

ETHNOGRAPHY AT THE MATH FORUM

Wesley Shumar

Department of Culture and Communication, Drexel University, Philadelphia
USA

Hybrid Worlds: Social Cyberspace, Imagination and Identity

My work has been primarily involved with the study of online educational communities and particularly most of my work has been with The Math Forum, an NSF funded digital library and one of the premier online communities for math education. My research at The Math Forum has focused on teacher communities and the ways teachers use The Math Forum to extend their face-to-face networks creating hybrid groups that overlap between physical space and virtual space. In this work I have suggested that teachers' imagination of community is transformed through their work online and with it their potential for learning (through informal means of professional development) and their sense of professional identity and efficacy (Shumar & Renninger 2002). Through this work Ann Renninger and I have developed a methodology for studying online educational communities that involves triangulation across several types of data, i.e., participant observation, in-depth interviews, online questionnaires, and logfile analysis.

From the work with The Math Forum I have suggested that digital libraries like The Math Forum are a new form of resource that we have begun to call interactive digital libraries. These interactive digital libraries involve social activity and uses that go way beyond the normal, use, re-use, search and browse functions assumed by many in the digital library world. The Math Forum has been a pioneer in leveraging these new activities by doing things like building collections out of traces of interaction between users, encouraging individuals to become lead participants in the community, developing hybrid activities that involve face-to-face interactions combined with virtual interactions, creating workshops and special events to take lead teachers and developers and help build out collections, etc. Recently I have begun to work with other digital libraries and online communities to expand the base of this research done at The Math Forum.

My work secondarily has moved to designing systems for learning. I am the PI of the Online Mentoring Project, an NSF funded project that has been developing curriculum for pre-service teachers to have a "pre-field" experience. Teachers learn to mentor students in the online mentoring environment and then they mentor live some of The Math Forum's Problem

of the Week students (an online challenge problem service where kids submit answers to math problems and then get a mentored reply online). This online mentoring environment is designed to be used in a face-to-face math education class. I am also co-pi on the Virtual Math Teams (VMT) project a project that is studying and designing online collaborative problem solving environments for math. The VMT project presents interesting challenges for an ethnographic approach to research in digital libraries. The focus of my presentation at the workshop will be on the work with VMT.

The work discussed above is a sample of some of the main work I have done at The Math Forum. There are several strands of theory that I have used throughout this work. First I have drawn on classic European social anthropology to make an argument about the nature of communities and the ways that boundaries work between social groups.

Theoretical framework

Boundaries and the cultural construction of community

Building on the work of Barth (1981) and Cohen (1985) and Shumar and Renninger (2002) it is suggested that communities, modern or traditional are based upon symbolic boundaries. If symbolic boundaries are the things that define communities, the attachment and belonging to those entities must be understood as socially produced and are often reinforced through rituals and other symbols. What is critical then for the definition of community, from an analytic point of view, is an understanding of the ways boundaries work and the forms of attachment and connection experienced by social actors.

Contemporary anthropological thinking tends to see community as a complex set of overlapping boundaries. Smaller more subtle boundaries are often only seen by insiders to the group and the larger external boundaries are often seen by outsiders. These boundaries are tied up with the symbols of belonging and attachment and thus community and culture are closely related and share the same complex structure. These boundaries are something that are manipulated by social actors and are often contested, leaving the community as more of a patchwork of connections and discourse about those imagined connections.

Imagined communities

Social imagination is the process by which groups of people understand the symbolic boundaries that define community, sub-groups in a community and the relationship to other communities. This suggests that all communities are virtual in the sense that they are the product of social imagination and must be defined symbolically (Anderson, 1991). It also suggests that the distinction between virtual and physical to which some point may more accurately represent a continuum of community types rather than two forms of community.

While some have suggested that Internet communities may be less deep and involved more surface forms of attachment and belonging (Nie & Erbring, 2000; Kraut, et. al., 2000), it is also the case that the Internet has made the experience of hybrid forms community more possible than in the past. What the Internet has done is not brought us virtual community, but allowed for a greater flexibility of forms of interaction and symbolic communication and that has stretched the realm of possible imaginations of community. There is greater "virtualism" to Internet based communities. This has on the one hand meant that many online groups are very surface and there is a thin connection to the group with weak attachments and not much of a sense of identity and belonging tied up with those groups. In those instances it certainly would be fair to say that "this is not an online community".

Social semiotics and discourse

The imagination of community is not only a cultural process but one that is semiotic in that it relies on particular signs to do specific work of framing how we understand the boundaries of a community and what constitutes membership in that community, what the rules of behavior are etc. There is often an official discourse that defines what membership is in a particular community. That discourse can be contested by various groups who vie for community membership and control.

Culture

Discussions of culture have also tended, like discussion of community have tended to be tied up with issues of boundary. While earlier discussions of culture identified a simple boundary and identified all within that boundary as homogeneous, more recent models have specified overlapping sets of boundaries and pointed to heterogeneity that is intertwined with homogeneity. More contemporary models of culture have drawn on Deleuze & Guattari's (1987) notion of the rhizome. A rhizome has structure and pattern. It also has diversity and a separation of parts. So within a culture or community there may be many sub-groups, alliances, overlapping boundaries, differences that make up the whole. This more dynamic structures may lead to

conflicts, hybrid identities and newer forms of dynamism.

Classic problems of difference and identity, which are part of all cultures, are compounded by the hybrid collaborations of people and groups that are possible in virtual spaces. Poster (2002), reflecting on the possibilities of the Internet, suggests, "Culture has lost its boundary" (p. 1). He points out that debates about the determining role of technology in the development of culture miss a very significant point. The Internet constitutes a space, "which encourages practices and which, in turn, serves to construct new types of subjects" (p. 3).

Cognitive and emotional aspects of shared practices

What constitutes culture beyond the complex semiotic structure of overlapping boundaries and continuities implied in the rhizome is the shared practices that members of particular communities share in and the ways the practices develop and evolve. This shared material plane of existence leads to what Bourdieu (1977, 1980) has referred to as habitus – "a set of durable, transposable dispositions". The shared nature of this set of practices and the process of "transposing" them led Lave and Wenger to the development of the notion of "communities of practice" and idea of "legitimate peripheral participation" (Lave & Wenger 1991, Lave 1993). Also cognitive anthropologists have suggested that habitus constitutes a model for rethinking the relationship of the external to the internal or culture to mind in that these regular forms of practice then will tend to produce schema within social actors where shared ideas, models and plans for action can be identified (Holland, Lachicotte, Skinner, & Cain 1998, Kirshner, & Whitson, 1997, Strauss, & Quinn, 1997) I would also argue that this internal external issue with culture also involves an affective dimension where unconscious desires find expression in particular idioms that are meaningful within a particular shared context (Paul, 1990 Winnicott, 1971). Finally these shared practices and the cultural ideas associated with them lead to particular forms of consciousness that are shared across a group of people in a specific context.

Methodology

There are several methodological challenges to working with interactive digital libraries such as The Math Forum. First and most complex is the question of how to envision the boundaries of such a complex hybrid world created by complex online groups. Over the last several years I have been working with Marc Smith, a sociologist at Microsoft research, on this problem. Marc has developed a tool called "Netscan" which allows one to do a social accounting of online discussion groups. Further they have developed

visualization tools that allow one to "see the shape" of online discussion groups. This tool goes a long way toward giving one the contours of particular kinds of communities and allows one to think about sampling issues such as who to interview, whose pattern of discourse to analyze etc. Netscan gives one a look at one kind of online interaction and it is part of what I would refer to as the social mapping process. Also social interactions, cultures and communities, take place within some social geography. Getting a sense of that social geography and how it informs the practices within the social space is a critical ethnographic task for any ethnographic work. With digital libraries we have tended to use a combination of tools like Netscan, online surveys, and participant observation (where possible) to get a sense of the overall contours of the community and what might constitute the groups within that social space.

From that general understanding of the social space we have then used interviews and again more participant observation to get a better sense of the specifics of what groups are doing, how their practices in the digital library relate to other activities in which they are engaged, and how these activities inform their consciousness. This work pays careful attention to the way hybrid worlds are particularly constituted by social actors and the ways boundaries and border crossing are informed by the tools and technologies that digital libraries offer.

Virtual Math Teams (VMT)

In my presentation at the workshop I will focus on our current project VMT. In this project we are working on developing synchronous chat spaces where students can work together to solve math problems. The goal of this would be to create a service that was as automated as possible where students could come, join a group, and get an opportunity to do collaborative problem solving together. Short term goals are to think about the ideas of social role and positioning in order to reflect upon what constitutes a good group, and to develop a robust chat environment for this kind of math problem solving.

Because of the nature of this project, it has tended to lead us to Conversation Analysis (CA) as a way to analyze the experimental chats that we have been doing with the project. But CA allows for only a very limited range of analysis of the specific work of conversational interaction. The larger frame of context within which students are doing the chats and their cognitive and emotional reactions to the work are more up in the air. I have been thinking about ways to read the chat "symptomatically" in order to create hypotheses that could be tested in other ways to give us some of the larger frame within which the students are doing the chats.

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