Room with John King performing political analysis at the magic map, would, in isolating one of the modes present in

the performance, support students' conceptions of map argument performance as multimodal. This "John King remix" was an innovation that proved to be analytically rich for me when observing students in process (I will discuss this in detail in Chapter 4).

As a final reflection on the design of instruction at SEC, I want to point out that Kevin and I are both former high school English and Language Arts teachers. Currently, we are literacy researchers. These biographical histories also certainly played a role in our design of instruction for this new domain. We took a largely textual approach, engaging students in small and large group analyses and critical interpretations of thematic maps and map argument performances as texts. Further, Kevin and I both have an interest and background in media literacy, in young people's media production across settings, and in practices of media production youth engage in on their own (e.g., remix). Our desire to create learning opportunities that involved not only the reception and interpretation of maps and map argument performances but also the production and remix of texts was surely influenced by these histories.

Data collection at SEC. Data collection consisted of video recordings of all instruction and activities. To capture as much of the sometimes spread-out group work and activities as we could, we typically had three operating digital video cameras with wireless microphones to record high quality audio. Standard practice was to locate one camera with a wide view of the room where instruction was taking place, one camera on the large pull-down screen at the front of the room if something was being projected there, and one camera to "follow" other activity (e.g., focus on one particular small group of students). Sometimes the "wide" and "screen" cameras would also follow small groups if there was not whole class instruction to record.

In following small groups, we positioned cameras to capture the production of thematic maps in a way that students' computer screens were visible as were their interactions with the

screens and with each other. We also collected student work (including digital files of student projects), artifacts related to instruction and design, and pre- and post-test data (see Appendix A for pre-test items related to maps in the media). At the conclusion of the course, we conducted individual interviews (audio recorded) with all students. These interviews focused on student learning and engagement across the course as well as on specific activities that students found meaningful. In terms of our design processes, we collected audio and/or written records of our design meetings and instructional decisions.

Phase 3: Design Experiment in a High School Media Production Classroom

Phase 3 was the second iteration of a classroom design experiment (Brown, 1992; Cobb, Confrey, diSessa, Lehrer, & Schauble, 2003) investigating the teaching and learning of thematic map and map argument performance interpretation and production in a high school media production classroom at a large suburban high school. Below I describe the settings, participants, instructional design, and methods of data collection for Phase 3 at LCHS. Following that, I describe methods of data analysis for both phases.

Local County High School (LCHS)

Setting and participants. I conducted Phase 3 of the dissertation study in three media production classes taught by the same teacher at LCHS, a large suburban public high school in Tennessee (2205 students in grades 9-12; Tennessee Department of Education, 2012). LCHS is the largest high school in the district, though all of the high schools are similar in size. The student population at the time of the study was 77% White, 13.3% African American, 5.5% Hispanic, and 4.1% Asian/Pacific Islander (Tennessee Department of Education, 2012). The state of Tennessee (Tennessee Department of Education, 2012) classifies 27.3% of the students as *economically disadvantaged*, meaning the students qualify for free or reduced lunch.

Because the study involved the investigation of the teaching and learning of curricular objects (thematic map productions) that have not yet found a disciplinary home in K-12 schools, I sought out a study site that could accommodate the study and in which students, teachers, administrators, and parents would hopefully find the topic beneficial. Because the study involved media interpretation and production, I focused on identifying a media production class where I could conduct the study.

Within the countywide district in which the study is situated, there were two media production programs. I contacted the teachers in charge of both of these programs, and only the teacher at LCHS agreed to participate in the study. Both programs were started by the same teacher, Ken Norman (a pseudonym), who is currently at LCHS. Mr. Norman had been teaching for 19 years at the time of the study and had been at LCHS since it opened in 2000. Before the school was opened, Mr. Norman successfully requested a classroom space to accommodate the media production program. For a map of the classroom that I created see Figure 3-5. Note that this map is not drawn to scale, but it does include key aspects of the room. The room featured a typical-looking classroom space (e.g., large whiteboard at the front of the room, desks arranged in islands) adjacent to a large television studio with two semi-permanent sets—one with the look of a news set (e.g., a desk for anchors and an adjacent space for sports and weather reporting) and the other a stage area or "porch" where larger groups of people could gather (e.g., the cheerleading squad stood on this set while the principal of the school talked about them as part of a daily news broadcast that I observed). Also connected to the classroom were three smaller rooms. One was a large production suite, with several television monitors, editing machines, and computers for producing programs that were broadcast throughout the school. The other two were storage rooms for equipment.

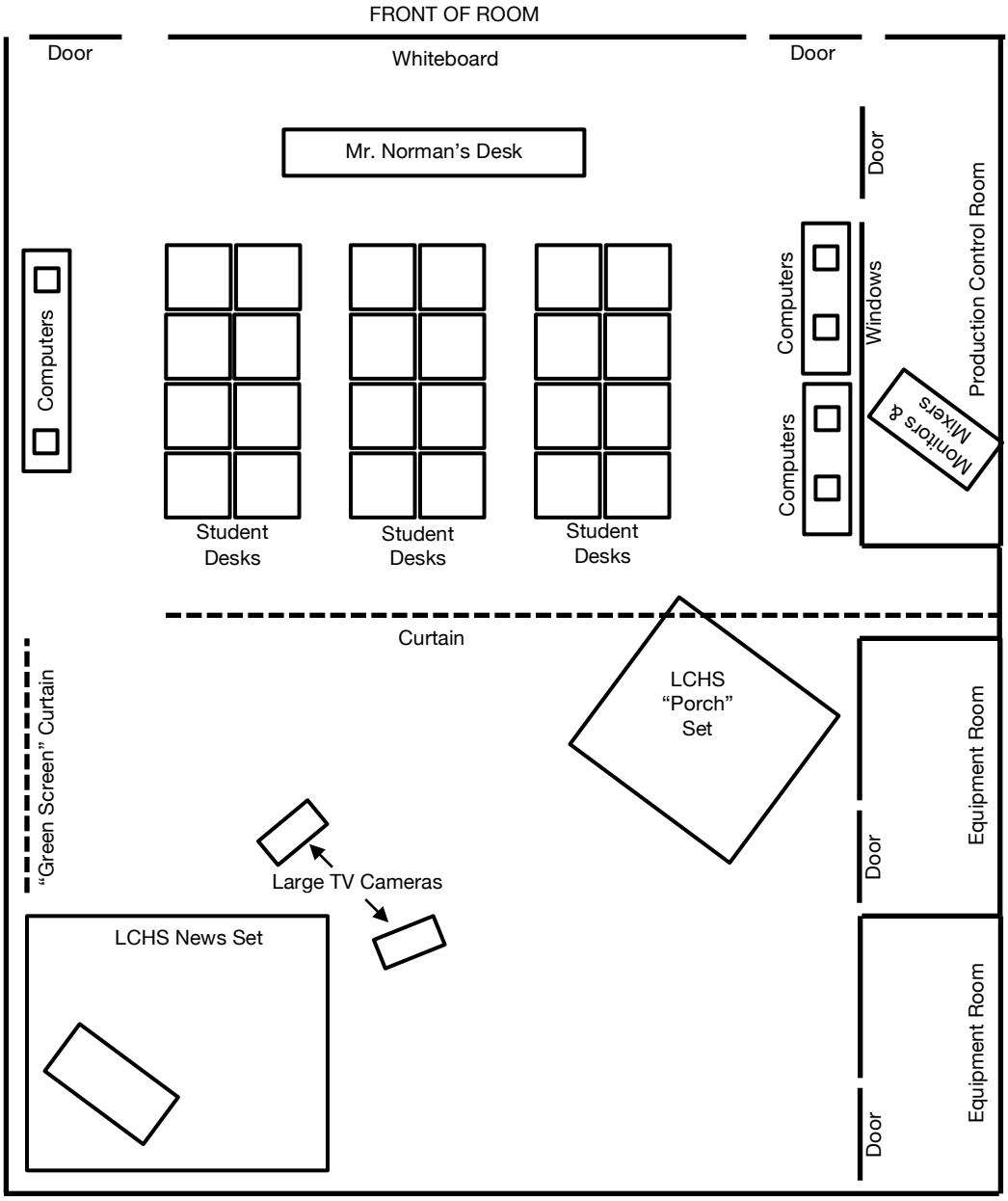

Figure 3-5. Map of the media production classroom at LCHS. Map is not drawn to scale.

The main classroom space and the television studio space were separated by a heavy curtain that could be pulled to block some light, though it did little to block sound. Both the classroom and the studio had very high ceilings, much higher than was typical for other classrooms in the school. The room was decorated with posters displaying logos from various

television networks (e.g., CNN, BET, NBC, TNT, Fox News, ESPN, Nickelodeon). The logos on the posters appeared to have been painted by students on white poster board. The front of the room was also decorated with posters depicting athletes and inspirational messages. There was a whiteboard in the front of the room and also one on a side wall. The whiteboard on the side wall (to the right as you came in the front door of the room) was divided by tape into sections creating a calendar. The 12th grade class used this calendar to plan the weekly television show that they produced.

A few locations in the classroom were noteworthy for the role they played in students' work and productions during the study. There were three tables in the classroom that each had two large Macintosh iMac computers on them (six total computers). One table was located against the wall on the left side as one was looking at the whiteboard at the front of the room (see Figure 3-6). The other two tables were located against the wall on the right side of the room as one was looking at the whiteboard at the front of the room (see Figure 3-7). The right side wall also had imbedded windows that looked into the large production control room. Student groups (of four or five students each) huddled around each of these computers when working on instructional activities. For example, in Figures 3-6 and 3-7, students were creating maps to use in their map argument performances.

Figure 3-6. Table with iMac computers located on the left of the room as one is looking at the whiteboard. Students gathered around the computers to work on thematic map projects at LCHS.

Figure 3-7. One of the two computer tables located on the right side of the room as one looked towards the front whiteboard. The second computer table on this side of the room is out of the frame to the right. Behind the glass windows is the production control room.

Another location of note for students during the study was the "green screen," which was an area next to the news set in the television studio. The green screen itself was actually a green curtain. With the green curtain in place, the television technology made it appear to viewers in a final production as if a map or other image was projected behind the person who was standing in front of the screen. Movie special effects and weather news reports are created using this technology. Students standing in front of the screen could see, in a monitor placed next to the screen and just off camera, the map that was projected behind them, although the green curtain remained blank (see Figure 3-8). Students could gesture over the green screen, with their gestures aligning with areas of the map as they spoke. The green screen was mentioned by many of the groups in exit interviews. For the 10th and 11th grade students, they were excited to use this technology because it was something they saw themselves using more in the future and had not yet had a chance to use. For the 12th graders, who were weeks away from graduation at the completion of the study, the green screen was still a fun technology to use because only a few of them (e.g., a student who took ownership of reporting the weather during daily announcements), had used it regularly, if at all, during their time in the media production classes over the previous three years.

Figure 3-8. A student, Bailey, stands in front of the green screen curtain during rehearsal of her map argument performance. In front of her is the monitor showing what will be seen by viewers (i.e., the map projected behind her). Bailey was holding the script that she wrote to accompany the maps in her group's map argument performance. Behind the TV monitor is the back of the news set where students broadcasted the daily announcements.

Mr. Norman taught three media production classes—each with 25 students and each for one grade level of students: 10th, 11th, and 12th graders. In the 10th grade class, students learned how to critique and produce media and created individual and group projects. The 11th grade class produced a daily live newscast that was broadcasted throughout the school. The newscast included announcements, results of campus competition and sports events, regional and local sports information, and weather. The 12th grade class produced a weekly hour-long news magazine that was broadcast throughout the school during lunch on Fridays. Towards the end of

the year, the 10th grade class began to produce some parts of the daily newscast in preparation for the following year.

At the time of the study, each student attending public high school in Tennessee was required to choose an elective pathway and take three years of relevant coursework within that pathway to graduate. One option was the "Journalism and Broadcasting" pathway, which included the three classes taught by Mr. Norman. Therefore, these classes were sequenced for students—the same cohort of students took one class each year from 10th to 12th grade in media production. For the 12th grade students, the classes occupied two back-to-back class periods. The other two class periods met daily for one class period. Class periods were 50 minutes in length on Monday, Wednesday, and Friday and 46 minutes in length on Tuesday and Thursday. The extra time on Tuesday and Thursday was utilized for a school-wide, individualized remediation program.

The culture of Mr. Norman's classes was an important element of students' interactions and participation. Mr. Norman came to teaching from a professional background in radio and television broadcasting. His technical expertise and professionalism were evident both in the physical, structural elements of the room as well as in the products his students produced. But the media production class ws also very different from other classes that students took in school. The purpose, especially in the 11th and 12th grade year, was to produce weekly or daily broadcasts that were viewed throughout the school. To me, the classes seemed to have a rhythm to them that aligned with the broadcasting schedule. As broadcast time approached, students snapped into gear, working on their various roles in production (e.g., operating a camera, speaking on-air in front of the camera, or gathering interviews from other students in the hall for a preproduced news magazine segment). But at other times, students were relaxed and hung out with each

other—not appearing to be doing anything related to their media production assignments. Mr. Norman seemed mostly comfortable with this arrangement, though I did see him express disappointment to students who took advantage of the classroom culture to break other school rules (e.g., leaving campus to purchase food).

Some students, especially older students, would come and go during other periods of the day (not their assigned class periods). These students would sometimes hang out, but other times they would intently work on projects for their shows or other media projects that Mr. Norman had asked them to help with. Mr. Norman seemed to be the go-to person for much of the media production work in the district. For example, I saw him editing videos to be used in high school orientations for other high schools. I also watched him work on editing videos to be used in LCHS graduation. As part of the school's student council elections, he taped candidates' brief statements for broadcast throughout the school. One day, he quickly set up a professional looking press conference space (i.e., with a table and background bearing the school's colors and logo) and then filmed as a student athlete—with coaches and parents at his side—announced his plans to sign to play for a particular college. The time and space of these routines in Mr. Norman's class—the snapping in and out of work and hanging out, the dedication across class periods and formal and informal times to accomplish something pressing—all seemed also to carry over to students' participation in the study.

I certainly do not intend to generalize all students, but most were committed to the assignments and work that we asked them to accomplish. They worked together in their groups to produce something that was meaningful to them, interesting, and fun. But this work almost always had the temporal and spatial rhythms I have described above. Sometimes students were working concertedly together. Other times, one student would be diligently performing a

particular role (e.g., the map maker within a group, or script writer, or on-camera person) while others sat around, used their cell phones to text message or check Instagram, and talked about things that were entirely unrelated to the task at hand. Again, there was a lot of variability across groups. By the end of the study, the 12th graders were days away from graduation, and for some students and groups, their interest flagged in completing the final map argument performance.

Instructional design and rationale for design. Instruction at LCHS took place over four weeks from 4 April 2012 to 3 May 2012. Over those four weeks, I was in Mr. Norman's classroom for 14 separate days. I also returned once on 15 May to conduct an exit interview with Mr. Norman. The schedule for instruction was arranged with Mr. Norman and was set up so that our presence and teaching did not interfere with other work that students were required to complete for the class, with school testing schedules, with field trips, or with other previously scheduled activities or events. Most days, we were present for a full class period (either 50 minutes, on Monday, Wednesday, or Friday, or 46 minutes on Tuesday and Thursday). Total instructional time was approximately nine hours. For a complete schedule of instruction at LCHS with brief descriptions of all instructional activities, see Table 3-2.

Table 3-2

Schedule and Brief Description of Instruction at LCHS

Date	Time	Brief Description of Instructional Activities
April 4	25 min.	Students took a paper pre-test (see Appendix D)
April 5	25 min.	"Focus group" viewing and discussion with each class divided in half; clip viewed was from a recent "Super Tuesday" edition of CNN Situation Room (recorded 6 March 2012; see Appendix E for focus group interview protocol)

April 9	50 min.	Whole class and group viewing of CNN Situation Room clip from 28 October 2008 (see Appendix F for student viewing instructions); introduction of John King Remix assignment (see Appendix F for student instructions); and time to begin working on this assignment (see Appendix G for transcript of John King Remix segment that was given to students)
April 10	46 min.	In groups, students worked on and completed the John King Remix assignment
April 17	46 min.	In each class, all students viewed each group's John King Remix followed by questions from me to the audience and to the group for each remix (see Appendix H for protocol of questions)
April 19	46 min.	I shared examples of thematic maps; I introduced key vocabulary related to thematic maps (e.g., base layer, cartogram, map scale, reference map, thematic layer, census tract); together, we analyzed the 28 October 2008 CNN Situation Room segment using the three-category model (i.e., Mappy, Recipe, Media Critic; see Appendix I for student handout: "What's a thematic map and how do I read one?")
April 20	50 min.	As a class, we analyzed a CNN Situation Room clip from Super Tuesday (broadcast on 6 March 2012) utilizing our three-category analytic model with volunteers sharing what they noticed at the front of the classroom; I briefly introduced the map argument performance assignment; I introduced the Social Explorer application and together we analyzed a map on Social Explorer; students began working on map argument performance in groups
April 23	50 min.	I reviewed the map argument performance assignment with the whole class (see Appendix J for a handout with specific assignment details: "Create Your Own 'Magic Map' Segment"); I showed students how to access Social Explorer via the LCHS subscription and how to save maps and export to PowerPoint; students continued to work on their projects in their groups
April 24	46 min.	At the beginning of class, I ask each group to share: (a) What layers are they using (or think they'll use)? (b) What have they found interesting in the Social Explorer program to share with the rest of the class?; students work in groups on their projects
April 25	50 min.	At the beginning of class, I reminded students of the requirements for their map argument performance projects (i.e., two categories of thematic layers, one change in scale, one change in history, four different maps total, tell a complete story) and explain some technical details; students work on their projects in groups; some groups rehearse at the green screen and record their final projects

April 26	46 min.	Student groups rehearse and record their final map argument performances
April 27	50 min.	Student groups rehearse and record their final map argument performances
May 1	25 min.	Final exit interviews with student groups (see Appendix K for the exit interview protocol); students took a paper post-test (same content as the pre-test; see Appendix A)
May 3	25 min.	Final exit interviews with student groups
May 15	30 min.	Final exit interview with Mr. Norman (see Appendix L for the interview protocol)

The scope and sequence of instruction was largely unchanged from SEC, although there were some differences. Mostly, these differences in our instructional design had to do with the peculiarities of this setting. I consulted with Mr. Norman on all aspects of the design and scheduling of instruction, but he was largely supportive of whatever I wanted to do. He was very helpful in thinking through and resolving technical challenges, and he helped me to plan effectively for the days and times that he had available for us to be in his classroom. Throughout, he was incredibly accommodating and supportive. Here, I will not describe again the rationale or impact of discoveries that informed instruction from Phase 1 of the study on the design of instruction at LCHS. All of that, as reported above in terms of designing instruction at SEC remains relevant. However, I will speak to some of the differences in instruction at LCHS versus SEC.

Differences in instructional design as compared to SEC. The initial introductions to thematic maps and map argument performances varied at SEC as compared to LCHS. At SEC, we spent more time analyzing and discovering different kinds of thematic maps in print media and online. At LCHS, the initial introduction to thematic maps was via a map argument segment

from CNN Situation Room's Super Tuesday coverage, which had occurred almost precisely one month prior to this class session. The difference in attention to broadcast media at LCHS compared with a broader array of media (i.e., print and online) at SEC was due to the focus of the media production program at LCHS. I believed that Mr. Norman, his students, and their parents saw value in what I was trying to do with instruction about thematic maps insofar as it connected to their curriculum and future goals. Because LCHS was a broadcast media class, I intentionally kept the focus of our work on broadcast media.

Another difference was the lack of an opportunity for shared readings at LCHS. Of great value at SEC was the chance for students to read Wood's (2010) second chapter from *Rethinking the Power of Maps* and to consult the human geography textbook about maps (Pearce & Dwyer, 2010). Wood began his chapter arguing that the perceived wisdom that maps are mirrors, that is, that they are representations, is incorrect. He went on to make a case for maps as propositions and maps as arguments using choropleths and cartograms of 2004 U.S. presidential election results. By using the cartogram in comparison to the standard choropleth, Wood showed the ways in which Republican candidate George W. Bush's victory over Democratic candidate John Kerry in 2004 could look visually like a landslide (in the choropleth) or an even split (in the cartogram). The evidence mirrored anchor Jessica Kumari's lesson about electoral weight from the Channel One episode narrative from Chapter 2. For students at SEC who read this chapter before they created their John King remix and their "make your own" map argument performance (hereafter, make your own MAP), they were developing background knowledge and critical interpretive tools to apply to their production projects. At LCHS, this kind of reading assignment was outside the scope of the class and expectations for the students in terms of what was typical to do in Mr. Norman's class—either has homework or as an in-class assignment.

This is not to say that I could not have tried to include a reading like this. Had I done so as an in-class assignment with a shortened excerpt from Wood's (2010) chapter as an example, it likely would have been beneficial. Rather, I chose not to based on input from Mr. Norman and my understanding of students' expectations.

In both settings, I introduced key terminology related to maps (e.g., thematic map, choropleth, base map plus data layers) and analytic frameworks that were subsequently exploited in whole class and small group analysis. However, the three-category framework of analysis that included Mappy questions, Recipe questions, and Media Critic questions (as described in Chapter 2) was an innovation at LCHS. I made this change because I was trying to develop a friendly way of talking about maps that introduced the important discoveries that informed instruction from Phase 1 of the study that I have described above. This was nascent in SEC but not developed. In LCHS, after introducing this model for analysis, we returned to it again and again when viewing new segments (for example, a second CNN Situation Room clip from Super Tuesday coverage that we analyzed together as a class on 20 April) and when viewing map argument performances that were created by students (for example, when viewing students' final map argument performances in the exit interview; for questions asked in that interview, see Appendix H). Based on the exit interviews, I believe this attempt at a model for viewing maps was successful in supporting students' thinking about the multimodal nature of map argument performances. In exit interviews, students could readily recite the model and the kinds of questions that fit within each category. The one exception that did not seem as clear to students was the media critic lens. In exit interviews, students were still unsure how to differentiate this category from others. Throughout the design experiments, I can see that a critical element was

largely missing from instruction. I will discuss possibilities for better supporting critical interpretation and action in future iterations of the design experiment in Chapter 6.

A final noteworthy difference in instructional design between SEC and LCHS was the final assignment: the student-created map argument performance (i.e. make your own MAP). At SEC, this assignment was completed quickly, with one and a half hours in total devoted to student groups creating and sharing their performances. Additionally the technologies between the two settings were very different. For the creation of maps, students at SEC used ArcGIS Explorer Online (http://www.arcgis.com/explorer/), a free online thematic map creation application made by Esri, the producers of standard professional GIS software package. ArcGIS Explorer Online has a powerful and easy to use, but somewhat limited, toolset for creating base maps and layers. There are also pre-produced maps that are available in a gallery on ArcGIS Explorer Online's galleries. For the purposes of SEC, this software worked well, and students created interesting maps that they could use to make arguments in their performances. At LCHS we were unable to use ArcGIS Explorer Online because of some issues with the computers in Mr. Norman's classroom. Instead, we used another online application called Social Explorer, which turned out to be an ideal software package for LCHS. In Chapter 5, I describe in more detail its capacities and the way students used it at LCHS.

Another technology difference between SEC and LCHS with regards to the you're your own MAP assignment was the technology for displaying the maps. At SEC, we projected students' maps onto a standard screen at the front of the room via a data projector. When students stood in front of the screen to point at objects or interact, they cast a shadow on the screen. At LCHS, Mr. Norman had green screen technology for projecting the maps, and both Mr. Norman and his students were excited to utilize it. Compared to the standard screen, the

green screen was difficult to navigate in pointing and gesturing to the appropriate place on the map. The monitor that students used to view the map when they were gesturing in front of the screen was small, and movements were counter-intuitive (see Figure 3-8). In terms of students' final performances, at LCHS, their discomfort and lack of practice with the green screen meant that students were much less likely to gesture in meaningful ways as compared to SEC.

Aside from the technical differences, the biggest difference between instruction at SEC and at LCHS with regards to the student-created map argument performance was the amount of time spent on the project in each setting. At SEC, only one and a half hours were devoted to this project, while at LCHS, nearly five hours were devoted to it for some groups. As I mentioned earlier, five hours of time *slotted* for work on this project does not mean that students were focused on this project for all of that time. However, there was, for all groups significantly more time spent on development of the map argument performance at LCHS as compared to SEC. I believe the longer amount of time was valuable and I would try to integrate it into future iterations of this design work.

Data collection at LCHS. As at SEC, data collection consisted of video and audio recordings of all instruction and activities. Each day, we[10] had four digital video cameras (two were capable of HD recording and had wide angle lenses attached), four wireless microphone sets, and three shotgun microphones. Cameras were rigged with available microphones each day and set on tripods. When possible, cameras were plugged in so they could last throughout the day (three periods of instruction each day) or were charged during breaks and lunch. During times

[10] As I wrote in Chapter 1, I am indebted to members of our SLaM research team (Rogers Hall, Kevin Leander, Ty Hollett, Jasmine Ma, and Katie Headrick Taylor) for their assistance in data collection. Nearly every day at LCHS I was accompanied by someone from the research team who helped set up and shuffle cameras and audio equipment and made sure things were in working order when I was teaching or responding to a group or otherwise occupied.

that the whole class was together for instruction, one camera was placed by the door into the production control room (front right as one was looking at the whiteboard) and aimed at students as they were facing the front of the room; a second camera was placed by the front door on the left side of the room as one was looking at the whiteboard and was also aimed at students facing the white board; a third camera was placed just behind the curtain line in the back of the classroom (with the studio behind) facing the whiteboard, Mr. Norman's desk, and the front of the room; a fourth camera was placed immediately next to the third camera and was zoomed in on the whiteboard when images were projected there or when there was writing on the whiteboard (see Figure 3-5 for a map of Mr. Norman's room). The first three cameras (not the one zoomed into the whiteboard) were all raised up above eye level and looking slightly down on the classroom. When the class was all together and cameras were set up this way, wireless microphones were distributed in a way that matched camera angles (i.e., one microphone on the right side of the room as one is looking at the whiteboard connected to the camera on the right side, one on the left side, one in the middle, and one in the front of the room).

When students repositioned themselves into groups and were gathered around computers or were rehearsing at the green screen, we repositioned cameras and microphones to capture each group in action. Each consented group had one camera assigned to it. The camera was typically placed above and behind the group when they were working at a computer so that it was aimed down and at the screen. In this way, the camera could capture movements and talk within the group as well as what was visible on the computer screen. One wireless microphone was also assigned to each group and connected to the camera that was aimed at that group.

In addition to video and audio records, I also took still photographs of students working and of the classroom setting. I would sometimes ask a student to take still photographs with my

camera. When I did this, I always asked one of Mr. Norman's students who was in his room during a period that wasn't the assigned media production class period; in this way, students were never asked to help when they could be working on their own projects with their groups. As one final set of data, I also collected any written work (e.g., pre- and post-test, scripts, completed handouts, notes for speaking during map argument performance) and digital files (e.g., final maps created in Social Explorer, video files for John King remix and make your own MAPs) that students produced related to their project preparations or in-class activities.

At the conclusion of the study, a member of the SLaM team conducted a final interview with each student group (see Appendix H for the exit interview protocol). This interview included students viewing (for the first time) and responding to their own map argument performance as well as questions about what they learned and about the experience of participating in these activities as compared with typical school instruction. Interviews were video and audio recorded for consented groups with the camera in a similar position to the one described above (i.e., above and behind the group so that the screen and all group members are in view). Additionally, I interviewed Mr. Norman at the conclusion of the study (see Appendix I for this interview protocol). I asked Mr. Norman about the following: (a) the role of the media production class in the school and in the district, (b) his understanding of what we were trying to accomplish during the study, (c) his perception of student learning during the study, (d) his perception of his own learning during the study, (e) and any future changes or additions that he would make to his class based on what we did together. The interview with Mr. Norman was audio and video recorded. We sat at his desk for the interview, and the camera was aimed at his face from the perspective of the interviewer.

Methods of Analysis of Data from SEC and LCHS

I analyzed data from SEC and LCHS using qualitative methods for constructing grounded theory (Charmaz, 2006) through constant comparison (Charmaz, 2006; Corbin & Strauss, 2008; Glaser & Strauss, 1967). In general, constant comparative methods included not only comparing incident to incident as I came to understand key categories but also making theoretical comparisons (Corbin & Strauss, 2008) that involved identifying and explaining my analytic observations—the categories that I identified as central to practices of map performance—using specific literatures that I sought out (Charmaz, 2011). In this way, comparison and analysis started with video records and, as I began to inductively identify categories across cases, moved to literature to flesh out the properties and dimensions of these categories. I then continued to compare and analyze categories and cases against emerging properties as I came to describe them. Below, I detail this process more specifically.

Because this was basic research investigating an unstudied domain of instruction (i.e., the interpretation and production of thematic maps and map argument performances), my approach to analysis of video records was inductive (see Derry et al., 2010). In general, I followed Erickson's (2006) whole-to-part approach to guide analysis, looking first across the corpus of data and then honing in on episodes for theory development. However, a key insight for analysis of the LCHS corpus came from a segment of video that we analyzed as a SLaM group from the SEC corpus, in which three students were working on their John King remix (this segment is analyzed in detail in Chapter 4). Students' surprising engagement and improvisation while working on this activity led me to wonder if, at LCHS, other groups would be similarly engaged in this project. This is a question that could not be answered by the SEC data because we had only managed to record a couple of groups during the John King remix activity, and the second

group was not similarly engaged (one student in the second SEC group spent the entire work time watching snowboarding videos on the Internet while his partners looked for words to cross out and replace in the script). Therefore, when I looked across the LCHS corpus for students' process work on the John King remix, I engaged in a more part-to-whole deductive process (Derry et al., 2010; Erickson, 2006).

With the LCHS video data, I used methods of video-based interaction analysis (Derry et al., 2010; Jordan & Henderson, 1995). I began investigating the corpus by first viewing and creating content logs (Jordan & Henderson, 1995) of exit interviews for all of the consented groups. I created content logs in InqScribe, a transcription application, noting time stamps for key moments of insights or questions that I had. Small sections were transcribed for interviews that seemed fruitful for further micro-analysis. In approaching the corpus this way, I was working backwards from the end of the study, looking in these interviews for insights from participants into the teaching and learning of thematic map and map argument performance interpretation and production. What did they report learning? How did they report learning? In their analyses of their own map argument performance, which they watched and analyzed together as a group at the start of the exit interview, how did they conceptualize and talk about thematic maps and about map argument performances?

The reasons I chose to approach the data by starting at the end was to foreground in my thinking some of what members of each group had reported learning and how they had perceived, for themselves, their participation, decisions, learning, and understanding about thematic maps and map argument performances as I approached content logging the rest of the data for each group. I thought approaching the data this way would especially, though certainly not exclusively, inform the second research question: What are some of the interpretive

challenges that young people face with respect to thematic map performances as made evident in analysis of data from a classroom-based design experiment? The final group interview included questions relating specifically to what students learned while doing the make your own MAP project and what was hard about it (see Appendix K for a the complete exit interview protocol). Answers to these questions and others informed my investigations and observations about the rest of the data. Keeping students' perceptions of their participation, learning, engagement, enjoyment, and interpretive challenges in mind as I approached the in-process video records helped me to work off of what I saw as compared to what they reported experiencing as I began to organize for myself key constructs in the talk and action of consented groups.

For example, in the exit interview I described in Chapter 1 with the Protesters group, Talisa's identity as a Black woman was described as central to her construction of self within the group and to the topic the group chose for the final make your own MAP project. Therefore, as I watched in-process video records of this group throughout their work together, I had in my mind these themes. In Chapter 5, I analyze an episode of this group working together on their John King remix. Though I do not state it there, I think it is apparent that I was influenced by this backwards-through-the-data design to think about the group's dynamics in a way that complemented what they had reported in the exit interview.

This approach has limitations. One limitation is that the group's reporting of their learning, experiences, and engagements might well differ from the observed record. In that case, knowing in advance what the group thought about their end results might color analysis. However, this could also be a positive feature of approaching the data in this way—having in mind the group's perceptions that are noticeably in contrast to their observed interactions, behaviors, and engagements in the video record makes for an analytic questioning about that

dissonance and a desire to understand it better. A second limitation of approaching the data in this way is that what I have called "the group's" perceptions from the exit interview might not be representative of some or most of the group members. Here, again, the Protesters final exit interview is a telling example. In that interview, Cole is nearly immobile and silent. Only once or twice does he respond verbally—when the interviewer, Ruby, asked him a direct question. His groupmates reported that he was not feeling well thus his reticence. In all other video records of this group working on their projects, Cole was an active participant, most often playing off of Talisa's enthusiasm as the two of them worked out ideas for their projects. And it was the two of them who were on camera when they recorded their make your own MAP. The point here is that the exit interview missed out on Cole's contributions and the way he might have changed what were reported as their perceptions and engagements throughout the study. Assuming, as I did, that the group's final exit interview would helpfully inform my observations of the rest of their work, ignores the fact that all exit interviews were partial and missing out on some voices that might have informed the work differently or altogether changed my perceptions.

After content logging the exit interviews, I indexed and briefly content logged the entire corpus of LCHS video using a Microsoft Excel spreadsheet to note the contents of every video file. I did not content log redundant video records (e.g., multiple camera angles on instruction with the whole class at LCHS), but I did note what was captured in each video file. From there, I determined to focus analysis on the two major productive activities: the John King remix and the make your own MAP activity. This decision had to do both with the surprising finding from SEC of students' embodied engagement in these activities but also with my interest in and pedagogical commitment to production and creativity as possibilities for learning and teaching with thematic maps. The indexing of the corpus convinced me that there were episodes of

interest from LCHS with regards to engagement, embodiment, improvisation, creativity, and learning through media production. These interests specifically related to the third set of research questions I had: Specifically, (a) How might moving beyond interpretive learning to thematic map production as well as participation in map argument performances impact the learning of interpretive strategies and methods? and (b) How are interpretation, production, and performance connected as practices of learning and teaching with thematic maps? Again, I worked backwards, watching and content logging students' final products and then returning to the Excel spreadsheet to identify video records for further analysis in which student groups were in the process of creating their projects.

Micro-analysis of episodes that I identified across the corpus at SEC and LCHS served to support me in refining and further understanding the theoretical categories I was developing, they also served to illustrate and flesh out these categories, for myself and others. In micro-analysis, I was influenced by several traditions in multimodal discourse analysis broadly conceived. Among these influences is Mediated Discourse Analysis (MDA; Norris & Jones, 2005), especially insofar as MDA is an interdisciplinary *nexus of practice* (Scollon, 2001) that is contingent and reflexive, promotes social change, and is centered on mediated action (Jones & Norris, 2005); geosemiotics (Scollon & Scollon, 2003); multimodal interaction analysis (Norris, 2004); multimodal (inter)action analysis (Norris, 2011); and embodied interaction analysis (Streeck, Goodwin, & LeBaron, 2011b). I realize in citing these traditions, I am introducing contradictions. For example, Streeck, Goodwin, and LeBaron (2011a) briefly question the history of the term *multimodality* in interaction analysis and then suggest that other fields that use the term in slightly different ways (e.g., multimodal communication with which I am most familiar and which is represented by many of the other influences I have listed above) are

analytically inadequate when compared to "the rigorous microanalytic focus on the formation of action sequences that is characteristic" (p. 10) of embodied interaction analysis. I choose not to dismiss one or the other camp, or any of these traditions. Instead, I try to maintain an interdisciplinary analytic method that attempts to take seriously action, interaction, bodies, objects, tools, movement, materials, and discourse in accounting for learning in the contexts I am studying. I also try to be reflexive about the process and to consider analyses, within the context of a design experiment, as primarily intended to develop local theories that can be tested in future iterations of the study.

As I described in Chapter 1, I developed constructivist grounded theoretical categories (Charmaz, 2006) during this process of analysis. Specifically, I identified two general practices of map performance that I first thought of as (a) "practices with map attributes" and (b) "practices of identity construction of self and others." I chose to focus on these two general practices rather than more specific learning goals of the design activities for two reasons. First, I believe this is an area that has never been researched before. I know of no other efforts to study teaching and learning related to thematic maps and map argument performances in the media. Further, with regard to map argument performances in the media, I do not believe this is a construct that has been identified, generally, as a genre of practice nor, more specifically, as a domain of study within schools or any other educational contexts. With that in mind, focusing on general practices seemed to provide the most leverage for future research regarding this domain and the possibilities for teaching and learning associated with it. In future iterations, I intend to investigate these practices within the map performance activities I developed. Are they observable in other contexts and with other students? How do they operate? How can they be used to better support learning in other contexts and with other learners?

Second, I focus on these two general practices because I observed them quite clearly in the data. After first identifying practices with map attributes and practices with identity construction as possible categories that had emerged from the data, they were observable in nearly every group's interactions. It seemed important to follow this thread as a way to better understand how map performance activities support learning generally through these two important and interweaving elements of map performances.

As I viewed and "re-reviewed" (Derry et al., 2010) video segments with the two categories in mind, I wrote theoretical memos and began to seek out literature from geography, critical cartography, literacy studies, media literacy, and learning sciences to better describe and explain these two broad categories of practice. In searching literatures across these fields, I aimed to compare the two categories I had inductively identified (i.e., "practices with map attributes" and "practices of identity construction of self and others") with ideas and evidence from other studies and theoretical work (Charmaz, 2006; Corbin & Strauss, 2008). Specifically, I wanted to be able to name and flesh out these categories to reflect the unique interdisciplinary and spatial nature of map performance practices that I observed. Because of this desire, I intentionally sought out descriptors within critical cartography and geography that could theoretically inform the spatial analytic nature of map performances. That literature was less familiar to me, and I hoped it could add a new dimension to important work on these categories that I was more familiar with.

For example, both Lewis and del Valle (2009) and Moje and Luke (2009) cited emerging work within literacy education studies that has developed the spatial nature of identity construction. Lewis and del Valle (2009) situated spatial perspectives on identity as a third wave of identity research within adolescent literacy studies. They discussed the ways that recent

studies (e.g., Guerra, 2007; Leander, 2002, 2004; Sarroub, 2002) showed that "identity was both enacted (in time) and placed (in space)" (p. 318). Moje and Luke (2009) analyzed "identity as position" as one of the five metaphors that they recognized in identity literature within literacy research:

> The thrust of work that operates from this metaphor is that subjectivities and identities are produced in and through not only activity and movement in and across spaces but also in the ways people are cast in or called to particular positions in interaction, time, and spaces and how they take up or resist those positions. (p. 430)

While these two perspectives on identity research in literacy studies immensely informed my thinking about the categories of practice I observed in the data from SEC and LCHS, I sought out critical cartographic and geographic literatures that could extend this literature on identity work and point to the ways in which map performances not only positioned identities in time and space within the classroom context but also did this work in interaction with spatial analysis with a thematic map. Therefore, through the process of comparative data analysis and investigation of literatures, I arrived at (a) performative semiotic aggregates and (b) imaginative geographies as central conceptual categories of practice that I will further investigate in Chapter 4 and Chapter 5. In Chapter 4, I explore the John King remix, and in Chapter 5 the student-created map argument performance. In both chapters, I use example episodes from analysis, chosen to illustrate findings.

In the dissertation, I have chosen to include micro-analysis of four total episodes from SEC (one episode) and LCHS (three episodes). All episodes are of in-process group work on the two projects: the John King remix (two episodes) and the make your own MAP (two episodes). I chose these episodes to illustrate the kinds of interactions within groups that were typical of

group work at SEC and LCHS. Using only episodes of in-process work with groups sitting in front of computers allowed for a comparison across the activities. I use the illustrations here to interrogate the research questions and to consider the theoretical constructs that are central to the project. I chose each of these episodes to both represent other group work with regards to specific activity types (i.e., remix and make your own MAP) and to clearly illustrate different ways performative semiotic aggregates and imaginative geographies operate across groups and activity types. As I introduce each episode in Chapter 4 (John King remix) and Chapter 5 (make your own MAP), I explain why I chose that particular episode and how it represents typical interactions within students' work for that activity type (i.e., either the remix or the make your own MAP).

CHAPTER FOUR

FINDINGS: JOHN KING REMIX

In the following two chapters, I introduce and analyze episodes of production-in-progress at SEC and, primarily, LCHS. These episodes are all taken from young people working in small groups to create one of two map performance projects: either the John King remix or the make your own MAP. Chapter 4 focuses on the John King remix. Chapter 5 on the make your own MAP. I have chosen these two activities for analysis because they were the two creative projects included as part of the designed instruction at both SEC and LCHS. In initial logging of the data across the corpus of instructional activities, it was clear that these activities were rich in terms of engagement, creativity, and play for many (but not all) groups. A central conjecture of the design for teaching and learning of thematic maps and map performances was that production had real possibilities for supporting engagement and learning. I found this to be true in logging the data and have therefore chosen to organize findings around episodes connected to young people in practice creating these two projects.

There are at least three other significant influences on my choice to concentrate analysis on these activities, which I briefly relate below in no particular order: First, as I wrote above regarding the analytic lens I take to these data, I wanted to narrow in on the collective action of the participants as a starting point. As Jones and Norris (2005) detailed, this is a crucial characteristic of mediated discourse analysis (MDA): "The first question [MDA] asks is, 'What is/are the action/s that is/are being taken here?'" (p. 9). Participants-in-interaction is also a commitment of an embodied interaction analytic perspective (Streeck et al., 2011b) and a reason

work settings where professionals coordinate through talk, embodied action, technologies, sign systems, and other activity systems (e.g., surgery, therapy, architecture, airplane piloting, etc.) are often studied from this perspective (Streeck et al., 2011a).

Second, as an educational researcher committed to the possibilities for innovation and change in "traditional" classroom teaching spaces, I wanted to focus analytic attention on parts of the design that I thought held out the most potential for both innovation and integration into classrooms. Analyzing the work of small groups seemed to connect to a large body of research and practice literature (e.g., Cohen, 1994; Johnson & Johnson, 2012). At the same time, these activities seemed to me to be new and promising possibilities for learning and doing new literacies in schools.

Third, in an effort to build theory through the design experiments, especially in the development and analysis of instruction at the first site (SEC) as building towards and in comparison to the development and analysis of instruction at the second site (LCHS), I wanted to analyze the John King remix activity because of its surprising success and innovation in our very limited data from SEC (I tell this story in more detail below).

Both Chapter 4 and Chapter 5 are organized the same way: First, I describe the focal activity, including any relevant notes about design. Second, I present illustrative episodes of students' in-process work on the focal activity. These episodes each begin with a summary of the episode followed by a description of the episode. Third, I discuss each episode in relationship to the development of a grounded theory of map performance that includes the interwoven conceptual categories of practice I described in Chapter 1: (a) performative semiotic aggregates and (b) imaginative geographies. Finally, I briefly compare the episodes.

Description and Design of the Activity

Background for Design

The design of the John King remix activity, which we first tried at SEC, was based on a conjecture about the possibilities of remix as a method of learning and assessment. The design of this activity was influenced by our reading about and experiences with remix in youth culture (Lankshear & Knobel, 2011; Lessig, 2008; Lewis, Leander, & Wang, 2008) and the possibilities of pedagogies that employ remix and popular culture in classroom settings (Erstad, 2008; Knobel & Lankshear, 2008; Heron-Hruby & Alvermann, 2009). Knobel and Lankshear (2008) point out, citing Lessig (2005), that the term *remix* can have a broader meaning in the sense that all cultures are made through commentary and cultural exchange and critique. However, I intend a more narrow meaning of remix here: "'remixing' involves taking cultural artifacts and combining and manipulating them into new kinds of creative blends and products" (Lankshear & Knobel, 2011, p. 95). This kind of remix is not new to the digital age, but the ease with which anyone can now take existing cultural artifacts and manipulate them has enabled the spread and possibilities of remix (see Lankshear & Knobel, 2011, for a history of remix).

Among others, Lessig (2008) and Jenkins and Bertozzi (2008) have argued that youth remix culture is a necessary part of development and literacy today. Jenkins and Bertozzi write that young people's "appropriations from commercial media are a kind of apprenticeship phase" for learning cultural production (p. 181). Lessig (2008) connects young people's remixes to the broader need for media literacy and as a specific way to learn by remixing media and information streams: "Indeed, [young people] learn more about the form of expression they remix than if they simply made that expression directly" (p. 81). Related specifically to the remix

of political analyses, Jenkins (2004) briefly analyzed remixes that parodied political discourse during the 2004 elections and surmised that young people were finding their way into serious political discourse and civic engagement through these parodies: "Call it Photoshop for democracy—where participatory culture becomes participatory government" (para. 7).

Description of the Activity

We believed, then, that remix held real possibilities for learning related to the interpretation and production of thematic maps and map argument performances as seen in media. With that in mind, we designed the John King remix during SEC. Specifically, students were asked to record a new audio track to plausibly match video footage from a segment of CNN Situation Room recorded prior to the 2008 U.S. presidential elections. The clip we used was the same one that is excerpted in the narrative in Chapter 2 with John King conducting analysis at the magic map as prompted by a question from CNN anchor Wolf Blitzer. However, the clip we used extended slightly longer than the segment I wrote about there. In total, the clip was one minute and 29 seconds in length. As a general reminder, John King's political analysis in the clip focused on the influence of Bill Clinton, who was campaigning in Pennsylvania and Florida for Democratic candidate Barack Obama a few days ahead of the election, on Obama's chances for winning the states of Florida and Pennsylvania in the general election. For a complete transcript of the clip from CNN News, please see Appendix G. Note that Appendix G is the transcript that was given to student groups at SEC and LCHS for their use in completing this activity.

Both at SEC and LCHS, we watched the clip together as a whole class and analyzed it before students began the remix activity. For the student handout that accompanied analysis as well as a complete description of the assignment for students, please see Appendix B (instructions for SEC) and Appendix F (instructions for LCHS). During whole-class analysis at

both SEC and LCHS, students were divided into three areas of focus for viewing. At SEC, these three areas of focus were (a) John King's voice, (b) John King's hands, (c) Magic Map. At LCHS, the three focal areas for viewing were (a) John King's voice, (b) John King's body, (c) Magic Map. After viewing and analyzing the clip together, students received the assignment. They were asked to record an alternate narration for the video footage. There were two ground rules: (a) the new narrative should be a complete narrative or tell a complete story as opposed to random statements and (b) the new audio track should plausibly match the video footage. Each group was given a digital audio recorder on which to record their new narration. Students spoke their new narration into the recorder, matching it visually with what they were watching on the video. I then took their recorded audio and overlaid it onto the video to create a new file that was shared with classmates.

Students were not given any instructions about the method or content they should use for creating the remix (i.e., what topic to use, whether to write down every word in a script before recording, whether to improvise). To help them with their preparation, all groups were given the transcript (Appendix G) that included all of the spoken words and a small set of images that matched up with chunks of spoken text. Many, but not all, groups used this transcript to write a script that matched the timing of the text segments in relation to the video images. Students in both settings also had access to the clip on their own computers, which they could play and replay as much as they wanted to in working to produce the alternate narration. In both settings, all of the remixes were shared with all students in class and the creating group members were asked questions by me and others present about their remix (for an interview protocol that I used in asking questions of group members at LCHS after their remixes were played for the class, see Appendix H).

Topics for remixes at both SEC and LCHS were creative and diverse. For the four production groups at SEC, the following topics were addressed in remixes: the correlation of UFO sightings and political speeches, destruction of Pennsylvania and Florida due to flooding, effects of weather patterns on voting in U.S. presidential elections, competing entertainment and candy companies (Walt Disney vs. Hershey). At LCHS, among consented groups, the following topics were covered in remixes: obesity, teen pregnancy, crime rates due to mob activity, corn growth, impact of Bill Clinton on Barack Obama's chances in the election (this group's remix was nearly identical to the original), events from or responses to the *Hunger Games* series of books by Suzanne Collins (3 groups), zombies (3 groups), a "ghetto" woman's revolving relationships with men, invasion by Cuba, the geographic divide in support for comedians Dane Cook and Kevin Hart.

Illustrative Episodes of In-Process Work

Summary of the Episode: The influence of weather on voting

This first illustrative episode of in-process student work was a revelation when I first saw it. As I've described above, it was one of two video records we have from SEC of groups working to create their John King remixes. With that in mind, it is impossible to say how typical this group's work was as compared to other groups at SEC. The only comparative example—the one other group that we have video data from—was definitely atypical. Group members replaced a few words from the script but otherwise kept the original dialogue intact. No other SEC group approached the project this way. The others involved imaginative revoicings. Still, we do not have any process data of those other groups. Going into data collection at LCHS, this was one of my main questions: Would any groups at LCHS repeat the kinds of improvisational and engaged interaction that we saw from this SEC group? In terms of the typicality of this engaged

interaction and improvisation as compared to LCHS groups, this kind of engagement was typical. Though not all groups improvised and engaged in the kinds of embodied ways that this group did, there were multiple examples across the corpus of similar kinds of engagement.

I have chosen this episode as an illustrative episode for two reasons. First, in terms of the process of the dissertation research, this episode is an important one, as I have described above. Second, the episode represents some of the kinds of engagement and embodied interactions that were seen across the corpus and, in comparison with the second illustration in this chapter, develops answers to the second and third research questions and provides details about the performative semiotic aggregate and imaginative geographies that support the development of those conceptual categories.

As this clip starts, Leslie, Layla, and Kevin (see Figure 4-1) are about 12 minutes into the process of "finding a story"—which they decided was the first step to completing their project. They are seated around a computer at which they played the CNN Situation Room clip—stopping and starting as necessary while working on their remix. They each had a script (see Appendix G) in front of them.

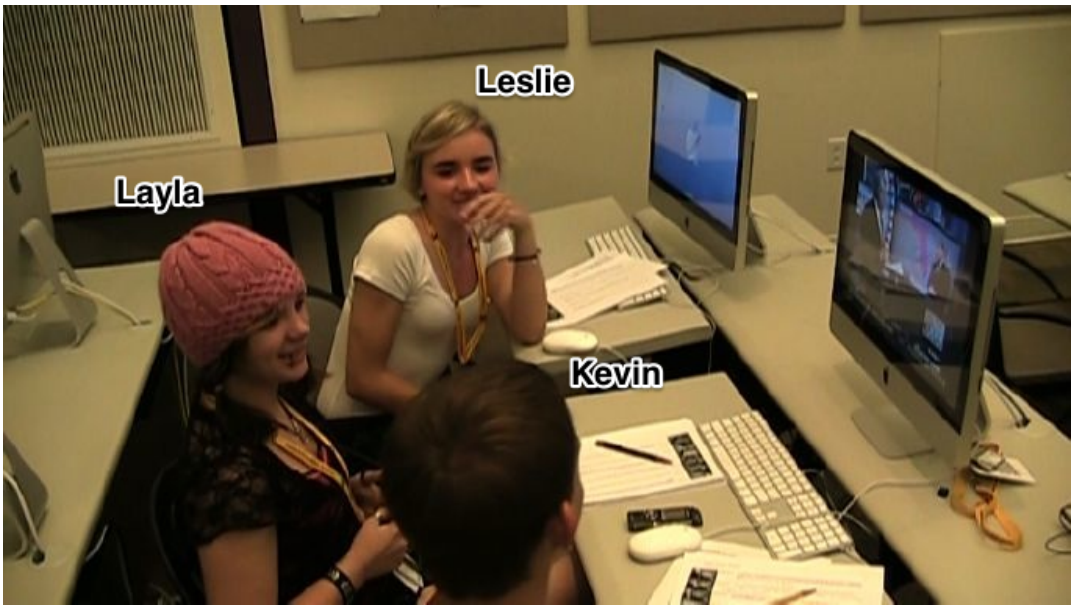

Figure 4-1. Leslie, Layla, and Kevin working on their John King remix at SEC. Note some resources for production: They each have a script (Appendix G) on the desk. They could play and stop the video clip on their computer as they planned.

In terms of their process, one of the SEC instructors stopped by just as the group began their search for a story and suggested that they might try turning off the sound and just watching the visuals on the clip as a way of finding a story. The group did this and they first decided to focus on a topic that was very near to the original: the historical voting patterns of particular states in relationship to the current election. As they began to think about how their new narration would unfold, they wrote specific words down in the script, lining up the words they were writing with segments of video.

As they were, at once, working through this rather conservative schooled version of the task—taking exact notes, sticking to the original quite closely—a second layer of activity emerged and eventually overtook the first. Throughout the first 12 minutes of finding a story, the group would sometimes stop and talk about an individual gesture made by John King and assign it a completely different meaning. For example, in the first video still below (Figure 4-2), John

King swiped with his left hand from top to bottom, his fingers spread, to highlight an area of Pennsylvania. As he did this, his swipe left a visible trace in bright green of two parallel lines. Kevin originally called these "railroad tracks," meaning the trace could represent railroad tracks on the map in their remix. For ease of identification, I refer to the gesture in this section as the railroad track gesture.

Figure 4-2. John King swiped at the magic map leaving a visible trace of two parallel bright green lines. He was identifying a particular part of Pennsylvania electorate.

As a second example of this attention to John King's gestures and traces on the map as this group worked through their new story, see Figure 4-3. Here, John King swiped, again with his left hand, across a section of Florida, noting what he called the "I-4 corridor." This swipe left a bright blue trace with two curved lines running parallel to each other across the state. At various times during the first 12 minutes of their search for a story, members of the group referred to this trace as representative of a roller coaster, landforms, tropical winds, and a hurricane. For ease of identification, I refer to the gesture as the I-4 corridor gesture.

Figure 4-3. John King swiped across Florida, leaving a bright blue trace. He said this was the "I-4 corridor" in Florida.

Initially, the group's identification of these gestures with potentially different meanings than John King's original meanings were peppered in the midst of the otherwise staid work of writing down the new story. But at the 12-minute mark, which is where the transcript below begins, the group seemed to erupt into an entirely different process of composition led by the possible new meanings of these gestures. No longer did they write down lines in the script. Instead, the began to improvise with the video clip, taking turns to join in and riff off of each others' ideas. They would adopt the embodied actions and gestures of one of the CNN personalities (i.e., Wolf Blitzer or John King), speaking new words to go along with a new story. Sometimes they would say introductory phrases such as "Like right here- right here he could be like" (line 8 below). But other times they just jumped in and starting speaking as if they were enacting the video clip, as Kevin did at line 10 below ("Please tell me"), while positioning their bodies and hands as if they were one of the announcers, adopting a tone of officiality and the

sound of news broadcasting. They would still stop the video from time to time to ask questions of each other or to interrogate potential meanings of a gesture (e.g., in line 18 below, Leslie asks, "What is this? What can this be?" while making the railroad track gesture). In the transcript and description below, it is difficult to capture the energy, engagement, and emotion of the group as they participated together in this new embodied compositional form. They laughed, slapped the table, said how wonderful their story was, and generally seemed to be enjoy the moment of creation that they were engaged in together.

This illustrative episode is a clip lasting 2:27 of the group right at the beginning of this new form of composition—creative, embodied, group improvisation. Below is a transcript of the episode with accompanying video stills (see Figure 4-4) followed by description.

Episode Transcript: The influence of weather on voting

1. Leslie: So wait is this gonna actually be like the influence of weather on the voting?
2. Kevin: *Yeah* it would be [like] weather-
3. Layla: [Yeah.]
4. Leslie: So it would be weather-related.
5. Kevin: Yeah.

((Layla and Kevin laughing))

6. Kevin: Wait [we don't even need to say] anything about the history of voting.
7. Layla: [This is wonderful.]
8. Kevin: [Like right ❶*here*- right *here*] {tapping the space bar to start the video} he could be like *we've had *so* many natural disasters recently*.
9. Layla: [Just say that you know-]
10. Kevin: Please tell me how th- how these natural disasters have influenced voting and-

11. Leslie: We know we need to [be keeping these] families in our thoughts.

12. Layla: [( )]

13. Leslie: But just here {she extends her left hand towards the screen}, explain to us how this is aff- affecting the election.

14. Kevin: Well in the present election we have Republicans dom- dominating Pennsylvania. But see *here* if we switch it to:: previous elections, we can [see that-]

16. Layla: [When the *rail*roads came through] ((laughing))

17. Kevin: [When the railroad] tracks were built-

18. Leslie: What is this? What can ❷this be? {motioning down with her left hand, fingers spread} Like when the- This can be the like <earthquake faults>.

19. Layla: Yeah. [Earthquake] ❸*fault* lines.

20. Kevin: [Earthquakes-]

21. Kevin: When the fau::lt ((giggling)) lines of the earthquakes opened up almost the entire state of Pennsylvania turned Democrat.

((Leslie and Layla laughing loudly))

22. Kevin: These-

23. Leslie: When here if we look at Florida. *Hang on just a second.* OK so uh *here* when the hurricane- When Hurricane *Pau::l* came through-

24. Kevin: ( ) *here* and *here*-

25. Leslie: Here and here the straight-line winds just took all the Republicans out. So here if you'll see that the winds were just so extreme that all the ( )-

27. Kevin: [Here's before and here's the after.]

28. Leslie: [Then all the Democrats- Then all the Republicans] moved out [and then Democrats] moved into the damaged homes=

29. Layla: [Here's the after yeah.]

30. Leslie: [=because the Republicans didn't want] to pay taxes on their damaged homes [so-]

31. Layla: [What about the income tax?]

32. Kevin: [Yes!]

33. Layla: They could not pay. [They moved-]

34. Kevin: [The Democrats were] cheap. >I'm just kidding<.

35. Layla: [Yeah they moved.]

36. Leslie: So then therefore there were more Democratic votes in the election here in Florida.

37. Kevin: [We can-]

38. Leslie: [So here] if you'll look back and here but then the Democrats-

39. Layla: As you can ❹see the damages in the hurricane area.

40. Layla: Oh thank you let's hope we don't have any more ((laughing)) natural disasters.

{At this point, I interrupt everyone's work in the room by asking the groups to finish and hand in their work so far. Another instructor then begins the next activity for the day. Despite the call to attention, this group continues to talk about their remix.}

41. Kevin: Let's hope there are no hurricanes or railroad tracks.

42. Layla: *No* we changed that to earthquakes.

43. Kevin: Oh yeah.

44. Layla: Oh you stole my pencil?

45. Kevin: [I don't really-]

46. Leslie: Sorry.

47. Kevin: Is there anything like . . *better* than earthquakes cuz that's good but um-

48. Layla: Fault lines. That's what it is.

49. Kevin: Fault lines OK.

50. Leslie: ( ) else that's *like straight*?

51. Layla: Yeah there's straight fault ❺lines {making the railroad track gesture with her right hand, fingers spread}.

52. Kevin: *Tornado paths*. *No*.

53. Layla: They could be tornado paths. Yeah that's a good one. This is ❻where {making the railroad track gesture with her left hand, fingers spread} the tornadoes [came] *through*.

54. Kevin: [See-]

55. Kevin: See here when the hurricane hit and the ❼tornadoes {making the parallel curved line gesture with his right hand, fingers spread} came through.

56. Layla: The tornadoes came through here.

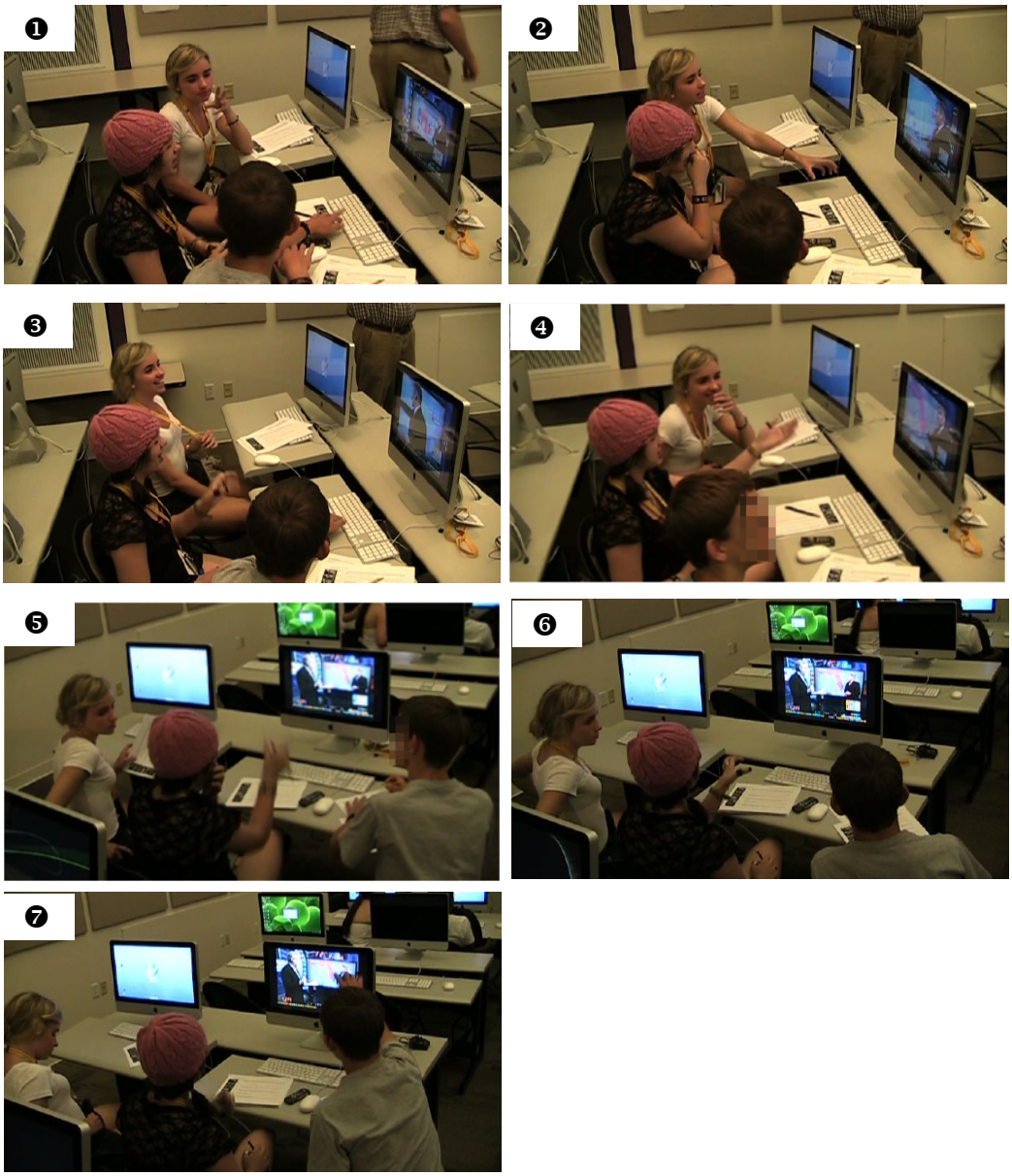

Figure 4-4. Video stills of Leslie, Layla, and Kevin in the process of creating their John King remix. Numbers correlate to the transcript above.

Description of the Episode: The influence of weather on voting

At the beginning of this clip, Leslie realized that they were now considering the possibility of a topic that wasn't related to the history of voting. As I described above, this determination did not come from a formal group decision making process but rather seemed to

emerge from the movement towards the new form of composition, in which John King's gestures were connected to physical features on the earth. After Leslie's question (line 1) about their new topic, Kevin and Layla agreed (lines 2-6), with Kevin stating that they no longer needed to say anything about the history of voting.

Layla then said, "This is wonderful" (line 7). In line 8, Kevin initiated an improvisational sequence in which the three of them worked back and forth, adopting roles fluidly as evidenced by their bodies and their vocal registers. Initially, Kevin adopted a propositional *footing* (Goffman, 1981) by stating, "he could be like" (line 8) followed by a line that might be said by Wolf Blitzer: "Please tell me how th- how these natural disasters have influenced voting and-" (line 10). As Kevin said this, however, he did not merely suggest that this is the kind of thing Wolf could say. Instead, he changed his vocal register, speaking differently than he was previously, softer and more measured. In other words, he took on the vocal space (see Phillips & Smith, 2012) of a newscaster.

Leslie picked up on this role adoption and responded by improvising a line that could be said by Wolf Blitzer (lines 11, 13). Kevin's response in line 14 is a continuation of the conversation between Wolf Blitzer and John King, with Kevin now speaking for John King: "Well in the present election…" Layla's contribution at line 16 returned the group to the question of the meaning of John King's gestures. She inserted "railroads" into the unfolding improvisational performance, which Kevin picked up on immediately (line 17). Here (line 18), Leslie paused the unfolding performance by asking about the railroad track gesture, making it with her left hand as she asked what it could mean. She suggested earthquake fault lines, and this was quickly adopted by Kevin as he continued with the story: "When the fau::lt lines of the earthquakes opened up…" (line 21).

In lines 23 – 39, Leslie worked through a new storyline, voicing for John King, that involved the movement of the map to Florida and the I-4 corridor gesture. She interpreted the gesture as "straight-line winds" that destroyed Republican homes (line 25). She then said that Democrats moved into the Republicans' damaged homes (lines 28, 30) because the Republicans did not want to pay taxes on their damaged homes (line 30) and, thus, the change in the electorate from one election to the next (line 36). In line 40, Layla picked up on Wolf Blitzer's segment-concluding language and said, "Oh thank you let's hope we don't have any more ((laughing)) natural disasters" (line 40).

The final segment of talk in this excerpt (lines 41-56) departed from the riffing, improvisational style of most of the rest of the clip and, instead, was the group's discussion about what John King's railroad track gesture should mean. Layla initiated this discussion in response to Kevin saying "let's hope there are no hurricanes or railroad tracks" (lines 41); she reminded him that they had decided on earthquakes and not railroad tracks. Kevin asked if there was anything better than earthquakes as a meaning for the gesture and Leslie asks what else is "straight" (line 50). Although Layla continued to defend fault lines as the appropriate interpretation ("Yeah there's straight fault lines," line 51), Kevin suggested tornado paths. At the conclusion of the clip, both Kevin and Layla seem to have agreed that tornado paths worked.

Discussion of the Illustrative Episode

Performative semiotic aggregates. In Chapter 1 I discussed the performative semiotic aggregate as an emerging conceptual category of practice that had explanatory power as an analytic tool for researchers and as an emergent meaning making composite that is part of any map performance. Analytically, identifying learning and assessing young people's engagement in map performances through the lens of the performative semiotic aggregate depends, also, on

viewing participants as making meaning via the resources, performative possibilities, and layers of semiotic systems at play. I argue that the performative semiotic aggregate is a particular kind of semiotic structure that is always present in map performances. It is both a structure of meaning making and a category of practice. In other words, the performative semiotic aggregate *works* to build meaning. As young people interact in concert with and across a performative semiotoic aggregate, they are creating new meanings, performing new worlds, and adopting new identities. Recognizing how the performative semiotic aggregate is working in map performances as I try to do here has implications for both research questions that address Phases 2 and 3: (a) What are interpretive challenges? and (b) How are interpretation, production and performance connected as practices of learning and teaching with thematic maps?

As I wrote in Chapter 1, I came to this construct through viewing data of young people interacting during map performances. The first such interaction that I saw and analyzed was this episode from SEC. I noticed in this episode that Leslie, Kevin, and Layla were interacting in what seemed to me especially unique, engaged, and embodied ways as they composed their John King remix. Their attention to gesture and trace on the map as an important meaning making element of the system was evident as they proposed multiple possible meanings for the railroad track gesture and trace (Figure 4-2) and the I-4 corridor gesture and trace (Figure 4-3).

In this way, this episode connected closely to Enyedy's (2005) findings in his work with 2nd and 3rd grade students reinventing topographic symbols to represent height in a map. He called the meaning making apparatus that he observed in that study the *semiotic ecology*, meaning "an overlapping set of sign systems that mutually reinforce and inform one another" (pp. 431-432) and focused particularly on the role of gesture as communicative and constructive of meaning. In that study, Enyedy noted that gesture may be particularly connected to the spatial

nature of the tasks and domain he was studying (i.e., topographic mapping). He also argued that "talk and gesture (as well as other interactional resources) are taken as a unified package, mutually reinforcing and modifying one another, and contributing directly to our ability to establish socially shared perspectives and meanings" (p. 432). In the episode above from SEC, talk, gesture, and other interactional resources seemed to be playing exactly that role—forming a semiotic aggregate through which shared meaning developed and was created during the episode.

The episode also shows the performative aspect of the semiotic aggregate. As I explored in Chapter 1, performance operates across multiple levels in map performances. I proposed four fronts of performativity in Chapter 1: (a) creating something intended to be broadcast or on display for others, (b) improvisation performance as participant examples (Wortham, 1994), (c) identity performances via imaginative geographies, and (d) performing a particular world.

First, I address three kinds of performance (a, b, d). The fourth (c) I will address in the section below about imaginative geographies. For this group, as to the first kind of performance, they were aware of the final product they were creating and that it would be shared with other groups after they had finished. In this sense, they knew their work—the final product—was performative in the theatrical sense: their voices, the characters and story they created, would have an audience with their classmates. During the in-process preparation of the John King remix, Leslie, Kevin, and Layla were aware of this aspect of their work. At one point Layla nominated Kevin to be the voice of John King in their final recording—a role he did eventually fill—and Kevin said, "I absolutely *hate* listening to my voice." Kevin's awareness of the eventual performance, in which his voice would be played for all to hear, is one way in which map performances operate to put participants on display.

As to the second kind of performance, this feature of the episode is evident (i.e., the improvisational, playful, role-playing nature of the interaction), but I am interested here in discussing how this performance operates. Understanding how it operates has implications for the third set of research questions and, specifically for understanding how interpretation, production, and performance connect as practices of learning and teaching with thematic maps. For me the most striking moment of this episode, and it was a surprise the first time I saw it, is what unfolds from line 10 to line 14. In this segment, Kevin proposed something Wolf Blitzer might say ("He could be like," line 8), and continued with this proposition: "Please tell me how th- how these natural disasters have influenced voting and-" (line 10). What happened next is the first surprise: Leslie picked up the next of Wolf's lines, playing along with Kevin's story and continuing his dialogue (lines 11, 13). There was no delay in her jumping in and she did not communicate with Kevin in any way. She didn't even look at him. Her eyes were trained on the screen, where the visual elements of the performance were rolling out. She concluded by asking virtual John King to "explain to us how this is aff-affecting the election" (line 13). And then the second surprise: in visual and aural rhythm (that is, in parallel with the sound and visuals) and without skipping a beat, Kevin came in with John King's response: "Well in the present election…" (line 14).

I wondered how Leslie and Kevin knew to riff off of each other in this way. They didn't plan or discuss doing this. They did not even appear to really look at each other during this crucial interplay. Kevin's eyes were not visible during the interaction, but his head stayed positioned towards the screen except for two quick turns towards Leslie as she spoke. It appeared that their eyes were fixed on the screen and on the bodies there (i.e., Wolf Blitzer and John King) that they were trying to give voice to. I offer three overlapping explanations for this occurrence,

which show the meaning making and productive resources of the performative semiotic aggregate. The first is that Leslie gestured towards the screen, directly at John King, when she said "But just **here**, explain to us how this is aff-affecting the election" (line 13). On **here**, Leslie reached out, inviting or offering with her outstretched hand for John King to respond (see Figure 4-5). Because the sound was muted on the screen, the only voices that could provide a response to Leslie's gestured invitation, her reaching out and offering to John King to speak, were Layla's or Kevin's voices. Because of this, Leslie's embodied and verbal invitation for a response, though directed at the screen, towards John King, were also directed at Layla or Kevin.

Figure 4-5. Leslie voiced Wolf Blitzer asking John King to explain the role of natural disasters in election results. She stared at the screen and reached out her hand as if to prompt the John King on the screen to respond.

The second explanation has to do with gaze and body movement. Although Leslie largely kept her eyes focused on the screen (as in Figure 4-5), when she said "the election" (line 13), she turned and looked directly at Kevin, nodding her head on two beats: **the** and e**lect**ion. Her nods

were similar to her previous hand gesture towards John King. In the case of her head nodding, she appeared to be offering to Kevin to take up the next line in response.

Figure 4-6. Leslie looked directly at Kevin when completing her voicing of Wolf Blitzer's opening line to the CNN Situation Room segment.

The third explanation has to do with the vocal registers adopted by Kevin and Leslie as they voiced the characters on the screen. In both cases, the voices they used were slightly different from their own, slightly lower in register and more serious-sounding, more newscaster-like. These adopted vocal registers are also evident in contrast to the way that they broke frame and laughed, interrupting the seriousness with which they approached the role-playing.

These three explanations, taken together, provide a glimpse of the possibilities for the work of layered meaning making afforded by the performative semiotic aggregate. It appeared that it a lamination of the three uses of semiotic resources that I describe above and possibly other semiotic resources were layered together in the work of social meaning making in a small group during map performance. In this small segment of "talk," I have suggested how the role of

gesture, body movement, eye gaze, vocal register, and the technological medium of the video operated together to make possible improvisation, play, and meaning making.

As to the fourth kind of performance—a critical cartographic performing of the world, this episode interests me for the ways in which the cartographic, semiotic, and multimodal affordances of map argument performances are on display, in play, and learned and understood by Leslie, Layla, and Kevin. These resources of the performative semiotic aggregate work in concert to perform the world in certain ways, and the group's understanding and interactions with these resources showed how this occurs. For example, the coming into being of natural phenomena in their new story depended on utilizing John King's existing gestures and traces. The ways that they read these gestures and traces tells us how they understood them to work on the map and in the performance in displaying phenomena in the world.

The railroad track gesture is a good example. The visual symmetry of the two parallel lines to a railroad track is evident. But the scale of the tracks as compared to crossing the entire state of Pennsylvania is problematic from the perspective of understanding the work the gesture is doing on the map. In other words, that would be one gigantic train if those were its tracks. Leslie seemed to recognize the scale problem when she asked, at line 18, "What is this? What can this be?" referencing the railroad track gesture by making it with her left hand. Leslie then posits a possibility: earthquake fault lines. Whether or not this is a geographically more plausible possibility, the group seemed to be grappling with the possibilities for the gesture and trace in terms of scale and, later, in terms of straightness (see lines 47-56). These questions about scale and straightness apply directly to the second research question. Scale and straightness are interpretive challenges that can be identified in the episode and that point to the ways in which the semiotic aggregate operates within boundaries of certain sign systems (e.g., map symbols).

Also, for the performative nature of maps, these wrestlings with representations, symbols, gestures, and traces matter because the thematic map and map argument performance are made up of this stuff and, in turn, this stuff makes up readers' and viewers' understanding of the world. For example, the existence of an "I-4 corridor" as a politically relevant unit based around the location of a highway and the kinds of voters who are congregated near that highway and its cities, does not come into existence without performances like John King's at the magic map.

This segment also provides evidence in response to the third set of research questions, which are about the intersections of interpretation, production, and performance in the teaching and learning of thematic maps. In this episode, the resources of the performative semiotic aggregate are marshaled for collective meaning making. Gestures, talk, gaze, vocal quality, and technologies come together as a stage on which meaning can be made and remade. As a means of understanding the intersections of interpretation, production, and performance, this episode provides evidence that interpretive acts can be collective, productive, and performative across multiple modes and semiotic resources. Learning here is in the work of reading and writing John King on the fly. The improvisation requires rapid-fire interpretation and production. In map performance activities like this remix, then, there is the potential for young people to not just recognize all of the semiotic resources but to perform them and be performed by them in the work of the group. In this sense, the performative semiotic aggregate offers a powerful response to the third set of research questions: interpretation, production, and performance are connected across the performative semiotic aggregate, and it offers specific resources for making meaning in specific circumstances of map performances like this one. For the teaching of thematic maps and map argument performances, the implication is that resources that are essential to interpretation of map argument performances could be identified during an activity like the

remix. In the production, young people could find and identify some of the elements that are important for interpretation. I now move to a discussion of imaginative geographies in this episode.

Imaginative geographies. In Chapter 1, I described imaginative geographies within the field of human geography as representations of other places, cultures, and peoples that shape one's perception of the world and of possibilities for acting in the world (see, e.g., Driver, 2005; Gregory, 2009). Imaginative geographies are "doubled spaces of articulation" (Gregory, 2009, p. 256) in which "our space" and "their space" are formed through cultural accretion and across local and global space and distance. In this episode, imaginative geographies can be seen in the group's co-development of the ideological positions of Republicans and Democrats in Florida. It is through the performative semiotic aggregate that John King argues changes in the electorate—specifically, through red and blue areas on the map at the scale of countywide election results. Leslie, Layla, and Kevin take for granted the operation of this semiotic system to differentiate between Republicans (red on the map) and Democrats (blue on the map). In other words, they never question which party's voters are red and which are blue. They also don't question the change over time in voting, seeming to understand that areas on the map can be represented by blue in one election and red in another.

In their emerging story about the effects of weather patterns on presidential elections, Leslie first proposed a weather-related explanation for the shift from Republicans to Democrats as seen on the map in the I-4 corridor region of Florida. In line 25, she said, "Here and here the straight-line winds just took all the Republicans out." There's no explanation yet for how this happened, for how they were taken out, but she quickly offered that they moved out of their damaged homes (line 28) and Democrats moved in "because the Republicans didn't want to pay

taxes on their damaged homes" (line 30). In these lines, the spatial implications for ideological positions are presented by Leslie. Her formulation of Republican and Democratic ideologies (i.e., beliefs about paying taxes) are juxtaposed against their imagined spatial responses to a natural disaster. This social and spatial positioning of identities is a clear example of imaginative geographies in map performance activities.

What is less clear in this episode is the role of imaginative geographies in the work of self-identification. Leslie did not share her own ideological position in the video record. How does she view her own political positions? What does she think about tax policy? We cannot tell here. However, there is one moment in this episode that might signal the work of self-identification in imaginative geographies by members of the group. Seconds after Leslie introduced this storyline of Democrats moving into Republicans' damaged homes, Kevin said, "the Democrats were cheap. >I'm just kidding<." Without any further evidence about his ideological position or political beliefs, it is impossible to say definitively that Kevin was othering Democrats in opposition to his own opinions and ideas when he called them "cheap," but his immediate "I'm just kidding" shows a sensitivity to this topic and an awareness that this could be a taken as an insult. This sensitivity shows the ways in which imaginative geographies are not merely individual relationships to representations. They are also positional with regard to others close by and to imaginations of others' beliefs and opinions. For Leslie, Layla, and Kevin, whatever their positions or beliefs at the time of this episode, the map performance activity brought ideologies and political stances to the open and put on the table in front of them opportunities to construct political and ideological identities in relationship to each other and through the process of imaginative geographies.

Next, I move away from this illustrative episode from SEC to a second episode of a group's in-production process for creating the John King remix. This time at LCHS. After SEC, a central research question I had was whether or not Leslie, Kevin, and Layla's engaged, embodied, improvisational performances while creating their John King remix was typical or atypical. I did not know if what I saw in that episode would be repeated in LCHS. It was repeated in many groups across the corpus. The following episode is from the John King remix production process of the Protesters group from LCHS. The Protesters are the same group I introduced in Chapter 1 talking about their group member Talisa's "being Black." I chose this episode to illustrate similar principles of embodied interactions and engagements as those I saw in the SEC example but including additional and different elements that were also found in other groups in the corpus (e.g., the infusion of popular culture into the process of creating the remix and other ways that self-identification is at play besides the political/ideological as described above).

Summary of the Episode: Oprah's hair

This clip is 30 seconds long and comes early in the Protesters' process of finding a story they can tell in their remix (see Figure 4-7 for a video still of Protesters group members Tiffany, Cole, Lindsey, and Talisa). They had been working together on the project for about two and a half minutes. As they started, Talisa proposed that they sing a song, but her groupmates told her the new vocal track had to relate to the map. After some clarification, the group began to watch the CNN Situation Room clip with the sound muted. Almost immediately, Talisa began to speak for John King using the lyrics from "It's Peanut Butter Jelly Time," a popular YouTube clip that

shows a pixelated dancing banana.[11] Talisa adopted the newscaster vocal register, gestured as John King did, and repeated some of the lyrics: "Peanut butter jelly time. Peanut butter jelly time. Now where he at? Where he at? I don't know. I don't know."

Figure 4-7. The Protesters group—Tiffany, Cole, Linsdey, and Talisa—working on their John King remix at LCHS. Note some resources for production: They have the small group analysis handout (including instructions for completing the John King remix) on the desk (Appendix F) as well as a script (Appendix G). Using the laptop on the desk, they could play and stop the video clip on their computer as they planned and performed their remix.

Cole and Talisa continued to propose possible topics that included "Where's Waldo?"; a rap; a weather forecast; and having the characters perform actions at the map without knowing what they mean (e.g., Cole said, "Or he could be like, 'I have no idea what I'm talking about. Watch. I'm about to draw two lines'"). Talisa then started talking, in her John King voice (i.e., subtly lower and more serious than her normal register) about Oprah being on vacation in Florida where she was seen with bad hair. The transcript that follows comes immediately after Talisa introduced Oprah's hair as a topic.

[11] The clip is available here: http://www.youtube.com/watch?v=s8MDNFaGfT4. It was uploaded in January 2006 and currently has over 23 million views on YouTube.

Episode Transcript: Oprah's hair

1. Talisa: Well if you look in Pennsylvania . . in 2004 you know she had that- >she-she< had that Jheri Curl on that was hot curled and pressed with some grease in it. And that's when you know she *( )*.

((Tiffany is laughing))

2. Cole: ((laughing)) We:: should do that.

3. Talisa: She got her hair done at *some* ❶salon {swiping with her right hand, fingers spread, using John King's railroad track gesture} over here in this region.

4. Cole: ((laughing)) We believe it was in ❷*this* {swiping with his left hand, fingers spread, using John King's railroad track gesture} area she-=

5. Talisa: She [should never go back.]

6. Cole: [=She went from-] She went from the ❸Yaki {left-handed railroad track gesture} to ( ).

7. Talisa: To ❹Remi {right-handed railroad track gesture}. From ❺Yaki {right-handed railroad track gesture} to ❻Remi {right-handed railroad track gesture}.

8. Cole: Al- alright we should do that.

9. Lindsey: Alright let's write our notes.

10. Talisa: I DON'T KNOW WHAT TO SAY- Listen I should [go- . .] go home and look up *weave*. All the different weave.

11. Tiffany: [Do what you just-]

12. Cole: [( ).]

13. Talisa: [You know- you know] Vivica Fox has- Vivica Fox the Black actress, she has her own weave-on out. [( ).]

14. Cole: [We believe] that Oprah's getting her new hairstyle in ❼thi::s area {left-handed railroad track gesture} or ❽thi::s {left-handed "I-4 corridor" gesture moving from right to left} area.

15. Cole: >She was< actually ❾*spo::tted* {left-handed "I-4 corridor" gesture moving from right to left} in this area with her hot mess.

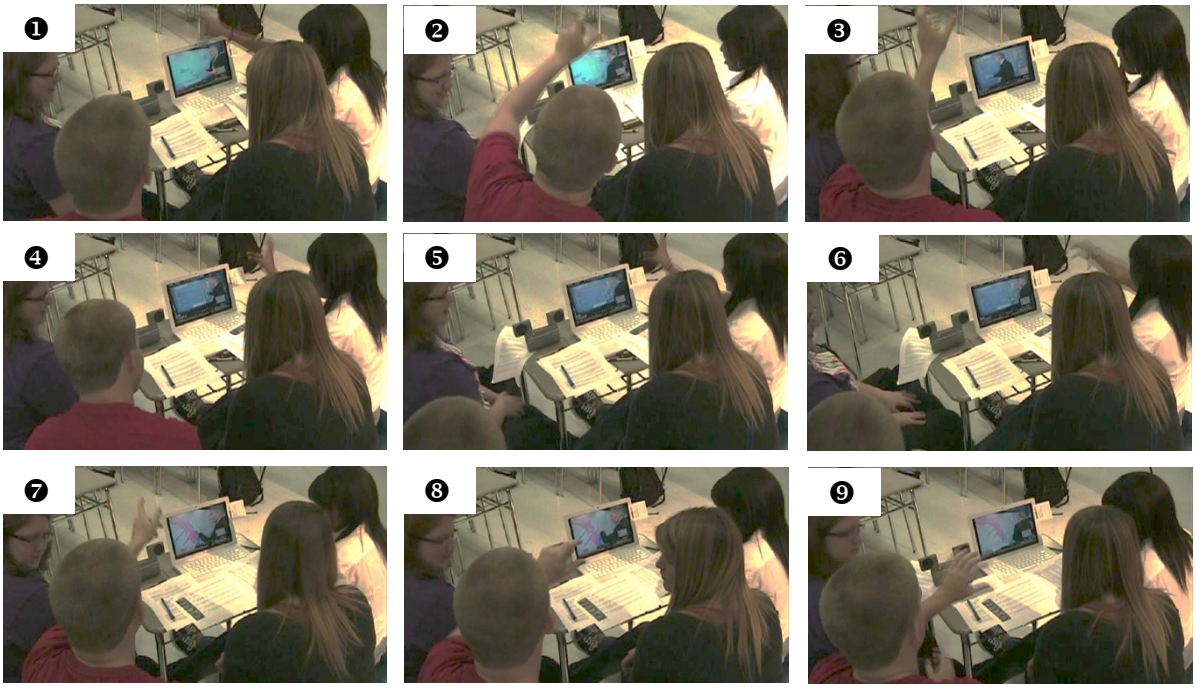

Figure 4-8. Video stills of Tiffany, Cole, Lindsey, and Talisa in the process of creating their John King remix. Numbers correlate to the transcript above.

Description of the Episode: Oprah's hair

At the start of this clip, Talisa voiced John King at the magic map in front of Pennsylvania. She introduced the place (i.e., Pennsylvania), time (i.e., 2004), and topic (i.e., Oprah's hairstyle) of their revoiced map argument performance (line 1). Talisa spoke in a

newscaster register—lower pitch, slightly slower, more serious than her typical voice. Cole responded that the group should do this topic (line 2). In line 3, Talisa first introduced John King's railroad track gesture, swiping with her right hand as she said, "*some* salon over here in this region." In this way, she used the gesture exactly as John King did, to delineate a geographical region. Cole responded by joining in and voicing John King, first using the railroad track gesture as Talisa did—"We believe it was in this area she-" (line 4)—to note a region but then using it in a different more conceptual way to suggest a class or category of things (in this case, a kind of hair weave—Yaki; line 6). Talisa then repeated Cole's use of the railroad track gesture to differentiate between a Yaki hair weave and a Remi hair weave. As she named each type, she swiped with her right hand (line 7).

As in the episode from SEC above, Cole joined into Talisa's improvisational revoicing without an invitation and without any discussion between them. As in the SEC episode, their gaze appeared to remain focused on the screen during this exchange, though they would quickly turn to look at each other as Talisa did when Cole said, "She went from the Yaki" (line 6), making use of the railroad gesture in a new way.

When Lindsey recommended that they write notes so that they could prepare their script to record the John King remix (line 9), Talisa responded that she didn't know what to say but that she should go look up different weave so that the recording could include this information (line 10). She then told her groupmates about Vivica Fox's line of weave products, couching her mention of Vivica Fox's name with an explanation: "Vivica Fox the Black actress" (line 13). Presumably she added this information because she thought the other members of her group might not know who Vivica Fox was. At the end of the segment, Cole continued to voice and gesture as John King, adding in the I-4 corridor gesture, which had not previously been used by

either him or Talisa as they riffed together. In both instances where he used the I-4 corridor gesture (lines 14-15), he delineated regions on the map (i.e., the area where Oprah got a new hairstyle, and an area where she was spotted with her old hairstyle).

Discussion of the Episode: Oprah's hair

I will now discuss this episode in terms of the development of a grounded theory of map performances in relationship to performative semiotic aggregates and imaginative geographies. In doing this, I include comparisons between the SEC and LCHS episodes of John King remixes in process.

Performative semiotic aggregates. I did not know, when I introduced this activity at LCHS, whether or not I would see, in groups at LCHS, the same kinds of engagement, play, improvisation, and embodiment that I saw with Leslie, Layla, and Kevin at SEC. But as this episode showed, this type of engagement was not unique to the SEC group. Just as in SEC, the Protesters jumped into an improvisational space almost immediately, adopting a different vocal register than their own to signal revoicing lines of John King's or Wolf Blitzer's. As in SEC, without discussion, Talisa and Cole riffed off of each other, coordinating their talk and gestures without previous planning. And they did this by attending to the possibilities and affordances of the performative semiotic aggregate.

In terms of layered discourses, as in SEC, the Protesters operationalized, repurposed, and played with their voices, John King's gestures, and other visual and textual cues in the map argument performance from CNN Situation Room. For example, Talisa picked up on the thematic map and textual cues to situate her revoicing in Pennsylvania in 2004 (line 1). As at SEC, the group members used their vocal registers to signal revoicings while improvising. Again, this seemed to invite participation in riffing and improvising among group members—as

when Cole jumped in to the middle of Talisa's performance (line 4). Gesture also played an important meaning-making function here, although in a different way than in the SEC episode. There, the function and meaning of gestures and traces were explicitly identified, questioned, and discussed (as in Leslie's question in the transcript of the SEC episode, line 18: What is this? What can this be?) Here in the LCHS episode, the function and meaning of gestures is heavily embodied but conceptually implied. There are two distinct uses of John King's railroad track and I-4 corridor gesture, but these are not negotiated by the group verbally.

Here, then, is an example of interpretive challenges facing young people with respect to thematic map performances (the second research question): How do gestures and traces operate as conceptual layers for meaning making? In the SEC example, the elements of the gestures and traces were discussed explicitly (i.e., straightness) and implicitly (i.e., scale). Here the gestures and traces are not deconstructed. Nevertheless, in analysis, it is apparent that the gestures are operating differently and, therefore, that they could carry meaning in different ways for different productions and for different viewers. The elements of gesture and trace in question here also get at the kinds of things that can be represented: in this case, categories of things versus spatially denoted regions. But *how* do gestures and traces operate to delineate the different kinds of things being represented? Here it seemed that the vocal track was the only indication.

An additional resource of the performative semiotic aggregate that appeared in this episode and not in the one from SEC was the infusion of popular and material culture into the performance. In the moments before and during this clip, the Protesters called up and integrated and repurposed song lyrics, book titles, television celebrities, and current hairstyles. This appropriation of popular culture appeared in many other remixes at SEC and LCHS (see, for example, the list of topics covered in remixes above). This can perhaps be explained by remix

culture. Young people in both study settings most likely have a lot of experience reading/viewing and composing remixes that appropriate popular culture for new purposes. When prompted to create a remix, students seemed to quickly turn to themes, characters, storylines, and ideas from popular culture as an important element of the performative semiotic aggregate.

Imaginative geographies. In human geography, imaginative geographies are most often analyzed at the scale of a large collective (e.g., a nation), but Valentine (1999) studied what she called the imaginative geographies of everyday life by considering the positioning of bodies through eating. She argued that the spatiality of our bodies—how we position them in space (social and physical) and how we imagine them as spatial—is central to our concepts of self and others and to the way we imagine sameness and difference. In short, imaginative geographies operate at the scale of the body—"the geography closest in" (Rich, 1986)—as well as at other scales. In this episode from LCHS with Tiffany, Cole, Lindsey, and Talisa, the meaning of hair becomes a site for reading sameness and difference.

On the one hand, the abstractness and distance of Oprah's hair, of Florida, and Pennsylvania would seem to have little influence in shaping local and individual conceptions of self and other, but I believe there is some evidence here for the positioning of bodies around the computer through imaginative geographies. Talisa, for example, distanced herself from an understanding of different kinds of weaves when she said she didn't know what to say and she should go home to learn more about different weave (line 10). Her groupmates might have imagined that as an African-American woman, she would align herself more closely with the hair practices that she and Cole have introduced, but perhaps especially because they are making fun of Oprah's hair, Talisa distanced herself from that connection. Cole seemed to comfortably introduce categories of weave when he said, "She went from the Yaki to" (line 6). Because he is

a White teenage male, his knowledge of weave types (or at least one type) was surprising to me, and I was not able to ask him about this—how or what he knew about Yaki hair. Still, the fact that he introduced the concept into the discussion positioned him in a particular way in relationship to his groupmates and one can imagine different positionings and different reactions among different groups of friends (e.g., his teammates on the football team). Here, as it was with Kevin's "I'm just kidding" in the SEC example, the positional, relational nature of imaginative geographies and identity constructions is important. Identities are not necessarily formed and solidified across contexts. But within contexts, they can be stabilized over time in practice and in relationship with others (Leander, 2002). Cole's friendship with Talisa in particular makes it possible that they have talked about weaves before—and probably joked about them. But wherever Cole's knowledge about weaves comes from, the way he deploys it here shows his imaginative understanding about what others in the group will understand or find funny.

Another moment of identity negotiation is Talisa's aside in line 13:

13. Talisa: [You know- you know] Vivica Fox has- Vivica Fox the Black actress, she has he own weave-on out. [( ).]

She began by saying "you know," which I understand to mean that she was saying something new or novel to the group. But I believe she intended the new or novel information to be that Vivica Fox has a line of hair weave products. However, as she said Vivica Fox, she stopped herself and explained who Vivica Fox is ("the Black actress"). She obviously felt that at least some of the other members of her group might not otherwise know Vivica Fox's name. Again, in other social situations, I imagine that Talisa would have approached this differently. Her positioning here suggests a distance from her groupmates that has to do with a cultural or interest

connection that Talisa has and she believes others might not. Compared with Cole's use of Yaki hair without making a comment or aside about what it means, Talisa's aside stands out.

This also positions the rest of the group members. Though I do not have the data to tell in this analysis what their thoughts were about Oprah's hair as a topic for their remix, their exit interview, which I excerpted in Chapter 1 makes clear that at least Tiffany and Lindsey imagine a strong racial component to their identities in relationship to Talisa. Whether or not that was at play in this particular segment, I do not know, though I imagine that it was.

For both Cole and Talisa, these kinds of personal negotiations with self and others across micro- and macro-scales of geographic distance and social space are central to imaginative geographies and seemed to be present in nearly every map performance I observed. What the LCHS episode makes clear, in comparison to the SEC episode above, is that imaginative geographies are built and built up whenever difference and sameness is negotiated across social or geographic space. It need not be an ideological, social, or cultural topic of any specific sort for this to occur. However, different resources of the performative semiotic aggregate apparently afford different kinds of relationships with maps and different kinds of readings and writings. Because thematic maps include a data layer that is often demographic (e.g., "blue collar voters" or Democratic voters versus Republican voters in the CNN Situation Room example used for the remix), students can be positioned in their interactions with the map. These kinds of maps are made up of stories of race, gender, class, and ideology. And so when students with bodies that are raced, gendered, classed, and ideologically positioned gather around them and gather around each other, their spatial and relational positionings and identities come into play as imaginative geographies both at the map—in the way it is read and rewritten in the remix—and in the room—in the ways that young people's identities are read and rewritten.

Findings connected to research questions. In terms of the research questions, this finding regarding the role of imaginative geographies both in the interpretive work of understanding a map and in the productive work of making creative remixes with groups of young people that are being positioned and positioning identities during map performances, relates to both the second research question and the third. With regard to the second research question, it is important to note that interpretive challenges are not merely related to what might be thought of as cartographic elements on the map (e.g., scale, map symbology) but also to other aspects of the performative semiotic aggregate that include co-present others and individual and collective identifications of difference and sameness. As to the third research question, through production and performance in the remix activity, interpretive moves that are tied to imaginative geographies are more evident than they would be in individual readings or individual meaning making. In this way, the social construction of meaning at the map through production of media (in this case, a remix) points to a useful practice for learning and teaching with thematic maps and map argument performances.

The John King Remix as a Distinctive Designed Activity Structure

These two illustrative examples point to ways in which the John King remix as a designed map performance activity supports engagement with the performative semiotic aggregate and imaginative geographies in ways that are unique and distinct from other research settings that have investigated semiotic aggregates (e.g., a crowded shopping area on a Saturday afternoon in Scollon and Scollon [2003]) and imaginative geographies (e.g., war in global borderlands in Gregory [2011]). This task structure of the John King remix is distinctive in design across two interacting planes: (a) the affordances of remix and (b) the spatial analytic nature of formulating arguments with dynamic thematic maps. First, remix as an activity makes

available to participants both interactional possibilities and contextual resources that are unique. The clearly performative nature of the interactions of participants, the ways that they jump into spaces of improvisation and embodiment are invited and supported by an activity that specifically tasks them with remixing a performance that includes John King's movements and vocal performance as resources. Contextual resources include the social history of youth remix practices as engagements with popular culture and as an explicit activity of identity reconstruction (i.e., giving John King a new identity in the remix).

Second, arguing with dynamic thematic maps as John King does affords storytelling-in-space and distinctive human-map interactive practices. Storytelling-in-space was visible in the geographic nature of the stories told through remix. The prevalence of popular culture topics such as *Hunger Games* and zombies in remixes is accounted for not only because the task structure of remix makes available resources from popular culture but also because these stories are spatial in nature (e.g., *Hunger Games* is built on a geography that is important to the story and zombie stories are often stories of spread and disbursement across terrain). John King interacting with the magic map, the visual component of the John King remix activity, affords students the interrelations of distinctive human-map interactive practices that they adopt in their processes of production. For example, the task is structured to include mapped scale relations and shifts in time.

In this chapter, I have analyzed two illustrative episodes of students' in-process work on the John King remix activity. Through the analysis of young people engaged in the process of identifying a story to tell through their remix, I have shown how the performative semiotic aggregate and imaginative geographies are operationalized during map performances. I now

move to Chapter 5, which focuses analysis on two episodes from LCHS of students in the process of creating their own map argument performances.

CHAPTER FIVE

FINDINGS: MAKE YOUR OWN MAP

Description and Design of the Activity

Background for Design

As an activity with both maps and media at its core, there are two complementary influences on the design of the make your own MAP: first, a commitment to production as a method of learning and engagement with media; and second, a conjecture about the possibilities of performance and play for learning and working with maps. One influence for the design of the make your own map argument performance activity was the central principle of media literacy education that students should be both interpreting and producing media in order to "develop *both* critical understanding *and* active participation" (Buckingham, 2003, p. 4; emphasis original; see also Bruce, 2009). In addition to my belief that media production is an important component of participation, activism, civic dialogue, and critical literacy for young people (e.g., Alvermann, Moon, & Hagood, 1999; Jewitt, 2008; Kafai & Peppler, 2011), I was also influenced by the possibilities of play and embodiment with the framework of critical media literacy and critical literacies. Wohlwend and Lewis (2011), for example, argue that "critical engagement is active engagement, embedded in physicality, emotion, and sensation, that reads bodies as sociopolitical texts and writes with bodies to produce identity texts" (p. 191).

Another influence on the design of the make your own MAP was perspectives of performance, performativity, and play within critical cartography. In part, developments in theoretical conceptions of map reading and use as performative—as opposed to scientific,

objective, and cognitive—have to do with technological advancements that have made it possible for anyone to create maps using freely available and widely distributed digital and online tools:

> The medium becomes much more social and task-oriented, more ubiquitous, ephemeral and mobile. Users and producers are no longer separate. Pervasive technologies offer people the possibilities of putting themselves on their own map, destabilizing the taken-for-granted representational neutrality of the image; new kinds of maps are being made; more people are making maps; more things are being mapped; and mapping is taking place in more contexts than ever before. (Perkins, 2011)

The new ubiquity of maps and mapping practices online, in the media, and via mobile applications and the possibilities for production of and with maps has opened up new spaces of research about play and performance with maps (e.g., Krygier, 2006; Perkins, 2009, 2011). Much of this work is related to the embodied and performative aspects of people's practices of mapping and using maps. The design work at SEC and LCHS extends that work to the introduction to young people of new possibilities for mapping, embodiment, and play with maps and media. In this way, it is much like Krygier and Wood's (2011) visual, playful, artful, and technical map-making guidebook that embeds the creation of maps with GIS within a social framework of critical action in the community.[12]

Description of the Activity

Largely because of technical capacity and time, the make your own MAP activity played out very differently at SEC and LCHS. In both settings, the basic concept was the same: students were asked to create their own magic map segment similar to the Situation Room clips that we

[12] As an example of the postmodern play of Krygier and Wood's (2011) *Making Maps: A Visual Guide to Map Design for GIS* (2nd ed.), the book opens with the story of two women, told in comic book form, who decide to design a map to argue against the city's proposal to widen a street. The book they pick up to help them is Krygier and Wood's.

watched together. In other words, they were to make an argument in front of a set of maps in the style of John King doing political analysis in with the magic map. This involved first making the maps to be used in the segment and then performing the segment with two on-camera personalities: a person in the role of John King and a person in the role of Wolf Blitzer. At both SEC and LCHS, the make your own map argument performance was the curricular culmination of the design experiment.

At SEC, students had a total time of one and a half hours (see Table 3-1) to conceptualize, create, and perform their map arguments. They were asked to choose groups of three students and, together, prepare a two-three minute map argument performance. In terms of technology for preparing their maps, students used ArcGIS Explorer, which was described more fully in Chapter 3. The software, available free online, allowed students to choose base and thematic map layers. It also had available a gallery of maps that had been created by other users online, and some students chose to integrate these maps into their performances. All students were asked to use one thematic map layer in common—"USA median household income"—and to include at least one other of the following: (a) historic layer (i.e., a change in time period); (b) another thematic map layer; or (c) scale changes (i.e., moving from state scale to county scale). A final requirement was that each group member fill one of the following roles: John King person, Wolf Blitzer person, technical person (i.e., the person who would switch maps to make sure that the correct map was being displayed during the performance). For complete instructions given to SEC students for this activity, see Appendix C.

At SEC, each group presented these map argument performances live in front of the rest of the class. Although we described it to students as being in the style of CNN's Situation Room, students were not filmed as if they were on a television show, and we did not show recordings of

the performances to anyone outside the class. We also did not have a magic map, so students were unable to interact with the map the way John King does—touching it to zoom in or out or to change map layers. Instead, students stood in front of a screen where their maps were projected, pointing to various parts of the map as they made their arguments.

At LCHS, students had nearly six complete class periods (approximately four and a half hours) to work on and record their map argument performances (see Table 3-2). Some of that time involved direct instruction (e.g., how to use Social Explorer or how to export maps to PowerPoint) or time to debrief and discuss how things were going (e.g., talking about thematic layers that different groups were finding to be useful), but most of the time was available to groups to work on creating their maps and planning, rehearsing, and recording their performances. The instructions for the activity at LCHS (see Appendix J) differed from those at SEC. Specifically, students were asked to include all of the following as part of their performances: (a) at least two different categories of thematic layers (e.g., age, race, labor force, median household income, etc.) that are compared in analysis; (b) at least one change in scale; (c) at least one change in historical time period; and (d) at least four different maps total.

The technical resources also differed at LCHS. As mentioned in Chapter 3, students at LCHS used a premium version of the online application Social Explorer to create their maps. Social Explorer had a lot more capacity than ArcGIS Explorer for creating maps that utilized census data across a broad range of categories from the 1800s to the present in building thematic layers. Additionally, students at LCHS utilized the technical capacities of their media production classroom to create and record their performances. See Figure 5-1 for photos of the technical capacities and process of creating and recording performances at LCHS; circled numbers in the following sentences correspond to specific images in Figure 5-1. Specifically, students recorded

their map argument performances in front of a green screen using one of the large studio cameras (❶). The on-camera performers could see the maps projected behind them on a green screen via a monitor placed just out of the camera's view (❷). Groups had their final maps saved into a PowerPoint presentation, and one group member operated the PowerPoint slide show from a computer across the room, switching slides so that the correct map was visible behind the performer in front of the screen (❸). Some groups also used the teleprompter and a second large monitor during their performances (❹). In the control room, the separate video feeds—the map and the on-camera performers were combined into one image (❺) and saved as a digital video file on another computer (❻).

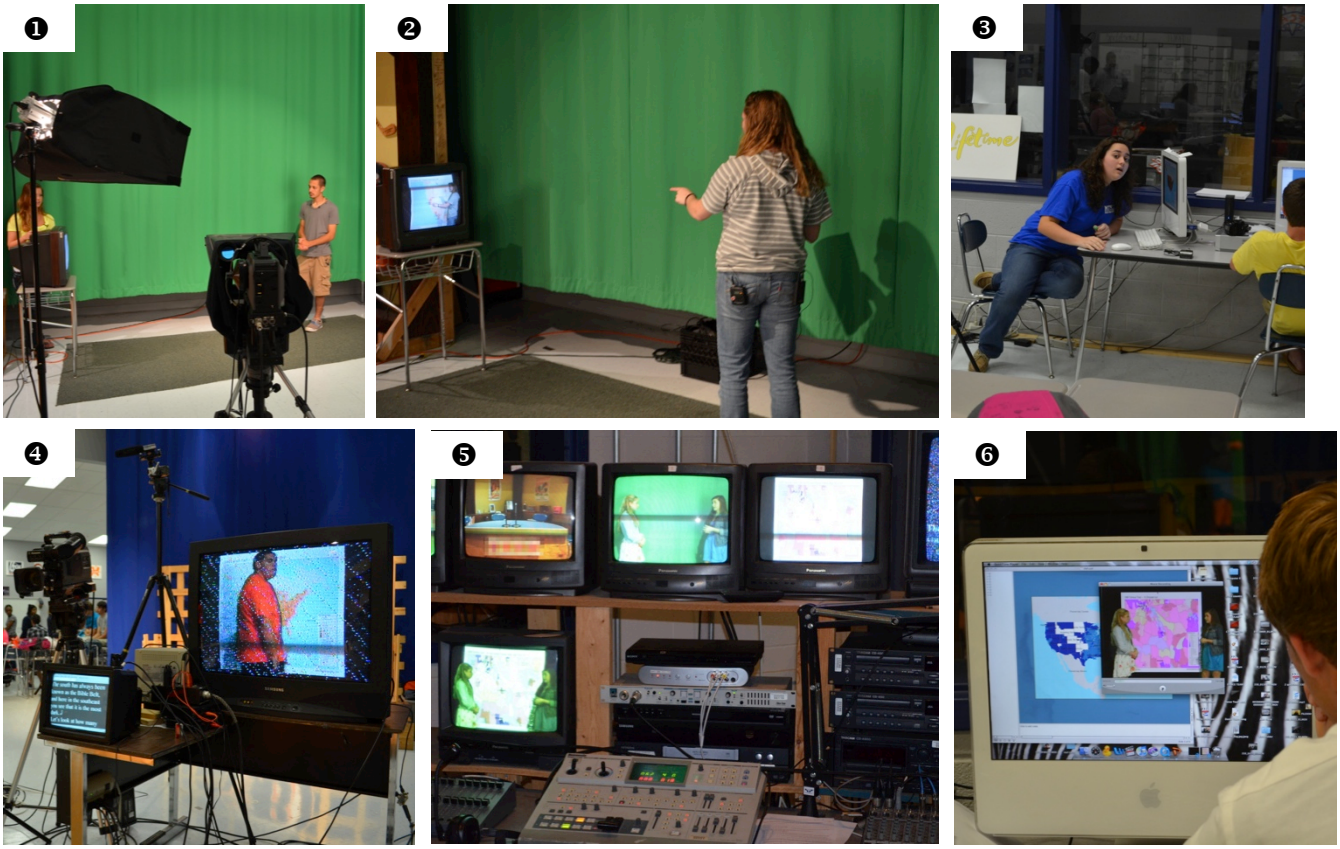

Figure 5-1. The technical capacities and process of production of map argument performances at LCHS.

Unlike at SEC, the make your own MAPs at LCHS were recorded and saved as video files. Unfortunately, we did not have a chance for all members of the class to view each of the performances. However, each group did get an opportunity to view their own final product as part of the exit interview.

For the four production groups at SEC, the following topics were addressed in make your own MAPs:

- connections between birth rate and median household income in the United States
- connections between diversity and median household income in Nashville and San Antonio
- connections between accessibility to supermarkets and median household income in the United States
- connections between consumer spending and median household income.

At LCHS, one group made an argument that had nothing to do with the data used to create their maps. Instead, they treated Social Explorer as a kind of painting program, creatively using it to color the United States in a way that aligned with their story: water covering the United States over time and the subsequent change in people's methods of transportation (from cars to paddleboats). The rest of the groups at LCHS made arguments that aligned with the data layers in their maps. Among those groups, the following topics were covered in map argument performances:

- population density by race in Tennessee counties over time
- changes in transportation (vehicles vs. walking) in Tennessee counties over time
- differences in population density of large cities in different states
- change in percentage of foreign born residents in Texas over time

- connections between education and unemployment nationally and in Tennessee
- connections between crime rates, race, and gender in Miami, Florida over time
- regional religious differences compared to education in the United States and in the Southeast
- regional changes in percentage of foreign born population on the East and West Coast over time
- comparison of percentage of commuters and population density of cities in California and Tennessee
- national and regional changes in percentage of single parents over time
- relationship between unemployment and race in Tennessee counties over time
- changes in percentage of married people in Tennessee and Nevada over time
- changes over time in median household income for high school attendance zones near LCHS.

Illustrative Episodes of In-Process Work

I now move to analysis of two illustrative episode from LCHS with groups working on make your own MAPs. The first episode, from the group KLNM working on their map argument performance, is seemingly mundane. Two group members, Mandy and Nicole sit in front of the computer and talk through the maps they have chosen for their make your own MAP while two other group members sit closely by and do not participate. I chose this episode for three reasons: first, it is typical of the kinds work of many groups in preparation for the their final map argument performances. The mundaneness, in that way, operates as representative of typical practice—even having only half the group participate actively while the other half sat by and did something else was quite typical. But the mundaneness is also important because I think there are

observably interesting aspects of this interaction that have import on the research questions for the study and on an understanding of the operationalization of the performative semiotic aggregate and imaginative geographies. In other words, mundane interactions can also have something to say to teachers and researchers about the learning and doing of map performance. Second, I chose this episode because the images of the maps on the computer screen were an important part of the interaction. I wish I had better captured close ups of what was happening on the screen, but it is still visible that Mandy and Nicole are attending to scale, color, difference, shifts in time, and spatial units of analysis on the screen. Third, I chose this episode because this group was unique in their choice topic, which I'll describe below. Because they chose a locally relevant issue, implications of their interactions for imaginative geographies in a way that was different from other groups seemed worth including as a way of further expanding our understanding of the operation of imaginative geographies.

Summary of the Episode: LCHS, Taylor, and Verona

Most groups, when creating their make your own MAP, included Tennessee or the Southeast as regions of analysis. This group, KLNM (see Figure 5-2), was unique in that they focused on their own community. They wanted to test whether or not their assumptions about their rival schools were true. In particular, which school was the "richest"? To test this, they used 1990 median household income data for their thematic layers. Because they were interested in identifying the median household income of each school's zoned area, which is not a unit available on Social Explorer, they zoomed all the way in to the map until they could identify roads. Once they identified roads, they navigated around and chose areal units that approximated the school zone boundaries based on their understandings of where the three schools they were

interested in were located. The three schools they investigated were Taylor, Verona, and LCHS (all pseudonyms).

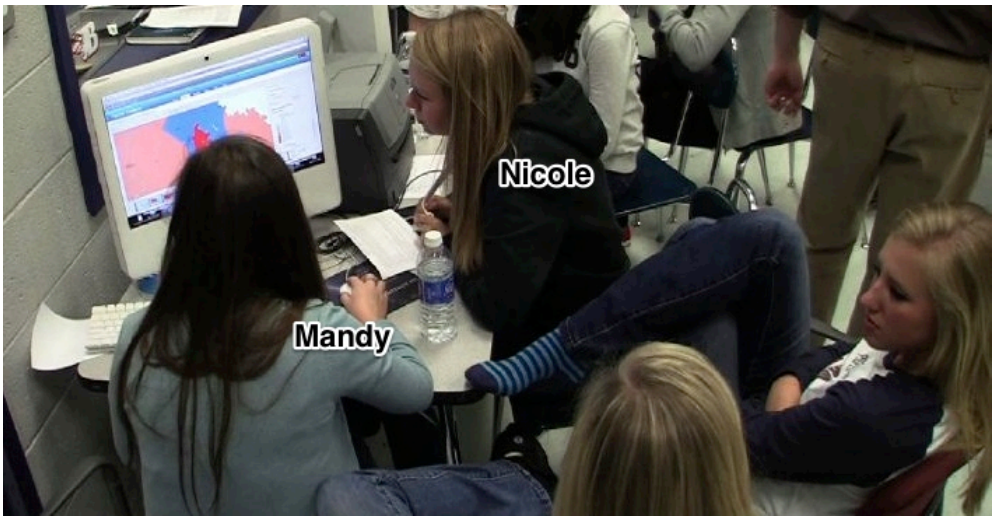

Figure 5-2. The KLNM group working on their map argument performance. I have only labeled Mandy and Nicole, because the other group members did not participate in this interaction.

By the time this episode started, the group had largely completed the work of finding a story and choosing maps. In the episode transcript below, Mandy and Nicole worked together to organize the maps (the other two group members sat back and did not participate in this interaction), to choose the scale of each map, and to begin to verbalize their argument. In verbalizing the argument, Mandy moved through multiple frames, sometimes explaining to Nicole what she was doing (line 4), sometimes talking to herself (line 8), sometimes adopting a performance voice and sketching out arguments as she was giving them (line 12), sometimes recognizing the potential audience for the map argument performance and explaining what she would tell them (line 18). Below is the transcript for the episode. Circled numbers correspond to video stills below the transcript (Figure 5-3). In most of the stills, a new map is visible on the screen.

Episode Transcript: LCHS, Taylor, and Verona

{Mandy was focused on a region of Tennessee on Social Explorer❶. She zoomed out slightly so that more nearby areas were in view❷.}

1. Nicole: Do that again.

2. Mandy: Do it out again?

3. Nicole: No.

4. Mandy: This is what it ❸is right now. {Mandy clicks to new slide} And then that's Taylor. {Mandy moves mouse to show Taylor area on the map} That's us. {Mandy moves mouse to show LCHS area on the map} And that's Verona. {Mandy moves mouse to show Verona area on the map}

5. Nicole: OK.

6. Mandy: Just leave it like that?

7. Nicole: Yeah.

8. Mandy: OK. And this is- I think we need another picture of ❹this. {zooms in to a closer view} This is the income. This is- This is Taylor. This is us. And then this is Verona. So we have a little bit ❺lower- {clicks to a new slide} We have a lower dropout rate.

9. Nicole: Yeah.

10. Mandy: Just . . slightly. But if you go to- I guess- I need to take another picture of ❻this {clicks to a new slide} to like- for order comparisons . . I think. That would be handy dandy. Alright.

11. Nicole: {pointing at computer screen} ❼That's income. You know that, right?

12. Mandy: Mhm. So look. It'll be like {clicks to a new slide} ❽income duhduhduh like let's go to ❾this picture. {clicks to a new slide} This is overall income. {new slide} ❿Let's <zoo::m in a little more.> >Then look closer.< ①{new slide} This is Taylor. >Taylor Road. Johnson Lane. blahblahblah< {new slide} ②LCHS community. >blahblahblah< {new slide} ③Taylor. >blahblahblah<

13. Nicole: Verona.

14. Mandy: I mean Verona. >blahblahblah< {new slide} OK. ④Back to the overview. Notice the color changes here. {mouse to an area} Color changes here. {mouse to an area} Color changes here. {mouse to an area}

15. Nicole: But they didn't *change*. It's the same thing, Love.

16. Mandy: Huh?

17. Nicole: It's the same picture. ⑤{pointing to computer screen}

18. Mandy: I know they didn't change . . . yet. OK I'm just gonna set- tell them to remember what colors they saw and then go back to this. >I'm just gonna be like< ⑥{new slide} [a- again] look at the overall colors you see [purple here].

21. Nicole: [Oh. OK.] [Those] are the incomes [yeah.]

22. Mandy: [And] this is the income again, but now I switch ⑦{new slide} it over to education. These are the rate of high school dropouts.

❶ 

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Figure 5-3. Video stills of Mandy and Nicole from the KLNM group in the process of creating their make your own map argument performance. Numbers correlate to the transcript above. In most frames, a new slide with a new map is visible on the computer screen.

Description of the Episode: LCHS, Taylor, and Verona

In this episode, Nicole acted primarily as an audience member for Mandy, listening carefully and giving feedback as Mandy practiced the segment. As the transcript begins, Mandy was adjusting the scale of one of the maps she intended to show, trying to get the correct scale so it could be viewed by the audience during the map argument performance. She zoomed out and Nicole asked her to do that again (line 1), though it was not clear to Mandy what it was Nicole wanted her to do again. Mandy, a little confused, responded, "Do it out again?" (line 2). Nicole said, "No" (line 3), but Mandy moved on to show her what the scale was currently. Within the map, Mandy pointed out the Taylor and LCHS areas ("that's us" is LCHS, line 4). Nicole and Mandy then agreed to leave the map at the original scale (lines 5-7).

Mandy next compared income in the three school zone areas and then dropout rates (lines, 8, 10). Nicole was not sure she followed the logic of Mandy's argument and pointed out that Mandy was presently on a slide showing income and not dropout rates (line 11). Mandy agreed and proceeded to run through the presentation. She signaled that she was going to run through it by saying, "So look. It'll be like" (line 12) and then proceeded to transition from slide

to slide. For each transition, she used a phrase she would use in the map argument performance (e.g., “let’s go to this picture,” “let’s <zoo::m in a little more>”), and she announced the topic for each slide as she would (“This is overall income,” “This is Taylor,” “LCHS community”) but the content within each slide is filled in by duhduhduh or blahblahblah (line 12). Nicole corrected a mistake that Mandy made at the end of line 12: Nicole said “Verona” (line 13), which is what Mandy meant when she said “Taylor” at the end of line 12.

Mandy corrected herself—“I mean Verona” (line 14)—and then transitioned back to what she called the “overview” (line 14). On this slide, Mandy pointed to three areas representing the three schools and said, “Notice the color changes here. Color changes here. Color changes here” (line 14). Nicole was confused by this (line 15) because the overview slide is the same image as the previous three only at a different scale. The previous three slides are zoomed in to show each school zone up close, but the overview slide has the same color scheme for the thematic layer. Nicole said, “It’s the same picture” (line 17). Mandy explained that she was setting up the audience to see a change that she had not shown them yet. The final slide compared income to high school dropout rates in each of the three school zone areas.

Discussion of the Episode: LCHS, Taylor, and Verona

Performative semiotic aggregates. In stark contrast to the lively, gesturing bodies of students working on the John King remix, Mandy and Nicole hardly moved their bodies while working on honing the map argument performance. They stayed stiff and hunched over the computer. The active gestural elements of the performative semiotic aggregate that were so evident during the John King remix were dormant in nearly all groups at this stage of the planning process for the map argument performance. I think this is explained by the difference in task structure. At this stage of the make your own MAP, groups are focused on the detailed work

of creating maps and not engaging in the performative possibilities of remix. But another way in which bodies collapse when groups are huddled around the computer was in the use of the computer mouse. The person controlling the mouse could direct attention with it and onlooking participants rarely reached out to contribute or to change the system by which the group directed attention or negotiated through the map creation software.

While the embodied, movement-oriented aspects of performance are not visible here, one element of embodied performance similar to the John King remixes found in this episode was vocal performance. In a similar way that students working on the John King remix adopted vocal qualities for a newscaster that were different from their more typical registers, so Mandy spoke differently as she tried out her argument. She transitioned into a different register when she said, "It'll be like" (line 12). However, this register was not the formal sounding newscaster register. I do think her voice was slightly lower and more serious sounding, as the voices were with the John King remix, but she also spoke very quickly and intentionally elided much of the content she was speaking about, filling it with rapid fire blahblahblahs.

This group showed evidence that they understood and were savvy about utilizing some of the map's meaning making potential. For example, the segment opened with Mandy wondering which scale would be most effective for making the argument she wanted to make. This was both a question of the map but also a question of the viewing audience for a performance that would be mediated through a screen. As another example of scale, the group created their own units of analysis based on their argument. Because the census tract was the smallest unit available for thematic layers in Social Explorer, the group had to determine the boundaries of their own analytic project, which they did with facility. The group was also aware of the ways in

which color conveys meaning on a thematic map, focusing on how to communicate to a viewing audience differences and connections via color on the map.

In this episode, as with those described in the John King remix chapter, the resources of the performative semiotic aggregate included the bodies, histories, and identities of participants. In this case, Mandy and Nicole's bodies are made spatial because the topic they chose was one that was localized for them in their school. They were specifically on the map in a way that no other group was: this story was about them, their school, and their rival schools. That said, not all of their data layers seemed to resonate with their experiences. For example, *high school dropout rates* as a thematic layer for four high school seniors who were weeks away from graduation seemed less resonant for the group as compared to socioeconomic relations as configured through median household income. In this way, even hyper-local map performances can be abstracted through data layers that are less resonant or that other or distance in some way.

Again because of the topic, this group's interaction seemed to make possible the performance of particular worlds in a way that other topics and interactions did not. The group set out to find out something about their rival schools. They asked, is Taylor really a "richer" school than we are? Whether or not this was an accurate way to pursue an answer to that question—or what that question can possibly mean in the first place—their search, which confirmed their opinions, was a way of performing the world around them, of using maps in powerful ways to apparently reveal objective truths.

Imaginative geographies. In many ways, a rival high school is an ideal "their space," a dialectical other that can shape one's own school community identity. The KLNM group's choice of a topic that so closely connected to their social and spatial positioning in the world led them towards further sedimentation of identities they had long formed regarding those around

them. I do wonder what would have happened if the experiment had failed their expectations and Taylor High School was found to be in an area with a lower median household income than their own. As I will discuss in Chapter 6, I believe there are real possibilities for building counternarratives through map performances, but this group's experiences show the ways in which map performances can be, and perhaps typically are, reinforcing of imagined geographies rather than calling them into question.

I was also struck in this episode by the choice of some of the slides depicting income for school zones. For example, the slides for LCHS (visible on the computer in image ②) and Verona (visible in image ③) are nearly solid colors. Surely, the KLNM group members are aware of some economic diversity among households in their school, and yet they presented this homogenous data layer without question. In the final presentation, Mandy even said phrases like the following about Verona: "they are making only 45 at the highest. 45,000 a year at the highest." This uncovers some ways that work with thematic maps can have a flattening or homogenizing effect on young people's views of the world. Despite our best efforts through the design of instruction to create spaces for questioning and critiquing maps, large or small regions of shaded space are powerful communicators.

In terms of constructing the world through imaginative geographies, this homogenizing effect seemed also to be impacted by the lack of representation, within the room, of the othered groups in their map argument performance (i.e., students from Verona and Taylor high schools). I imagine they probably have friends or know people who attend those other schools, but those friends are not co-present in the room and so the visibly homogenous group make up (though there could be diversity that is not visible) of KLNM constrains the imaginative possibilities for the groups they othered in their maps. Even the choice of high school dropout rate as a data

layer—again, not one that is likely connected to their personal experience or the personal experience of those around them—as a generic indicator of education level within each of the school boundary zones is an abstract and distant measure. The space-time of their othering, then, feels paradoxically further away and more removed from them than other groups that chose topics and data layers that would seem on the surface to have less of a resonance for participants.

Findings connected to research questions. The analysis of KLNM's in-process work on their make your own MAP has import for both the second and third research questions. As to interpretive challenges, the group's seemingly savvy utilization of color, difference, scale, and even vocal performance in the construction of the make your own MAP hid their lack of facility and understanding regarding the makeup and meaning of data layers. Both Mandy and Nicole were obviously trusted by Mr. Norman and were very experienced in media production. They were often in Mr. Norman's room during other periods of the day working on projects for him or for their weekly shows. The ways in which they efficiently rehearsed in this episode and prepared their visuals for recording displayed an understanding of media production and audience awareness that was not true of every group. But all of this hides the ways in which their rehearsal and project display a lack of understanding regarding the meaning of the data layers they have chosen. For example, median household income in a census tract, which colors the whole tract one color is taken to mean the range of income represented is, in fact, the amount of money that people in that area make. Also, using high school dropout rate as a proxy for "education" in these same areas is not thought through or questioned. So, then, an important finding is that interpretive challenges can appear at a much more fundamental level than the surface. For viewers who can recognize arguments that display differences in color or show data

layer differences at larger and smaller scales, there may still be a foundational misunderstanding of what the map is arguing.

As to the third research question, one connection among interpretation, production and performance in practices of teaching and learning thematic maps and map argument performances that is present again here, as it was in the John King remix episodes, is the ways in which production informs interpretation—both in terms of the performative semiotic aggregate and in terms of imaginative geographies. With regard to the performative semiotic aggregate, as I just discussed, interpretation can be proficient at one level of the data display (e.g., the visible referent layer) and not at another (e.g., a deeper understanding of the formation and meaning of data as presented in map data layers). With regard to imaginative geographies, there was a paradoxical finding here that even a story that is local can be interpreted at an abstract, distant space and time if there are not co-present others that in some way resonate with or are connected to that story or to the data layers in the map.

Summary of the Episode: Orange working on their make your own MAP

As the second illustrative episode of in-process production, I have included three segments from one class period in which the LCHS group I will call Orange worked on their make your own MAP. During this class period (April 23), the group worked for 32 minutes on the project. This was the second time they spent a sustained amount of time together on this. In a previous class period, they worked together on the project for 20 minutes. As their work together began on this day, the group tried to remember the topic they had been thinking about during the last class period. They remembered that they had been interested in the census category *foreign born* the last class period. Although they had started to make maps during the previous class

period using data layers related to percentages of foreign born population in different parts of the country, they failed to save any of those maps and were starting over on their maps on this day.

In this episode, racial, ethnic, and national identities are important elements of the students' conversation and work together. With that in mind, I include identity information for group members when introducing them. Group members Lana (African-American), Michael (White), and Lauralynn (White) huddled around the computer (see Figure 5-4) while Dominic (White) stood behind them. Michael operated the computer. Vincent (Mexican-American), a member of another work group sat at the table next to them, looking at a different computer screen.

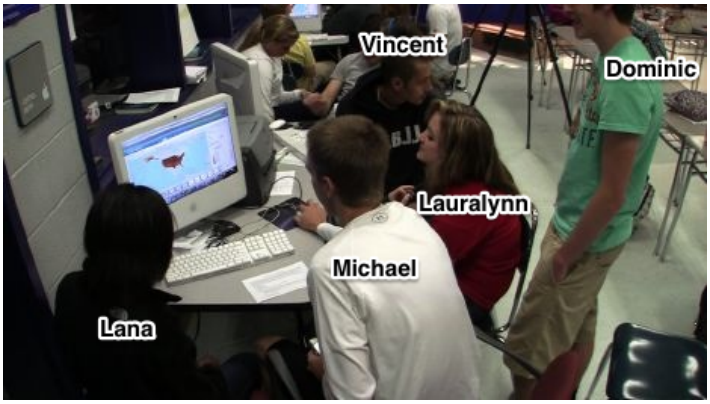

Figure 5-4. The LCHS group Orange worked on creating the maps they would use in their map argument performance. Members of the group were Lana, Michael, Lauralynn, and Dominic. Vincent, a member of a neighboring group, is also labeled.

In much the same way that groups preparing their John King remixes were trying to find a story, so groups preparing their map argument performances were also looking for a story to tell. For this group, Orange, their method was to try out various data layers connected to the category of foreign born populations or the population density of ethnic, racial, and national origin groups. Michael would move through various layers while the rest of the group commented on, made connections to, told stories about, or asked questions about what they saw

(e.g., “They have a lot of fun in Brazil, so why would they come over here?”; “My best friend in Illinois used to be Czechoslovakian”; “I used to have a Bosnian friend”; “My granny went to Maine and she said they looked at her kinda weird”).

Much of the full 32 minutes of the Orange group’s discourse and interaction during this class period related to the ideas in the chapter. By pulling out three brief representative segments of talk and action, I hope to keep intact the overall nature of the discourse and action during the period while also choosing segments that can be analyzed here. I chose this episode for two reasons: First, it is typical of groups’ work at LCHS in preparing the make your own MAP in terms of their method of trying out different data layers to see what showed up and, in this way, work to find a story. Second, the positionality of this group in relationship to Vincent, a nearby member of a different group who played an important role in their discussion illustrates the ways in which classroom interaction and identity formations are spatially relevant experiences (see Leander, 2002) both at the scale of the map and its projection out into the world but at the scale of bodies close by as well.

Episode Transcript and Description: Orange working on their make your own MAP

For each of the three segments, I include a starting and ending time stamp [minutes:seconds]. The time stamp measures time from the beginning of filming, so the first segment begins one minute and 47 seconds into their work on this day. I do this so that there is a sense of how time passed through these brief segments of interaction. I also depart somewhat from previous practice earlier in the dissertation in presenting transcripts. Here, I present each segment followed by a description of that segment. Then, I discuss all three segments together.

Transcript of Segment 1.

[01:47]

1. Lana: I have a question, Vincent. . . . >Never mind<.

2. Michael: ((quick chuckle))

3. Lauralynn: [Microphone.]

4.Vincent: [Do I need] to come over there and you can ask me?

5. Lana: No. >I didn't want it-< I didn't want it to sound racist.

6. Vincent: [It's OK.] The- I'm- Nothing can sound racist to me. I promise.

7. Michael: [( ).]

8. Lana: Does your family live in Texas? [Like-]

9. Vincent: [Yeah.]

10. Lana: Did they like . . *migrate*?

((Lauralynn laughs quickly))

11. Vincent: No I think- [I think we're-]

12. Lana: [Like did your] ancestors like a long time ago?

13. Michael: I knew that was [coming.]

14. Vincent: [Yeah] I think my grandparents and them came over here [when] my great great grandparents came over here [>from Mexico<].

15. Lana: [( ).] OK.

16. Michael: They moved right there too. {indicating a spot on the map with the mouse}

17. Vincent: They moved to- They moved to . . . Grapevine, Texas.

18. Lana: Oh.

19. Vincent: I think. I'm not real sure though.

[02:27]

Description of Segment 1. In Segment 1, Lana told Vincent, who was sitting at the same table as her group but looking at his group's computer screen, that she had a question to ask him (line 1). Before he responded, however, she said "Never mind." It appeared that Lauralynn assumed the reason Lana decided not to ask her question was because of the wireless microphone sitting on the desk (line 3): Lauralynn said, "Microphone." Vincent offered to come over to her, perhaps thinking it was a question she wanted to ask in private (line 4). Lana then explained her hesitancy: "No. >I didn't want it-< I didn't want it to sound racist." Vincent responded calmly, still looking at his group's computer screen that whatever Lana's question, "Nothing can sound racist to me. I promise" (line 6). Lana then asked three questions before Vincent had a chance to respond (lines 8, 10, 12). Each question was about Vincent's family history, though they were phrased quite differently and taken individually would have each meant something different. Lana seemed to be rephrasing each question to make it clear what she was wondering and also to do it in a way that she thought would be more respectful to Vincent. She seemed to want to know Vincent's family history—how his family ended up in Texas.

Before Vincent answered, Michael said, "I knew that was coming" (line 13) apparently having anticipated Lana's question. Vincent then responded that he thought his grandparents had come to the U.S. when his great grandparents "came over here from Mexico" (line 14). Michael then used the mouse to point to a spot on the map somewhere in Texas and said, "They moved right there too" (line 16). Vincent replied that he thought they moved to Grapevine, Texas (lines 17, 19).

Transcript of Segment 2.

[05:55]

{Michael switched to a new map that the group had not seen previously}

20. Lana: Wo::w.

21. Lauralynn: Oh >that one looks like< in ❶Paint {she holds her hand up as if holding a spray paint can and moves it around, her finger extended as if she was spray painting something} where you do the spray can.

22. ((Lana laughs))

23. Michael: But the problem is what does it *mean*?

24. Lana: {reading off the computer screen} <Foreign born place of birth.>

25. Michael: Mr. Norman! {turns to look back over his shoulder where Mr. Norman is sitting}

26. Lana: What does foreign born- foreign born place of birth mean?

27. Mr. Nor.: Foreign born place of birth?

28. Lana: Yeah.

29. Mr. Nor.: Born outside of- If you were born outside of the United States. Those are all . . probably immigration [( )].

30. Michael: [SO LIKE] THEY'RE SAYING THEY- THEY WERE BORN SOMEWHERE ELSE BUT NOW THEY LIVE HERE? {pointing at the computer screen and turning to his right to look back at Mr. Norman} So when they move here, that's where they live. Let's save that one too.

31. Vincent: Betcha it's all Texas ain't it?

32. Michael: [Not really.]

33. Lana: [No it's all California really.]

34. Michael: California, New Jersey, [Massachusetts, Washington-]

35. Lana: [And Florida.] There's not as much in Texas as there is in like [California and Florida.]

36. Michael: [There's probably more in] Tennessee than there is in Texas, which is kinda scary.

[06:44]

❶

Figure 5-5. Video still of the Orange group in the process of creating their make your own MAP. Number correlates to the transcript above.

Description of segment 2. In Segment 2, both Lana and Lauralynn had immediate reactions to a new layer that Michael tried. It is difficult to see the layer in the video footage (see Figure 5-5), but it was obviously unique in some way because Lana immediately said, "Wo::w" (line 20) and Lauralynn described the layer as looking like it had been spray painted using the computer application Paint (line 21). As she described it that way, Lauralynn waved her hand and held her finger as if she were spray painting. Michael was more perplexed than impressed: "But the problem is what does it *mean*?" (line 23). Lana read the category name off the computer—*foreign-born place of birth* (line 24)—and the group turned to Mr. Norman for help understanding this census category (lines 25-28).

Mr. Norman responded that it was people born outside of the United States who have immigrated (line 29) and Michael clarified that they are people who were born in another

country but live in the U.S. now (line 30). Vincent, who could not see the computer screen of the Orange group predicted that all of the foreign born population would be in Texas (line 31), but Lana and Michael listed off other states that seemed to have a larger population of foreign born residents than Texas: California, New Jersey, Massachusetts, Washington, and Florida (lines 32-35). Michael then commented that there was probably more foreign born residents in Tennessee than in Texas, "which is kinda scary" (line 36).

Transcript of Segment 3.

[14:18]

37. Dominic: Wow that's kinda weird how they're all in the South.

38. Michael: Mexicans?

39. Lana: {leaning back and looking up at Dominic} ❷You said it's kinda weird how all the Black people are in the South?

40. Dominic: Yeah cuz like they were all in the South ( ).

41. Lana: Cuz we were slaves there. So we just stayed there.

42. Dominic: You'd think it would be the opposite.

43. Michael: That's what I would- Ida get the *heck* outa there ( ) slavery ( ) back.

44. Lana: NO WE TOOK *OVER*!

[14:36]

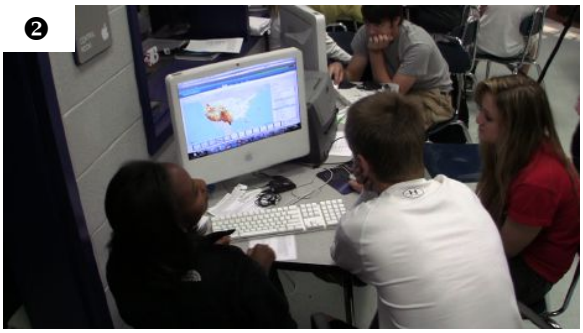

Figure 5-6. Video still of the Orange group in the process of creating their make your own MAP. Number correlates to the transcript above.

Description of Segment 3. The third segment occurred about seven and a half minutes after Segment 2. Dominic, who had been watching and participating all class period while standing up behind his group commented on one of the data layers that Michael had pulled up. It is unclear to me what layer it was, but it showed a distribution that appeared to be exclusively in the Southeast (see Figure 5-7). While looking at this layer, Michael said, "Well there is no Blacks in the West Coast." Lana immediately responded: "*Yeah* there is." Following this, Dominic commented on the distribution: "Wow that's kinda weird how they're all in the South" (line 37).

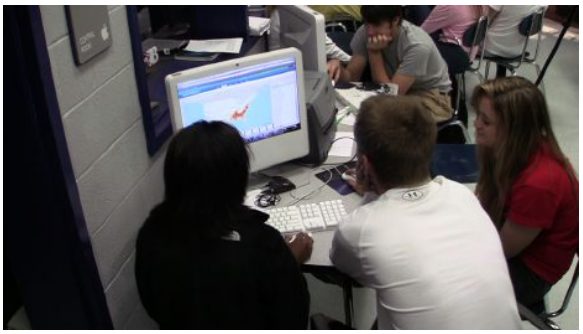

Figure 5-7. The group Orange looked at a data layer that showed a distribution of people that appeared to be exclusively in the Southeast, prompting Dominic's comment in Segment 3 above (line 37).

Lana paused for a beat, continuing to look forward, and then leaned back to look at Dominic who was standing up and behind her. She made certain she understood him correctly: "You said it's kinda weird how all the Black people are in the South?" (line 39). Dominic reaffirmed: "Yeah cuz like they were all in the South ( )" (line 40). Lana respond flatly, "Cuz we were slaves there. So we just stayed there" (line 41). Both Dominic and Michael respond that they think the opposite would be true (lines 43-44), but Lana proudly and cheerfully said "NO WE TOOK *OVER*!"

Discussion of the Episode: Orange working on their MAP

Performative semiotic aggregates and imaginative geographies. In this episode, the co-presence of the performative semiotic aggregates and imaginative geographies is strong. With that in mind, I depart from the format of discussion up to this point and discuss the two together in this section. As I described in Chapter 4, students' recognition and deployment of embodied aspects of the performative semiotic aggregate while creating the John King remix were apparent—the way they gestured, changed their voices, and used their bodies to signal shifts in roles and turn structures in an unfolding improvisational routine. In this episode of map argument performance production from LCHS as with the KLNM group, the opposite seems to be true. The bodies interacting with maps on the computer here are still, stiff, and hunched. There is almost no movement or gesture. This seems all the more strange for the fact that the purpose of this activity is to stand up, to interact with maps, to voice arguments, and to perform for an audience. An obvious explanation for this difference is the purpose of this phase of preparation for the group and the task structure associated with that purpose as opposed to the task structure and purpose of the remix, which called for embodied engagement with a pre-existing story. There will come a time when the development of the make your own MAP project

when each group will have chosen maps and determined a story. Then, they will rehearse in front of the green screen, bringing to life through movements, gesture, and speech, the arguments they previously framed in writing and pixels while hunched together over the computer.

But what I don't want to dismiss or lose in this phase of the preparation is a new kind of embodied resources that was less evident (though present) in the John King remix episodes. Here, the work of finding a story in maps on Social Explorer seemed to produce what I will call *geo-bodies* (borrowed and adapted from Winichakul, 1994), meaning spatialized, othered bodies of co-present participants and nearby others. In his study of the history of Siam (Thailand) as a nation, Winichakul uses the term to refer to the territorial dimension of a nation. He intends for it to convey multiple meanings surrounding the territoriality of a nation beyond "merely space or territory" (p. 17): for example, concepts such as integrity and sovereignty; practices such as border control, invasion, and wars; institutions such as trade, tax, administration, and education. But he also means for the geo-body to be a component of the nation: "It is a source of pride, loyalty, love, passion, bias, hatred, reason, unreason" (p. 17). I imagine that Winichakul's conception of the geo-body relies on people living in nations to collectively conceptualize the geo-body of the nation. These people might be thought of as individual geo-bodies. They are spatialized and positioned as members a particular community largely, if not entirely, because of lines on a map. With that in mind, I intend this second conception of the geo-body as meaning a spatialized, othered body. Similar to Wortham's (1994) *participant examples*, geo-bodies in the sense that I intend are always dual in identity: a person is both the spatialized geo-body, created through classroom interaction and map performances that layer identities and also a student, friend, and classmate. The process of creating geo-bodies will be described below through a reading of this episode.

As a resource in the semiotic aggregate, participants' bodies are (re)read and (re)written as the group works together at the map—especially as they investigate census categories that are inclusive of co-present participants. Prompted by the categories her group was pursuing on the map, Lana chose to ask Vincent about his family heritage. It is not that her questions were uniquely available to her in this setting. Of course she could have asked Vincent about his Mexican roots any time. But it appeared that the work of preparing a map argument performance layered census categories, state boundaries, and histories atop the people and nearby places in the room. In this way, Vincent's history as a Texan and his Mexican heritage are made more visible. As is Lana's family history with slavery. When she said, "Cuz we were slaves there" (line 41), she adopted a history that is hers into the present, utilizing this geo-body resource to counter the unsympathetic dismissiveness of her groupmates and proudly proclaiming "NO WE TOOK *OVER!*" The process by which imaginative geographies lead to the othering of classmates and friends is clearly through the performative semiotic aggregate.

In this episode, the work of the performative semiotic aggregate in learning to interpret at the map is also visible. When Lana and Lauralynn immediately responded to the visual impact of a new data layer that Michael found (lines 20-21), they prompted his at once dismissive and insightful retort, "But the problem is what does it *mean*?" (line 23). Here, Michael recognized several elements of the map that were layering to construct meaning: the census category name, the colors on the map, and the spatial distribution of the colors. His restatement at line 30, which is said loudly because he's speaking across the room to Mr. Norman, is evidence of the kinds of learning afforded by the performative semiotic aggregate. Here, Michael recognized a breakdown—he didn't know what the map meant—and he was able to repair the breakdown by first questioning the map and then seeking support.

Still, misinterpretations and misappropriations abound across the corpus in map argument performances. Students often misunderstood data layers, mistook them for other meanings, or did not interrogate the data that produced them. One example was the back and forth between Michael and Lana that led into Segment 3. Michael said, "Well there is no Blacks in the West Coast," with Lana immediately correcting him: "*Yeah* there is." I do not know what the data layer showed that led Michael to conclude that the map, at least, was arguing that there were no Blacks in the West Coast, but it is clear both that critical interpretation and interrogation is an essential resource for map performances and also that learning and repairs are made more possible by collective inquiry.

At least two aspects of imaginative geographies through the resources of the performative semiotic aggregate were visible in this episode from LCHS: the construction of geo-bodies and the reading and writing of a kind of fear discourse about immigration and mobility of people of color across multiple maps and people in this episode. Above, I briefly introduced the conception of geo-bodies. Here, I want to more closely analyze the process at play in othering a classmate or friend when participating in map performance activities as it played out in this episode. De Haan and Leander (2011) analyzed racial and ethnic othering across social space in classrooms in the Netherlands and the U.S. Here, I include the map performance activity as a resource in the process of othering and ethnic and racial identity construction in the classroom.

I don't know precisely what prompted Lana to ask Vincent about his heritage. I assume it was either the general topic of foreign-born populations in the United States that her group was analyzing or a specific map category or data layer that included Mexican immigrants and/or Texas. Whatever the specific prompt, the operational power of an immigration narrative

generally and a specific narrative about Mexican immigrants in the United States had an effect on othering and distancing Vincent from the outset.

Consider, for example, Lana's three questions: Does your family live in Texas? Did they like . . *migrate*? Like did your ancestors like a long time ago? These three questions could conceivably be asked of anyone whose family might live in Texas. Were they asked of a White student, there would not have been the political and cultural force connected to a currently powerful political narrative around "illegal immigration." In fact, Lana was careful to ask her questions in a way that was specifically silent about immigration status. For example, she seemed to emphasize that she was asking about Vincent's immigration history with his "ancestors like a long time ago" (line 12). Immigration status does not come up in Vincent's responses either. But that silence certainly does not dismiss the power of the discourse from the interaction and from spatializing and positioning Vincent as a geo-body that is colored, raced, nationalized, and possibly criminalized.

In the transcript, there is evidence that Vincent was aware of and responsive to the way in which he had been territorialized as a Mexican-American Texan. When Michael figured out that one of the layers represented the distribution of the current location of foreign-born residents of the U.S., Vincent said, "Betcha it's all Texas ain't it?" (line 31). Vincent was in a neighboring group, not looking at the screen of the Orange group, but it seemed that his response was in part anticipatory and defensive, recognizing another way that the group's map might work to position him in a particular way again. His shifts in footing (Goffman, 1981) in this episode reflect both the liminal nature of his participation in the Orange group and the ways in which his identity is in play—his geo-body, in a sense, hovering between the two groups throughout this class period. At times, Vincent the classmate is a ratified participant in the Orange group, as when Lana asked

him the series of questions about his family history, but in this case where he said "Betcha it's all Texas ain't it?" (line 31), he was obviously eavesdropping and then chose to insert himself.

Allen (1999) makes two points about imaginative geographies that are germane to the fear discourse that is interpreted and produced in this episode. First, that imaginative geographies are elaborate and durable and "draw their robustness from their ability to make it difficult to see or make sense of things in ways other than that represented" (p. 44). Second, that authority and power legitimize a particular worldview. In other words, it is both the map that gives power to the worldview and the worldview that gives power to the map and makes it seem to represent "what *is* without provoking disbelief" (p. 44; italics original). Throughout this episode, in excerpted transcript I have included here and in segments of interaction that I did not include, Michael and others operate with a discourse that views White occupancy of space and territory as normative and the mobility and immigration of the various ethnic and national groups investigated via the map as invasive. Through all of it is a fear discourse that operates in two directions: first, Whites are scared of invasions by minority groups; second, minority groups stay away from certain territories and spaces on the map because of a fear of Whites.

This discourse is evident in line 36 of the transcript. There, Michael was talking about the general population of foreign-born residents of the U.S., as opposed to a country-specific population, and said, "[There's probably more in] Tennessee than there is in Texas, which is kinda scary." Here, the fear seemed to be for himself as a resident of Tennessee. Another example is an interaction that occurred when Michael started to choose country-specific layers. For example, census data includes residents of the United States who were born in Poland or El Salvador or Germany. These population distributions can be displayed via Social Explorer.

When Michael chose "Mexico," Lauralynn noticed that Montana did not have a large Mexican-born population as compared to most of the other states:

1. Lauralynn: Nobody likes Montana.
2. Lana: ((laughing))
3. Lauralynn: That's completely understandable.
4. Michael: There's some scary White people in Montana.
5. Lana: Yeah they're not very welcoming.
6. Michael: They don't go mess- You don't go up there if you're Mexican.

Nearly every one of the country-specific data layers was read this way by the group. An absence of a large population of Mexican-born residents of the United States in North Dakota, South Dakota, and a rural county in Alabama, were all explained by how scary it would be for these populations to be there. However, it was not always "scary Whites" that were described as the unwelcoming residents. When the group zoomed into a rural Alabama county that had a small population of Mexican-born residents, Michael said, "What's so scary about Alabama?" and Lana responded, "Black people." These interactions are obvious openings for counternarratives that were not designed into the curriculum and do not develop on their own. In Chapter 6, I address this weakness of the instruction and propose some possibilities for utilizing opportunities to reframe imaginative geographies that perpetuate difference through map performance activities.

Findings connected to research questions. This analysis connects to the second and third research questions in the following ways: First, as to interpretive challenges (research question #2), a new finding is that the visual impact of a data layer, the way its aesthetic qualities can overtake the meaning making operation—at least on initial response—is clear in the segment

where Lana and Lauralynn immediately responded to the visual impact of a new data layer (lines 20-21). Michael also recognized that there was something complex going on, though he tried to uncover the meaning. In his effort to understand the layer (lines 23-30), Michael showed one way that interpretation of thematic layers can be learned (research question #3): when production is layered with interpretation, interpretive acts take on higher personal stakes for individuals and groups. In this case, it was Michael who wanted to know what the layer meant so that he could do something with it. Additionally, his work to repair his initial lack of understanding depended on a recognition that he did not understand something in the map. This recognition can be contrasted with the KLNM group, and many others during the study, moving along with an assumption that they have a handle on the meaning a data layer and misrepresenting it in talk.

Another interpretive challenge (research question #2) is a misreading of absence of thematic content in a data layer. Throughout the make your own MAP work, I saw groups do this. Students would account for absence in ways that did not match the reason for the absence (or could not plausibly match the reason) or were simply baffled by absence of thematic content (e.g., no color in a rural county in Texas when the layer was population density of White people). Michael's comment that led into Segment 3—"Well there is no Blacks in the West Coast"—is an example of this kind of confusion over absence of observable data layers.

With regard to teaching and learning via interpretation, production, and performance, this episode points to the way in which task structures elicit different kinds of performances. While embodied, improvisational performances were common with the John King remix, here performances of geo-bodies is more common. The othering and identification of classmates via imaginative geographies identifies semiotic structures that have potential for critical literacy and that also have potential for reification of existing beliefs and attitudes with regards to race, class,

gender, and ethnicity. In the study, the latter was more common as an outcome. But identifying the possibilities of interpretation, production, and performance for the creation of counternarratives is a powerful finding for future iterations of this study and the potentials for this kind of teaching and learning.

The Make Your Own MAP as a Distinctive Designed Activity Structure

The two illustrative examples represent the unique aspects of the make your own MAP as a designed map performance activity that is different from other research settings in which semiotic aggregates and imaginative geographies are analyzed. An important unique aspect of this designded activity system is the way that technologies make available to participants embodied demographic layering that reaches out from the computer screen to laminate participants and co-present others. Unlike other activity systems—even those with thematic maps such as the John King remix—the make your own MAP uniquely performed localized geo-bodies even with seemingly distanced demographic layers in Social Explorer. For example, Mexican-born residents of Texas as a demographic layer extended out to Vincent, who was sitting near the Orange group. This demographic layering spatialized and othered nearby bodies, recruiting performed identities that were used in spatial stories of difference and sameness. The unique aspect of the geo-body performance via the technologies designed in the make your own MAP as compared to, for example, participant examples (Wortham, 1994) is the way in which data layers adopt abstract and concrete resources of sameness and difference nearby for the performing of global and local spatial stories. Sameness in the bodies in the room, for example, was read back onto the map through a Whiteness-as-normative narrative.

The make your own MAP activity is also designed to uniquely historicize local and global spatial stories through the assigned requirement to include not only data layers of

demographic difference but also temporal difference. Participants created stories of change across time and read and performed map arguments as both spatial and historical. Here, the history of the designed instruction is important as well as the task structure itself. The models students saw and studied of John King delivering map argument performances were all both spatial and temporal in this way.

CHAPTER SIX

DISCUSSION AND IMPLICATIONS

Summary and Discussion

In this chapter, I first summarize and discuss findings from the design studies at SEC and LCHS. Second, I consider future design considerations. Third, I offer implications for research.

Map performances are practices that involve people in interaction with thematic maps and map argument performances. Thematic maps are maps that show the spatial distribution of a concept, phenomenon, or theme (Dent et al., 2009; Kimerling et al., 2009). They were first produced in the mid-1800s in the United States, but they are still not well understood as textual objects of interpretation—even in K-12 instructional settings devoted to geography learning (Wiegand, 2006). What I call map argument performances are a new category of practices that I believe has not previously been identified nor studied. Map argument performances are segments of news or other media produced to make arguments or tell stories that include bodies and thematic maps in interaction. The term is flexible and meant to cover bodies that might be heard (e.g., a voice over accompanying a complex thematic map on television news or on the Internet) and/or seen. New forms of map argument performances such as the CNN News magic map have been developed within the last few years.

Both thematic maps and map argument performances are increasingly prevalent in media streams intended for adults and for youth. And while media producers create and distribute complex maps and map argument performances with increasing regularity, there is no effort, even in K-12 schooling, to support viewers in learning how to read these texts. Advances in

technology and easy access to large public data sets have also meant that people with no technical training using free online computer applications can create complex thematic maps and map argument performances.

Map performance practices include reading, interpreting, playing with, remixing, and creating thematic maps and media presentations with thematic maps and people in interaction. Any interaction of a person and a thematic map will involve map performances. But map performances can also be leveraged as activities in instructional settings to support young people in learning to interpret and produce thematic maps and map argument performances. This study investigated the ways in which map performance activities, as part of a package of instructional designs, supported learning in innovative ways, primarily through media production with small groups of young people in classroom settings.

Specifically, as I viewed video records of young people participating in map performance activities across two iterations of a design experiment in two classroom contexts, I began to see patterns of participation and engagement, particularly, embodied ways of engaging with maps, with media, and with others involved in the activities. I came to describe these patterns of participation as an interplay of two conceptual categories of practice: performative semiotic aggregates and imaginative geographies.

The performative semiotic aggregate is a way of describing the network of discourses interacting when young people view, read, play with, and create thematic maps and map argument performances. It is an emerging meaning making composite adapted from Scollon and Scollon (2003) that is specific to the work of map performances. Scollon and Scollon conceptualized the semiotic aggregate as the interwoven semiotic systems present in any place, including language, the organization of people in social interaction, signs, and other material

objects. I have proposed that the *performative* semiotic aggregate is formed by the intersections of semiotic systems related to map argument performances with bodies in interaction, classroom technologies, and performances of maps and people. The performative aspect is evident in at least four ways: (a) in the way that small groups of participants perform for others outside the group via public display of projects; (b) in the way small-group participants improvise and riff for and with each other in unscripted ways during activities; (c) in the way participants perform identities during activities; and (d) in the way a particular world is performed by maps and people involved in map performances.

The performative semiotic aggregate works to build meaning. That is, as young people interact in concert with and across the performative semiotic aggregate, they are creating new meanings, performing new worlds, and adopting new ideas. But the performative semiotic aggregate also illuminates map performances for the benefit of learning and instruction. Insights across instances of map performances aid researchers, teachers, and young people in leveraging map performances for learning, in better understanding the potentials for meaning making and in extending possibilities for production and engagement.

Imaginative geographies are acts of identity articulation in concert with or counterpoint to thematic maps and/or map argument performances. Within human geography (see, e.g., Allen, 1999; Driver, 2005; Gregory, 2009), imaginative geographies are representations of other places, cultures, and peoples that shape one's perception of the world and of possibilities for acting in the world. These representations can range from a global scale of distance and difference (e.g., Said, 1978; Gregory, 2004) to an embodied, intimate scale (e.g., Valentine, 1999). Map performance activities seem to uniquely produce opportunities for imaginative geographies by bringing into conceptual space, with groups of students, the resources, tools, and technologies

(e.g., bodies, discourse, texts, representations, computer applications, maps) for performances and negotiations of identities.

In the previous two chapters (Chapters 4 and 5), within discussions of map performance activities (i.e., the John King remix and the make your own MAP), I have compared findings. Here, I compare across activities, summarizing findings from within activities and considering how performative semiotic aggregates and imaginative geographies operate for participants in different and similar ways across the domains of the two different activities.

Performative Semiotic Aggregates

In any map performance, the performative semiotic aggregate operates as a resource for constructing meaning by participants. For teachers and instructional designers, it is also a means of building for learning and development of interpretive and productive capacities across the semiotic systems at play. I address both of these here.

Meaning making for participants. First, as to its meaning making potential for participants, the performative semiotic aggregate supports meaning making in map performances through resources that are shared during interaction. Interactions in the designed activities that I studied were with small groups of students. The way the performative semiotic aggregate worked was to both collect and make available resources for meaning making. Meaning was made in map performances through the process of interaction with the performative semiotic aggregate, which included co-present others; technologies; signs and symbols on maps; histories of participation with others; racial, ethnic, gender, class and other identity categories of bodies that are visible in the interaction or not; gestures; traces; sounds; vocal qualities; gaze; and body movement. In this way, every map performance and every group interaction was different. Meaning was co-constructed in the moment for all groups and in all map performances, but this

co-construction was unique, relational, and specific to the resources that were brought into the map performance. For example, biographical histories and popular culture references, to name only a few of the potential resources that could be contributed by participants to the performative semiotic aggregate were shown in the analysis in Chapters 4 and 5 above to be, in part, constructive of geo-bodies—raced, colored, and classed laminations layered onto participants.

The performative semiotic aggregate in map performances is also always spatial, relational, and positional in nature. In this way, it is unique from the semiotic aggregate (Scollon & Scollon, 2003) generally or from other descriptions of layered semiotic systems (e.g., Enyedy's, 2005, semiotic ecology). In other words, the thematic maps and map argument performances at the center of the map performances investigated in this dissertation uniquely collected and afforded spatial and relational systems of meaning and of identity construction.

As examples of the unique attributes of the performative semiotic aggregate for meaning making in map performances, consider that a wide array of semiotic resources across both activities (i.e., the remix and the make your own MAP) served to perform, make space, create relations, and articulate identities. With the John King remix a varying collection of map symbols, traces, gestures, gaze, body movement, vocal registers, popular culture references and practices, thematic data layers, media personalities' words, paper script, and embodied improvisational play positioned bodies, ideologies, and cultural practices against one another to form new meanings or make new identities.

This is not to say that in the John King remix and the make your own MAP, the performative semiotic aggregate operated in precisely the same way. As I wrote above, it will be deployed differently for different groups and with different projects. It can even be largely ignored based on the agency and participation of group members. We observed group members

at SEC and LCHS choose not to interact with or contribute to some of the affordances of the John King remix. For example, groups that did not interact or talk together, where one person wrote the script and others sat around or watched YouTube videos. But even in that situation, I believe the meaning that is being constructed from and with the map argument performance in the remix is still taking place across the performative semiotic aggregate. It is still spatial, it is still relational, and identities are still constructed and performed in interaction with the aggregate. However, these distinctions may be internal and impossible to observe, and so I cannot say for certain yet that this individualized performative semiotic aggregate works in the same way.

In analysis of what I will call functional groups at SEC and LCHS, that is groups that are not the outlier case of no one talking or very little talking, there were observable differences across activities with relationship to the performative semiotic aggregate. For example, the John King remix afforded an embodied, playful response from group members as they completed the project. By contrast, analysis of groups' in-process work on the make your own MAP showed group members hunched over the computer, hardly moving. The nature of the remix, its connection to popular culture and youth remix culture, and the invitation to reproduce something from existing materials (a kind of sandbox built for play with an existing structure and materials available for (re)mixing) all seemed to contribute to innovate, creative, and embodied play.

Again, that is not to say that these differences were inevitable. However, the more generalized differences can be helpful in the context of designing for instruction in the future. Leveraging the affordances of the performative semiotic aggregate for learning how to read thematic maps and map argument performances is one powerful reason to attend to the performative semiotic aggregate.

Building for learning. How might that be accomplished? How can the performative semiotic aggregate be leveraged for learning with regard to thematic maps and map argument performances? A few possibilities: First, both the John King remix and the make your own MAP evidenced an array of semiotic resources in practice as groups participated in these activities. For example, groups altered their vocal tone, they played creatively with the possibilities of gestures, and they integrated popular culture. In the middle of the production cycle of either activity, the class could debrief and talk together in small groups or as a whole class about these semiotic resources. What did students notice about their interactions? Why did these resources come up in the interactions? What work of meaning making did they do? Because the identification of resources would be built from the group's work, they could then think about how these same resources applied to make meaning in thematic maps and map argument performances. How would attending to them further support learning?

Further, they could consider the unique aspects of the performative semiotic aggregate for performing worlds, identities, and play. Which groups experienced these performances? What did they feel like for you as a participant? How did they affect your reading and understanding of thematic maps and map argument performances? How were you positioned in your group and as a learner? What did those positionalities with group members and with the data on the map have to do with how you felt and what you understood from the map?

A second idea might be to harness the differences described above regarding the relative embodiment and playfulness of the remix as compared to the make your own MAP. One strategy could be to ask students to pay attention to their bodies during both activities and to talk together about their findings as a class in a debriefing session. A goal could be to recognize that bodies are positioned in both activities but in different ways. What do the different ways afford in terms

of their learning? How is embodied playful participation with maps a way to see them differently and think differently about the interpretive acts of reading them in broadcast media? How are bodies positioned in the make your own MAP project? What do students recognize about how they feel and how they see themselves as they participate in making map argument performances? And how does that affect their learning?

These suggestions operate here as conjectures for future design studies, as ways to leverage the unique aspects of the performative semiotic aggregate as discovered in this study. Next, I consider imaginative geographies.

Imaginative Geographies

I was surprised by the level to which identity work was a part of map performance activities. In nearly every map performance activity in process I have observed, imaginative geographies were visible at some level. Sometimes these geographies operated at the level of micro-scales of relational and embodied positioning in which participants in the same group or nearby others were (re)performed as geo-bodies (e.g., raced, classed, and/or gendered in relation to their classmates or groupmates). Other times, the scales of relationships were more distant. For example, beliefs about other places and other peoples (e.g., Californians, Texans, Floridians, Cubans, angry White people) were often expressed in the make your own MAP activity. Sometimes these positionings of distant others had no observable corollary in terms of the way classmates were positioned and performed. However, other times, even the seemingly distant othering had effects on nearby students in the classroom. This was true, for example, with Vincent who was identified as a Mexican-American and Texan despite his own seeming distance in time and space from those labels.

I do not know exactly how to account for the presence of imaginative geographies in nearly all map performance work. It may be that map performances and imaginative geographies conceptually overlap so that whenever one is negotiating difference and sameness across social and geographic space with a thematic map or map argument performance, imaginative geographies are at play. However, it is important to note that all of the map performances in the study were related to politics or human geography (i.e., census data). Would imaginative geographies be as powerfully present in map performances if the topics of the maps were plant growth, disease, or animal migration? This points to a limitation of the study—the narrow focus of the kinds of maps that were investigated. In future iterations, I would like to investigate maps with non-human topics as a way of thinking about how thematic maps operate more generally. It may well be that humans insert themselves into maps and map performances no matter the setting or topic.

As I showed in the case of Leslie, Layla, and Kevin at SEC, imaginative geographies were not always obviously connected to the work of self-identification or of identification of co-participants or co-present others. The level to which imaginative geographies operated for self-identification seemed to differ across activities and across the diverse makeup of groups. It was not always evident that young people were reading themselves against imagined others in the formulation of identities. The remix seemed, overall, less likely to obviously engage imaginative geographies in the work of self-identification as compared to the make your own MAP. The fact that nearly every group included the state of Tennessee or the Southeastern United States as part of their analysis in the map argument performance shows that groups were imagining their spatial selves in comparison and opposition to distant or local others. With regards to distant others, groups seemed sometimes to choose random locations to compare with Tennessee in their

map argument performances. Some comparisons were made because groups were looking for interesting data patterns to share. But others were clearly made because an exotic of far away location offered an exciting contrast to Tennessee (e.g., the coasts, California, or Miami).

Difference in imaginative geographies seem to be connected to differences in resources from performative semiotic aggregates in different activities and with different populations of participants. For example, access to the significant number of census data layers in Social Explorer and the demographic nature of many of them made for the possibility of introducing census categories that were resonant for group members and co-present others as compared to the John King remix, which did not have a large list of data layers. The makeup of group participants and co-present others also seemed to have an impact on the kinds of identifications available through imaginative geographies. Groups with observable diversities were more likely to display imaginative geographies that were observable as identification of selves and others and that had the effect of othering group members or nearby co-present students.

Popular culture as a resource also seemed to be tied in with identifications. Through imaginative geographies, young people could assign differences that became hard to break down, but it seemed that they could also make connections and identifications, for example, as fans, across distances. Representations of imagined others with celebrity lifestyles become objects of desire and interest. This might explain the popularity of *Hunger Games* and zombies as topics for John King remixes. The movie *Hunger Games* was released a couple weeks before we started the LCHS design experiment. Several students were reading the books after having seen the movie. Their connections and desires associated with the story, the characters, and the actors and actresses may have made *Hunger Games* a resource for map performance activities.

Unfortunately, the map performance work, without a clear critical literacies component (which I discuss below), seemed especially to reify existing categories of difference and to position people in ways in which they could easily be othered. Some of these otherings and identifications were more innocuous than others, but the performative semiotic aggregate affords possibilities for many kinds of identification and there were certainly otherings that I thought were harmful or potentially harmful. De Haan and Leander (2011), in the conclusion to their investigation of ethnic othering in classroom social space in the context of Dutch and U.S. classrooms, wrote, "practices that appear to 'domesticate' and support ethnic othering should come under greater scrutiny" (p. 335). With this in mind, map performance practices deserve scrutiny for the ways in which othering was both supported and sustained by these activities in the study. Leander (2002) was also critical of the oppressiveness of identity artifacts in classrooms in his ethnographic study of the production of social space at an urban high school, but he pointed to the possibility for such artifacts to produce new relationships of power and new relationships of identity and learning. I find hope, as well, in the as yet unharnessed critical possibilities of map performance activities. Below, in naming some future design considerations, I describe more specific ways that imaginative counter-geographies (Gregory, 2009) may be possible with map performance activities.

Future Design Considerations

Imaginative counter-geographies. I designed map performance activities with the goal that they would support critical engagement with people and texts in the world—especially in the context of media interpretation and production. I had hoped that young people would be empowered by their engagements with thematic maps and map argument performances in the context of the classroom design activities to participate in processes of interpretation and

production in the media and in the world that would have import for them now and in the future. And I have evidence to that effect both anecdotally and empirically. Anecdotally, several students at LCHS told me about thematic maps that they saw in the news or on ESPN. They were excited to tell their friends or parents what they had learned about how a map they came across together worked and how to best go about reading it.

Empirically, the exit interview data from LCHS yielded a surprising result. In nearly every group, at least one person mentioned that they were now more interested in politics after the study and that they felt like they better understood what was going on in a political discussion. It was not necessarily a goal of the study to apprentice young people into an interest in politics, and I was surprised that this was an outcome, but it is understandable given the topical focus of the maps we studied together and the engaged way students were able to interact with, interpret, and play with politically relevant thematic maps and map argument performances.

Observational findings also point to the success of the study in terms of empowering young people and supporting their engagements with thematic maps and map argument performances in order to participate in the world. For example, in nearly every group's make your own MAP, they investigated difficult topics that required relational thinking across demographic categories, historical layers, and spatial distributions. I have noted some students' misapprehension of categories or constructs in this work, but the effort itself, is an example of the kinds of empowerment and engagement I hoped to foster—an interest in the world and in methods of analyzing relevant issues in order to make decisions.

Despite these successes, a lasting impression for me of the design studies will be of missed moments to harness opportunities for *imaginative counter-geographies* (Gregory, 2009)

that would work to undo delineations of "our space" and "their space"—particularly among classmates and peers. Wohlwend and Lewis (2011) note that "critical literacy teaching all too often ends in reproducing rather than transforming stereotypical identity performances despite curricular social justice goals" (p. 191). Too often, and the data is clear on this, map performance activities were opportunities for young people to reify imagined geographies of difference, particularly as those geographies of difference applied to minority classmates. Map performances, crucially, bring out into the open dialogue about imagined constructions and categories of difference. But, as Allen (1999) argued, "it is always possible to think through such imaginary constructions rather than think with them, contesting their authority and pointing out their provisional character" (p. 45). A key in future design work is to do that—to make critique and "thinking through" rather than "thinking with" imaginative geographies.

An important way that this study contributes to future design work that can include more elements of critical literacy and imaginative counter-geographies is the identification of conceptual categories of practice that operate within map performances. For example, the ways in which imaginative geographies operated within every map performance was not a finding I anticipated. Knowing now that work with maps will create moments for interrogating conceptions of "our space" and "their space," I can build in critical interventions as part of future designs. For example, make your own map argument performances might be designed to be responses to imaginative geographies that reify difference, making connections or counterarguments instead that can build relationships across geographic and social boundaries. The media component of this design work is a powerful way to distribute messages that could make a difference for bringing communities together or for critiquing discourses that divide.

Mathematical and statistical literacies. In the analysis presented in the dissertation, I have not focused on learning and engagement related to mathematical and statistical literacies, but this could be a promising element of future design work. Video data from LCHS, that I have only cursorily investigated from the perspective of mathematical literacies, makes clear that for most students, the mathematical and statistical data that made up thematic layers remained both hidden and misunderstood. Because this study took place in a media production classroom, I did not design instruction to focus on the mathematical and statistical elements of thematic maps and map argument performances, so there is a great deal to explore here. How can students learn to dissect thematic layers and understand the origins of the data represented there? I believe core map performance activities—remix and make your own map argument performance—are ideal methods for teaching and learning mathematical literacies. What would be required as a provocation in design is that students decompose or compose projects in ways that require digging into statistical foundations of thematic layers. For example, a remix that was still wide open in terms of content but included an assigned requirement that students voiced one or two mathematical or statistical concepts (e.g., mean, median, spread, distribution) would be productive.

Changes to technologies. In neither the SEC nor LCHS setting were students able to truly interact with maps in the way that John King does with the magic wall. This certainly changes not only their engagement with the project but the possibilities for their better understanding the way the magic wall and magic wall performances work to make meaning. In future designs of instructions, I would like to incorporate different technologies that would make possible a more interactive engagement with the map. One way to do that would be through an interactive SMART board. Another way to do it would be through touch screen devices like

iPads. However, the small scale of the iPad would seem to take away from possibilities for embodied actions.

Implications for Research

New literacies. When this study began—with a question about the kinds of maps that were used in the media—the world was seeing, for the first time, an embodied, interactive performance with maps on CNN News. In only a few years since then, large screen, multi-touch, interactive technologies used in the media for displaying maps are now more common. For example, several students at LCHS mentioned to me the interactive thematic maps they saw on ESPN in the context of sports reporting and entertainment. Data displays like thematic maps and other complex spatial and informational representations for making arguments in public spheres are now commonplace, and production via free online software is increasingly easy for people without any specialized training. But we are only on the cusp of understanding how to interpret these complex texts and how to teach interpretation and production that will have implications for people's ability to engage in information exchange in the world. This dissertation study represents basic research in both the design of teaching and the processes of interpretation and production. The central conceptual categories that I found in map performances should be tested in new settings and, more importantly, exploited for design as I discuss here in Future Design Considerations.

Based on this study, thematic maps and map argument performances as emerging multimodal texts present real challenges for teaching and learning. For example, map argument performances are not only inherently multimodal—operationalizing an array of modal resources that include sound, gesture, gaze, dynamic scale changes, color, traces on interactive surfaces, camera movements—they are also inherently mathematical. And if we have only begun to

understand and to research how multiple modes work together to make meaning in multimodal ensembles, we have not even started the interdisciplinary work of investigating how statistical data layers are read through modal translations (e.g., in color, spatial contours, height, area, sound, embodiment, and interactivity) in complex media performances that are now commonplace for broadcast television viewers.

In addition to their multimodal and mathematical properties, thematic maps and map argument performances are also inherently spatial and demanding of spatial thinking and analysis for interpretation in ways that we are, again, only beginning to understand. For example, dynamic shifts in scale, a frequent and routine practice in map argument performances, are not easily accounted for with multimodal or mathematical analytic or pedagogical perspectives. Additionally, spatial perspectives, especially a critical cartographic understanding of maps as arguments rather than objective bearers of truth, are also necessary to fully understand and act on maps that appear in everyday media.

Method. I plan to make changes to research methods in the next iteration of the design experiment. The primary change I would make is to include a method of capturing the computer screen when students were creating maps in ArcGIS Explorer or Social Explorer for the make your own MAP. It is evident even in the analysis above of the KLNM group at LCHS that a screen capture of the maps being produced would aid in understanding the meaning making Mandy and Nicole were engaged in collectively as they created maps and rehearsed.

Despite these methodological challenges, this study included innovative methods for researching young people's engagement with complex spatial productions. For example, the John King remix as a method of researching young people's interactions with thematic maps and map argument performances opens up the possibility for observing and analyzing the imagined,

embodied nature of viewers' interactions with map argument performances. The same is true of the make your own map argument performance. As I have mentioned, an important foundation of the instructional design was production activities for young people. But these activities serve not only to make possible innovative teaching and learning but also innovative methods of analyzing and understanding young people's interpretation and production in practice.

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Appendix A

Note to Appendix A. Below are the exact instructions SEC students received regarding the small group analysis of thematic maps found online.

Maps in the Media
Wed Afternoon, Activity 1

Go online and scan/review several examples of different thematic maps. Use the links below or other links you will find.

Select, as a group, a focal thematic map for analysis and presentation to the entire class. Pick something that you think is associated with an interesting topic (e.g., controversy is often good) and you can critically think about as an example of media.

Prepare a short presentation for the rest of the class in which you address the following questions. You may also extend your presentation into other areas that you think are useful to understand the characteristics of your thematic map and your critical appraisal of how it is being used in context.

Key Questions

1. What is the proposition, argument, or story? (What's it trying to say or argue?)

2. What features does this map show? (e.g., political boundaries, natural features, place names, color or shading, legend, other features). What features seem most important for its purpose?

3. What is shown and what is hidden?

4. What could be interpreted differently?

5. How would changing the scale of the map itself or the layers of data change the meanings of the map?

6. How is this thematic map related to anything else around it (e.g., surrounding text, captions, a story, photos). Does the map tell the same story as surrounding material?

7. Why do you think these media producers (identify who they are) chose to present data this way, as opposed to some other way?

Search for "interactive map" on nytimes.com (this link should also do that: http://query.nytimes.com/search/sitesearch?query=interactive%20map&st=cse-related)

Here's a great set of maps from nytimes.com:
http://www.nytimes.com/interactive/2011/03/06/weekinreview/20110306-happiness.html

http://www.datapointed.net/

Featured Maps on http://geocommons.com/

Not all of these maps are thematic: http://www.axismaps.com/portfolio.php

http://www.worldmapper.org/

You have to search around a little on this one, but there are good thematic maps: http://spatialanalysis.co.uk/

Not everything here is thematic, but lots of great maps: http://scimaps.org/maps/browse/

http://www.theatlantic.com/misc/the-12-states-of-america/

http://www.flickr.com/groups/1478218@N22/

http://opinionator.blogs.nytimes.com/2010/12/09/visualizing-slavery/

http://makingmaps.net/2010/11/30/more-old-school-cartograms-1921-1938/

Click on the 'Maps' tab for more thematic maps: http://labs.slate.com/

lots of thematic maps: www.socialexplorer.com

Appendix B

Note to Appendix B. Below are the instructions SEC students received regarding the small group analysis of a CNN Situation Room clip followed by instructions for completing the John King remix activity. Please note that the text has been slightly changed to remove potentially identifying references.

Maps in the Media
Wed Afternoon, Activity 2: What John King Said

We'll watch a short clip (1:30) from an episode of CNN Situation Room recorded in October 2008. The clip mostly features John King talking about Obama's chances during the election by interacting with a "magic map," a large multi-touch screen.

This clip introduces some complexities to the ways we've been thinking about how maps are used in the media. How is this clip different from the newspaper or online examples we've seen so far? What's more/less complex?

As we watch the clip, you will each be assigned an area of focus. Within your area of focus, think about the following questions. And when we're done watching, you'll have a chance to think about the clip with your group.

Three areas of focus:

John King's voice
Pay attention to John King's words. What does he emphasize with his narration? What arguments is he making? What stories is he telling with his voice? How do his words interact with the map and with his body movements? What are other words he could have used or other stories he could have told?

John King's hands
Watch the gestures that John King makes and the ways he interacts with the map. What does he emphasize with his hands and body? How does he emphasize things? How does he interact with the map? What arguments is he making with his body? What stories is he telling? How do his gestures and body interact with the map and with his words?

Magic Map
What proposition, argument, or story is each map making? What features are shown in each map? What is shown and what is hidden by each map? What could be interpreted differently? How are transitions among maps handled? Are there stories in the transition time? What scale changes occur from map to map? How does the map interact with John King's words and body? What other maps might John King have used?

After watching the clip, discuss it as a group, considering your three different areas of focus and how the things you were paying attention to interacted with things others were paying attention to.

John King Alternate Narration Task

You will each receive a transcript of John King's words from this clip. Your task as a group is to record an alternate narration. You will have a digital audio recorder that you can use to record your narration and we'll play it back with the original footage. There are two rules to your alternate narration:

1) It should be a complete narrative (as opposed to random statements).
2) It should plausibly match the video footage.

As a group, plan out and time your new audio track and then record it. If you want to re-watch the original footage, it's available in the folder on the desktop. The easiest way to watch it will be to reboot your computer in the Mac operating system instead of in Windows (but you can also watch it in Windows on the Windows Media Player).

Appendix C

Note to Appendix C. Below are the exact instructions SEC students received for preparing their map argument performances.

Map Performance Activity

1. Choose groups of 3.
2. Prepare a 2-3 minute map performance (Situation Room style) that makes an argument.
    a. 3 roles (you may change roles during the performance)
        i. John King person
        ii. Wolf Blitzer person
        iii. Technical person (for map manipulations)
    b. Base thematic layer: USA median household income
    c. At least one other use of the following:
        i. Historical layer
        ii. Another thematic layer
        iii. Scale changes

Appendix D

Note to Appendix D. Below is the text of the pre- and post-test LCHS students completed on the first and last days of the study respectively. Students at SEC also took a pre- and post-test. At SEC, the test also included questions related to the mathematics of space and motion and to mobilities. The section of the test related to maps in the media was exactly as below.

PRE-TEST
Maps in the Media

Name: _____Date: _____

1. Explain what a thematic map is and describe a situation where you would use a thematic map.

2. On the next page are two maps depicting the results of the 2008 United States presidential election (maps by Mark Newman, 2008). These maps were originally in color, and you have a half sheet in color to refer to. The **lighter gray is red** in the original maps. And the **darker gray is blue** in the original maps. (See half sheet.)

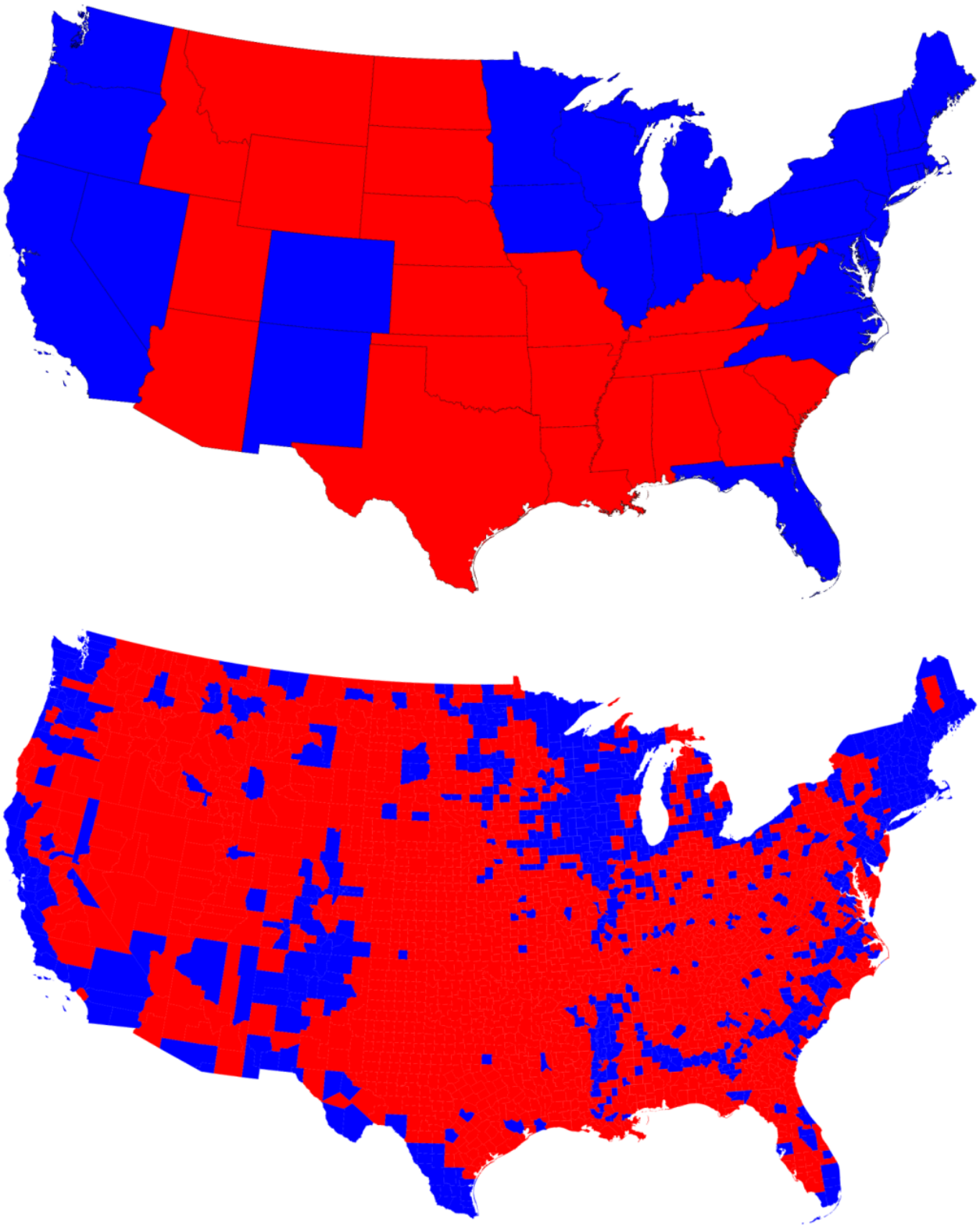
   In the first map, each state in the U.S. is depicted. States where a majority of voters chose the Republican candidate (John McCain) are red. States where a majority of voters chose the Democratic candidate (Barack Obama) are blue.

   In the second map, each county in the U.S. is depicted. Counties where a majority of voters chose the Republican candidate (John McCain) are red. Counties where a majority of voters chose the Democratic candidate (Barack Obama) are blue.

   Have a look at both maps and then complete the following:

   a. How can these maps be used to make different arguments or to tell different stories about the 2008 election? Using each map as evidence, tell a different story or make a different argument about the 2008 election.

   b. Of the two stories or arguments, which do you think is a better one? Why?



3. Depict the following data on the map of the United States below. Note that not all states will be represented.

United States Population Change 1990-2000

States with three times the average gain in population:
Nevada, Arizona

States with two times the average gain in population:
Idaho, Utah, Colorado, California, Oregon, Washington

States with average gain:
Oklahoma, Kansas, Nebraska, South Dakota, North Dakota

States with a decrease in population:
None

4. Below is a still image from a broadcast of CNN's "The Situation Room," which aired 5 days before the 2008 presidential election. In this image, CNN host John King compares Democratic presidential candidate Barack Obama's chances in Florida to Bill Clinton's election in 1996.

   Look closely at the image and list all of the elements that are being used in this broadcast at this moment to make an argument or tell a story about the pending 2008 presidential election. Feel free to circle or mark things in the image (but be sure to write a label or brief explanation for any element you circle or mark).

Appendix E

Note to Appendix E. Below is the text of the focus group interview protocol from 5 April 2012 at LCHS.

Focus Group Interview Protocol

Clip: CNN_20120306_Ohio clip.mov [1:35]

Background: This clip comes from a CNN broadcast on the evening of March 6, 2012—about a month ago. CNN was covering 'Super Tuesday' Republican primary election results for the ten states holding primaries that day. Ohio was a hotly contested state on March 6. This clip was broadcast before any polls had closed in Ohio and before any results were known. In it, CNN political analyst John King uses the 'magic map' to analyze important parts of Ohio for candidates Mitt Romney and Rick Santorum.

1. What did you think of this clip? First impressions?
2. Who is the clip for? Who is supposed to watch it? How do you know?
3. Who are all of the people involved in creating this segment?
4. What do you think is the main point John King is trying to make? Or, in other words, what's the story John King is telling?
5. How do you know that's the main point?
6. How does he make that point?
7. Why do you think John King chose this as the story to tell or as the main point?
8. Describe the different maps that were used in the clip. [Prompt for detailed description.]
9. What did you notice about the differences and similarities among maps?
10. How are the maps used to make the point John King is trying to make?
11. Besides the maps, what other elements of the broadcast support the main point that John King is making or help you know what to pay attention to?
12. How did John King's words help you to know what to pay attention to in the maps?
13. How did his body/gestures/interactions with the map help you to know what to pay attention to in the maps?
14. Do you think there were important parts of the map that were not part of the story being told by John King?
15. Describe some of those. [Prompt for this. e.g., Hilary Clinton won the Democratic Primary in 2008]
16. Could people understand the map differently than John King does or tell different stories with this same map?
17. What are some other interpretations of the map that could be made?
18. What are other stories that could be told? Or, what are other main points that could be made?
19. This clip doesn't mention Tennessee. But Tennessee's Republican primary was also on Super Tuesday. Why would Tennessee voters care about results in the Ohio Republican primary? In what ways does John King's analysis connect with Tennessee voters?

20. At the conclusion of the interview (with 1-2 minutes left), ask the following:
    a. What did you think of this activity?
    b. How was it different from or similar to the kinds of things you typically do in this or other classes?
    c. What did you like?
    d. What did you not like?
    e. What did you learn?

Appendix F

Note to Appendix F. Below is the text of the instructions for whole class and small group analysis of a CNN Situation Room clip followed by instructions for completing the John King remix activity at LCHS.

Remixing Maps in the Media

Group Viewing Instructions

We'll watch a short clip (1:30) from an episode of CNN Situation Room recorded in October 2008. The clip mostly features CNN analyst John King talking about Barrack Obama's chances heading into the presidential election. As he talks, King interacts with the "magic map."

As we watch the clip together, you will each choose an area of focus. In each group, make sure at least one person is assigned each area of focus. Within your area of focus, think about the following questions. And when we're done watching, you'll have a chance to think about the clip with your group.

Three areas of focus:

John King's voice
Pay attention to John King's words. What does he emphasize with his narration? What arguments is he making? What stories is he telling with his voice? How do his words interact with the map and with his body movements? What are other words he could have used or other stories he could have told?

John King's body
Watch the gestures that John King makes and the ways he interacts with the map. What does he emphasize with his hands and body? How does he emphasize things? How does he interact with the map? What arguments is he making with his body? What stories is he telling? How do his gestures and body interact with the map and with his words?

Magic Map
What proposition, argument, or story is each map making? What features are shown in each map? What is shown and what is hidden by each map? What could be interpreted differently? How are transitions among maps handled? Are there stories in the transition time? What scale changes occur from map to map? How does the map interact with John King's words and body? What other maps might John King have used?

After watching the clip, discuss it as a group, considering your three different areas of focus and how the things you were paying attention to interacted with things others were paying attention to.

John King Remix

Each group will receive a transcript of John King's words from this clip. Your task as a group is to record an alternate narration. You will have a digital audio recorder that you can use to record your narration and we'll play it back with the original footage. There are two rules to your alternate narration:

1) It should be a complete narrative (as opposed to random statements).
2) It should plausibly match the video footage.

As a group, plan out and time your new audio track and then record it. Feel free to watch the clip as many times as you'd like while working on your new audio track.

Appendix G

Note to Appendix G. Below is the transcript that was given to groups at SEC and LCHS when completing the John King remix activity. The transcript includes talk, time stamps, and video stills that match with each section of text. Note that font, layout, page orientation (i.e., landscape), and images are all presented here as they appeared for students. The purpose of presenting the transcript this way was to allow students to have space to write notes. For the purposes of presentation in the context of the dissertation, I have **bolded and underlined** the word that was spoken in coordination with the image on the left. This information was not available to students. Also, note a mistake that I made in the original transcript. The section marked as starting with the time stamp [00:58.06] is illustrated with a video still that is not from that section of the video. The still is from the next section, and the transcript is missing a video still for the segment marked as beginning with the [00:58.06] time stamp.

[00:00.00] Wolf Blitzer: How significant in Pennsylvania where he's **speaking** right now and in Florida later tonight where they'll have a joint event uh the Bill Clinton factor for Barack Obama in these final days?

[00:09.25] You know the state of Pennsylvania. You know the state of **Florida**. And you know Bill Clinton.

[00:13.20] John King: Well let's come out to Pennsylvania. **Now** again, John Kerry did win this state last time. Not since 1988 has it gone.

[00:19.16] But remember the primaries. How significant is Bill Clinton? These are the Democratic primaries. The **light** blue is Hillary Clinton. These are your more conservative blue collar voters.

[00:27.01] Bill Clinton has appeal to them because he won this state quite handily back, we'll go back as far as **1996** and look at the state.

[00:33.16] **Look** at the state. I mean he just won the state. He swept the state 49-40 over Bob Dole with a little bit of help from Ross Perot in that race.

[00:39.12] Now you're talking about Florida. Again this is the **state**. We're back- Let's go way back. Let's come back to 2004 first.

[00:45.09] Look George W. Bush won this state because John Kerry wins down here, Democratic area. This is the **battleground** where you have the population and the I-4 corridor.

[00:53.04] Kerry won in Orlando and out along the coast but George **W.** Bush swept in through here. Let's go back in time.

[00:58.06] The last Democrat to carry this state, Wolf, you know his name. He's speaking in Pennsylvania right now.

[01:02.16] But look at all the **blue** from when Bill Clinton carried Florida. If Barack Obama can do this. And our latest poll shows he's doing quite well in this community.

[01:08.27] If Barack Obama can win down here like **both** Bill Clinton and John Kerry did but also put more blue up here. And I wanna show you again '04. Remember all that blue?

[01:16.11] That's when Bill Clinton last **won** it. Now we come back to George W. Bush. Look how red it gets.

[01:20.06] This is the area right through here. Bill Clinton **helps**. Those voters know him and they remember the Clinton economy.

[01:25.12] WB: It's cert- certainly true. He's a huge uh asset for him **on** this day.

[01:29.04]

Appendix H

Note to Appendix H. Below is the lesson/interview protocol for a sharing and discussion of each group's John King remix at LCHS on 17 April 2012.

Response to Mashups

For each group, play the mashup. First get a response from the audience. Followed by a response from the group/mashup creators.

Audience Questions

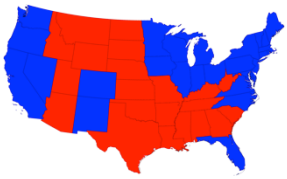
1. What did you think? First impressions?
2. What did they do really well?
3. What is the main point John King is trying to make in the new audio? In other words, what is the story that John King is telling?
4. How do you know that's the main point?
5. How does he make that point?
6. How did the new narration change or repurpose our understanding of the map?
    a. How does the map tell new stories when the vocal track is different?
    b. How did the group get us to attend to different parts of the map or to see it differently by changing the vocal track?
7. Did the group leave out any parts of the map or other elements of the visuals with their new vocal track? Describe what was unexplained with the new vocal track.
8. Do you have any questions for the group? [Time for group to respond.]

Group Questions

1. Anything you want to respond to from the initial discussion?
2. Why this topic? How did you choose a topic as a group?
3. What process did you use to create your new vocal track? [Prompt: Did you write a script? Did you improvise? Did you rehearse many times? Did you do it in one take? Did you pause?]
4. If you had more time, what would you have done differently?

Appendix I

Note to Appendix I. Below is the text and layout of a handout I used in LCHS while introducing vocabulary related to thematic maps and map argument performances as well as the three-part analytic model that would become a central part of the pedagogy at LCHS.



What's a thematic map and how do I read one?

Maps are…

Vocabulary

argument
base layer
cartogram
choropleth
map scale
qualitative thematic map
quantitative thematic map
reference map
thematic map
thematic layer
census tract

Key Questions

Mappy Questions

- What's the base layer?
- What are the data layers?
- Where do data layers come from? How are mathematical and statistical data represented in data layers (e.g., through color, size of an object on the map, gradations in color)?
- What are questions this map can answer? What are questions it cannot answer?

Recipe Questions

- What are the ingredients of this map or map performance (e.g., image, sound, color, gesture, gaze, written text, music)?
- How are those ingredients interacting together?
- What new meanings are formed from interacting ingredients?

Media Critic Questions

- Who created this map or map performance?
- Why was it created? What is its purpose?
- How might different people understand the message of this map?
- What points of view are represented in the map? Which ones are missing?

Appendix J

Note to Appendix J. Below is the text of the instructions students received for completing the assignment to create their own map argument performances at LCHS.

Create Your Own "Magic Map" Segment

1. As a group, prepare a 2-3 minute map performance (in the style of CNN's John King arguing in front of the magic map) that makes an argument. **You will record your segment this Thursday, April 26. Everything needs to be saved, loaded, and ready to go by the end of class on Wednesday, April 25.**
2. Practice in advance so that the on-camera analysis matches with your maps. Your analyst's gestures and movements should be coordinated with the maps and with the argument that your group is making.
3. All group members should participate in the production of the segment. Here are some possible responsibilities/roles for group members (note that you *must* include both a John King person and a Wolf Blitzer person):
   a. *John King person
   b. *Wolf Blitzer person
   c. Camera operators
   d. Teleprompter operator
   e. Map manipulator (make sure the correct maps are displayed)
   f. Director
4. Your performance must include all of the following:
   a. Prepare your maps in Social Explorer. Your maps should include the following:
      i. *At least* 2 different categories of thematic layers (e.g., age, race, labor force, median household income, etc.) **that you compare in your analysis** (e.g., age is connected to labor force, population density is connected to household income, etc.)
      ii. *At least* 1 change in scale (e.g., from census tract to county, from county to state, from state to nation, etc.)
      iii. *At least* 1 change in history
      iv. *At least* 4 different maps total
5. Feel free to use other thematic maps that you find. Check to make sure they are from a reliable source.

Appendix K

Note to Appendix K. Below is the interview protocol for final interviews with student groups from LCHS. Each interview was conducted by a member of the SLaM research team.

1 May 2012
LCHS
Final Group Interviews

For each group, identify if they are consented or not. Turn on camera if consented.

Explain that you're going to talk together specifically about their John King-style map performances and more generally about what we've learned over the last month.

Map Performances
Let's watch your map performance together. As we do, will each of you choose one of the ways of looking at map performances that we've used in class. They should name the three ways (i.e., Mappy, Recipe, Media Critic).

What are some kinds of questions that go with each way of analyzing maps? (They should name.)

Mappy Questions
- What's the base layer?
- What are the data layers?
- Where do data layers come from? How are mathematical and statistical data represented in data layers (e.g., through color, size of an object on the map, gradations in color)?
- What are questions this map can answer? What are questions it cannot answer?

Recipe Questions
- What are the ingredients of this map or map performance (e.g., image, sound, color, gesture, gaze, written text, music)?
- How are those ingredients interacting together?
- What new meanings are formed from interacting ingredients?

Media Critic Questions
- Who created this map or map performance?
- Why was it created? What is its purpose?
- How might different people understand the message of this map?
- What points of view are represented in the map? Which ones are missing?

<u>After viewing together:</u>
As a group, respond to the following:

1. What did you do well?

2. What is the main point your group was trying to convey? In other words, What's the story or main idea?

3. For Mappy people, what did you notice?

4. For Recipe people, what did you notice?

5. For Media Critic people, what did you notice?

6. A couple questions about the process:
    a. Why did you choose this topic? How did you decide on this topic as a group?
    b. What process did you follow for creating the maps, deciding who would play which role (e.g., who would be in front of the camera, who would run the PowerPoint, who would be Wolf, who would be John, etc.)?
    c. If you had more time, what would you have done differently?

7. Thinking specifically about this activity (creating maps and performing in front of the green screen):
    a. What did you think about this activity?
    b. How was it different from or similar to the kinds of things you typically do in this or other classes?
    c. What did you like?
    d. What did you not like?
    e. What was hard?
    f. What did you learn?

<u>General Questions about the last month of activities (everything we've done together):</u>

1. When you look across the different things we've done together, which were the most memorable for you? Why? What did you learn from them?

2. How would you describe what we've been doing to a friend who has not been here? What is the "big picture" of our time together?

3. What ideas/concepts do you think are most important for learning to read the maps that you see in the media?

4. What ideas/concepts do you think are most important for learning to make the kinds of maps and map performances that your group made?

5. Are the things we've done together similar or different to the activities and thinking you use in school? In what ways are they the same or different?

6. What, if anything, will you use from what we've learned together after we're gone? How, if at all, has what we've learned changed how you think or what you'll do in the future?

Appendix L

Note regarding Appendix L. Below is the interview protocol for interviewing LCHS media production teacher Mr. Norman. Please note that I have edited the interview protocol to change any potentially identifiable references in the questions.

Questions for LCHS instructor
20120515

Purpose of the interview:

1) Explore the context of the media production classes
2) Discuss students' work during the study (in comparison to other work in the class)

Questions:
Context of media production classes
Could also ask for document for things rather than have him answer questions

1. Briefly describe the sequence of courses that students take in the media production program at LCHS. What is the title of each course and what is its purpose?

2. Briefly explain the Tennessee state pathways and how the series of courses that you teach are connected with a specific pathway?

3. Describe the curriculum for each course. What are the major ways of teaching and what are the major things that are taught? e.g., I noticed a textbook, but I never observed students using the textbook in the classes I observed. I assume it is used with the younger students.

4. How do students end up taking these courses? Do they self-select? Is there an application process?
    a. There seems to be some variation in who is in each class (sometimes a sophomore in the junior class or a junior in the senior class). How does that work?
    b. Do some students drop out of the program/pathway from one year to the next? How are they replaced?

5. I see the major regular production tasks as daily morning announcements and weekly news magazine show. Are there others that I didn't observe?

6. How are students selected to perform these production tasks? I saw kids from different grades and classes (e.g., both juniors and sophomores) doing morning announcements and doing different tasks (e.g., on-camera, operating cameras, operating prompter).

7. How are students trained/taught to perform these production tasks?

8. Could students add other production tasks that would be viewed across the school?

9. What production tasks are behind the scenes and not viewed by the student body generally? For example, recording school events, editing videos for other classes, schools, and teachers.

10. How are any of the production tasks assigned? How do you determine who will do what?

11. More generally about what happens in your classes: Students reported that these classes are the few "hands-on" experiences they have in school and also that your classes are the only places in school where they can talk about what's going on in the world. First, does that sound accurate? Second, why do you think that happens here and not in other classes?

Student work during the study

1. Over the course of the time that we were here, what stands out to you as most memorable? Why?

2. If a colleague asked you what we were trying to accomplish with the things we taught during the study, what's your quick response? In other words, what's the "big picture" of what we were trying to accomplish?

3. Do you think students learned anything during our time together? If so, what do you think they learned?

4. What do you think will be the lasting effects, if any, of what they learned? e.g., will it change anything about their media production tasks in the future?

5. What would you describe as the most important instructional elements of what we did?

6. From your experience, explain how students view the 'audience' that they're performing for when they're being filmed. What's their relationship to this audience? And how do they develop over time in relationship to the audience as they spend more time in front of the camera?

7. How did the process we went through during the entire time I was here compare to what would typically be taking place in class?

8. Did you learn anything during the study? What do you think you learned?

9. How, if at all, has what we've done during the study changed how you think or what you'll do in the future?

10. Based on what you saw me do here what would you do differently in the future? What would you change?

11. Is there anything I didn't ask you?