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Literacy Networks: Following the Circulation of Texts, Bodies, and Objects in the Schooling and Online Gaming of One Youth

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In this article, we offer an approach to conceiving of the relation between literacy practices and space–time. Literacy, embedded in other forms of activity, has a unique role in producing and organizing space–time relations, and such relations provide for different forms of cognition and learning. Closely examining how literacy practices produce and organize space–time helps researchers move beyond folk distinctions based on setting or context, such as "in school," versus "out of school," which necessarily associate different settings with different practices. Drawing on actor network theory, we propose a new way of reconceiving of literacy and its relations to space–time through the construct of the literacy network. We define and develop 5 space–time dimensions of literacy networks, including translation, the heterogeneity of space–time representations, movements and positions of texts in circulation, rhythms and speeds of circulation, and network continuity. Drawing on these dimensions, we analyze 3 different literacy networks that 1 youth, Brian, participates in, including 2 from school classrooms and 1 from his play of a massively multiplayer online game. We argue that the space–time dimensions of these networks have direct relevance to understanding Brian's engagement, agency, and identity.

Models of literacy have always presented some version of space–time, either implicitly or explicitly. Space–time in an autonomous literacy model, for instance, is relatively abstract: The mind and text transcend the constraints of the local situation . By contrast, locally situated perspectives often emphasize the uniqueness of place in literacy practice at the expense of flow or circulation, sometimes drawing

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on a predefined notion of place (e.g., the classroom). Critical discourse analysis, with its imagined geographies of the social world, works to connect the micro and the macro, but creates its own problems of space–time by, at times, black-boxing the macro (e.g., gender relations, race), analyzing both micro and macro as nonmaterial, or analyzing the micro as material and the macro as discursive (critiqued by Massey, 1997). Conversely, one might productively critique the analysis offered in this article as following material circulation only a short distance. Literacy theories always engage, implicitly or explicitly, theories of space–time, and hence they always carry certain possibilities and limitations.

The ways in which individuals conceive of the relationship of literacy to space–time is theoretically and practically important for cognition and instruction in a number of ways. First, although reading and writing are often conceptualized and examined as social and cognitive processes independent from other activities, many reading and writing practices are interwoven with other forms of activity. What makes these relationships of texts to other tools, objects, and persons distinctive and powerful for learning and cognition? Part of the response to this question is that texts coordinate and structure space–time within a given activity, and space–times across diverse activities. An important theoretical and practical task is to interpret the configurations, circulation, and translations of texts in relation to other actors in activity. Examining these relations and movements helps researchers avoid a particular myopia in literacy studies of focusing on isolated texts or even textual practices, and an associated myopia of focusing on what texts mean rather than what they do. Such an examination reconceives of literacy as clearly embedded in other activity structures and forms and helps one to consider the special role that literate activity has in shaping the spatial and temporal relationships of streams of activity.

Second, although there appears to be an increasing concern in the learning sciences for learning in and out of school settings, it is not clear how current conceptions of *in school*, *out of school*, or other setting-based separations provide powerful distinctions for understanding differences among practices of learning, teaching, and thinking. Rather than taking the separations of *home, school, workplace,* or other situations as necessarily associated with meaningful changes in literacy practice (critiqued by Leander & McKim, 2003; Schultz, 2002), researchers are in need of principled means of making distinctions among literacy practices and their relations to space–time. Such a movement will enable them to better recognize how similar practices are actually located in different situations, understand the reach of literacy across space–time, and conceive of the work of literacy in translating and mobilizing interests. This movement will also extend emerging conversations about how literacy and texts participate in social–material configurations (Brandt & Clinton, 2002; Clarke, 2002). Third, and directed toward practical issues in learning and teaching, when different literacy practices organize and constitute space–times in unique ways, these relations have consequences for

learners' agency, engagement, and identity, effects that can be examined empirically.

In this article we illustrate how literacy practice involves the circulation of diverse "actants" (Latour, 1987, p. 84). Literacy is a form of networking that produces space–time. We propose a way of reconceiving of literacy and its relations to space–time through the construct of the literacy network. Specific space–time dimensions of these networks enable one to better understand and distinguish literacy practices from one another in ways that are neither autonomous nor overly situated in particular locales. Researchers who study literacy in and out of school need to develop new ways of thinking about space–time in relation to literacy, ways that move beyond the conceptions of context-as-container. In moving social practice theories of literacy (Gee, 1990; Street, 1984) forward, we argue, researchers need to develop a view of the social that includes an understanding of how a wide range of actors (e.g., humans, texts, technologies, and objects) are brought into relationship with one another, and how these relationships have unique space–time qualities.

For such a conceptualization of literacy networks, we draw on Actor Network Theory (ANT; Latour, 1987) and the everyday literacy practices of one youth, Brian (all names are pseudonyms). Ethnographically, we analyzed Brian's literacy practices in two different school classrooms and at home in a multiplayer, online computer game. We propose the literacy network as an expansive notion for theorizing literacy practice, and propose five dimensions of displacement as an initial way of making distinctions among such networks:

1. Translation: How do texts stand in the place of, speak for, or appear to mobilize bodies, objects, or other texts?
2. Heterogeneity of space–time representations: What space–times are represented by texts, and how are these representations organized in activity?
3. Movements and positions of texts in circulation: How might one describe the social–material geography of texts in activity? Do texts combine or form hybrids with other actors in activity?
4. Rhythms and speeds of circulation: What patterns and tempos of movement among texts and other actors are evident?
5. Network continuity: How are the social–material relations to the texts that one is reading and writing more or less extended and continuous?

Second, we argue in this article that the space–time dimensions of different literacy networks have direct relevance to understanding literacy engagement, agency, and identity. We treat engagement, agency, and identity as "relational effects" (Thrift, 1995, p. 35) that are produced through the associations that literacy networks make possible. Thus, becoming recruited (or enrolled) to use literacy, or assuming agency with literacy, or developing a particular identity through literacy

is neither described through an individual's internal states nor socially attributed to larger structural orders. Rather, we focus on the differences of spatial and temporal displacement among networks. We contrast the literacy networks in Brian's history and English classes, and in the online role-playing game *Star Wars Galaxies: An Empire Divided* (*SWG,* LucasArts & Sony Entertainment, 2003), as uniquely engaging and productive of agency and identity, according to their distinctive relations of literacy and space–time. Understanding how engagement, agency, and identity involve particular displacements in space–time offers valuable insights for how literacy learning and instruction may be more optimally organized and designed.

THEORY/METHODOLOGY: LITERACY PRACTICE, ANT, AND SOCIAL SPACE

As we are drawing from theory and working toward a new methodology for interpreting literacy practices, we have labeled this section "theory/methodology." Also, because some of the principles we discuss can be particularly abstract, we provide some extended illustrations, including exemplars from Brian's playing of *SWG* (LucasArts & Sony Entertainment, 2003).

The relationship of literacy to space and time, or space–time as an integrated construct, has been conceived in widely various ways. "Strong-text" theorists (Brandt, 1990, p. 3) such as Goody (1986), Olson (1977, 1980), and Ong (1982) have argued that texts enable the literate to break free from the limits of space and time. The development of literacy in this perspective assumes an understanding of texts (and of the literate self) as detached from social context. Attributing to literacy and text such "decontextualizing powers" was "central to claims that literacy induces changes in thinking and social organization" (Brandt & Clinton, 2002, p. 340). More recently scholars in the new literacy studies (NLS; Gee, 1990; Street, 1993) have critiqued this autonomous model of literacy, and have emphasized instead the locally embedded or situated qualities of literacy and literacy development (Barton, Hamilton, & Ivanic, 1999). In this critique, literacy practice is recognized as political, contingent, highly socially, and culturally involved, not always mobile from one context to another, and not acting as an independent agent for social change, cognition, or identity.

However, the relatively recent situated or local turn to studying literacy practices has also raised a number of problems for understanding the ways in which literacy moves and acts beyond the locale. How, for instance, might researchers interpret textual–social practices such as Web surfing and mall cruising, "traversals" that "radically cross genre boundaries" (Lemke, 2001, ¶ 7)? Or, how might one account for the material objects in literacy events (e.g., window grills at the post of-

fice, walls in classrooms, cell phones) that materially frame interactions and yet clearly have traveled from other places (Brandt & Clinton, 2002; Latour, 1996b)? Further, how do researchers adequately interpret and account for the ubiquity of particular social literacy practices, and especially those of schooling (Street & Street, 1991)? These theoretical and methodological problems and others may be attributed to the accelerated flow of media, texts, commodities, and bodies in contemporary global culture (Appadurai, 1996; Castells, 1996). Alternatively, these problems may also be attributed to current limits in theorizing literacy and its relationship to space–time.

ANT, developed within the broad area of science and technology studies, has begun to influence work in social psychology, geography, medical sociology, management, economics, and other areas of the social sciences (Michael, 2000, p. 19). ANT has been taken up less often in educational studies; however, early connections and critiques of ANT from educational theorists are at least a decade old (Nespor, 1994). Education-related work drawing on ANT has been more prevalent in math and science (Hall, 1999; Nespor, 1994; Roth, 1996). More recently, however, literacy scholars are beginning to theorize the relations of ANT to literacy studies (Brandt & Clinton, 2002; Clarke, 2002) and to apply ANT-inspired analyses to literacy policy (Hamilton, 2001).

Scholars who have been key to the historical development of ANT (Callon, 1986; Latour, 1987, 1996a; Law, 1994) are often reflexive about the theory itself as an actor (Law & Hassard, 1999), and critical in particular of the ways in which the work can be taken up and pressed into service as a theoretical framework. Aware of the impulse in social science to overly tame theory and method, we draw on ANT not as a stable body of work, but one that provides some tools and perspectives with which to think and analyze literacy as a social practice (Clarke, 2002). In the sections that follow, we first introduce the relation of ANT to the analysis of social space, and then discuss the heterogeneity of actants circulating in networks. Following from the heterogeneity (and hybridity) of actants, we consider the distribution of agency in networks. We then return in more detail to consider the constitution of space–time in actor networks, with a particular focus on the circulation of texts.

ANT and Social Space

Bruno Latour (1999), likely the most widely known thinker behind ANT, wrote that he believed that the most "useful contribution of ANT" has been "to have transformed the social from what was a surface, a territory, a province of reality, into a circulation" (p. 17). Latour's work, along with other work in ANT, seems saturated with geographical metaphors and modes of thought (Bingham & Thrift, 2000). For Latour (1987), time and space did not describe an independent frame in which things move, but the result of the interaction among things. In this vein,

Latour (1999) bemoaned the popularization of the term *network* as associated with the Internet, where complete and unfettered connection is assumed among all participants "without deformation" (p. 15). In place of the network as static object, Latour's work has imagined a dynamic, vibrating series of connections (and failed connections) among network objects that routinely involves the translation of these objects; to be an actant involves shifting in space and time, which involves the translation of actants as they circulate, are recruited, organized, and hybridized with other actants. Space and time, therefore, are considered to be the consequences of the ways in which actants relate to one another; "spaces and times are traced by reversible or irreversible displacements of many types of mobiles" (Latour, 1988a, p. 25).

Reconceiving of space–time or social space as organized by networked actants rather than organized *a priori* to social action involves shifting from an idea of the *local* and the *global* (or micro and macro) as thing–nouns to considering *localizing* and *globalizing* as practical activities, as acts of rendering:

> Neither individual action nor structure are thinkable without the work of *rendering local*—through channeling, partition, focusing, reduction—and without the work of *rendering global*—through instrumentation, compilation, punctualization, amplification. One cannot get anywhere in sociological theory if one is forced to *start* from the substantial existence of either individual action or structure. (Latour, 1996b, p. 234)

The words *local* and *global,* then, describe not pregiven social structures but perspectives on networks that are "more or less long and more or less connected" (Latour, 1993, p. 122). From the researcher's perspective, Law (1992) argued that people should take the local as all there is, rather than assuming that they are observing traces of a macro social system in the local. At issue is not merely restoring a material status to locally observed texts, but tracing how texts, as they circulate, translate and organize the space–times of activity that precedes them (Latour & Woolgar, 1986), and how texts are simultaneously juxtaposed, laminated, or otherwise arrayed with other objects in real-time activity. We return to these issues in the following sections, following a brief introduction to heterogeneity and agency in ANT.

Heterogeneity, Identity, and Agency Through Actor Networks

In Latour's (1988b) work and ANT more broadly, objects of all sorts—actants—are brought into circulation, including people but also (in his analysis of Einstein's work) trains, clouds, men with rigid rods, lifts, marble tables, mollusks, clocks, and rulers. Although Latour (1996b) argued that the split between the political

world and the material world is characteristic of the modern period, in ANT the work of the material, technical world of the network is brought to the fore and given its due—the image of the world becomes one in which technologies are active agents, recruiting and enrolling humans (Latour, 1996a). *A priori* distinctions between humans and nonhumans are not made, indexing a tenet of ANT known as *generalized symmetry* (Callon, 1986; Pardoe, 2000). Rather than purifying categories, Latour (1993) called for a "new anthropological matrix" in which notions such as "subject" and "agency" are replaced by "variable geometry entities" (p. 11). If one starts from the position that subjectivity and agency are not merely given in advance, but are relational achievements involving people and things, then a key problem involves understanding the chains and translations between human (H) and nonhuman (NH) actors: "No-one has ever seen a social relation by itself … nor a technical relation … . Instead we are always faced with chains which look like this H-NH-H-NH-H-NH" (Latour, 1991, as cited in Michael, 2000, p. 22). Semiotic chains of humans and nonhumans are more sensible to literacy studies if the original, nontextual and nonlinguistic meaning of semiotics is recovered to involve order building or path building among a very wide variety of actants (Akrich & Latour, 1992, as cited in Michael, 2000, p. 22). Thus, spatially speaking, ANT may be considered a prepositional approach, as it seeks to specify how the relations among actants (e.g., orientation, directionality, proximity) are worked out in circulation (Bingham & Thrift, 2000, p. 290).

The approach to identity in this analysis is informed by ANT and its relationship to social practice theories of identity (Holland, Lachicotte, Skinner, & Cain, 1998; Holland & Leander, 2004). Both bodies of work are concerned with how individuals and social groups are configured together with sociocultural resources. These positionings, or prepositional configurations of persons with texts, with artifacts, with cultural models of various sorts or other resources are examined as practices of identification. This approach to practices of identity does not preclude other analyses and categories of social identity work (e.g., affinity groups, virtual identities, and projective identities), but is rather more general in its approach, concerned with the possibilities and dynamics of identification through networked circulations. Identification, an active term, "invites us to specify the agents that do the identifying" (Brubaker & Cooper, 2000, p. 14).

The idea of agency in ANT is directly related to the heterogeneity of actors in networked relations. Latour (1996b) argued that there are not "actors on one side" and "fields of forces on the other;" rather, there are only actants, "any one of which can only 'proceed to action' by association with others who may surprise or exceed him/her/it" (p. 237). Therefore, agents are not treated as having agency apart from networked circulations; rather, agents are "relational effects" (Thrift, 1995, p. 35). This view of agency is distinct from that perspective more common to social practice perspectives of literacy, which have worked to recover a sense of the agency of "local readers and writers … making meaning of literacy on their own turn and on

their own terms" (Brandt & Clinton, 2002, p. 341). We are highly sympathetic to the perspective of asserting the local meaning-making agency of individuals in practice as evident in the NLS, yet see the theoretic (and political) problem not as one of highlighting the agency that individuals assume, but rather understanding the relations through which agency is produced. Law (1994), for example, noted that if one removes from a manager the technologies with which he or she works (e.g., telephone, fax machine, computer, desk, chair, light), he or she can no longer function in the same capacity.

In the case of *SWG* (LucasArts & Sony Entertainment, 2003), the case for the circulation of agency and identity is even more compelling than that of Law's (1994) manager. To begin his play of *SWG,* Brian needed to construct a virtual character (see Figure 1). In creating this character, Brian did not act alone, but within the constraints and affordances of the game: its named species, professions, body types, slider bars, and moving, posing, digitally mastered characters that seem to appeal to the player to be selected from among their digital companions. The game and Brian were coagents in shaping Tiumbe; he did not think of the character as an empty image, but as already imbued with particular qualities. During his character creation, Brian noted, "You can always make another character, so I'm just going to see what this guy's got." From the beginning, Brian and the character responded to one another as coactants. In this sense, the game positioned Brian in an ambiguous and emerging middle space across roles—what Juul (2001)

FIGURE 1 Creation of Tiumbe at the outset of play in *Star Wars Galaxies* (LucasArts & Sony Entertainment, 2003). Courtesy of LucasArts, a division of Lucasfilm Entertainment Company Ltd. LucasArts and the LucasArts logo are trademarks of Lucasfilm Ltd. *Star Wars Galaxies* is a trademark of Lucasfilm Entertainment Company Ltd. © 2002–2006 Lucasfilm Entertainment Company Ltd. or Lucasfilm Ltd. and TM as indicated. All rights reserved.

called "a twilight zone where [the player] is both an empirical subject outside the game and undertakes a role inside the game." Given the affordances for creating characters in *SWG*, Tiumbe was a robust, creative, and aesthetically pleasing translation of Brian. Most importantly, Tiumbe did not merely translate Brian faithfully (he was not a realistic icon of Brian in some manner) but rather translated Brian's desires for identity, identity play, and aesthetic choices of embodiment (Filiciak, 2003). Brian's translation of identity into Tiumbe continued throughout his game play as he modified the character.

Moreover, in addition to the translations of himself as Tiumbe, the relationship of Brian to Tiumbe may be conceived of a circulation of H-NH-H-NH-H-NH, or human to nonhuman hybridity. Brian was very much embodied in the activity: he moved, tensed up, shifted in his chair, squinted, blinked, coughed, drank Coke, moved his mouse, typed with rapid fire speed, scanned the screen, picked up the telephone, and talked out loud. The game translated some (but not all) of Brian's embodied activity into the shape and embodied motion of Tiumbe. Tiumbe was also quite embodied in the game world. He moved across grassy fields and waterways; he oriented himself to other characters' bodies when speaking, and even if Brian did nothing, he automatically began to defend himself when attacked by a creature. Tiumbe also moved Brian to act—to save Tiumbe from danger and death, to purchase items, to ask questions. Brian's body sometimes worked behind Tiumbe's body, peering over his shoulder; at other times, Brian oriented to Tiumbe from any number of angles or textual representations. Tiumbe did not replace Brian; rather, Brian and Tiumbe existed in a relation of movement or space–time displacement. (Hereafter, when foregrounding their coconstituted identities and agency in activity, we speak of them as *B-T*.)

ANT and the Space–Time Work of Texts

> Any time an interaction has temporal and spatial extension, it is because one has shared it with non-humans. (Latour, 1996b, p. 239)

On the one hand, applying the principle of generalized symmetry (Bloor, 1976; Callon, 1986) to texts among other circulating objects or actants in literacy networks would not give texts special status. Rather, they would be considered to circulate with other human and nonhuman objects and to be understood in these relations. On the other hand, the position of texts in ANT is somewhat paradoxical, as they are afforded a special relation to other actants. In ANT, literacy does indeed seem to have a "heavy hand" in "building networks across time and space," "delocalizing," "reframing," and "providing the centralizing powers by which larger and larger chunks of the social world are organized and collected" (Brandt & Clinton, 2002, p. 347). In the following, we discuss the heavy hand of literacy in

networks from two space–time perspectives that signal our methodological approach in the analysis to follow. First, we discuss translation: how texts are preceded by the flows of other actants and translate these other actants into a new form. This interest has been key to ANT in particular within laboratory studies, where entire series of experimental moves and mishaps, persons, funding bodies, instruments, and other actants get collected, organized, and translated into the research article (Latour & Woolgar, 1986). In turn, the scientific article or other text then circulates and is recruited to produce ongoing work in the semiotic–material world of the research lab. The second space–time perspective we deploy involves focusing on the real-time work of texts in action, or the particular ways in which texts, practices, objects, and bodies are arrayed or configured in the course of activity. For this discussion, we draw on Brandt and Clinton's (2002) notion of "literacy-in-action," which retains the mediating role of literacy in human action but also conceives of literacy itself as an actant or "social agent" (p. 349).

Translating space–time with literacy practice and texts. Early and ongoing analyses of technoscientific activity informed by ANT have emphasized the role of texts and *inscription devices*—specific textual forms (diagrams, pictures, tables) or text-producing technologies that permit scientists to make the complex and messy world simplified and easily readable (Latour, 1983). Writing or inscription is a type of displacement, in that difficult to move objects are rendered mobile in texts, which function to fix particular facts and forms of knowledge (as immutable) and which can be combined with other texts and mobile actants (Latour, 1988a).

Although it is relatively easy to imagine the connections within any given social–literacy–technical practice, the logic of translation processes is not nearly so apparent. Latour (1983) wrote that ANT, as a "theory of translation" (p. 153), is essentially a theory of metaphor, where one thing means something else. A simple example familiar to academics is the case of the curriculum vitae (CV) standing in for the person and summing up a vast array of technologies (cassette recorders, laptops, name tags), conversations, article revisions, grant applications, conference hotel rooms, department chairs, and other actants. The CV collapses and congeals the space–time of an academic life, yet not simplistically so, as it selects space–times (omitting, for instance, romance, child rearing, car repair, and rejection letters) and amplifies others. Important for actors is that the CV or any other written translation is seen as a "faithful translation and not a betrayal, a deformation or something absurd" (Latour, 1983, pp. 154–155). Translation is a process that is never complete, it may be challenged by others as inaccurate or deformed in some way, or it may fail. Conceiving of translation as an ongoing process is one of the ways in which ANT is distinct from an autonomous perspective on literacy, which would posit that texts roam free from the political and material space–times of their production and reception.

Literacy-in-action: The real-time work of texts in activity. The discussion in the previous section has already begun to elide the distinction between conceiving of translation, on the one hand through a focus on particular texts and the social histories and geographies condensed in them, and on the other hand through a focus on given moments where particular text–action–objects are configured. In the following, we direct our attention to this latter notion. We assume a perspective from close in, considering the relations among texts and other actants as they organize and render diverse space times. Unlike the analysis of the social life of baboons and chimpanzees, already highly complex (Latour, 1996b, p. 230), the analysis of action in human societies must be concerned with space–time production and organization, or how action is "shared with other kinds of actants dispersed in other spatio-temporal frameworks and who exhibit other kinds of ontology" (Latour, 1996b, p. 239).

An analysis of literacy as embedded in action is more than just a theoretical exercise, but rather helps people understand how literacy and texts function as actants in a range of practices, where agency is assumed to be located more squarely in individual minds, technologies, institutional structures or within other actors-as-containers. In particular, we are concerned with the practices of abstraction or formal thinking, as these practices are most closely associated with claims about the autonomy of literacy. Latour (1988, as cited in Bingham & Thrift, 2000) argued that abstraction is a property of reference rather than a property of mind, designating a "fast circulation from one repertoire to another" rather than a "higher level of figuration" (p. 286):

> The "big picture" is not given in one frame of reference, but in going from one frame to all the others through a network. Operations like thinking, abstracting, building pictures, are not *above* other practical operations like setting up instruments, arraying devices, laying rods, but are *in between* them. (Latour, 1988, as cited in Bingham & Thrift, 2000, p. 286)

Thus, rather than a modernist geography of the mind-as-container, or the cognitive spatial metaphor of being above a situation or problem, Latour (1988, as cited in Bingham & Thrift, 2000, p. 286) pressed for an interpretation of the movements between actants and their associated space–time frames.

Because we analyze highly diverse literacy practices in the following, we want to interpret these practices, and the thinking associated with them, as not only sociocultural, but also technical and material. Removing the agency of texts and tools in formalizing movements risks romanticizing the practices as well as the humans in them; focusing uniquely on the texts and tools lapses into naive formalism or technocentrism. Abstraction is a property of relations, of betweenness, of the circulation and hybridization of formal tools with informal interaction (Berg, 1997, p. 12).

Brian's use of the skills screen in *SWG* (LucasArts & Sony Entertainment, 2003) provides a compelling illustration of the working of reference through literacy-in-action. During the course of his first 3 weeks of play, Brian became increasingly involved in monitoring experience points, skill acquisition, and title or profession acquisition. *Profession* in the game, as described in the guide packed with it, refers to a collection of skills and titles. Skills screens consist of 4 ×4 charts of boxes, each one of which describes a skill that one needs to complete en route to a profession. When a particular skill is completed, it is colored in on the skills screen. Thus, the skills screen is a dynamic model of identity; color codes indicate which skills are complete and which are lacking. For instance, as shown in Figure 2, Brian had completed 10 of 16 skills to become a Master Scout in his 3rd week of play.

In Brian's play, and in particular during the hunting episodes, he repeatedly shifted his perspective between the transparent immediacy of his game avatar (Tiumbe) in the scene of action (typically, a hunt) and the hypermediated account given by the skills screens. In conceiving of literacy-in-action, the skills screens functioned as an actant or "co(a)gent" (Michael, 2000) in B-T's activity in a number of ways. For instance, during one observation, Brian explained that

FIGURE 2 Skills screen for Master Scout in *Star Wars Galaxies* (LucasArts & Sony Entertainment, 2003). Courtesy of LucasArts, a division of Lucasfilm Entertainment Company Ltd. LucasArts and the LucasArts logo are trademarks of Lucasfilm Ltd. *Star Wars Galaxies* is a trademark of Lucasfilm Entertainment Company Ltd. © 2002–2006 Lucasfilm Entertainment Company Ltd. or Lucasfilm Ltd. and TM as indicated. All rights reserved..

B-T was hunting that day with a pistol, rather than a more appropriate rifle, because he was trying to get more pistol experience points. In this case and many others, Brian's decisions about particular weapons or traps to use, or game to hunt, were guided by the skills screen and not by what one might consider to be practical, commonsensical, or a most efficient means in locally embodied activity. Rather, the skills screen, and its own particular sensibility for advancement, structured goals, and sub-goals influenced Brian to shape his experiences in particular ways that would "give *good* experience," where *good* was defined as filling in particular slots.

METHOD

Study Background

Data for this research are taken from a larger ethnographic study of the everyday communication practices of seven youth in online and offline contexts, a study termed *Synchrony.* Case studies developed from this project traced how adolescent youth use new information and communication technologies (ICTs, including instant messaging, chat, e-mail, searching the Internet and building Web sites), and how ICT use was related to face-to-face and online literacy practices in school. The goal of the larger study was to examine the relations of diverse literacy practices, social space, and identity.

The key informant for our research was Brian, a 13-year-old youth during the time of the research, who lived with his brother and parents outside a small town (population 6,000) in the mid-South. The school Brian attended, Tyler Middle, had 770 students (75% European American, 16% African American, 6% Latino, and 3% Asian). Twenty-five percent of the students at Tyler Middle were on free or reduced price lunches. Brian was new to the school the year of our research, having just moved from the Midwest.

Brian had little competition from family members for access to a recent model PC with a cable modem. He spent, on average, 2 to 3 hr per day in online activity, which primarily involved playing massively multiplayer online games (MMOGs). These online environments are graphically rich, three-dimensional video games in which a participant creates his or her character and then uses this character to interact with the game environment, as well as with characters controlled by other online players. Such video games can be understood as "persistent social and material worlds, loosely constructed by open-ended (fantasy) narratives, where players are largely free to do as they please" (Squire & Steinkuehler, in press). During the summer months, Brian's online activity often increased to 5 or more hours per day as he began to play *Star Wars Galaxies: An Empire Divided* (LucasArts & Sony Entertainment, 2003), an MMOG produced by LucasArts and Sony Online and based loosely on the Star Wars milieu. In part, Brian was interested in playing this game because of his in-

terest in Star Wars culture. He had also been a frequent and fluid player of *Jedi Knight II: Jedi Outcast* (LucasArts, 2002), a first person fighting game that could be played on- or offline. However, Brian's initial excitement about engaging in *SWG* had less to do with Star Wars culture than with reports from others about its high-end graphics and expansive possibilities for activity. In addition to his online activity, Brian enjoyed a range of activities, including playing the string bass, skateboarding, collecting and painting Warhammer models (used to play an offline war game), and hanging out with his friends.

Data Collection

Data collection for this study made use of a number of ethnographic techniques and was informed by assumptions of interpretive–constructivist research (Erickson, 1986; Guba & Lincoln, 1994). Data collection was also informed by emerging perspectives advocating an analysis of online activity not as isolated from material, embodied activity, but as interpolated in complex ways with local, material geographies (Baym, 1998; Hine, 2000). Data were collected through screening surveys, interviewing, field notes, the collection of written artifacts (from the classrooms), digital capture of online interaction (using Spector Pro, Spector Soft, Vero Beach, FL), and videotaping of online interaction, using a digital video camera. Brian was observed at least once per week in his English and history classes from February to June of 2003, and his course work from these classes was collected during these visits. Biweekly home observations of online literacy practices, including computer gaming, also began in February and continued through August of 2003. Each home visit lasted approximately 1½ to 2 hr and consisted of observing and asking questions about Brian's practice during his online activity. Monthly follow-up home observations of online interaction were ongoing for a year following this period, and long-term follow-up is ongoing as of May 2005. Brian was also formally and informally interviewed on several occasions throughout the study concerning his literacy practices; most interviews beyond the initial screening interview were discourse-based, shaped around one of Brian's texts or textual practices. Brian's history and English teachers were also interviewed twice during the study, as were 20 other students.

Data Analysis

We recognize that the practice of interpreting circulations and configurations is not separate from the practice of actively creating them. In our interpretive work, we recognize particular organizations and relations over other possibilities (Gee, 2000). We are not assuming a God's-eye, all-seeing view on the social world and do not assume that such a view is humanly possible. Our own selective interpreta-

tions of the configurations involved in some of Brian's literacy practices have been focused on how literacy, space–time, and identity are coproduced.

Our analytic process has involved analytic review of the body of ethnographic data, interpretive coding of these data, cross-comparison of interpretations, triangulation across the data, and member-checking with Brian. Our approach to coding has been shaped in dialogue with studying ANT (and related work). In our interpretation of this work, analysis calls for the interpretation of relations (configurations and circulations) rather than isolated elements that are then reassembled through various coding processes. Thus, our process can be best described as the identification, coding, and comparison of distinct configurations and circulations of texts and other objects in various forms of activity. From this process of dialogue between the data and theory, we have developed an analytic framework that we draw on throughout the article.

We consider this framework as an emergent, incomplete, yet productive heuristic for describing literacy as circulation or literacy networks. Our analytic framework involves five dimensions of displacement: translation, global representations of activity, movements and positions of texts in circulation, rhythm and speed, and continuity of networking. These analytic dimensions are defined as follows:

1. Translation: Although the construct of translation in ANT can involve diverse practices and objects, we were primarily concerned with textual translation. In analyzing the data, we considered how texts stood in the place of, spoke for, or appeared to mobilize bodies, objects, or other texts. For instance, we took as a classic instance of translation the way in which a student assignment, written as a paper text, mobilized the body and thoughts of the student and continued the circulation of the student toward the teacher, where the student could be examined and evaluated.

2. Heterogeneity of space–time representations: Texts express particular versions of space–time (time–space or chronotopes; Bakhtin, 1981; Leander, 2001). What space–times are produced and organized in particular texts, linguistically, imagistically, or otherwise? (This dimension, of course, is related to the dimension of translation.) In coding and contrasting these data, we were particularly focused on the presence of texts that offered participants representations of their activity that were global in scale with respect to their locally embodied activity. By introducing these representations, how are multiple timescales (heterochronies; Lemke, 2000) and multiple spaces (heterotopies; Foucault, 1986) produced?

3. Movements and positions of texts in circulation: We analyzed how material texts move and are arrayed with other actants in activity, seeking to describe a geography of the text in activity. We considered the space–time prepositional relations (e.g., before, after, during, on top of, beside, behind) of texts to other objects in activity. For example, although in some forms of activity the text is placed as the final result or curve of what went on before it (e.g., producing a written summary

of a lecture), in other forms of activity texts are overlaid with activity. The space–time relation of a text to another actant may even be collapsed such that there is a fusing or hybridity of text–actant. For example, nurses may use cups, infusion bags, and other containers that have measurements already inscribed on them, or whose measurements have become routine in practice, such that these containers are also texts of measurement for routine practice (Berg, 1997). Berg argued that such "small crossings," are essential for understanding how the seeming gap between the formal–textual and practical is traversed by participants, how material hybridity allows researchers to conceive of texts as acting among a "myriad of little powers" (p. 420).

4. Rhythms and speeds of circulation: Although the dimension of movement and position foregrounds a spatial dimension of displacement, the analysis of rhythm and speed is more directly focused on temporality. In some forms of practice (including some computer games), texts and the space–times mobilized by them are placed in frequent and rapid relation to other actants in circulation. Humans in these forms of practice appear to beat out a rapid rhythm of texts and action. In other forms of social practice, the speeds are much slower, and the beats may not be heard for long periods.

5. Network continuity: Although any text or other object in a network could ostensibly circulate without end, circulations that could be traced were afforded a God's eye view and could connect a select, observed locale with myriad other nonobserved locales in space and time. However, some networks are much more continuous in space–time than others, even from a participant's constrained perspective. In comparing Brian's literacy practices, we attended to how his relations to the texts he was reading and writing appeared to be more or less extended and continuous on the one hand or cut (Strathern, 1996) on the other.

DATA AND ANALYSIS I: ETHNOGRAPHIC DESCRIPTIONS OF SELECT CLASSROOM LITERACY PRACTICES

History Lecture and Notes Routine

In general, Brian reported that he liked history and felt it was a strong subject for him. He described his interest in history as beginning with a previous teacher in a former school who taught him world history in Grades 5, 6, and 7. What Brian found most engaging were this previous teacher's stories about the world: "He had a lot of personal stories. He had pretty much been everywhere in the world; he's been to like 60 countries … usually about every single different thing you would talk about he would have a story about it, about when he was there." Brian mused that this teacher may be one of the reasons he had begun to like to travel so much.

Unlike his current U.S. history teacher, Brian's former teacher did not require note-taking: "He would just stand up there and teach and we'd have to do some homework, maybe." This important difference notwithstanding, Brian related to him; history classes had a "distinct environment," including lecture and storytelling, and it was "just easier for [him] to pay attention and get things done" than in some other courses, including English.

What we have termed the *history notes routine* was a nearly daily routine in the U.S. history class Brian was taking during the time of this research, but we capture 1 day of this ongoing project as an example of the kinds of participants, texts, and circulations within it. When Brian walked into class, Mrs. Quinn, an African American woman in her late 50s, was passing back study guides that the students had completed the day before. (This class, as well as Brian's English class, was designated for the higher group among the five groups of students on the Red Team. Brian's teachers reported advancing him on the basis of believing that he needed to be challenged.) Brian started copying notes off of the board when he arrived in class. In the middle of the board was a list of 14 questions, beginning with

1. Who were the progressives?
2. How did bosses gain control of city government?
3. What boss gained control of New York?
4. How did muckrakers hope to eliminate social evils?

On the right side of the board were 19 vocabulary terms, including *Gilded Age*, *Political Machines, Bosses, Boss Tweed,* and *Progressives*.

To receive credit in class, the overall task for the students was to listen to Mrs. Quinn talk about history and to capture, within her lecture, the answers to the questions listed in the middle of the board. The vocabulary terms were also to be defined. This capturing activity was prestructured by the lists on the board and by the student note format, in that students were to write out the questions and terms on arriving in class and were to leave a line or two for answers from the lecture. Once completed, students also were to mark the answers to the questions on their notes with a highlighting pen, to save Mrs. Quinn time in checking over the sheets. Class notes, vocabulary, and definitions accumulated from class day to class day, and students were supposed to end up with a large set of notes to be used in studying for the next test.

Mrs. Quinn's delivery of the lecture was continuously interwoven with storytelling and anecdotes of her social experiences. For example, on this day, Mrs. Quinn began talking about the meaning of *gilded* in *gilded age* by giving the example of a doll she had as a child that, although painted with brown paint, was really white underneath. With great animation, Mrs. Quinn talked of how the doll terrified her. A bit later, the students broke out with many side conversations when Mrs. Quinn talked about working as a grill cook in a restaurant, and how meats and other

foods are made to look more appealing, linking this detour to the idea of muckrakers and *The Jungle*. When side conversations broke out, Brian mostly engaged with his friend, Paul. He very rarely volunteered to respond to a whole class question. Yet, Brian described history class as a "real active class" in large part because the teacher was "real into it." The teacher's stories were "a little more interesting than just the dry old notes." Brian also noted that there was something about the way that the teacher "presented herself" that he found motivating for learning history—she had a sense of presenting "where kids would actually pay attention."

Of all of the activity in the class, Brian was least interested in taking notes, describing himself as "definitely not a note-writing person." Brian would sometimes abbreviate the notes so as to reduce the task. The only reason he took notes in class was to get a grade on them. Brian remarked that without the grade on notes, "you wouldn't have any grade in class." Brian also remarked that he felt the highlighting task was tedious and would often lose his highlighting pen. Although Brian recognized that he was supposed to study from his notes for tests, he reported never doing this: "See, after you had listened attentively and written all of them down you really didn't need to study, I mean, it was all in your head."

Brian often complained privately about taking notes in class and 1 day even publicly asked Mrs. Quinn, "Are we going to have to take, like, 50 notes again?" On this day, as many others, Brian struggled to keep up with taking all of the notes in this class. His notes appeared hastily written with a labored script and had quite a number of blank definitions (10 of 20) and unanswered questions (8 of 14). Two weeks later, before the test, Brian had kept very few of the notes from past classes. Although some students had all of their notes neatly arranged in their notebooks, those that Brian still possessed were either folded diagonally in the back of his history book or stacked up in the bottom of his locker. Nonetheless, Doug, who appeared to take better care of his notes and to study more for tests than Brian, called Brian a "history geek," as Brian regularly scored better than Doug on tests and eventually earned a B+ in the class.

The English Research Project

As reported in interview, Brian was generally uninterested in English class and felt that it was one of his poorer areas of achievement: "I never do well in English, and if I can get a B in English, that's fine with me." Brian felt that in English, unlike history, one did not have to be paying attention all of the time, and the general content of the class did not recruit him as an active member: "Just like taking books and you know, and identifying the conflicts and things like that—it just really doesn't interest me." Across 3 years of English classes reported in follow-up interviews, Brian's approach to the class appeared relatively consistent. Although Brian spoke about himself as not doing well in English—that there was "no way [he'd] ever get an A"—he never spoke about English class as being challenging.

Ms. Marshall, Brian's English teacher, assigned the students a research project in early May. She expressed a hope that that project would help the students with their writing. She related their needed writing improvement to achieving a score a 5 or 6 on the forthcoming Tennessee State Writing Assessment, which would indicate that they were proficient writers. The teacher wavered a bit the first few days of the project, but ultimately decided they did not have enough time for a full research paper and would write note cards and an outline. The class topic of the research was either going to be historical periods or careers, but because the Yellow Team (generally speaking, students tracked as college bound) was using the library materials on careers, Ms. Marshall settled on historical periods. Ms. Marshall noted that students could pick any historical period in which they were interested and for which they could find information. Brian chose World War II as his topic, saying, "Well see I just—she wanted us to do something on a time period or a war or something like that, and I just thought there would be a lot of information on World War II, and so I just did that."

After establishing topics for the research projects, Ms. Marshall handed out to the class a sheet describing accuracy in paraphrasing, another sheet describing note cards and how to write them, and a third blank sheet with 3-in. × 5-in. boxes sketched on it for students to practice taking note cards in class. After some note-taking practice and discussion in class, the students had two days to work on their research in the library and an additional day in the computer lab. They were required to write 25 note cards from 4 sources. Three different varieties of sources were to be used, including a book, a reference book, and an Internet site.

Brian wrote very little when he was in the library or computer lab. Rather, he talked with Enrico and Doug, two of his friends in school that he talked and joked with regularly in English when he could. Brian noted that he "may have done a little more work in the computer lab" had his friends not been in the class with him, but also noted that he usually procrastinated with "big English projects" and tried to spend the "least amount of time as [he could] on them" and do them at the last minute. Still, in study hall he completed 20 note cards from 4 listed sources and also completed 3 source cards, listing two Web sites and a book as sources. He brought the book to study hall with him and was permitted to go to the computer lab (next door to his study hall classroom) to use the Internet. Brian described his process:

> See, like, I was finding notable people first, you know, like the presidents of the different countries that were in the wars. And I put those down. Like she would just want like names. She wouldn't want complete sentences on the thing so I'd put that kind of thing down. … I wrote their name down. And then like I would—and then on a different card I might write some details about it.

The note cards offered scanty detail and many of them included information that Brian already knew. For example, one card lists "WWII," and underneath, "Pearl Harbor," followed by "Japan bombed Hawaii." Brian reported spending about 10 min writing the cards, and being primarily motivated by avoiding a 0 on this "big project," which "could really hurt you." Even though his project topic was about history, a topic that he liked, Brian conceived of the task as procedural, which he found unmotivating as he "already knew most of that stuff anyway. … We've been doing 5 paragraph essays since third grade now."

On the day that the cards were due in class, Brian had forgotten about the requirement to make an outline. He quickly drafted up an outline during the few minutes that Ms. Marshall was taking attendance and collecting other students' papers (see Figure 3). This outline, besides the "Intro" and "Conclusion," included three main sections: "Daily life," "Notable people," and "The war." Subcategories under each main category were broad; for instance, "Daily life" had two subcategories: "a. women worked," and "b. Jews captured/discriminated." Brian received a B– on his project, scoring full credit for handing it in on time and having completed most

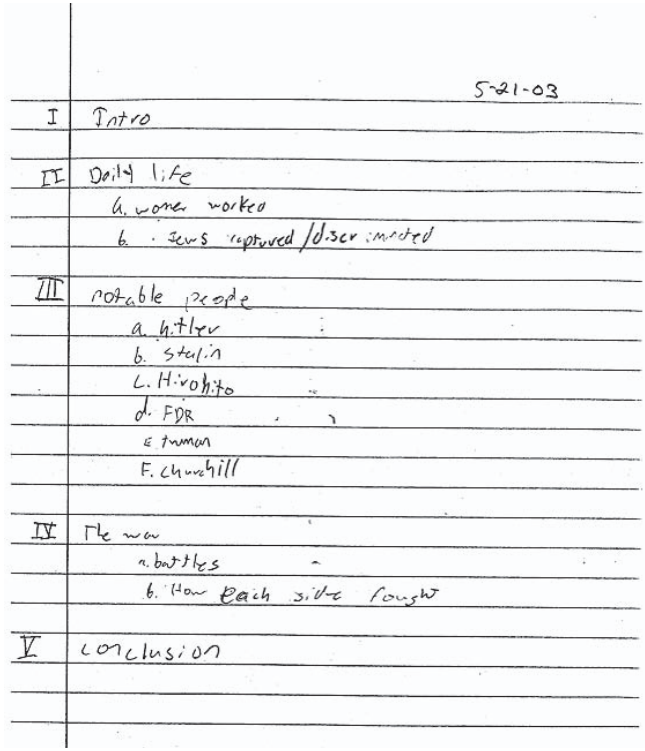

FIGURE 3 Outline from World War II research project.

of his note cards, but losing some points for not having three different source types and having a less than well-detailed outline.

How was Brian enrolled or recruited by history and English classes, how did he assume agency with and over texts in these classes, and what forms of identification did he make within these networks? We interpret the courses together to draw out similarities of school-related networks but also to contrast differences in school experiences. The analysis is obviously complicated by the fact that Brian entered 8th grade English and history with partially developed subjective positions or school-subject identities, which we have suggested from the interview data. He already saw himself as much more of a history student than an English student, even before the school year begins. Over time, Brian had not only been enrolled but also has enrolled himself in these networks in different degrees. Acknowledging the histories of these networks and Brian's uses of them, in the following we discuss the five dimensions of displacement in Brian's history and English classes as represented in the activities studied. Table 1 contrasts the respective networks along these five dimensions, and the discussion following analyzes these contrasts in detail.

Translation

Many forms of translation in structuring classroom activities occurred even before the students engaged in them, and teachers and print texts were important actors in these processes. We emphasize these more historically and spatially extended networks and translations to foreground how we are analytically bracketing or "cutting the network(s)" (Strathern, 1996, p. 523) and also to suggest how our interpretive approach is more globally applicable. Brian's teachers used material texts to translate the interests of actants from other space–times (publishers, politicians, researchers, parents, and state and national boards) into local activity. In history, the questions and answers that Ms. Quinn used in her lectures, stored on a computer drive in her classroom, translated textbook history, the curriculum, and her historical knowledge into a set of discreet facts and definitions. Standardized assessments were also an actant: Ms. Quinn discussed how she was under increased pressure from standardized testing to cover more material, and thus update and expand the number of questions structuring her official curriculum. In English, Ms. Marshall drew on a number of inscriptions that had translated the idea of good writing, proficient writers, and appropriate genres, including the Tennessee State Writing Assessment. Ms. Marshall's handouts were especially important actants. The handouts, available in her filing cabinet, included information on the material size and shape of the card, the assertions of "one fact" on each card, the notion of "IN YOUR OWN WORDS," and so on. Once passed through the photocopy machine (another important actant), the handouts became important "immutable mobiles" (Latour, 1988a, p. 22). Of course, the translation of research work as note card taking and collecting is a social practice that associated technology with a his-

TABLE 1
Dimensions of Displacement in the History Notes Routine and English Research Project

Dimension of Displacement	*History Notes Routine*	*English Research Project*
Translation	Student texts translate student bodies and identities at far end of activity.	Student texts translate student bodies and identities at far end of activity.
	Grades enroll Brian as a History note-taker.	Grades enroll Brian as an English student.
	Teacher stories partially enroll Brian as History student.	
Heterogeneity of space–time representations	Global historical knowledge orally presented with local, personal stories. Global divided from local through print: textbook, notes, and testing.	Global and relatively homogeneous representations of space-time.
Movements and positions of texts in circulation	Text to text movements across a prescribed and limited range.	Text to text movements across a prescribed and limited range.
	Students scribe from authoritative text sources.	Student scribe from authoritative text sources.
	Teacher texts order and dominate space-time; isomorphisms of central text and social space.	Teacher texts order and dominate space-time; isomorphisms of central text and social space.
Rhythms and tempos of circulation	Repetitive daily rhythms of lecture and notetaking, longer rhythms of testing.	Irregular rhythms; long periods of little activity with fast paced production at deadline.
	Quick tempo of note-taking difficult for Brian, yet influences attentive stance.	
Network continuity	Partial network continuity in the design of note-taking for testing. In practice, Brian's partial participation cuts the network.	Discontinuous network, texts display performance and terminate circulation with teacher evaluation.

tory that predated and spatially extended beyond Ms. Marshall's classroom. Schooled research of this type involves "stable routes" and "worn landscapes" (Nespor, 1994, p. 15). Moreover, research topics considered by Ms. Marshall were not just random, but rather related to specific book sets available in the library, as well as to the relations between the Yellow Team and the Blue Team.

Just as curricular texts translate distal interests, student-produced texts translate student identities in important ways, functioning as translations of students' bodies and activity. At some point, students do not continue to travel with their texts; rather,

the texts they produce move on from them and provide an account of them as students, to be translated into further texts, including grades and diplomas. In Mrs. Quinn's class, the notebook, as a body of work, mobilized the student body or student identity as something to be examined. Part of her evaluation focused on the completeness and organization of the notes, which functioned as a partial translation of Brian's identity. Although Brian tested very well in the class (producing one print text translation of his engagement), he ultimately earned a B, largely due to incomplete and disorganized notes. From an embodied, material perspective on identity-in-practice, Brian's identity as a history student was partially shaped through his self-circulation in notes, and in written homework assignments. Mrs. Quinn said,

> Brian is *very* unorganized. And he has a higher opinion of what he can do perhaps that what he actually can do. … Yeah, about like this (showing Brian's notes). About half done. So he might do two—and he did that when he was in the regular class. He might do two, skip one, do two, skip one, you know, thinking I wasn't going to notice. But then once I figured out that he was a "do two, skip one" kind of guy, then I always paid particular attention to his.

However, alongside the textual practices of note taking and note evaluation, another literacy practice and form of translation was active in Ms. Quinn's classroom: storytelling. Two kinds of stories permeated her talk in the class: accounts of American history and stories and vignettes of her own experiences in other contexts. Thus, her account of the gilded doll, a translation of her life into interaction with the class, was laminated with the text of *gilded* on the board. Occasionally, Ms. Quinn also translated the identities of students into brief stories, and especially the identities of former students, whom she spoke about with affectionate humor. According to Brian, Ms. Quinn's storytelling, as a continuation of a way of experiencing history in school, was an important means of enrolling him as a history participant. In history class, thus, Brian simultaneously experienced very partial enrollment or engagement in writing texts, such as classroom notes, and fuller engagement in listening to stories and lectures. He played the game of school, engaged primarily for purposes of grading, with the class as a form of written text production, and yet appeared more genuinely engaged in listening to the information presented in stories and lectures.

Brian's translation as an English student was more completely driven by grading, and nearly entirely focused around producing texts with enough procedural display (Bloome, Theodorou, & Puro, 1989) so as to earn credit. Even as students began to work on the research project, it became clear that Brian's topic was not merely a matter of interest or choice in terms of personal emotional attachment, but was rather a matter of the circulation of material resources—re-

sources he could get his hands on quickly, and use in a way that depended on his memory of historical details. Upon completing the assigned project, Brian's note cards and outline were wrapped in a rubber band and put into a plastic tub in the classroom for Ms. Marshall's evaluation. The note cards translated his labor, completed nearly entirely outside of the classroom space, and provided evidence of his ability to follow directions. The plastic tub was unusual for collecting work, but was used by Ms. Marshall instead of the usual paper tray, because even note cards do not materially fit into the routine paper flow of classroom work. Ms. Marshall was delayed in reading the cards, perhaps in part because the plastic tub was less of a well-worn and visible route in her evaluation processes. Yet, 2 weeks after turning the cards in, Brian received a grade of B–, which was a further print translation of the activity and a partial translation (and reproduction) of Brian's student identity in English.

Heterogeneity of Space–Time Representations

Brian's history class was characterized by a substantial degree of space–time heterogeneity. As described previously, the juxtaposition of local anecdotes and stories to more global concepts appeared an important means of enrolling Brian as a history student, in Ms. Quinn's class as well as in previous years. At the same time, student writing (notes, homework, tests) were a routine means of separating global (abstract, general, timeless, and spaceless) and local (personal, storied, and affective) knowledge. Brian was tasked to select out of Mrs. Quinn's spoken text the global information that was important to record, thereby separating lived, personal narratives from history as a set of facts. This extraction process appeared guided primarily by a test economy—producing a brief, yet complete and testable, response. In our research observations, we came to think of the classroom verbal text as the rich text and the printed classroom notes as the poor text.

In English, particularly in the research project, there was less evidence of heterogeneous space–time representations and their relations. Brian's writing followed and fixed on (global) abstract procedures for writing note cards and an outline, and his reading involved interaction with more distal or global representations of social and cultural life (during World War II). The procedural or thematic relations between more global texts and processes to local practices and social life were not made. Brian's research activity involved searching for material that could be transferred to the note cards without much paraphrase or simplification—historical material that was already well known and could easily float free from the complexities of particular space–times, such as "Japan bombed Hawaii" and "FDR elected President." If the sentence could embed the information in a social historical situation with all its contingencies, then writing in incomplete sentences seemed to be a

means of creating a timeless, spaceless text—a genre more akin to a list, which could only suggest the space–time relations of agents to social situations but could not put flesh on them. Doing the physical printing–extraction itself was seen by Ms. Marshall to be an important part of the process, something not to be replaced by the networked computer and student who would just hit print. The spatiotemporal idea of research as a textual act, suggested at least by the outline, was of research as a pastiche of simplified (card-sized) ideas that were recombined and mobilized as a new product. From this perspective, it is noteworthy that one of Ms. Marshall's main struggles in relocating English work to other material spaces (the library or computer lab) was keeping attention focused on global texts and procedures. Although Ms. Marshall imagined work on the project as involving asocial relationships to certain kinds of print texts, which were more readily available in nonclassroom spaces, Brian imagined the departure from the classroom space as one in which local social relationships somewhat separated within the classroom could be pursued. These interpretations feature fundamentally different configurations of actants.

Movements and Positions of Texts in Circulation

After analyzing Brian's online gaming activity, we came to see the movements and positions of texts in activity as a significant means of interpreting literacy-related engagement, agency, and identity. A key literacy characteristic in history and English class was that students moved texts from one material–textual space (e.g., the whiteboard or research book) to the space of their own printed pages. Texts were not produced as a result of other nontextual activity. Moreover, texts were not put into circulation with or positioned in relation to other diverse actants for interpretive work. (For example, Brian did not use his history notes or English research notes to understand another social or natural body, or even a different body of textual information.) Rather, movements proceed text to text, and student-produced texts have a prescribed and limited range of movement. Once generated from teacher texts, Brian's texts moved back to his teachers, and later, back to him, along with another teacher (evaluation) text.

In the history and English illustrations, the transfer of text from a more authoritative source (e.g., whiteboard, textbook) to a less authoritative source (notes, student work) was a key way of assuming agency in the network. In taking history notes, Brian's scribing from the whiteboard onto notebook paper provided a frame for the teacher's talk to come, a way of anticipating and sorting forthcoming information. He was to faithfully record a copy of the whiteboard, or transfer a publicly shared written and verbal text into his notebook and thereby demonstrate his ability to move text. Similarity rather than diversity was the goal of this scribing. In Brian's research work for English, Brian's task was to extract a simplified, poor

text from a richer text. This extraction was prestructured; Brian knew that he needed information on historical facts and historical persons, and that he needed to record this information in phrases or some other form of incomplete sentences.

The material circulations of student texts and bodies in these literacy networks are made still more visible if we relate them to how teacher texts order and dominate space–time. In this manner, particular space–time representations are constituted as space–time practice (Lefebvre, 1991; Soja, 1989). In particular, Ms. Quinn's lists of questions, definitions, and answers also mobilized the schedule for the day, week, and 2- to 3-week unit. Because each day followed the same dominant pattern, these lists functioned as a plan for a class activity and as a record or translation of past activity. As such, Brian's note text was completed by him and evaluated by Mrs. Quinn as evidence of where he was at with respect to the class. A number of isomorphic relations were shaped in activity between the question–answer lists, the schedule, student and teacher work, final testing, and other text–activity structures.

Rhythms and Speeds of Circulation

A daily rhythm was apparent in Ms. Quinn's history class, a rhythm that was marked in the visible, regularized practices (e.g., students taking their notebooks out and recording questions, without instruction, prior to class beginning) and also in the responses to this rhythm by the students (e.g., "How many notes do we have today?"). Ms. Quinn collected notes for checking approximately every other week. Thus, class notes circulated in and out of the notebooks (or, were folded in the back of the textbook in Brian's case) on a daily basis, circulated up to the teacher biweekly (where they could be assessed in relation to the teacher's ideal note text), and were returned a day or two later. The daily rhythms of presentation and note taking were punctuated by a slower rhythm of test review and test taking every 3 weeks or so; the teacher's assumption was that the students would internalize the notes (take them inside their bodies or heads; digest them) to re-present them on the paper test. Rhythms and speed are particularly interesting with respect to Brian and the history notes routine, in that he struggled to quickly capture all of the information from Mrs. Quinn. Although Brian was a very fast typist at the time, his handwriting was somewhat labored, and he greatly preferred typing to writing by hand. At the same time, the demand on Brian to attempt to keep up with the teacher-directed rhythm and speed of movement in the class, and his enrollment in this writing through grading, produced a continual active and seemingly attentive stance with respect to history that was not evident in English.

The rhythm of Brian's work on the English research project was much more irregular. Brian did very little on the project for the first 10 days or so after it was assigned, and then worked at rapid pace right before deadline. Although this is a broad social practice of space–time in and out of school, it is noteworthy how

Brian practiced the space–time of the English classroom not as a place to engage in research activity, but as a place merely to be informed about work that would be done elsewhere.

Network Continuity

The history notes routine provides a good example of a fairly continuous literacy network, at least as conceived ideally and in 2- to 3-week cycles. Mrs. Quinn's lectures were to be scribed as student notes, which were to be retained in notebooks that would be circulated to student homes for studying every 2 to 3 weeks, prior to the unit exam. In his literacy practice, however, Brian's participation was discontinuous or cut at different points: He did not transcribe all of the required lecture notes, he did not organize his notes in a notebook, and he did not study even the notes he had prior to his unit tests. Rather, Brian relied on other reading, previous knowledge, and his memory of the lectures for taking tests. By design, Brian's English research project was much less continuous, as is reflected in the notion that the project ended with note cards themselves, which are typically seen as a product to be translated into other writing. (By design, the note cards were to lead to the outline—another point at which Brian cut an already discontinuous network.) The discontinuity in Brian's participation in both forms of schooled literacy practice is perhaps best indexed in the eventual trajectory of texts from both classes—folded in the back of his book or dropped in the bottom of his locker. Neither set of texts were seen by Brian as having use value, and their exchange values were determined by how they would eventually be translated into grades.

DATA AND ANALYSIS II: ETHNOGRAPHIC OVERVIEW OF SELECT GAMING PRACTICES

Summaries of Gaming Observations

In the following we present and analyze data from two episodes of Brian's early engagement in a MMOG called *Star Wars Galaxies: An Empire Divided* (LucasArts & Sony Entertainment, 2003). Like the later *Star Wars* films, this game was heavily anticipated. First announced in 2001, the game was hyped among movie fans as well as MMOG game players, but was not actually released until June 26, 2003. After anticipation and speculation had built for so long, the initial response was so enormous that the *SWG* server had to be shut down until June 27. Despite the rocky start, the game rapidly gained a wide following. A press release issued just after the game's one-year anniversary notes that *SWG* "quickly became the fastest growing massively multiplayer online role playing game … in North America and today boasts over 500,000 users, with more than 115,000 players log-

ging into the game every day" (Lucas, 2004). Brian's 5 months of *SWG* game play coincided with its inception and early transformations, wherein game designers introduced a variety of new possibilities into the game—including elements such as cities, townships, and homes.

SWG (LucasArts & Sony Entertainment, 2003) is a very complex textual world, and this textual world—its design, production of popular culture, story lines, and life as a commercial product—could be analyzed from many different perspectives. MMOG research, in general, cuts across a range of disciplines and involves varied approaches to this game genre. Recent work has looked into areas such as social dynamics (Kolo & Baur, 2004; Jakobsson & Taylor, 2003; Taylor, 2003), economics (Castranova, 2003), postmodern identification (Filiciak, 2003), discourse practices (Steinkuehler, 2004a), learning practices (Steinkuehler, 2004b), cybercultures (Squire & Steinkuehler, in press), and literacy practices (Steinkuehler, in press). However, in line with our particular theoretical and methodological goals, we have modestly focused on a small set of Brian's practices during our second and third observations of his playing *SWG* (July 2 and July 10, 2003). We have selected these two episodes because they illustrate something of Brian's early learning of the game and the literacy networks that characterize his gaming activity.

Observation 2, July 2. Just a week previous to this episode, Brian had created a virtual character for game play, Tiumbe, using a set of tools built into the game. He had also done a bit of exploring around the planet Tatooine. In this session, Brian decided to explore a different planet, Naboo. Brian had already sold the first gun he had purchased, replacing it with a custom built gun from someone in the game "who [was] really good at building them." Brian had also given Tiumbe new armor on his legs and a new backpack. Tiumbe's exploration of Naboo was motivated by Brian's desire to find a place for his future house, and because Naboo was full of waterways and islands, exploration consisted of a good deal of swimming and walking long distances. Few characters and creatures existed in the areas that Tiumbe explored. Although Tiumbe covered 6,000 m, as measured on the planetary map, day and night cycled every hour in real time. Brian decided that the islands that Tiumbe explored were too far from the city (and thus other players, shopping, transportation, and other services). Tiumbe headed back to the city to catch a ship to Tatooine, while simultaneously communicating with another player whose character was on a different planet in the game. Using a chat screen, he asked how to *autorun* (make Tiumbe run across the landscape automatically). The other player did not know. Tiumbe then made his way to the starport, and while waiting for his ship, browsed auction listings on a computer terminal located near the starport.

Observation 3, July 10. Brian began by noting the house of a friend, who was a rich player in the game. Tiumbe toured the house and shopped for a sofa

among the various items this other player offered for sale. After Tiumbe moved outside, Brian provided a brief explanation of experience points and hunting to the researcher. Tiumbe then teamed up with another player, Ben, to conduct a hunt. The two engaged a giant peko peko bird, but were overpowered. To recover, Ben made a camp, but the camp actually disappeared temporarily—an occurrence that Brian explained as a bug in the game. To work around this and other game bugs, Ben decided to log off temporarily. Tiumbe then showed the researcher a new guild hall—a central meeting space for fellow guild members and him. When Ben logged back in, the pair briefly aided other hunters and then successfully hunted a falumpasset (large four-legged creature) by themselves. After the two harvested animal parts, Brian made camp by drawing out a ready-made camp site from Tiumbe's inventory and noted another game bug: Tiumbe sometimes did not sit directly on the camp chair. Following some surveying work, Tiumbe helped Ben defeat two ikopi (horse-like creatures). After harvesting resources from the animals, the two were beset by rabid shaupauts (kangaroo-like creatures). During this attack, Brian noted, "I'm trying to get experience for trapping," and so Tiumbe employed traps to help defeat two waves of shaupauts while Brian distinguished between the various types of traps and their effects. Brian then discussed and demonstrated trap crafting, using the resources collected from animals. Tiumbe and Ben then went on additional hunts for other animals, set up a new camp following, and crafted additional traps.

LITERACY NETWORK ANALYSIS OF BRIAN'S EARLY PLAY OF *SWG*

In the following analysis, we use the dimensions of displacement outlined earlier as a set of analytic constructs to interpret Brian's game play. The analysis, however, proceeds differently than the classroom analyses, in that, for the sake of economy, we move across the dimensions and across the episodes. Table 2 presents a summary of our findings, comparing the dimensions of displacement in *SWG* (LucasArts & Sony Entertainment, 2003) with the two different school-related networks analyzed earlier.

Heterogeneous Space–Times and the Hybridization of Texts With Bodies and Objects

We are especially concerned in this section with the heterogeneity of space–time representations and text–body or text–object hybridity. In *SWG* (LucasArts & Sony Entertainment, 2003), Brian continuously read and wrote heterogeneous representations of his activity in space–time. Our previous discussion of the skills screens emphasizes heterochronicity—the multiple, copresent time frames

TABLE 2
Dimensions of Displacement in History, English, and *Star Wars Galaxies*

Dimension of Displacement	*History Notes Routine*	*English Research Project*	*Star Wars Galaxies*
Translation	Student texts translate student bodies and identities at far end of activity. Grades enroll Brian as a History note-taker. Personal teacher stories partially enroll Brian as History student.	Student texts translate student bodies and identities at far end of activity. Grades enroll Brian as an English student.	Translation of body to identity-text at front end of activity. Ongoing circulation between Brian as player and avatar in game. Ongoing construction and hybridization of textualized self.
Heterogeneity of space-time representations	Global historical knowledge orally presented with local, personal stories. Global divided from local through print: textbook, notes, and testing.	Global and relatively homogeneous representations of space-time.	Highly heterogeneous representations routinely used that depict local and global space-times.
Movements and positions of texts in circulation	Text to text movements across a prescribed and limited range. Students scribe from authoritative text sources. Teacher texts order and dominate space-time; isomorphisms of central text and social space.	Text to text movements across a prescribed and limited range. Student scribe from authoritative text sources. Teacher texts order and dominate space-time; isomorphisms of central text and social space.	Text to object, text to body, and other heterogeneous chains in the network. Text/object and text/body hybridity. Brian constantly cycles between global and local texts and embodied activity.
Rhythms and tempos of circulation	Repetitive, daily rhythms of lecture and notetaking, longer rhythms of testing. Quick tempo of note-taking difficult for Brian, yet influences attentive stance.	Irregular rhythms; long periods of little activity with fast paced production at deadline.	Daily rhythms of play, yet unpredictable rhythms in activity. Ongoing play demands semiregular rhythms of engagement. Speed of cycling among windows enables increased hybridization.
Network continuity	Partial network continuity in the design of note-taking for testing. In practice, Brian's partial participation cuts the network.	Discontinuous network, texts display performance and terminate circulation with teacher evaluation.	Highly continuous and recursive. Numerous translation possibilities between different actors and ongoing circulations through the accumulation of different forms of capital.

of Brian's activity in the present and ever-changing representations of his advancement toward future identity goals. In this case, we emphasize the spatial side of space–time relations, considering how Brian used heterogeneous perspectives on space and movement. Drawing on heterogeneous space–time representations, B-T's successful and strategic navigation through the territory of Naboo was a result of frequent and rapid circulations across the territory and a readily available planetary map of Naboo, circulations that included *hybridities* or "small crossings" (Berg, 1997, p. 411) of map–territory. B-T's navigation is a form of reading Naboo that involves the dynamic configurations of B-T's virtual body, print and graphic maps, virtual landscapes, and technologies for hybridizing objects.

Navigable space characterizes digital environments and online games in particular (Manovich, 2001; Murray, 1997; Wolf, 2002). Although Brian was very experienced with role playing games, in his first episode of playing *SWG* (LucasArts & Sony Entertainment, 2003) he seemed somewhat disoriented in navigating the vast spaces of the game. The scale of the virtual territories in *SWG* was simply much greater than that of the other games Brian had played, and B-T spent a good deal of time wandering around a virtual cityscape, looking for other characters and getting a sense of the game territory. By the end of the first week, however, B-T was navigating and exploring successfully across complex landscapes. In the following, we consider B-T's exploration of Naboo, with a focus on his cointerpretations or readings of maps, territories, and his own positions in the game world.

Prior to exploring Naboo, B-T had visited two of its towns for about a half of an hour in real time, and used the map to consider where he had been in relation to what he wanted to explore: three islands in the south-central part of the map. The visit to the first town, where he met a house builder who showed him several model homes, was important in shaping B-T's purposes for exploration. Brian continually narrated his exploration in this episode as motivated by his desire to find a location for a house he wanted to have built, and referred back to the town as the origin of that plan. The map served, thus, as an identity artifact of his history and also, proleptically (Wertsch & Stone, 1985) as the sketch of his future identity in space–time. Were he simply embodied in an immediately local space–time—were the more global Naboo not translated as a map—B-T would not have had any sense of the extent of the planet, nor of its possible characteristics for creating a life story that included living on an island. The map of Naboo provided certain kinds of information, such as the fact that it was "pretty watered, like, a lot of percent water," as well as the positions and shapes of landforms, islands, and towns. Additionally a window to the left of the map offered to provide information on the locations of shuttle ports, cloning facilities, banks, and other sites.

As he began his exploration, Brian gave some sense of why the map information was not enough to make a decision about where to live:

> But the bad thing is that I don't know the enemies on this planet, like the creatures and stuff, so, I don't know which ones are weak and which ones will tear me to pieces. (Transcript, Observation 2)

Thus, while using the map in practice, Brian related that the map did not provide him an adequate understanding about the islands, so he needed to also be on them, to experience them in a (virtually) embodied manner. The researcher (Kevin) became more aware of the contrast between Brian's perspective on embodied and textual information and his own, when, about 10 min into his exploration of Naboo, he asked Brian:

> Kevin: Is there a little thing you can pull down with a little description about the planet?
> Brian: Well, yeah, I'm not really sure where it is, though.

When Kevin suggested that Brian could be more informed about the island and its dangers from a text, this kind of reading of the world was distant from Brian's perspective; rather, he insisted on the necessity of being present on the landscapes of the islands to understand them. Brian confirmed the importance of embodied, local interpretation approximately 18 min into his journey, when he noted, "Let me see how big this island actually is," and, rather than consulting his map, set off to walk across it and thereby interpret distance as lived experience through his (virtual) body. Eventually, Brian decided against moving to the first island, in part based on the embodied–textual knowledge of its remote location, and in part based on how he had to continually avoid its present inhabitants: "The only thing about this island is that it's got lots of, monsters on it, like, creatures that will attack you" (Transcript, Observation 2).

Thus, Brian insisted on his embodied, local knowledge of the islands, and yet B-T's local interpretations were routinely and simultaneously interpreted in relation to more global texts within the *SWG* (LucasArts & Sony Entertainment, 2003) literacy network. Brian continually switched between two primary perspectives: an overhead map of the island on the one hand and that of Tiumbe's body traversing Naboo's landscape on the other. In the first 19 min of his journey to the islands, Brian circulated in this way, between a hypermediated (global) and transparent immediate (local) perspective 20 times, sometimes looking at the map for nearly a minute, and other times just briefly checking something on it. This perspective switching on *SWG* is called *cycling*, and is accomplished with a single keystroke.

After about 12 min of walking and swimming, B-T gazed at the first island from across a waterway and Brian offered the following commentary regarding the island and the map (Figure 4):

FIGURE 4 Map of Naboo with way points. Courtesy of LucasArts, a division of Lucasfilm Entertainment Company Ltd. LucasArts and the LucasArts logo are trademarks of Lucasfilm Ltd. *Star Wars Galaxies* is a trademark of Lucasfilm Entertainment Company Ltd. © 2002–2006 Lucasfilm Entertainment Company Ltd. or Lucasfilm Ltd. and TM as indicated. All rights reserved.

> I think that, that island looks pretty cool. It's … (pulls up map again). I'm still going on (passes cursor over two island images, one at center of map and one to far left). I'm going—I'm coming this way first (moving cursor over island image at far right) and then I'm going on (moving cursor to middle and far left island images). Let's see, maybe that island's going to be my best bet (cursor over right island image) because this one (cursor over middle island image), this one's really far away from anything. It's not like—I'm going to have to have a land speeder or something (moves cursor from middle island image across image of waterway between it and land). Let's say I want to get to like Tatooine or something, I'm going to have to like walk, or swim all the way through that (again marking distance through water with cursor) and then go over to this town. So, this one's gonna be closer to stuff (pointing cursor to far right island; shifts back to embodied perspective on landscape). (Transcript, Observation 2)

Brian's use of the map and narration in this instance is striking in a number of ways; we would like to briefly mention two and focus on a third. First, Brian was not merely engaged in checking his present location. He was also weaving together a reading of map and landscape as well as getting a perspective on his longer-term activity as dis-

tributed in space–time. He was utilizing the map to construct a *spatial story* (de Certeau, 1984). Secondly, Brian did not choose between embodied activity and the map to construct a narrative of himself in space–time, but used territory and map as a configuration and circulated between the two. Because he was very close to reaching the first island, and even commented that it "looks pretty cool," one might imagine that Brian would simply make a practical check of the map and press on across the territory. Yet, Brian switched to the map and sustained his gaze at it for approximately 45 sec, while narrating a possible future, "let's say I want to get to like Tatooine or something, I'm going to have to like walk, or swim all the way through that (again marking distance through water with cursor) and then go over to this town." Third, Brian's practices with the map text in this instance illustrate a hybridity of text and body as actants. As Brian passed his cursor from island to island, and as he marked out a distance across the waterways with it, his hand–mouse–cursor–map tracings enabled him to dynamically engage with the map and not merely observe it at a distance. (Of course, Brian was involved in narrating his work for the researcher, and so his tracings were part of this joint action as well.)

This moving across the surface of the map, where the cursor becomes a new embodied representation, was just one of several ways in which Brian's map reading and embodied activity were hybridized. Another example included the way in which Brian would dynamically zoom in on a particular area of the map, shaping and scaling the map to more directly correspond to his embodied positions. An even more important example of map–territory hybridity, however, was Brian's use of *way points* in navigating. From the perspective of the map, way points appear as triangular flags that are set by the player on the map as desired destinations. In reading the map, then, Brian could compare his current location (evident as a stylized X on the map) with his desired future locations (way point markers; see Table 2). More important, from the perspective of embodied play, way points are translated as dynamic arrows that appear in space on the screen, at about head-height with respect to the character, and tell the player which direction to move the character in. Depending on Tiumbe's embodied orientation, these arrows may have been located behind him or in front of him, but they were ever present. Moreover, each way point invoked a single corresponding directional arrow in embodied space, such that B-T had three hovering arrows near him after setting way points for the three islands. On official game missions, as provided by the game and engaged in by B-T and others, way points also appear as a (near-Biblical) column of light in the world, marking the mission location as one nears it. Once set, the way point is a form of hybridity or "small crossing" (Berg, 1997, p. 411) with big effects, because not only is the map and territory hybridized through it, but also, map–territory–body relations are put in reconfigured. The directional arrows functioned as a type of built-in compass for B-T's body, while Brian's ability to create and destroy way points on the map records his embodied history and future goals in space–time.

Circulating Between Simple (Local) and Complex (Distributed) Perspectives, Text–Object Hybridity, and Network Continuity

Analyzing Brian's hunting practices, especially in Episode 3, in the following we discuss and relate three dimensions of displacement. First, we extend our discussion of the heterogeneity of space–time representations and the movements and positions of texts in activity. We consider in particular Brian's use of health monitoring information (HAM bars) to provide him a more local and simplified view of complex distributed activity. Second, we consider how traps, in hunting, circulate as texts and objects, and how these text–object circulations or hybrids afford agency to B-T. Third, we use B-T's creation and use of traps in hunting as a productive means of analyzing the continuity of his literacy network in playing *SWG* (LucasArts & Sony Entertainment, 2003).

While hunting in *SWG* (LucasArts & Sony Entertainment, 2003), Brian read and wrote a variety of texts that were produced and displayed with other objects in a sociotechnical array. The hypermedia of his screen (Observation 3, Figure 5) included skills summary and skill bars (middle right), menu icons for pulling up other screens (lower right), information and chat screens (lower middle), a radar

FIGURE 5 Hunting a rabid shaupaut with a Glow Juice Trap. Courtesy of LucasArts, a division of Lucasfilm Entertainment Company Ltd. LucasArts and the LucasArts logo are trademarks of Lucasfilm Ltd. *Star Wars Galaxies* is a trademark of Lucasfilm Entertainment Company Ltd. © 2002–2006 Lucasfilm Entertainment Company Ltd. or Lucasfilm Ltd. and TM as indicated. All rights reserved.

screen with a 64-m range (lower left), a window that displayed Tiumbe's current state of action, mind, and general levels of health in color coded HAM bars (top left), a legend of function or hot-key character movements (top middle), and HAM bars for hunting targets (top right). In *SWG*, health is measured and represented as the present state of Heath (physical health), Action (physical energy) and Mind (mental strength, alertness).

In Episode 3, B-T began to engage in a fight, along with his hunting partner (Ben) with a giant peko peko. The simultaneity of his activity was striking: in the midst of a potentially lethal attack, Brian was chatting, executing moves of shooting and avoiding the bird on the main screen, in addition to monitoring health levels. Brian explained to the researcher (Kevin) that he could tell who was being attacked at this moment not simply by the images on the screen, but by monitoring the health levels of all three actants (the bird, Ben, and himself): "It's been attacking [Ben] and now it's attacking me." Although it might seem strange that Brian would elect to look at anything else besides the immediate scene of play to interpret who was being attacked, the HAM bars function spatially in a manner somewhat opposite that of the skills screens or landscape maps discussed previously. Although the other representations provide global perspectives, the HAM bars provide a spatially reduced, closer-to-the-body summary of activity that is distributed beyond the center screen. As with other activity in this game, the fight with the giant peko peko bird was often moving off of the center screen: the birds hover overhead, partially off screen; creatures run off in the distance; bullets and other forms of fire traverse the screen too quickly for monitoring; partners in battle cannot be immediately seen. The HAM bars simplify this scaled up and temporally accelerated information, they provide a miniature summary what can be seen but also of what cannot; they reduce and contain the experience in a small representation of the body. The HAM bars provided a means of seeing how the literacy network of Brian's play of *SWG* (LucasArts & Sony Entertainment, 2003) did not merely involve the proliferation of global representations of local activity (as in the skills screens or landscape maps), but rather the constant circulation of both local and global texts, or rather localizing and globalizing moves.

While they reduce space, the HAM bars also provide information that extends forward in time: they indicate not only the current state of health but also the time left before death or incapacitation. In reading the health information, Brian made determinations of time remaining for B-T, his hunting partners, and the opponent. These temporal judgments guided Brian in making decisions about attack strategies in difficult battles, including when he or his hunting partner should pull in or pull back, and what weapons to use: "like for example the rifle; it has a skill called head shot and it'll just amplify the damage you do to the thing you're shooting at and that takes away from mind" (Fieldnotes, Observation 4).

In routine and mundane ways, Brian's play of *SWG* (LucasArts & Sony Entertainment, 2003) hybridized texts and objects into what we have termed

text–objects. Episode 3 opened with B-T running out into a field, followed by his hunting partner (Ben). Spotting a bird, Brian clicked his cursor on the bird, and a small bit of text appeared above the bird image, telling Brian that the bird was a giant peko peko. (This practice of clicking on objects to access textual information is called targeting in *SWG*.) The bird's name was highlighted in white, which indicated that the bird would not attack unprovoked, yet an additional yellow colored icon on the screen indicated that the creature was above B-T's skill level in fighting (fighting skill levels are automatically contrasted on five levels). Brian momentarily decided to avoid attacking the bird, remembering that, although his hunting partner had previously killed a baby peko peko, "I don't think we can both take that one because it's a giant one." Two very small but critical pieces of information were supplied by Brian's cursor click at this point: the name of the bird (in particular, "giant") and the idea that it is not aggressive (as indicated by the name color). Although it may be that Brian remembered this information about the giant peko peko from previous experiences, the point is that he was not required to, and he chose to click on the bird. In so doing, the image of the bird and the bird's identity text made the bird available to Brian as a text–object, an object to be acted with and interpreted a both an embodied (sign) and text (sign). Put another way, when Brian read the bird, abstraction was a property of reference rather than a property of mind (Latour, 1988b).

In the middle of the battle with the giant peko peko, Brian pulled up a menu of items in his inventory, and noted, "I'm going to use a trap on him." He selected and threw this trap toward the bird, but then observed, "They don't affect it. It's too powerful." B-T then selected a different trap and ran backwards while throwing this trap toward the giant peko peko. These traps were also text–objects, but in a manner different from the creatures that supply text–screens when clicked on or the HAM bars that rapidly circulate as texts with virtual bodies. Rather, traps circulate ontologically in the game as both signs and objects. Pulling up the inventory menu in the middle of the fight, Brian had visible an array of traps at his disposal, listed as small icons and names, among other items in his inventory. He scanned this list quickly and selected one, which materialized for B-T's immediate use in the game. In one sense, the inventory trap name and icon is just a simulacrum, a sign of a sign (Baudrillard, 1983), in that the trap called up by clicking on it is just another image. In another sense, however, the trap, as text–object, has agency in the world unlike a sign—slowing, blinding, and damaging other creatures. By circulating quickly in ontological status between image (sign) and object, traps (and an array of other objects in the game) pull off a particular space–time trick: They have no mass or volume, and therefore can be either fully available or fully concealed. B-T's carrying capacity in the game at the time of the research was limited to 60 objects, which means that he had to choose 60 items that were available to him at any time (he could store other items in his house). Thus, although B-T traveled lightly on the one

hand, moving freely about without encumbrance, he was heavily equipped on the other hand, having constant access to all of his selected traps, camp set-ups, armor, and other materials. In this manner, a vast economy of commodities was nearly instantly available to him in the midst of activity. By his second week of game play (July 10), Brian had become adept at distinguishing between an array of traps and they functioned as actants in the game, including the Glow Juice Trap, which made creatures vulnerable to ranged and laser attacks, the Wire Mesh Trap, which made creatures vulnerable to close range attack, and the Lecepanine Dart, which made the creatures dizzy.

The use of traps is a particularly interesting illustration of literacy-in-action, and three points are worth noting. First, B-T's relationships to the trap as a thing fluidly moved between interpreting it and throwing it, or put another way, between reading it as a text and relying on it as a coactant in hunting. Second, the compression of space in the digital also permits a particular perspective on identity in practice. Brian is not simply translated as a (virtual) body, a social relation (as B-T), but rather moves about in the game world in instant relationship to a subset of his possessions that are available in his inventory. From an ANT perspective, Brian's identity may be understood as a chain of human and nonhuman actants (H-NH-H-NH-H-NH), although in this case the chain appears to be a configuration with many more nonhumans than humans copresent. Third, the creation and use of traps, including their hybridized ontological status as text–objects, provides a means of seeing how continuity is constituted within the literacy network of *SWG* (LucasArts & Sony Entertainment, 2003). Over time, B-T's practice of hunting became punctuated with crafting new traps for future hunts. In this manner, network continuity was produced not only by experience points, but also by objects that were literally produced from experience and returned to experience. This kind of circulation was highly complex; we summarize only part of it. During hunting rest periods, which would take place in instantly-made camps (taken from one's inventory) B-T would often chat with Ben, but he would also use the virtual crafting station to make new traps, replacing those he had previously expended and preparing for the next hunt. Trap crafting was a matter of identity in that materials for this crafting process are taken from one's inventory, and therefore reflected previous purchases, trades, and experiences. For instance, B-T often used bones that were harvested from previous kills to create new Sharp Bone Spur traps. Further, the materiality (Sloane, 2000) of traps prompted Brian's interaction in other circles, including trading goods with other players.

Moreover, B-T's ability to produce certain types of traps was constrained and enabled by previous experiences and accumulated skills. Trap crafting (and use) circulated in space–time relations to past and future experiences, and to specific choices about how to budget one's identity goals and experience points (for Brian, how many artisan or crafting skills he could pursue in relation to the Bounty Hunter skill sets. and other relations). In a crafting session while in camp with Ben

(Observation 3), after pulling up the crafting station window, Brian discovered that he had accumulated experiences that would permit him to create a shirt, travel biscuits, fireworks, a 10-sided dice set, a chance cube, a fishing pole, sharp bone spurs, and other objects. He was surprised, noting, "I didn't know I could make any of this stuff. I can make a bunch of stuff." He then clicked on the 10-sided dice set as a list item to consider and read information about the materials needed for it. The updating of skill sets to craft production was automated by the game, and appeared at this point much more opaque to Brian than the pursuit of professional skills. Nevertheless, the activity of crafting reflects something of the rapidly circulating and continuous economy of experiences, signs, objects, and identities across space and time.

CONCLUSIONS AND IMPLICATIONS

In the following, we return to the comparison of Brian's literacy practices in the two classroom activities described earlier with his initial play of *SWG* (LucasArts & Sony Entertainment, 2003; Table 2). Brian's participation in schooling and gaming obviously involves a complex array of practices and could be compared along many dimensions. We intend by our analysis and discussion not to provide an exhaustive account, but rather to draw together the two central arguments of the article. In our discussion, the dimensions of displacement provide a preliminary framework for conceiving of different literacy practices. These dimensions highlight important distinctions that extend our analyses beyond static notions of *school based*, *home based*, or other placed-based assumptions, and are used to describe how different literacy networks afford distinctive possibilities for engagement, agency, and identity. For each dimension, we begin with questions that both reflect the preliminary state of work in this area and that provoke implications for such work.

Translations: Bodies to Text

We have considered various forms of translation in the analysis, but wish to focus here on the translations of Brian's body to text. Importantly, we do not introduce the idea of translating a body to text as an inherent quality of the shift from offline to online activity, or from Brian's schooling to his gaming. Rather, we argue that body–text translations are a feature of many literacy networks. Such translations have implications for understanding identity as constructed through literacy practices. Moreover, such translations suggest that different forms of cognition are made available when individuals are able to think with identity-relevant texts that are arrayed and circulate differently across space and time. In this study, a comparison of a few of Brian's literacy networks begins to address the following issues,

questions that could be productively raised in relation to a broad range of literacy networks:

- What forms of identity translation occur as entrée and exit points within a particular literacy network?
- How do human participants continue to circulate in the network vis-à-vis translations of their identities?
- How broad are the possibilities for identity in these translations?

In our analysis, we make evident how both schoolwork and gaming involved translations of Brian's body to text. In taking history lecture notes and writing note cards for English research, Brian began the translation of himself to text in the course of activity. In history, Brian was required to produce a *self text* that scribes the teacher's ideal text; in his English research he shared some agency with library materials, the Yellow Team, and a range of other actors. These school texts circulated very little until the final curve of activity, at which point they typically moved to the teacher and later, following evaluation, back to the student. Because these texts were evaluated, and evaluations became a new kind of text (notations of grades in a grade book), texts continued to function as translations of students' bodies into forms of identification by others and the self. Student texts and grades comprised a body of work—they stood in for the student body in moments of evaluation and sorting—to travel where the body could not go, to be combined with other student texts as immutable mobiles (Latour, 1988a) in developing a profile of the schooled self and body.

Although Brian is translated as a student text and eventually into a grade in these classes, and although grading seems to be what primarily enrolls him as an actor in the classes, accounting for Brian's perspectives on the networks also makes evident how he was also enrolled as a history student by the teacher's translation of historical facts into personal stories and illustrations. This example illustrates how enrollment or engagement in literacy is not predetermined by institutional contexts writ large, but can be shaped by the particular space–time dimensions of teacher and student practices.

In contrast to his classroom practices in history and English, Brian's play of *SWG* (LucasArts & Sony Entertainment, 2003) required him to translate himself as a text as a point of entrée to game play. In *SWG*, the range of possible ways of being is brought to the fore as an initial (textual) act in the game: One crafts an identity and with it a set of initial ways of being and projects (e.g., a profession of Brawler as an identity trajectory). This process of crafting textual identity continued throughout the game, and was directly related to the ways in which Tiumbe, as a virtual body, entered into materially juxtaposed, laminated, and hybridized relations with a broad range of other texts. Moreover, Tiumbe did not leave Brian behind, but rather circulated with him in ongoing relationship. The

ongoing production of B-T was a circulation of Brian's (traditionally) embodied self to his (virtually) embodied self-representation. Stated otherwise, what became separated in the two classroom cases (the body and its textual translation) maintained ongoing, dynamic, and rapid circulation in the game. Clearly, in online and offline contexts alike, there is much to understand about how such externalizations of the self, in their dynamic relationships to the individual in activity, make available unique practices of learning and cognition.

We argue that the difference between front-end and back-end translations of body to text affords different possibilities for Brian's identity, or practices of identification. Yet, just as literacy has been heavily psychologized and abstracted away from material practice, so has identity (critiqued by Bourdieu, 1977). As a kind of abstraction, identity is often considered as a property of mind rather than as a property of practice and material circulation. Alternatively, following Latour (1988a), we posit a corollary for identity: Identity is not a property of mind, it is a property of reference. Researching how particular circulations and configurations are produced, as well as how the enactment of circulations is tied up with recognition work (Gee, 2000), permits us a means of bridging practice theories of literacy and practice theories of identity (Holland et. al.,1998; Holland & Leander, 2004). Through this relationship, key questions concern how (and if) texts and identities are made to be mobile, and how they are rendered local, global, or "glocalized" (Kraidy, 1999, p. 472) in social practice.

Heterogeneity of Space–Time Representations

Arguing for the notion of literacy learning being constituted through local situatedness, Barton and Hamilton (1999) proposed that "literacy is best understood as a set of social practices; these are observable in events which are mediated by written texts" (p. 9). Gee (2003), with an eye toward role play in video games, similarly argued for "active learning" and "critical learning," and noted that "video games are potentially particularly good places where people can learn to situate meanings through embodied experiences in a complex semiotic domain and meditate on the process" (p. 26). Extending these ideas further, we argue, following ANT, that local and global situations are rendered in circulations rather than given in advance, and that literacy has a special role in shaping the spatial and temporal contours of local–global relations. Attending to the particularities of these relations circulations, in addition to the situatedness of literacy in embodied activity, is critically important for understanding the types of thinking and agency provided through literacy. The analysis from our contrasting cases has begun to address the following questions, which are also valuable to consider for research on an array of other situated and circulating literacy practices:

- How are local and global texts relationally aligned or separated within particular literacy networks?
- When and how often do participants cycle in their reading (and writing) practices between local and global texts?
- How do local–global circulations provide agency to participants for present and future action?

From a relational perspective, the literacy networks in Brian's school experiences have limited possibilities for engagement, identity, and agency because they primarily contain homogeneous representations of space–time. These representations are primarily abstract and global in relation to the embodied situation of being in the classroom. Yet, Ms. Quinn's history course offered a key exception. The history teacher's storytelling about herself and her students was offered as something *with* the text of the classroom notes, and was a practice that Brian found highly engaging. However, materially speaking, these spoken narratives were separated from the official classroom texts, which circulated as whiteboard texts, notes, tests, and eventually as grades. This form of circulation (and hence, valuing) rendered these stories of self and other as relatively local, fleeting, unaccounted for, and unstable; however the textbook knowledge, composed as timeless abstractions of historical facts, was rendered global, circulating with the furthest reach. In *SWG* (LucasArts & Sony Entertainment, 2003), by contrast, global representations and local texts were comprised of the same material (digital information), and Brian was afforded the possibility of constantly shifting his perspective between them. The constant cycling of the local and global is perhaps best exemplified in B-T's navigation of Naboo. Brian's use of hypermediated, global texts to manage the immediate needs and demands of B-T's embodied navigating activity was not simply an option in his gaming; rather, it was a necessity of successful game play. Similarly, Brian's constant cycling between the skills screens, his inventory, and hunting or other activities illustrates how a personal history, a proleptic, personal future, and an emergent identity are organized by the circulations of local and global texts.

Movements and Positions of Texts in Circulation

Conceiving of literacy and identity as social practices involves interpreting how certain configurations are achieved, maintained, extended, and pulled apart. From an ANT perspective, we are interested in how these configurations result from interactions between both human and nonhuman actants, as well as in how these interactions sometimes result in hybrid configurations. The notion of the symmetry of human and nonhuman actants and of the hybridization of humans and nonhumans presents a major challenge to conventional accounts of social activity, identity, and learning. Literacy in this account is considered not merely as a tool

that humans use, as something that stands between humans and mediates human activity, but as an actor in its own right. Literacy and texts participate in the distribution and organization of thinking and learning activities. Related questions for research and teaching include the following:

- How diverse are the chains of action among humans, texts, and other actants?
- Is the space–time of the network under investigation dominated by a text or other actor?
- How do text–object hybrids afford new forms of agency?
- Are texts and text–objects uniquely used for representation, or are they used and do they act in other ways?

Our analysis begins to address these questions in Brian's contrasting networks. Brian's work in school, as described in our examples, involved text work with a relatively narrow range of textual materials and modalities (Kress & Van Leeuwen, 2001). Chains of action appeared as relatively regular human–text interactions (H-T-H-T, etc.). For example, work in history involved the history teacher translating curricular and textbook texts to whiteboard and spoken texts, which Brian translated as note texts, and then later as test texts. Chains of activity in *SWG* (LucasArts & Sony Entertainment, 2003) were much more heterogeneous. In the hunt of the giant peko peko, for example, Brian first consulted a text of information about the bird, then produced a chat text with a partner, then shot his gun, then monitored the HAM bars of himself and his partner, then pulled up his inventory and selected a trap, and then threw the trap and ran. Of course, this then–then sequence is a vast simplification of a large degree of simultaneous activity, but it gives some sense of the chains of heterogeneous texts, actors (characters, birds, traps), and forms of action (chatting, shooting, running, throwing).

As with patient records in hospital work (Berg, 1997), texts in the course of playing *SWG* (LucasArts & Sony Entertainment, 2003) are produced, read, and interpreted as part of social practices that involve goals (both practical and pleasurable) that do not terminate with text production, and in spaces that are not isomorphically structured and disciplined by texts. Although this observation may seem mundane, its importance is clearer when one considers how the practices of reading and writing are fundamentally different when texts are configured or networked with heterogeneous objects. Brian's play of *SWG* afforded the production of myriad hybrids. These hybrids can be illustrated as circulations that move so fast that they collapse the time of moving between, say, the skills screen and the flow of virtually embodied activity, converting it into one subject–object–text. We observed this type of hybrid emerging to a greater degree as Brian gained more experience in the game. Forms of hybridity were also evident in the collapse of space between objects of different ontological status—the blending of print labels, for instance, with creatures that roam about the virtual landscape, or of traps as texts

and traps as effective objects for hunting. These ontological hybrids push us to reconsider how texts (and literacy) function as actants in streams of activity rather than being mere forms of representation.

Rhythms and Speeds of Circulation

Although much of the discussion thus far has emphasized the spatial side of space–time relations, another important consideration involves the rhythms and speeds of activity and places emphasis on the temporal dimension of circulations. In our analyses, the various rhythms and speeds of Brian's networks suggest the following questions for ongoing research and teaching:

- How is time distributed across diverse actants in networks?
- When do regular rhythms of activity structure ongoing engagement?
- How does speed in literacy networks produce hybrids of texts and other actors?
- How are networks made discontinuous by rhythmic breaks?

For Brian, the two literacy networks associated with school evidenced very different qualities of rhythm and speed. In the case of history, the rhythm of activity was quite regular, with every day following nearly the same structure. However, the demand for physical speed in note taking within this routine activity was a struggle for Brian. The struggle to keep up, as well as the general fast pace of the talk in the class, appeared to have the effect of helping Brian keep engaged in the activity (along with other actors previously described). However, in English, the rhythms of working on coursework were less structured by the group activity and more structured by Brian's (lack of) engagement in the activity. Although the course moved along with a somewhat regular rhythm of the assignment–individual work submission, Brian organized the research project as something to be done outside of class, and with a great deal of speed in the penultimate moment.

In *SWG* (LucasArts & Sony Entertainment, 2003), rhythms of activity in game play were quite even in terms of Brian's near-daily game play, although rhythms within the game changed depending on his activity type. Although we do not have the space to analyze it here, an important rhythmic aspect of Brian's game play involved the need to service ventures he had set up (e.g., a mineral mining operation) and to provide maintenance for his possessions (e.g., his house). Without these forms of servicing and maintenance, his ventures and possessions were designed by *SWG* to suffer decay or disappear altogether. In fact, Brian eventually gave up game play of *SWG* when he was away from the game for a few weeks on vacation and had lost much of what he had owned. Thus, rhythm in this case was related to network continuity (following). In relation to speed, the analysis emphasized Brian's rapid cycling between different perspectives on his activity, including local and global perspectives. This speed appears to have been an important feature of

Brian's literacy practice, in that it permitted him to nearly simultaneously read very different texts, which were all relevant to his ongoing activity.

Network Continuity

This last dimension of displacement has to do with how networks are recursive and continuous on the one hand or broken and cut on the other. The issue of network continuity has special relevance to the issue of designing a learning environment that might sustain engagement in activity. Although smart configurations appear to involve high measures of recursivity and continuity, school-related literacy networks often appear to be discontinuous or cut. Here, questions relevant to ongoing research and teaching include the following:

- How do the relations of texts to other actors in the network create sustained forms of engagement?
- What forms of capital do the activities produce and how might these forms be exchanged and recirculated?
- How are the possibilities for identity production supported by network continuity?

This dimension can perhaps best be drawn out by contrasting the image of Brian's note cards, in the plastic tub and later in the bottom of his locker, with the integration of hunting, making traps, and experience points in *SWG* (LucasArts & Sony Entertainment, 2003). If Brian seemed detached from his research project along the course of doing it, the final deposit of the project into the tub appeared to be a final detachment. The project circulated out of his hands into the teacher's, and when it finally did come back to him 2 weeks later, was buried in the bottom of his locker. The project, which did not push Brian far in collecting bits of information on World War II, could not be exchanged for another kind of value or capital after it had been translated as a grade. For Brian, the sense of the grade as a translation in school involved a fairly long-term trajectory: He needed to do well enough on the project so as to get a good enough grade in the class (a *B*), with a vague sense of a future trajectory leading to high school and college. By design, the relations of texts in Brian's history class were more continuous, with notes being produced for studying and biweekly testing. However, Brian's own practices separated note taking from studying and testing, thus cutting the meaning of producing the notes to grading alone.

By contrast, Brian's circulations in *SWG* (LucasArts & Sony Entertainment, 2003) were highly continuous and recursive and provided a large number of exchange possibilities between various forms of capital. We interpret these continuous exchange possibilities as directly related to Brian's sustained engagement in the game. For instance, following his hunting episodes, B-T was given an account of how many experience points (xp's) he had accumulated from that hunt within

different skill categories. These xp's, as well as materials harvested from the hunt, would circulate into the production of traps and other crafted objects, which Brian also exchanged with other players or translated into credits to be used as money, and so on. The easy and frequent translations of capital created a quick and recursive circulation. Of course, as described, this continuity of *SWG* as a network does not describe Brian's entire course of play: He played for approximately 5 months and then stopped, cutting this network (except for its relation his other gaming practices). However, the built-in, organic continuity of the game world does describe something of how Brian continued to play the game over time and sustained a high level of engagement in it.

Understanding network continuity is important for not romanticizing out-of-school activities like role playing games. By viewing the individual in relation to the network, we avoid the assumption of conceiving of students or gamers as individually smart and motivated, regardless of circulation. Rather, if researchers see the categories of *smart* and *motivated* not as internal states but as configurations, they might begin to think about—and design—smart configurations and motivated circulations. Classrooms and game worlds are not dull and unmotivating merely because they are filled with unmotivated persons. They are unmotivating because they are immobile.

Literacy Research as Networking

We close with some final reflections on literacy research as a form of networking, raising questions about the limits of the types of analyses presented herein and suggesting possible directions for future work. Primarily, we consider how we have bracketed or cut the networks of Brian's literacy practices in the service of our research. One illustration of this network cutting involves how we have only considered a part of the very broad range of literacy practices that exist within MMOG game play as well as within activities tangential to play (Squire & Steinkuehler, in press; Steinkuehler, 2004c). Steinkuehler (2004c) has pointed out that MMOG literacy practices also include in-game narratives, fan fiction, Web sites, and game-related discussion boards. Additionally, as players immerse themselves in these digital worlds, numerous chat terms emerge to facilitate play. Chat with other players oftentimes bears little resemblance to grammatical English, and the production of such text involves a number of different, shared practices such as abbreviation, truncation, erosion, borrowing, and gesture, as well as the use of special terms, icons, and symbols (Steinkuehler, 2004c). Brian's literacy practices in *SWG* (LucasArts & Sony Entertainment, 2003) evidenced this breadth; he produced and shared image files, read discussion boards, chatted with other players inside and outside of game play, sent bug reports to the game developers, and engaged in other practices. Indeed, were we able to follow Brian's literacy practices with *SWG* across this broad range, we expect that many of our claims regarding engagement, agency, and identity would be understated. An important challenge for research on literacy and space–time is to

continue to consider how literacy networks are stretched across myriad practices and actors, and how we theoretically or pragmatically cut these networks in research.

Another direction of future work on literacy networks involves analyzing how the arguments we have made through a close analysis of displacements, regarding engagement, agency and identity, play out over greater expanses of space–time. How do the networks that humans recruit for their own purposes continue to enroll them in networked futures, or how are they cut or transformed? Moreover, how does the literacy network help people conceive of possible social futures in ways that the trajectory or other developmental metaphors do not? For example, prior to his engagement with *SWG* (LucasArts & Sony Entertainment, 2003), and for the two years following, Brian's participation in online gaming and game-related online friendships has engaged him in the project of learning Finnish. This project has even involved Brian participating in online tutoring sessions while instant messaging his Finnish friends, composing with his Finnish-English dictionary by his side and scrolling back through texts to discover language patterns. Brian and others have translated this online textual engagement this coming school year (2005–2006) into a plan for him to study abroad in Finland for a year. This type of ongoing circulation of bodies, texts, and objects presents significant yet important challenges for researching the relational effects of expansive literacy networking.

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REFERENCES

Appadurai, A. (1996). *Modernity at large: Cultural dimensions of globalization*. Minneapolis: University of Minnesota Press.

Bakhtin, M. M. (1981). Forms of time and of the chronotope in the novel (C. Emerson & M. Holquist, Trans.). In M. Holquist (Ed.), *The dialogic imagination: Four essays by M. M. Bakhtin* (pp. 84–258). Austin: University of Texas Press.

Barton, D., Hamilton, M., & Ivanic, R. (Eds.). (1999). *Situated literacies: Reading and writing in context*. New York: Routledge.

Baudrillard, J. (1983). *Simulations* (P. Foss, P. Patton, & J. Johnston, Trans.). New York: Semiotexte.

Baym, N. (1998). The emergence of on-line community. In S. G. Jones (Ed.), *Cybersociety2.0: Revisiting computer-mediated communication and community* (pp. 35–68). Thousand Oaks, CA: Sage.

Berg, M. (1997). Of forms, containers, and the electronic medical record: Some tools for a sociology of the formal. *Science, Technology, and Human Values, 22,* 403–434.

Bingham, N., & Thrift, N. (2000). Some new instructions for travellers: The geography of Bruno Latour and Michel Serres. In M. Crang & N. Thrift (Eds.), *Thinking space* (pp. 281–301). New York: Routledge.

Bloome, D., Theodorou, E., & Puro, P. (1989). Procedural display. *Curriculum Inquiry, 19,* 265–291.
Bloor, D. (1976). *Knowledge and social imagery.* London: Routledge & Kegan Paul.
Bourdieu, P. (1977). *Outline of theory of practice* (R. Nice, Trans.). Cambridge, England: Cambridge University Press.
Brandt, D. (1990). *Literacy as involvement: The acts of writers, readers, and texts*. Carbondale: Southern Illinois University Press.
Brandt, D., & Clinton, K. (2002). Limits of the local: Expanding perspectives on literacy as a social practice. *Journal of Literacy Research, 34,* 337–356.
Brubaker, R., & Cooper, F. (2000). Beyond "identity." *Theory and Society, 29*, 1–47.
Callon, M. (1986). Some elements of a sociology of translation: Domestication of the scallops and the fishermen of St. Brieuc Bay. In J. Law (Ed.), *Power, action, and belief* (pp. 196–233). London: Routledge.
Castells, M. (1996). *The rise of the network society.* Cambridge, MA: Blackwell.
Castranova, E. (2003). On virtual economies. *Game Studies: The International Journal of Computer Game Research, 3*(2), Retrieved October 20, 2004, from http://www.gamestudies.org/0302 /castranova.
Clarke, J. (2002). A new kind of symmetry: Actor-network theories and the new literacy studies. *Studies in the Education of Adults, 34,* 107–122.
de Certeau, M. (1984). *The practice of everyday life* (S. F. Rendall, Trans.). Berkeley: University of California Press.
Erickson, F. (1986). Qualitative methods in research on teaching. In M. C. Wittrock (Ed.), *Handbook of Research on Teaching* (Vol. 3, pp. 119–161). New York: Macmillan.
Filiciak, M. (2003). Hyperidentities: Postmodern identity patterns in massively multiplayer online role-playing games. In M. J. P. Wolf & B. Perron (Eds.), *The video game theory reader* (pp. 87–102). New York: Routledge.
Foucault, M. (1986). Of other spaces. *Diacritics, 16*(22–27).
Gee, J. P. (1990). *Social linguistics and literacies: Ideology in discourses.* New York: Falmer.
Gee, J. P. (2000). The new literacy studies: From 'socially situated' to the work of the social. In D. Barton, M. Hamilton, & R. Ivanic (Eds.), *Situated literacies: Reading and writing in context* (pp. 180–196). New York: Routledge.
Gee, J. P. (2003). *What video games have to teach us about learning and literacy*: New York: Palgrave Macmillan.
Goody, J. (1986). *The logic of writing and the organization of society.* Cambridge, UK: Cambridge University Press.
Guba, E., & Lincoln, Y. (1994). Competing paradigms in qualitative research. In N. Denzin & Y. Lincoln (Eds.), *Handbook of qualitative research* (pp. 105–117). Thousand Oaks, CA: Sage.
Hall, R. (1999). The organization and development of discursive practices for "having a theory." *Discourse Processes, 27*(2), 187–218.
Hamilton, M. (2001). Privileged literacies: Policy, institutional process and the life of the IALS. *Language and Education, 15,* 178–196.
Hine, C. (2000). *Virtual ethnography.* Thousand Oaks, CA: Sage.
Holland, D., Lachicotte, Jr., W., Skinner, D., & Cain, C. (1998). *Identity and agency in cultural worlds*. Cambridge, MA: Harvard University Press.
Holland, D., & Leander, K. M. (2004). Ethographic studies of positioning and subjectivity: An introduction. *Ethos, 32,* 127–139.
Jacobsson, M., & Taylor, T. L. (2003, August). The Sopranos meets Everquest: Social networking in massively multiplayer online games. *FineArt Forum, 17*(8). Retrieved April 16, 2005, from http://www.fineartforum.org/Backissues/Vol_17/ faf_v17_n08/reviews/reviews_index.html
Juul, J. (2001). Games telling stories?—A brief note on games and narrative. *Game Studies: The International Journal of Computer Game Research, 1*(1). Retrieved July 29, 2004, from http://www.gamestudies.org/0101/juul-gts/

Kolo, C., & Baur, T. (2004). Living a virtual life: Social dynamics of online gaming. *Game Studies: The International Journal of Computer Game Research, 4*(1). Retrieved December 5, 2004, from http://www.gamestudies.org/0401/kolo/

Kraidy, M. M. (1999). The global, the local, and the hybrid: A native ethnography of glocalization. *Critical Studies in Mass Communication, 16*(4), 454–467.

Kress, G., & Van Leeuwen, T. (2001). *Multimodal discourse: The modes and media of contemporary communication*. London: Edward Arnold.

Latour, B. (1983). Give me a laboratory and I will raise the world. In K. Knorr-Cetina & M. Mulkay (Eds.), *Science observed: Perspectives on the social study of science* (pp. 141–170). London: Sage.

Latour, B. (1987). *Science in action*. Cambridge, MA: Harvard University Press.

Latour, B. (1988a). Drawing things together. In M. Lynch & S. Woolgar (Eds.), *Representation in scientific practice* (pp. 19–68). Cambridge, MA: MIT Press.

Latour, B. (1988b). *The Pasteurization of France (with irreductions)*. Cambridge, MA: Harvard University Press.

Latour, B. (1993). *We have never been modern*. Hemel Hempstead, UK: Harvester Wheatsheaf.

Latour, B. (1996a). *Aramis or the love of technology.* Cambridge, MA: Harvard University Press.

Latour, B. (1996b). On interobjectivity. Symposium on "The lessons of simian society." *Mind, Culture, and Activity 3*, 228–245.

Latour, B. (1999). On recalling ANT. In J. Law & J. Hassard (Eds.), *Actor network theory and after* (pp. 15–25). Oxford, UK: Blackwell.

Latour, B., & Woolgar, S. (1986). *Laboratory life*. Princeton, NJ: Princeton University Press.

Law, J. (1992). Notes on the theory of the actor-network: Ordering, strategy and heterogeneity. *Systems Practice, 5*(4), 379–393.

Law, J. (1994). *Organizing modernity.* Oxford, UK: Blackwell.

Law, J., & Hassard, J. (Eds.). (1999). *Actor network theory and after.* Oxford, UK: Blackwell Publishers/The Sociological Review.

Leander, K. M. (2001). "This is our freedom bus going home right now": Producing and hybridizing space–time contexts in pedagogical discourse. *Journal of Literacy Research, 33*, 637–679.

Leander, K. M., & McKim, K. K. (2003). Tracing the everyday "sitings" of adolescents on the Internet: A strategic adaptation of ethnography across online and offline spaces. *Education, Communication, & Information, 3*(2), 211–240.

Lefebvre, H. (1991). *The production of space* (D. Nicholson-Smith, Trans.). Cambridge, MA: Blackwell.

Lemke, J. L. (2000). Across the scales of time: Artifacts, activities, and meanings in ecosocial systems. *Mind, Culture, and Activity, 7*, 273–292.

Lemke, J. L. (2001). *Towards a theory of traversals*. Unpublished manuscript. Retrieved May 5, 2006, from http://www.personal.umich.edu~jaylemke/papers/traversals/traversaltheory.htm

LucasArts. (2002). *Jedi Knight II: Jedi outcast, single and multiplayer first-person shooter game.*

LucasArts. (2004, June 28). Star Wars Galaxies: An Empire Divided *celebrates its one year anniversary* (press release). Retrieved October 16, 2004, from http://lucasarts.com/press/release/89.html

LucasArts & Sonly Online Entertainment. (2003). *Star Wars Galaxies: An empire divided, massively multiplayer online roleplaying game.*

Manovich, L. (2001). *The language of new media*. Cambridge, MA: MIT Press.

Massey, D. (1997). The political place of locality studies. In L. McDowell (Ed.), *Undoing place? A geographical reader* (pp. 317–331). New York: Arnold.

Michael, M. (2000). *Reconnecting culture, technology and nature*. New York: Routledge.

Murray, J. H. (1997). *Hamlet on the holodeck: The future of narrative in cyberspace*. New York: Free Press.

Nespor, J. (1994). *Knowledge in motion: Space, time and curriculum in undergraduate physics and management*. London: Falmer Press.

Olson, D. R. (1977). From utterance to text: The bias of language in speech and writing. *Harvard Educational Review, 47*, 257–281.

Olson, D. R. (1980). Some social aspects of meaning in oral and written language. In D. R. Olson (Ed.), *Social foundations of language and thought* (pp. 90–110). New York: Norton.

Ong, W. (1982). *Orality and literacy: The technologizing of the word*. London: Methuen.

Pardoe, S. (2000). Respect and the pursuit of 'symmetry' in researching literacy and student writing. In D. Barton, M. Hamilton, & R. Ivanic (Eds.), *Situated literacies: Reading and writing in context* (pp. 149–166). London: Routledge.

Roth, W.-M. (1996). Knowledge diffusion in a grade 4–5 classroom during a unit on civil engineering: An analysis of a classroom community in terms of its changing resources and practices. *Cognition and Instruction, 14*, 179–220.

Schultz, K. (2002). Looking across space and time: Reconceptualizing literacy learning in and out of school. *Research in the Teaching of English, 36,* 356–390.

Sloane, S. (2000). *Digital fictions: Storytelling in a material world*. Stamford, CT: Ablex.

Soja, E. W. (1989). *Postmodern geographies: The reassertion of space in critical social theory*. London: Verso.

Squire, K. D., & Steinkuehler, C. A. (in press). Generating cyberculture/s: The case of *Star Wars Galaxies*. In D. Gibbs & K. L. Krause (Eds.), *Cyberlines: Languages and cultures of the Internet*. Albert Park, Australia: James Nicholas.

Steinkuehler, C. A. (2004a). A discourse analysis of MMOG talk. In J. H. Smith & M. Sicart (Eds.), *Proceedings of the Other Players Conference*. Copenhagen, Denmark: IT University of Copenhagen. Retrieved December 5, 2004, from http://www.itu.dk/op/proceedings.htm

Steinkuehler, C. A. (2004b). Learning in massively multiplayer online games. In Y. B. Kafai, W. A. Sandoval, N. Enyedy, A. S. Nixon, & F. Herrera (Eds.), *Proceedings of the Sixth International Conference of the Learning Sciences* (pp. 521–528). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Steinkuehler, C. A. (2004c, April). *The literacy practices of massively multiplayer online gaming*. Paper presented at the Annual Meeting of the American Educational Research Association, San Diego CA.

Steinkuehler, C. A. (2006). Massively multiplayer online videogaming as participation in a Discourse. *Mind, Culture, & Activity, 13*(1), 38–52.

Strathern, M. (1996). Cutting the network. *Journal of the Royal Anthropological Institute, 2*, 517–535.

Street, B. V. (1984). *Literacy in theory and practice*. Cambridge, England: Cambridge University Press.

Street, B. V. (Ed.). (1993). *Cross-cultural approaches to literacy.* New York: Cambridge University Press.

Street, J. C., & Street, B. V. (1991). The schooling of literacy. In D. Barton & R. Ivanic (Eds.), *Writing in the community* (pp. 106–131). Newbury Park, CA: Sage.

Taylor, T. L. (2003, November). *Power gamers just want to have fun?: Instrumental play in a MMOG*. Paper presented at the 1st Diagra Conference: Level Up, The University of Utrecht, The Netherlands.

Thrift, N. (1995). Mapping the subject. In S. Pile & N. Thrift (Eds.), *Mapping the subject: Geographies of cultural transformation* (pp. 13–56). London: Routledge.

Wertsch, J. V., & Stone, A. (1985). The concept of internalization in Vygotsky's account of the genesis of higher mental functions. In J. V. Wertsch (Ed.), *Culture, communication and cognition: Vygotskian perspectives.* Cambridge, UK: Cambridge University Press.

Wolf, M. J. P. (2002). *The medium of the video game*. Austin: University of Texas Press.