Re-*Placing* the Body in Children's Learning

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Symposium Overview

In this symposium we present four recent design studies with young people that leverage *bodies-in-place* as an opportunity for *making sense* of and *taking place* in practices. Our common aim in this session is to contribute to a more robust theory of embodied cognition by providing descriptive and comparative analyses of how young people make "body sense" (Cajete, 2000) of the places in which they are engaging. In a recent special issue of *Journal of the Learning Sciences*, researchers provided further evidence and arguments for the centrality of the corporeal for learning mathematics (Hall & Nemirovsky, 2012). While that work has most recently promoted embodied cognition as a viable theory of learning, educators and educational researchers still struggle against the tendency to fetishize abstracted, "pure knowledge" over the ways in which our moving, feeling bodies make sense of the world. Additionally, and as Stevens (2012) pointed out in his commentary to the "Modalities of Body Engagement in Mathematical Activity and Learning" *JLS* Special Issue, attempting to build a broad understanding of how the body and learning relate via solely classroom-based studies is a major limitation to robust theory-building. Thus, our collective narrative provides a (literally) grounded account of embodied cognition that problematizes the absence of space and place in previous accounts of learning.

Knowing how to make learning relevant and salient for young people across content areas is a recurring question in our field. As designers for this work in mathematics, ecology, media production, and geography, we were informed by ideas put forward by studies of inquiry-based curricula (e.g., Salierno, Edelson, & Sherin, 2005), "reality based education" (Emdin, 2010), families' funds of knowledge (e.g. Moll, Amanti, Neff, & Gonzalez, 1992), and hybridity and thirdspace practices (e.g., Taylor & Hall, 2013). Building upon these concepts to increase learners' agency and engagement, the four design studies presented here explicitly resourced the mobile bodies of young people with tools for "hacking" the traditional uses of places for new and emergent purposes. For example, in one study (Taylor), teenagers wore GPS devices on their wrists to walk and inscribe a personal message over the terrain of the neighborhood. In this sense, a place that was once a geography of mundane activity became a canvas for authorship through which new realizations about the built and developing environment emerged. In another example (Ma), groups of middle school math students were given ropes and lawn flags to transform the football field into a large-scale, 3-dimensional space for geometric problem-solving. And in yet another example (Phillips), spatially-indexed demographic data sets were made visible to high school media production students to create a counter-narrative of the imagined geography and spatial arguments contained in a map. In this way, unlikely places, in combination with bodies and tools, became unconventional portals to youth agency and learning/production.

Our design studies with young people intentionally leveraged bodies as a resource for learning in *dynamic* relation to a particular geography that was *outside* the classroom. These places varied in scale and provided different affordances and constraints for the interacting bodies of learners. A football field, an urban forest preserve, a neighborhood, and the imagined geographies of faraway places are the examples of place conjured in this symposium, the particularities of which invoke Geertz's (1983) comment that "no one lives in the world in general" (p. 262). Each setting provided unique challenges for the bodies of learners that are typically distilled out of classroom activities; intense humidity on the football field, damp socks in the forest preserve, swarming cicadas in the neighborhood streets, and natural versus "relaxed" hair in the production studio, were not *obstacles* to learning, but were intrinsic and necessary parts of how young people made sense of geometric problem-solving, ecological observational inquiry, spatial analysis, and map argumentation, respectively. However, it is not the particularities, but the over-arching similarity of these seemingly disparate places that makes them so interesting for a story of embodied cognition; no matter the scale or the configuration of the activity within each place, the gendered, cultured, and racialized bodies of learners exploded the identifiable boundaries (Nespor, 2008) of painted lines, signposts, highways, or state borders to make an embodied history present in every moment of learning and engagement.

The four design studies in this proposed symposium used common data collection and analytic methods to understand and explicate the relevance of bodies-in-place for young people's learning. We captured detailed video recordings—often with the help of our participants—of collaborative engagement, problem-solving, and production during "on-the-move interventions." Both Marin and Taylor, for instance, asked study participants to wear cameras as they navigated the forest and neighborhood. Mobile video recordings helped us to see the different resources in circulation and how new resources emerged depending on the changing location of participants. Moreover, through video records, we saw that new geographies elicited new actions. Gestures, facing formations, and stopping and starting sequences were co-constituted by the activity, the coordinated objectives of the participants, and the challenges and affordances of the place. Our analyses followed from theory and observations that meaning making occurred through all of the senses and possible arrangements of the body in relation to setting and activity. Multimodal (Kress & van Leeuwen, 2001; Norris, 2004) and microanalyses of interaction (Jordan & Henderson, 1995) allowed us to see that performance genres—"a set of specific forms of embodied action" (Stevens & Hall, 1998; p. 108)—were much less predictable when the terrain of interaction was constantly in flux (e.g., weather, hills, marshes, missing signage, eroding roads).

The influential exchange between place and body has been a topic of renewed interest during the corporeal turn in social science (e.g., Evans, Davies, & Rich, 2009). And while the learning sciences have welcomed a resurgence of research that presents the body as central to cognition, there is still very little work that contributes to a theory of embodied cognition by investigating novel practices in "naturally-occurring" places. The following talks do just that by offering new methods, new units of analyses, and new concepts from research working within the theoretical framework of embodied cognition.

Re-Placing the Body in Walking Scale Geometry

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This paper describes findings from part of a design study investigating how middle and high school students engaged in a learning setting called Walking Scale Geometry (WSG). These tasks took students outside to a grassy field to construct, transform, and answer questions with and about large-scale geometric objects. The objects were constructed by students with everyday objects such as ropes, lawn flags, and their own bodies. The purpose of this paper is to share two findings from the study with respect to student bodies in dynamic relation to place. These findings problematize typical views of what counts as appropriate and productive in schooling and in mathematics learning. I will begin with a brief overview of the design and framing and the data and methods used in the study, then proceed to a summary of findings.

Design and Framing

WSG was designed to promote hybridity (Gutierrez, Baquedano, & Tejeda, 1999) in geometry learning—the design was meant to help students make connections to out-of-school funds of knowledge (Gonzalez, Andrade, Civil, & Moll, 2001) or repertoires of practice (Gutiérrez, & Rogoff, 2003) in order to support the emergence of a transformed learning setting that inextricably incorporates students' sense-making with classroom disciplinary practices and learning goals. Unlike previous studies of hybrid learning settings, where instruction was designed to bridge school content with home resources (Calabrese Barton & Tan, 2009), or unexpected incidents were capitalized upon (Gutiérrez, Baquedano, & Tejeda, 1999), WSG tasks were meant to *disrupt* aspects of typical mathematics classroom activity in order to facilitate students' recruitment of meaningful-to-them resources for spatial reasoning (see Ma, 2013). In other words, a key design conjecture was that disruptions to mathematics classroom activity like space, tools, and division of labor would make it difficult for students to depend on familiar means of problem solving. These familiar means included physical tools like paper and pencil, as well as conceptual tools like what certain geometric figures "look like" at paper scale and rules for drawing or constructing triangles and quadrilaterals. For students comfortable with these taken-for-granted tools and practices, the disruption would problematize their tacit understandings and provide opportunities to adapt and invent new tools for similar situations in the WSG setting. For other students, the disruption would release them from the usage of tools and practices that they had trouble reasoning with (but felt they had to make use of them), and so promote their own sense-making and connections to out-of-school experiences and knowledge.

I treat place as not simply containers with physical features, but as constituted by a built environment in interaction with participants' past, ongoing, and anticipated engagements in them (Leander, Phillips, & Taylor, 2010; Lefebvre, 1991). I take an "interactionist" view of embodiment (e.g., Stevens, 2012), treating human cognition and action (and therefore doing and learning mathematics) as distributed across the local semiotic environment, which includes historically and culturally developed tools for sense-making, as well as talk, co-present others, and the material world. Bodies and materials (including the built environment) are fundamental resources for reasoning—not as separate, external elements in support of mental activity, but as constituent components of cognition. As interaction unfolds, embodied, discursive, and material resources are dynamically recruited for meaning-making and communication, in service of the goals of the group. These

semiotic resources mutually elaborate each other; they bring meaning to ongoing interaction, and simultaneously take on particular significance in the context of that ongoing interaction.

Methods and Data

WSG, implemented as part of a design study, was investigated in two different settings: a 7th grade mathematics classroom at a struggling (by state testing standards) urban middle school (KCMS), and a two-week residential summer enrichment program (SEC) held at a university for high-achieving rising 9th and 10th graders. At KCMS the WSG tasks took place in the school's soccer field, while in SEC students worked in a grassy university quadrangle criss-crossed with concrete walking paths. The study took place over the course of five consecutive weeks at KCMS, and just two days in SEC. Lesson sequences were designed and revised with instructors at each site, in response to ongoing analysis of student engagement. The mathematics coach and classroom teacher were the primary instructors at KCMS, while researchers served as instructors in SEC.

Data collected at both sites included video records of design sessions, interviews with students, field notes during WSG implementation, student work artifacts, still images, and video and audio records of WSG activity. Whenever possible video and still images were recorded from above the students' WSG activity (atop a nearby hill or building) as well as from ground level. This allowed close analysis of embodied engagements using a close-up but narrowly-framed view as well as a wide-angle, bird's-eye-view of entire groups. Methods of analysis began with rough coding of students' recruitment of resources to engage in problem solving, in relation to the designed disruptions of WSG. "Hot spots," or episodes of interest due to an unexpected event, or intense engagement by students, or representativeness of types of student-recruited resources, were chosen and analyzed using methods of multimodal discourse analysis (Norris, 2004) and interaction analysis (Jordan & Henderson, 1995). These findings serve to contribute to theories of (mathematical) bodily engagement in places, and to future design conjectures for leveraging bodies and space as resources for mathematics learning.

Findings

The WSG tasks moved problem solving to settings where students had a variety of past and ongoing engagements, but never classroom mathematics. The KCMS students spent time on that soccer field over the course of the day either participating in gym class activities or soccer practice and games. At the time, the boys' soccer team was in the midst of a winning season, and most of the students in the class were either on the team or regular spectators. The university quad was often a space that the SEC students had to traverse in order to get between their dorms and the cafeteria and their classes. They also spent some of their free or residential activity time on this lawn, reading in the sun, chatting and gossiping, or playing kickball or capture the flag. These places had vivid associations for the students, and they often engaged in conversations about past or future events while working on WSG tasks. They even made jokes about what would happen if these activities collided: "What if the star striker of the opposing soccer team tripped up on a yardstick we left stuck into the ground?"; "The capture the flag flags better not be the same as these little WSG lawn flags; that would be sad."

Students' bodies, of course, also had rich and varied meanings for the students, and they were deployed from head-to-toe to become parts of inscriptions (e.g., vertices in triangles), as integral parts of the physical representational infrastructure (e.g., holding piece of rope together), as measuring devices (e.g., using a student's height as a unit of measure), and as discursive resources for negotiation of strategies during problem solving (e.g., gesturing, demonstrating, haptically "overhearing" others' actions).

One striking consequence of the WSG setting was that students inevitably incorporated play and playfulness into their work outdoors. This included enacting alternative uses of the various WSG materials (e.g., using a triangle side for jumping rope or tug of war) and telling stories about and partially performing imagined scenarios involving the space and materials (e.g., pretending to be trapped in a quadrilateral). Sometimes play was sustained and intertwined with mathematical activity, while other times problem solving was punctuated with quick episodes of play, constrained by ongoing mathematical engagements. This play was rarely observed in the classroom during instruction before the design experiment began, or when we returned inside to discuss their WSG experiences. Outdoors, play was occasionally a distraction, but often accomplished in parallel to problem solving. On a few occasions play contributed to developing problem solving strategies and innovations.

A second finding of this study was that mathematics activity and problem solving became inextricably tied to *particulars* of bodies, space, and time so that bodies and space were sites of mathematical activity and "environmentally coupled" (Goodwin, 2007) in problem solving. The learning of mathematics concepts and of inscriptions and representational practices co-develop, and are mutually influencing (Lehrer & Lesh, 2003). Here the inscriptional system itself is embedded in a complexly specific place and imbued with meanings, mathematical and otherwise, rather than the very general, very immutable and mobile (Latour, 1990) piece of paper. Inscriptions and inscriptional conventions (for WSG) were developed in relation to past and ongoing bodily engagements in the setting. When it had recently rained, the mud became "ink" for marking off sections of rope, and yardsticks could be pushed into the soft ground as vertices or just for fixing rope in place. Students ran and jumped and danced, often as soon as their feet hit the grass. However, when it was unbearably hot,

students' WSG figures became much smaller in size and their strategies factored in their reluctance to walk across the field. When the field was freshly painted for a game that afternoon, the glaring white lines provided ready-made line segments, right angles, and circles that could be incorporated into representational strategies. Contingencies like these tied the development of students' inscriptional strategies to meaningful local constraints and goals. Space, bodies, and mathematics were produced together for problem solving and learning.

Re-Placing Walking in the Analysis of Children's Observational Inquiry

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Mobility, or people's movement from place to place and through places, is central to learning in everyday life. Social scientists and performance researchers are increasingly using ambulatory methods and walking interviews to examine relationships between place, spatial practices, and knowledge building (Myers, 2011). However, as Taylor and Hall (2013) explain, mobility "is rarely considered part of learning in the learning sciences, and it is almost never used as relevant, experiential content in teaching" (p. 66). In science education there is an increasing interest in place-based and field-based experiences (e.g., Lim & Barton, 2006), however little attention has been given to the role of walking in constituting these experiences or learning science content. In this paper, I focus on the relationship between mobility (i.e., walking), attention, observation and learning about the natural world. I will begin by motivating the need to focus on learning about the natural world and the practice of observation. Then I will describe an exploratory study where I used case studies to examine families' experiences during walks in urban forest preserves (Marin, 2013). I will conclude by discussing how mobile video recordings from this dataset led me to re-conceptualize units of analysis.

The Natural World, Culture, and Science Learning

Learning about the natural world is a central human activity, part of the cultural process of development, and influenced by everyday experiences (e.g., Cajete, 2000). Observation is one methodology used to learn about the natural world and plays a significant role in science teaching and learning in the primary grades and outside of school, particularly in domains that rely on field experiences and investigations (Windschitl, Dvornich, Ryken, Tudor, & Koehler, 2007). In addition, observation is almost always mentioned in reform documents but it receives far less attention than other inquiry practices and is rarely theorized (Smith & Reiser, 2005). Perhaps observation receives so little attention theoretically because it is often viewed as a mundane practice and a simple step in the scientific process. However, some researchers have argued that observation is a complex process and involves the relational activities of watching, listening, and feeling in order to selectively attend to and notice particular features of the environment (Kawagley, 2006). These activities are dependent upon the coordination of theory, domain knowledge, and attention habits (Eberbach & Crowley, 2009).

According to Ingold (2011), "all science depends on observation and all observation depends on participation—that is, on a close coupling, in perception and action, between the observer and those aspects of the world that are the focus of attention" (p. 75). From these perspectives, observational inquiry is rooted in particular places and directly influenced by land and its inhabitants (Kimmerer, 2012), as well as the weather-world or the medium between sky and ground that people inhabit and navigate (Ingold, 2007). Walking is an everyday observing practice that individuals, families, and groups engage in to build relationships with the natural world (e.g., Bang, 2009). As Waitt, Gill, and Head (2009) suggest, walking is a "way of doing nature" (p. 43). Direct experience and participation with nature through the use of one's body and sensory perception is central to doing science and making sense of the environment (e.g., Cajete, 2000). The purpose of this paper is to illustrate the ways in which the practice of observation is constituted by *bodies-in-place*.

Investigating the Relationship Between Mobility, Place, and Science Learning

To examine the relationship between body sense, place, movement, attention, and observation, I asked six families (three Native American families and three non-Native families) with children between the ages of five to eight years old to go on repeated walks in urban, forest preserves. I will refer to this activity as forest walks. In the context of this study, culture, or the routine practices that families engage in to accomplish goals, is enacted or "paced out along the ground" (Ingold & Vergunst, 2008, p. 1). This mobile research activity incorporated the urban, ecological context and afforded an examination of the moment-by-moment process of attention and observation as families traversed land.

The design for this study grew out of my participation in a community-based design research project and my experiences on that project as a designer, teacher, and researcher. The aim of the project was to develop culturally based curriculum for Indigenous youth and families (see Bang et al., 2014). Deeply grounding this work is the belief that humans are not apart from nature but a part of nature and that nature is all around us (Cajete, 2000). A foundational design conjecture of the project was that people learn about the natural world by walking and talking land (Cajete, 2000). I extended the work of this community-based design project by using a more constrained research activity (i.e. forest walks) to examine the ambulatory aspects of learning and

observational inquiry from a place-centered and body-centered lens.

Developing Embodied Units of Analysis

During forest walks, families used two forms of digital technology: a digital camera and the POV 1.5, a wearable camera that continuously captures video (see http://www.vio-pov.com). This camera was positioned on the shoulder and captured the embodied experiences of family members while on the walk. Overall, the data corpus consists of over 30 hours of video. Videos of the forest walks were analyzed in Transana v2.51 (Woods & Fassnacht, 2012). Transana pairs transcript and video for analyses purposes and has been successfully used for multi-modal analysis (Halverson, Bass, & Woods, 2012). In each case, I focused on the routine interactional practices families engaged in while walking in order to highlight what is worthy of being noticed. I relied on techniques from conversation analysis (e.g., Pomerantz & Fehr, 1997), ethnomethodology (Stevens, 2010) and microethnography (Phillips, 1983), to identify sequences within each forest walk. Through multiple viewings of video, what became most evident to me was that the activity, or the walk, was demarcated by changes in gait. Working from this point, I developed a unit of analysis, which is bounded by change in gait. I term this unit of analysis *ambulatory sequences*. Once sequences were identified, video clips were created and organized in collections for each participant and coded for sequence components. These sequence components or semiotic fields include physical location, walking patterns, spatial orientation, movement characteristics, and talk. I argue that each ambulatory sequence is complex in nature and akin to a micro or situated activity system (Goodwin, 2003) where action emerges from the layering of fields at the individual and social level.

Conclusion

Mobility is integral to knowledge and meaning making practices (Gutiérrez, 2008; Ingold & Vergunst, 2008). What we attend to with respect to the natural world is organized, at least in part, by people's movement through place. More specifically, walking or making our way from place to place and noticing phenomena in our surroundings is both structured by land and structures our engagement with the natural world. How do we account for and analyze the relationship between mobility, attention, and observation from a systems perspective? Researchers use a variety of techniques to identify routine phases and patterns in interaction. Once concepts of interest are identified, exchanges are often coded at the utterance or turn level. For example, analysts may focus on shifts in discourse in order to identify sequences. In this paper, I introduced two ideas: (a) that change in gait may serve as a marker for sequence boundaries and analytic units and (b) that sequences bounded by change in gait constitute an ambulatory turn. I suggest that families' walks follow a pattern of continuously walking and stopping and that these unique sequences constitute situated activity systems. This unit recognizes the importance of body sense (Cajete, 2000) as a way of knowing the world and considers the layered and emergent qualities of interaction. In addition, it provides a structure to explore relationships between the physical and verbal organization of attention and observation with respect to land.

Locative Learning: Constructing Sense-Scapes Through GPS Drawing

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This paper describes GPS drawing as a sociotechnical, intact activity system (Greeno, 1998) in which two groups of three youth inscribed an image or word over the terrain of their neighborhood by walking a planned route with a handheld Garmin™ GPS device. GPS drawing was part of a larger social design experiment (Gutiérrez, 2008) to support youth in counter-mapping (e.g., Peluso, 1995) their neighborhood, or making claims to community resources for the future with urban planners and local stakeholders (Taylor, 2013; Taylor & Hall, 2013). GPS drawing was a designed activity that brought the sensuous experiences of the body-in-place in contact with mapping technologies to produce a narrative of urban life that is oftentimes ignored (i.e., that of inner city youth). Within this tension—between the practiced and the abstracted—young people constructed "sense-scapes" (Grasseni, 2009), or spatially-indexed narratives of emotion, nostalgia, and morality as a new map layer. While GPS drawing has traditionally been considered a form of "locative media" (e.g., Reiser, 2011) in some fields, I argue that GPS drawing is an example of *locative learning* where youth gained facility with geospatial technologies and mapping practices (e.g., ground-truthing, scale-body translations) while inscribing and sharing new and emergent meaning into an intimately familiar landscape with their mobile bodies.

Framing and Design

How do you describe a place that you know intimately? What are the salient experiences you have in that place? How do you *show* that you know a lot about a place? How can you represent place-based feelings and affect as a legitimate (map) layer of experience? These were the questions I asked when designing GPS drawing as one activity in a series for youth to learn about counter-mapping their neighborhood—a racially segregated food and mobility desert in a midsouth city—with urban planners and local stakeholders.

Having done an ethnographic study of a participatory planning process in the same neighborhood as

this design study, two observations were important for designing the GPS drawing activity in particular. First, residents often treated the map as an invitation for storytelling. Planner-created maps provided entrée into the telling of one's rich history of many lived experiences within that place. These stories served to disrupt the disembodied, abstracted narrative represented on the map to create a *sense-scape* of lived experience and desire. Sense-scapes bring the sensuous experiences of the body forward, but also layer abstracted space with *common* narratives of nostalgia, desire, fear, and morality that give the map personally relevant meaning (Grasseni, 2009). The second observation important for designing this activity was that the experiences of young people in the community were oftentimes ignored or misrepresented by both the adults and the maps that were central to the participatory planning process (Taylor & Hall, 2013).

Therefore, GPS drawing was a designed activity to facilitate young people in bringing all of their senses to bear on, not just the map of their neighborhood, but mapping technologies and the neighborhood itself. GPS drawing was a technologically re-mediated way of walking the neighborhood and telling a story about a place in which the young study participants had their own rich histories and experiences. I describe this activity as a sociotechnical intact activity system because individuals, the resources and senses of their bodies, technologies (i.e., GPS devices, pencils, wearable cameras), representations (i.e., maps of the neighborhood), the terrain of the neighborhood, and the resources of that environment came together to pose challenges, solve problems, and inscribe a new layer of meaning over that place.

GPS drawing consisted of four phases and lasted three hours, though experiences from the activity were referenced throughout the remaining weeks of the study. The first phase was a tutorial on GPS drawing that occurred in a local, youth-serving organization located in the neighborhood. The second phase was a planning phase, where study participants in groups planned their inscriptions with markers and maps of the neighborhood. The third phase was the walking/inscribing phase through the neighborhood with maps, GPS devices, and wearable cameras. The fourth and final phase was a sharing/analysis session in a university computer lab where youth's inscriptions were uploaded into Google Earth™ and authors described their production experiences on the ground to each other and adult volunteers and researchers. These inscriptions were also shared with urban planners and local stakeholders a few weeks later as part of the culminating event of the study—an "Open House" youth counter-mapping session.

Methods and Data

The young people that participated in GPS drawing, and the larger social design experiment, were members of a bicycle-building and riding workshop located in the neighborhood's youth-serving community center. Part of "The Workshop's" mission was to address issues of youth mobility and access to citywide resources. Local stakeholders in the community were eager to make the neighborhood safer and more conducive to independent mobility for youth, either on foot or on bicycles. Carissa, Leah, Beth, Fred, William, and Wallace were all African-American youth between the ages of 12 and 15 years old (1). Designed activities took place over five weeks in The Workshop, through the neighborhood, or in the university computer lab. We met twice a week. GPS drawing occurred in the third week of the study; youth made other artifacts with mapping technologies during other sessions. After the five weeks of designed activities concluded, the youth met with professional cartographers and urban planners to argue for changes in the community, displaying their artifacts as evidence for "on the ground" research and analysis.

Over the course of the study, my research team and I made video records of all the activities. I also conducted initial and concluding interviews with each participant. I collected participant-produced artifacts that included time-diaries, GPS tracks of their mobility around their homes using a GPS data logger, and photos and camera footage. For GPS drawing specifically, the activity was video recorded by two research team members, and was also captured by participants who were wearing head cameras while they participated in the activity.

Findings

Constructing technologically mediated sense-scapes over the map of their neighborhood came easily to the youth. The boys walked the shape of an hour-glass with sand/time dripping through it over the baseball field adjacent to their school; the girls inscribed the word "LOVE" over a five-block area that included all of their homes. For each group, the walk through the neighborhood was dense with talk and stories. Topics included, but were not limited to, cicadas, the lack of sidewalks, being hot, the rain, music videos, cute boys living in the neighborhood, bad drivers, a girl in "booty shorts," and dozens more. But from my analysis, the paths they created on foot were more than *story* lines. These pathways held their bodies together in coordinated activity with technology, elevated their pulses, fleetingly brought neighborhood residents into the interaction, sent them careening down hills on their bottoms, and elicited reactions from all the senses (even taste). Even though the mobility of the "scribe," or the person wearing the GPS device, was the only mobility that *actually* mattered for the inscription, all of the teens walked the planned routes together. Neither group decided to send the scribe down a dangerous, slippery slope alone or walk up a steep hill while the others took a different route. These

newly intentioned, collaborative pathways through a familiar landscape became *lifelines*—whole bodies were engaged and held intact within and because of a place already teeming with action, memories, and sensation.

Compared to the (literal) liveliness of the planning and production phases of GPS drawing, the analysis phase seemed void of life. Once viewable on the overhead projector in the computer lab, the lifelines that emerged on the ground (sadly, to me) transformed into a litany of errors and *inaccuracies* for the youth. Leah, someone prone to elaborate, embodied dramatizations, no longer enthusiastically used her body to respond to adult queries and lead conversation; seated at a desk, she obsessed over the errors that the GPS device left in the record of their movement with a deflated tone. Even though the word "love" was easily visible (and I would argue, beautifully done), both Leah and Carissa were hyper critical of their inscription. While the girls wanted to express in the GPS drawing the love they felt for their neighborhood, they felt very little of that toward the device itself in the viewing phase. The layering of stories, feeling, memory, embodied responses, collaboration, and group cohesion that existed on the ground was reduced to a critical self and technological appraisal of performance, as viewable and measurable by the track data on top of a satellite image of the neighborhood. In this way, the vibrancy, at the *scale of doing*—of bodies intersecting with an important place—all but vanished at *the scale of viewing*, where place-making and technological production became another school-ish exercise of doing well on an assignment. The disparity of youth engagement between the scale of doing and the scale of viewing the inscription shows that locative learning has enormous potential for fostering the kinds of ideal learning for which we design—relevant, collaborative, creative, and interest-driven. This disparity also demonstrates that the context and norms of a classroom setting (in this case a computer lab) have disciplined youth to make even the most novel activities feel like school.

Re-Placing Bodies Across Imaginative Geographies In Classroom Activities With Map Argument Performances

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This paper identifies findings related to bodies-in-place from a design study in classroom settings investigating the teaching and learning of the interpretation and production of thematic maps and map argument performances with young people. Two iterations of a design experiment investigated how map performance activities supported learning in innovative ways, primarily through media production with small groups of young people.

Framing and Design

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 or phenomenon. They were first produced in the mid-1800s in the United States, but we know very little about how they are interpreted, understood, and read by those who use them (Wiegand, 2003). What I call map argument performances are a new category of practices; they 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 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 have been developed within the last few years. For example, since 2008, political news analysis on the U.S. television news network CNN regularly includes use of a "magic map," a multi-touch interactive screen in which CNN analysts change map scale (e.g., from county-level to state-level election results) and data layers (e.g., moving from previous election results in a state to current polling) while quickly making arguments and predictions regarding upcoming elections.

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 little or no technical training using free online computer applications can create complex thematic maps and map argument performances.

Map performance practices include 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 paper reports on a study of the ways in which map performance activities supported learning in innovative ways, primarily through media production with small groups of young people in classroom settings. Map performance activities for the classroom design experiments conducted during this study were informed by prior research I conducted analyzing map performance activities as texts utilizing analytic perspectives from muiltimodality within literacy studies (e.g., Kress & van Leeuwen, 2001), historical and critical cartography (e.g., Crampton & Krygier, 2006), and media literacy (e.g., Buckingham, 2003).

Methods and Data

I report here on data collected from two iterations of a design experiment (Cobb, Confrey, diSessa, Lehrer, & Schauble, 2003). While little is known about the teaching and learning of thematic map interpretation generally (Wiegand, 2003), pedagogies of map performance activities have not yet been studied at all. The purpose of the design experiment is to investigate teaching and learning with map performance activities in classroom settings. The first iteration was conducted during a Summer Enrichment Course (SEC; all settings and participants are described here with pseudonyms) devoted to spatial thinking. Participating in the class were 12 students, all rising ninth and 10th graders, who lived in university on-campus housing at a large urban university in the United States for two weeks. The course included 54 total hours of instructional time across multiple facets of spatial thinking. The data I collected related to map performance activities comprised approximately 7 hours of instructional time. The second iteration of the design experiment took place in three media production classes taught by the same teacher at Local County High School (LCHS), a large suburban public high school in the Southeastern United States. Each of the media production classes had 25 students and each had one grade level of students: one class each for 10th, 11th, and 12th graders.

In this paper, I focus analysis on student participation in two designed activities from SEC and LCHS: the *John King Remix* activity and the *Make Your Own MAP* activity. Students participated in both activities in small groups (4-5 students). Following are brief task descriptions for each of these activities: In the John King Remix activity, students recorded a new audio track to plausibly match video footage from an 89-second clip of CNN political analyst John King conducting analysis at the magic map prior to the 2008 U.S. presidential elections. In the Make Your Own Map Argument Performance (MAP) activity, students created their own magic map segment similar to CNN magic map segments described above. In groups, students made an argument in front of a set of maps in the style of John King doing political analysis with the magic map. Students first created maps to be used in the segment and then performed the segment with two "on-camera" personalities: one student in the role of John King and another student in the role of Wolf Blitzer.

Data collected were video and audio records of all phases of instruction and student work, interviews with student work groups, artifacts of student work and final productions, and interviews with the teacher at LCHS.

Findings

This paper makes two claims relative to bodies-in-place: (a) new meanings and new identities are formed among maps and group members during the John King Remix and (b) technologies in the Make Your Own MAP provided resources for embodied performances of identities and global and local spatial stories. Both claims relate to "the construction of difference in terms of the interrelatedness of spaces and histories of travel as they are connected to the moment of the present" (de Haan & Leander, 2011, p. 323). That is, in both designed activities reported here, participants formed and reformed their own racial, ethnic, and cultural identities and the identities of others across the physical and social space of the room as well as across the *imaginative geographies* (e.g., Gregory, 1995) of local and distant others represented on the maps and map performances that were the contested and central texts of the activities.

The first claim is that in the John King Remix, resources for textual reinterpretation in the form of a remix made possible embodied improvisational engagement with co-participants such that reading the map together and recreating the map together became a way of forming new meanings and making new identities both of the map argument performance and for co-participants. The clearly performative nature of the interactions of participants, the ways that they jumped into spaces of improvisation and embodiment as they produced a new vocal track for a segment of political analysis at CNN's magic map were invited and supported by an activity that specifically tasked them with remixing a performance that included John King's movements and vocal performance as resources. In these interactions, the 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—new bodies in new places.

The second claim is that in the Make Your Own MAP activity, technologies provided resources for participants to spatialize and other co-present bodies. Unlike other activity systems—even those with thematic maps such as the John King Remix—the Make Your Own MAP uniquely made possible the performance of localized *geo-bodies* (adapted from Winichakul, 1994)—spatialized, othered bodies of co-present participants. For example, "Mexican-born residents of Texas" was a demographic layer added to a map being created by one group via mapmaking software. As this group's members worked, this data layer on the computer was seen as extending out to Vincent, a student who was sitting nearby. For group members, his identity as a Mexican-American was foregrounded and they began to talk with him about his family heritage. This demographic layering made possible the spatializing and othering of nearby bodies like Vincent's, 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 is the way in which data layers came to

adopt, for learners, abstract and concrete resources of sameness and difference nearby for the performing of global and local spatial stories and identity constructions by youth—new bodies in old places.

Endnotes

(1) All participant, place, and organization names are either pseudonyms or intentionally vague.

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