

Running Head: Sociocultural Analysis of Online Professional Development

Sociocultural Analysis of Online Professional Development:
A Case Study of Personal, Interpersonal, Community, and Technical Aspects¹

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Introduction

Robert¹ is from Iowa, now living in a small town near the Rhone river valley in central France with his French wife and two children. He teaches English as a foreign language in the local high school where he has only a handful of colleagues who share his educational interests. He turned to the Internet five or six years ago to find "intelligent contact with English-speaking people". More recently, he joined an email list about an online pedagogical approach called InternetInquiry². Then, while planning to lead local workshops on "teacher training in educational technology" Robert joined Tapped In (<http://www.tappedin.org>)--a multi-user virtual environment (MUVE) designed to promote teacher professional development--and soon "fell in love" with the environment. By the time we interviewed him seven months later, he had designed his online office, attended more than forty seminars--including monthly sessions on the topic of InternetInquiry--and launched his own weekly seminar about language learning.

In this chapter, we describe and analyze Robert's experience in Tapped In and related changes in his professional practice. While his experience is not necessarily typical of participants in Tapped In or other online communities, the particular details of his activities illustrate issues common to many educators who seek to develop their professional practice through participation with colleagues in online communities. By presenting a detailed view of Robert's experience in light of appropriate theory and literature, we provide the reader with a salient example with which to compare similar instances of online professional development efforts.

¹ All names are pseudonyms and identifying information has been changed

² "InternetInquiry" is a structured approach to Web-based student research. It began in 1995, and has evolved into a very popular tool for teachers across grades and subject areas.

A primary aim of this chapter is to illustrate a particular analytic approach to understanding processes of learning and development in relation to multiple contexts. Our approach draws on sociocultural theory and uses ethnographically-oriented case study methods to highlight the inter-connections between online and offline contexts in the professional trajectory of one Tapped In participant.

Through Robert, we ask how individuals enter and participate in particular professionally-oriented online environments. What do they do there? Why do they remain or leave? What do they gain from the experience? How does their online activity relate to other aspects of their professional practice? In posing these questions, we begin to identify the complex set of personal, social, institutional, cultural, and technological issues that underlie efforts to design and facilitate online teacher professional development. Answers to these questions are necessarily complex, and they are at the heart of why one online environment may be vibrant and fulfilling for certain types of participants, situated in a particular sociocultural context, while another becomes stagnant and disappointing.

We begin the chapter by describing our particular sociocultural approach to analyzing learning and development in online community settings. We then outline the methods used in the larger study of Tapped In of which this case study is a part. Next, we present an overview of the Tapped In environment to set the stage for the in-depth case study of Robert that follows. Finally, drawing on insights from this case study, we extend it by discussing implications for the design and study of online learning communities and their participants.

A Sociocultural Approach to Online Learning and Development

As researchers, our dilemma is how to grasp the complexity of online teacher professional development, while retaining analytic focus. Towards this end, we draw on sociocultural theory to help make sense of Robert's experience and extend its implications to other settings. The hallmark of sociocultural theory is in the analytic connection it affords between the thoughts, feelings, and actions of individuals and their social-historical contexts by way of mechanisms variously called cultural tools (Vygotsky, 1978), artifacts (Cole, 1996), or mediational means (Wertsch, 1998). In this view, the appropriate unit of analysis is never an individual in isolation or in interaction with a separate environment (Rogoff, Baker-Sennett, Lacasa, & Goldsmith, 1995), rather it is "activity", an "activity system" (Engestrom, Miettinen, & Punamaki, 1999), or "practice" (Bourdieu, 1977; Holland and Lave, 2001, Lave, 1988; Wenger, 1998) that encompasses individuals, their social partners and cultural, institutional, and historical traditions.

From this perspective, development involves changes in patterns of participation in sociocultural activity and a reciprocal relationship between person and context in which "individuals' changing roles are mutually defined with those of other people and with dynamic cultural processes" (Rogoff, et al, 1995). The research reported in this chapter contributes to our understanding of how learning and development occur in computer-mediated environments, and how these processes may compare and contrast with similar processes in traditional offline cultural settings (Rogoff, 1990). More broadly, we ask whether the sociocultural contexts of online learning are more flexible and adaptive than traditional settings; or, do they simply replicate traditional forms of

enculturation, socialization, learning, and development--in what ways, and under what conditions? In either case, online communities provide a valuable source of data about these kinds of sociocultural processes, especially when the majority of communication among members occurs within the community and is easily documented. As new socio-technical innovations continue to emerge in the design of online learning communities, it will be increasingly important to study how these communities and the individual members learn and develop.

In the following pages, we organize our analysis of Robert's experiences in terms of personal, interpersonal, and community aspects (Rogoff et al, 1995). These three "planes" of analysis provide sufficient structure to be a useful heuristic within the umbrella of sociocultural theory, while being broad enough to accommodate constructs from related perspectives--e.g. activity theory (Engestrom, Miettinen, & Punamaki, 1999), communities of practice (Wenger, 1998), cultural models (D'Andrade, 1987, 1995; Holland and Quinn, 1987; Shore, 1996; Strauss, 1992), figured worlds (Holland, Lachicotte, Skinner & Cain, 1998), the dramatic pentad (Burke, 1945/1969; Wertsch, 1998)--or derived as grounded theory (Glaser and Strauss, 1967) particular to Robert and his experiences. Additionally, to address the issues particular to online communication and community, we integrate "technology" as a fourth aspect of our analytic framework.

While we make an analytic distinction between personal, interpersonal, community, and technological aspects of socio-technical systems, in practice, they are deeply intertwined. Therefore, while examining one plane of analysis, it is important to note connections to the others. It is useful to think of this relationship between the analytic parts and whole as a kind of photograph in which the subject (one plane) is "in

focus" while the others are visible but blurred, their general shape being recognizable but not their details (Rogoff, 1998). In our writing this is achieved by occasionally juxtaposing discussion of different planes of analysis rather than keeping them entirely confined to separate sections.

In this way, we remind ourselves that each plane emphasizes a different aspect of the broader socio-technical system. As Table 1 summarizes, the personal plane of analysis focuses on how individuals change through involvement in sociocultural activity; the interpersonal plane examines how people communicate and coordinate their activities; and, the community plane of analysis focuses on people participating with others in culturally organized activity. For our purposes, the technology plane of analysis examines information and communication technologies as cultural artifacts used by individuals and groups to manipulate symbolic material (e.g., to record, transmit, store, organize, and display information) in the process of constructing meaning.

Table 1.

Overview of the four “planes” or foci of analysis used to understand inter-related aspects of Robert’s professional activity. Adapted from Rogoff (1995).

| Plane | Analytic Focus | Case Study Example |
|----------------------|--|---|
| <i>Personal</i> | How individuals change through involvement in sociocultural activity | Learning French and teaching English as a second language shapes and is shaped by Robert’s life trajectory and self understanding |
| <i>Interpersonal</i> | How people communicate and coordinate their activities | Robert’s interactions with close colleagues and students are organized around his expertise with language and learning technologies |
| <i>Community</i> | Patterns of participation in culturally organized activity | Robert attends and leads online sessions structured like face-to-face academic seminars |
| <i>Technology</i> | Use of information and communication technologies by individuals and groups to construct meaning | Projecting a common webpage to seminar participants fosters coordination of attention and content of discourse |

Through this additional analytic lens we see how the technology of Tapped In mediates activities at each of the other levels of organization. As we discuss in detail later in the chapter, the underlying MOO technology on which Tapped In is built (Curtis, 1997; Schank, Fenton, Schlager, & Fusco, 1999) affords the exchange of text to simulate multiple modalities of communication, including verbal (e.g. talk, whisper), gestural (emote), and written (projections of signs, whiteboard). These forms of communication mediate all interpersonal interaction on Tapped In in a very direct way, and more

indirectly shape personal and community aspects of the activity system. Projection is a feature that allows participants to show a web page to one or more people in the same virtual room. As such, it can help coordinate the attention and discourse of a group in ways that foster community processes, such as the construction of shared values. Aspects of Tapped In features that are particularly aligned with the personal plane of analysis includes self descriptions (visible when one "looks" at another participant), customizable private offices, and personal recorders that allow participants to review and reflect on their previous social interactions. Finally, textual descriptions, graphic elements, movement-oriented commands, and computational objects support the spatial metaphor of an academic campus with buildings, offices, hallways, elevators, and functioning physical objects. These features organize personal, interpersonal, and community aspects of online activity in Tapped In by, for example, allowing groups to conduct private conversations in their own offices.

Whereas we discuss Robert's life trajectory and professional roles under the rubric of personal and interpersonal planes of analysis, we might also examine them in terms of *activity theory* (Engestrom, Miettinen, & Punamaki, 1999) to emphasize a systemic view of meaning making and the mediating role of artifacts. Alternatively, we could analyze these issues in relation to social processes of learning in *communities of practice* (Wenger, 1998). Likewise, our discussion of the community norms and structures of Tapped In and the After School Online seminar series could be re-cast in terms of *cultural models* (D'Andrade, 1987, 1995; Holland and Quinn, 1987; Shore, 1996; Strauss, 1992) *figured worlds* (Holland, Lachicotte, Skinner & Cain, 1998) or the *dramatic pentad* (Burke, 1945/1969; Wertsch, 1998) to emphasize the construction of

identity and agency in particular cultural worlds. While we will mention these kinds of related perspectives where they seem to illuminate the issues being discussed, it is beyond the scope of the chapter to fully develop and apply multiple theoretical perspectives.

Nonetheless, we highlight two essential aspects of sociocultural theory in our work. First, our unit of analysis is not Robert as an individual, it is the systems of activities or practices in which he operates and which include him. Through the multiple "planes" metaphor, we examine different aspects of this system, but try to not to lose sight of its totality. While we talk about Robert's personal life trajectory and professional roles, we also examine them in relation to the communities in which he acts.

Second, we keep the notion of mediational means (Wertsch, 1991) relatively prominent in our analysis. That is, when we talk about what Robert does with colleagues, we note the cultural tools he uses. Foremost among these tools are the technological features of Tapped In and the symbolic systems that it carries as a mediator of interaction and understanding among people. Hence, for example, we examine how the "whisper" command and personal office space feature of TI make possible and more likely private interactions and close interpersonal relationships with colleagues. While the technological design of TI affords these kinds of interactions, it does not guarantee them. Rather, interactions are determined by factors in all four planes--for example, the personal goals of the individuals involved, their interpersonal history and relationships, the prevailing cultural models of communication shared by participants, and the communicative affordances of the TI technology.

It is important to note that each "plane" is both an analytic lens--a way of looking at the whole sociotechnical system--and an ontological reality--a set of potentially observable events. As researchers, it is useful to examine and label our analytic tools, to acknowledge our own processes of interpretation and biases. In this sense each plane represents a type of analysis. Concomitantly, each plane has an ontological correlate. Individual people, interpersonal interactions, patterns of community, and technological features are each manifest in the observable world. Hence, we use the four planes of analysis to organize our descriptive, analytic and reflexive writing.

Finally, in this view we do not make a sharp distinction between learning and development, since a single change in an individual--such as learning how to facilitate an online inquiry--can have a wide range of meanings in the various social settings in which the individual interacts, and across multiple timeframes ranging from collegial discourse to career trajectory. Likewise interpersonal, community, and technological change can have multiple levels of impact. When we consider learning and development in the sociotechnical system, we consider changes over time from all four perspectives.

Research Methods

The case study of Robert presented here is part of a larger study of Tapped In designed to examine issues of professional development in terms of online discourse, values related to learning and technology, professional identity, and social networking (c.f. Tatar, Gray, & Fusco, 2002). To examine the relationship between these factors, we chose a single "focal event" in which to locate key examples of discourse, and from which to trace evidence related to the other topics. This was achieved by recording a

logfile of all conversations, public and private, during a one-hour seminar on the topic of InternetInquiry³. Within a few days we conducted 1-2 hour telephone interviews with 12 of the 15 participants, those who granted permission. The interviews were designed to reveal data on the four topics mentioned above, and included questions about specific parts of the conversation in order to reveal how participants interpreted particular online events [see Appendix A for sample interview questions].

Decisions about what data to collect were based on a variety of criteria. For the focal event, we chose an After School Online (ASO) seminar because these meetings are a core institution within Tapped In. Hence, the analysis would be likely to inform our understanding of other ASO seminars and their role in Tapped In. We chose to examine an ASO session on InternetInquiry, because it is a popular monthly seminar conducted by the originator of this approach to online pedagogy. The popularity of the session together with its focus on a specific academic topic meant that it was likely to produce data useful for understanding teacher professional development from each of the perspectives we had defined, including values for learning.

Of the twelve participants we interviewed, we chose Robert for this case study for several reasons. First, he was an active participant in the focal event, other InternetInquiry seminars, ASOs on other topics, and Tapped In more generally. Second, he seemed to have used these experiences for his own professional development. Finally, he was willing to talk at length about his online experience and professional practice during the interview. In short, Robert seemed to be a model Tapped In community

³ We were not able to acquire permission in advance because the sessions are open to the entire Tapped In community and anyone else who logs in as a "guest". Participants who attended this session were notified of the recording at the beginning of the seminar, and permission to use their comments in our research was obtained afterwards.

member, and we reasoned that if we could understand his particular experiences--what drew him to Tapped In, how he participated in the focal event, what he got out of the experience--we would understand something important about how this and other online communities do or do not support educators' efforts towards their professional development.

Tapped In

Tapped In is a multi-user virtual environment (MUVE) dedicated to teacher professional development. It is organized around the metaphor of a conference site, with multiple buildings, public meeting rooms, private offices, and outdoor areas. Launched in 1997, it grew steadily to 1000 members by early 1998, to 5000 in mid-1999, and 11,000 by mid-2001 (Fusco, 2002; Schlager, Fusco, & Schank, 2002). Approximately 10% of members log on each month with logon times averaging roughly 4 hours per month (Fusco, 2002; Schlager, Fusco, & Schank, 2002).

While there is a core of regular activity, participation patterns vary significantly across Tapped In members. Some individuals log on regularly, every week or month for the length of a particular online course or project, or across multiple events for the duration of their entire membership. As Table 2 illustrates (Fusco, 2002), length of membership ranges from one to fifty-five months, with half of all members remaining active for approximately one academic or calendar year (7-14 months). It is not uncommon, while remaining members, for individuals to be very active for a period of time and then go dormant for many weeks or months before coming back when their professional circumstances change (Schlager, Fusco, & Schank, 2002).

Table 2

Duration of Memberships in Tapped In from launch (1997) to mid-2001.⁴

| Months | Members | |
|---------------|----------------|----------------|
| | Number | Percent |
| 1-3 | 818 | 10 |
| 4-7 | 1227 | 15 |
| 7-14 | 4090 | 50 |
| 15-24 | 2045 | 25 |
| 25-30 | 1227 | 15 |
| 31-40 | 654 | 8 |
| 40-55 | 164 | 2 |

Source: Fusco, 2002

During their memberships, individuals also vary in how often they log on to Tapped In. On average, across all members and duration of membership, approximately 80% of individuals log on (at least once) during 20% or less of their membership months (e.g., during 1 or 2 months over the course of a 1-year membership); 10% of members log on during 20% – 50% of membership months (e.g., between 3 and 6 months per year); and another 10% of members log on between 50% and 100% of available months (e.g., between 6 and 12 months per year).

The wide range of membership duration and login frequencies means that members also vary significantly in the total number of visits to Tapped In. As Table 3

⁴ Note: “Duration of Memberships” does not differentiate between different start times, or reasons for ending time, such as member request, automatic termination, or end of sampling period.

illustrates (Fusco, 2002), the majority (62%) of members log on only 1 and 5 times, suggesting a process of initial exploration and evaluation which does not move into sustained activity. Another 25% of members logged on between 6 and 20 times, indicating long term occasional activity, or perhaps a short burst of moderately active use. The 12% or approximately one thousand members who logged on between 20 and 200 times appear to be regular or very active members, perhaps those who consistently attend organized classes or seminars. A much smaller group of 66 members, constituting less than 1% of Tapped In members, logged on more than 200 times. These members are likely to represent the core group of highly active and longterm Tapped In members, volunteer leaders, and staff. The case study of Robert presented in this chapter focuses on one of these highly active members--specifically, he logged on for 100% of the months of his membership, with 1342 logins over 22 months (Fusco, 2002).

Table 3

Number of logins per member in Tapped In from launch (1997) to mid-2001.⁵

| Logins | Members | |
|---------------|----------------|----------------|
| | Number | Percent |
| 1-5 | 5066 | 62 |
| 6-20 | 2031 | 25 |
| 21-200 | 1018 | 12 |
| 201+ | 66 | 1 |

Source: Fusco, 2002

⁵ Note, “Number of Logins” does not control for length of membership—e.g. 30 logins may occur over one week or two years.

About half of Tapped In members are K-12 teachers, with the remainder including K-12 support staff, university faculty, researchers, staff developers, technology support providers, and pre-service teachers (Schlager, Fusco, & Schank, 2002). Members join Tapped In either through their affiliation with one of its “tenant” organizations (e.g., Pepperdine University, Lawrence Hall of Science), or as individuals interested in attending organized events or interacting informally with colleagues. Interactions among members are facilitated by a small group of paid and volunteer staff who greet newcomers, guide participants to scheduled meetings, and provide helpdesk services such as advice on how to record conversations or set up an office for private meetings. Typically, at least one such facilitator is available in the reception area during daytime and evening hours in the U.S.

Interactions on Tapped In are predominantly text-based realtime discussions with additional capabilities like "facial expressions"(e.g., "Jenny smiles with understanding") and "gestures" (e.g., "Audrey waves at Marty") also supported by the MUVE environment. As Figure 1 illustrates, there is also a graphical interface, “Tapestry”, that provides maps of the environment, point and click access to various functions (e.g., acquiring a personal tape recorder, or transcripts of past meetings), and display of optional photos or icons of each person who is logged on and present in the same room. TI also supports *projection* of web pages in which one person can cause a window with a web page in it to open on other people’s screens. Participants use projection so that they can view and discuss a common web object.

Insert Figure 1 approximately here

Participation occurs in various structures. Informal interactions are common in the Reception Area where newcomers first arrive and are met by TI staff or volunteer Help Desk personnel. Individuals can acquire and customize personal offices, which are then available for private meetings, informal conversations, or other activities. Groups come to TI and set up meeting rooms or even entire buildings to host their various activities. Large groups like Pepperdine University are paying "tenants" and receive customized services from the TI staff, such as the construction of their own virtual building. Many existing educationally oriented groups (e.g. Museum of Tolerance, Lawrence Hall of Science, PBS Teacherline) use TI to meet, discuss common interests, plan projects, and the like. Finally, the Tapped In staff sponsors professional development activities, such the After School Online seminar series. The staff provides planning and logistical support for these seminars by sending out email newsletters to all TI members alerting them to upcoming activities, posting a web calendar of events, facilitating meetings, and providing transcripts of meetings to both attendees and others not present for the real-time discussion.

The participation structure most widely accessible to all members of the Tapped In community is the After School Online seminar series. A typical monthly Event Calendar at Tapped In includes 30-50 ASO seminars on topics such as social studies, language learning, science, math, school administration, technology coordinators, and "Tapped In Tours and Tips". Seminars are offered on a weekly and monthly basis, as well as special one-time events. While existing organizations contract for customized services, and individuals can interact informally in private offices and public spaces of

TI, it is the ASO seminar format that most readily affords small groups discussion around a focal topic.

The Tapped In ASO format is notable for its adaptability to diverse topics and participants, opportunities for sharing web-based resources, knowledge construction through real-time discourse, and potential for fostering professional development. While some ASO sessions are sponsored by TI staff, many are designed and run by participants. The TI staff encourages people to organize ASO seminars and provides help in planning and leading them. Hence, the institutionalized participation structure of the ASOs and the available scaffolding provide a significant professional development opportunity for educators. Individuals can join TI, participate in existing ASOs, and then launch their own seminars to expand their professional circle of like-minded colleagues, enhance their content knowledge, and expand their leadership abilities. The case study presented in this chapter traces one such developmental process, and illustrates how the 4-planes of analysis framework helps to identify the presence or absence of factors that shape development.

Robert: A Case Study of Professional Development in Tapped In

In this section, we examine processes of development from personal, interpersonal, community, and technological perspectives. We ask how Robert, his interactions with colleagues, and the Tapped In environment change over time, and in relation to each other. The aim is to illuminate why Robert comes to Tapped In, what makes it inviting and meaningful to him, what he gets out of it, and how his activities in turn shape the environment.

In our analysis, we have identified three main themes that link Robert's personal and professional trajectories to his experience in Tapped In and give it meaning: *literacy* (French, English, and learning technologies), *expertise/leadership* (vis-à-vis colleagues and students), and *interpersonal connection*. The third theme of connecting to others is what Robert himself articulates most clearly. He describes his own changes online as lessening his "bad habit" of being "too enthusiastic", talking "over other people", and hence "not leave them time to talk". He also reports using what he learns online with his young students, and in his teacher-training workshops. In the coming pages, we examine these themes across multiple planes of analysis.

A Personal View of Professional Development: French-English Literacies and Identities

Robert is a high school (Lycée) English language teacher in France. He comes from Iowa, and now lives with his French wife and two children in a small town of 12,000 near the Rhone river valley. He counts among his local colleagues three other English teachers in his Lycée, two more English teachers in this local town, four or five other technology teacher-trainers, and the many teachers who have participated in his educational technology sessions--"5 workshops so far this year", as of mid-March.

At the time of our data collection, Robert had been a member of Tapped In for seven months, and had been "involved with using the Internet with teaching" for three years. During this time, he has established many valuable professional relationships. As he put it, "I've gotten far more out of contact with people that I've never seen with my own eyes than with colleagues that I can actually speak to and listen to." He finds several aspects of the Tapped In environment especially valuable, a topic we will address below in more detail.

French and English languages--learning them, teaching them, speaking them--play a key role in the trajectory of Robert's professional development and identity. More recently, computer literacy has taken on a similar role. As a college student, he moved from the US to Quebec to study French literature and ultimately to get a bachelor's degree in English as a second language. From there he went on to study comparative literature at the University of Iowa before moving to France, getting a French teaching certificate, and starting his current career teaching English as a second language.

Robert's facility with language allowed him to study in Quebec and learn how to teach English to French speakers. Language literacy became a key component in shaping his personal and professional path. As Robert put it, "teaching English was my ticket out of Iowa". With an ability to speak and teach both English and French, Robert was able to use "the educational system for my own agenda" and live and work in [Francophone country] and then [a Northern region of France] before settling in Central France.

Robert used the literacies that he had developed to shape his professional path, and those experiences have shaped his sense of self. "Learning French for me was building a new identity" he told us, "basically, because I had changed almost every aspect of my life from working for Pizza Hut." As Robert tells it, "when I moved out to Quebec and studied French literature, that was a complete switch for me, and I completely changed my life and became a whole other person in many different ways."

Speaking in retrospect, Robert is quite consciously aware of how he has used his education to build a life for himself and how this process has made him feel like a new person; and yet, while living in France he remains, in many respects, an American.

I've kind of exiled myself in the middle of all these French-speaking people...and I love French, and I love French culture and food (too much) and I love everything here; but, my first reason for getting on the Internet about 5, 6 years ago, was to have contact with, intelligent contact, with English-speaking people who had intelligent things to say and not just my family giving me a guilt trip about not visiting them often enough.

Despite his French citizenship, Robert identifies himself as an American; indeed, when asked about his "ethnicity or race" he replied "White, Iowan." Like many immigrants (Deaux, 2000), he has a dual sense of allegiance and identity. For Robert, information and communication technologies afford the kind of social interactions that keep his intellectual identity and his more geographically distant, American sense of self alive.

Interpersonal Interactions and Relationships: Intellectual Connections and the Construction of Expertise

As mentioned above, Robert has a range of both local and online colleagues with whom he discusses educational issues. The professional identity he constructs in these conversations appears to be focused in large part on expertise. Robert presents himself and is known as a competent professional who shares his knowledge and takes on leadership roles. We discuss his relationship to local French colleagues and students, to a variety of online peers, and novices, and to other experts.

Local Colleagues and Students

In his local town, Robert aligns himself most strongly with other English teachers who are "at least somewhat interested in the same issues" and identifies himself in contrast to all of the other teachers. There are four English teachers in his Lycée, only one of whom Robert has "a lot of exchange with." The other three, like the other Lycée teachers, are not very interested in learning technologies. Although Robert attempts to share his interests and expertise, "often my exchanges with them are trying to show them other educational technologies and ways they can use the Internet." Their school has only been connected to the Internet for "a very short period of time" and Robert is "one of the very few teachers who uses, maybe the only one, who makes intense use of the Internet." Apparently only two or three others have "taken students to the Internet at all" and according to Robert, they "have no real idea of what they're doing." From Robert's perspective, the other teachers are quite different from him in many respects,

Basically all the other teachers in my school are very reluctant and consider themselves far too busy to bother listening to what I have to say....They're a very unreceptive bunch and spend most of their time smoking cigarettes when it's illegal to smoke cigarettes in a French school. That's another issue.

By contrast to his school environment, Robert has cultivated a small group of colleagues in the local area, who do share his interests in technology and pedagogy. As he describes it, "we're a group of four English teachers in my town", including one from his school, and "two other colleagues who are at least somewhat interested in the same issues." They have been getting together once a month and "talking about lesson plans, mostly oriented around cinema, and showing each other things [they've] been doing and sharing resources."

These collegial activities do, in fact, affect how Robert interacts with his Lycée students. As he notes, "trying to motivate them is the number one issue and of course using the Internet or using film clips and so on, all those things, anything that gets them out of their textbook is a big motivating factor." As an English teacher, Robert "can use pretty much whatever source material" he wants to, and he is "successful using things like the FBI site or NASA and exploring Mars and all these things..." These types of Internet activities appeal to his students because many of them are technologically oriented, and because it's new for them, and it is not what they expect in an English class. It works well for both students and teacher, as Robert sums up, "It's motivating for them and they like it. So that's good. That's valorizing for me. It makes me feel better about my job and so on."

While Robert values teaching his students, he is especially enthusiastic about working with educators who want to explore new ways to use technology. He notes that "the really interesting exchanges" have been in the teacher training sessions and with other teacher trainers. He appreciates the people in his seminars for their openness to his ideas, "my agenda with all those people has been a lot more fulfilling and interesting because they're closer to actually accepting using technology...but don't know most of the stuff that I've been doing." Likewise, Robert finds mutual exchanges with other teacher trainers especially rewarding:

Some of them have been doing really interesting things on their end, in different areas that I'm not that familiar with. So we've had really interesting exchanges. And all those have been really fulfilling, valuable exchanges, which is a real contrast with my typical exchanges with other teachers in my school. Well, since

we're all doing teacher training basically on the same topic, which is educational technology and language learning, but since we all have different ideas of what that is and what things can be done.

Robert's professional development represents change for both himself and his students.

He emphasizes both. When asked if he is happy in his current job, he replied,

Yeah, everything's been great and I've been able to reduce, I mean I like my students a lot, but I've been able to reduce the number of hours I spend in the classroom with students, which is good, and spend more time doing creative things and teacher training on Internet and pedagogical strategies of using the Internet and film and things like that, which is great. And it's like I'm working and not working because they're interesting subjects.

Online Colleagues

While the Internet provides a source of information and resources that Robert can use in his high school classes and teacher workshops (e.g., educational web sites), it also offers access to a wide range of like-minded colleagues. His "first reason" for getting on the Internet about 5 or 6 years ago was to have "contact with English-speaking people who had intelligent things to say." More recently, during the last three years that Robert has been "using the Internet with teaching" he has explored a range of online venues, including educationally-oriented email lists (e.g., FLT, NetTeach L) and chat environments (e.g., IRC and ICQ). For example, about a year and a half ago, Robert's students introduced him to IRC chat, where he then participated "for awhile" in different

subject-oriented rooms "trying to find other writers and people interested in some of the subjects [he's] interested in."

Then, in August of 2000, Robert began two new activities. He started doing "teacher training in educational technology" for local educators, and he joined Tapped In. His initial reason for coming to Tapped in was to support his new workshop activities, as he put it, "I do teacher training in educational technology. Thus, my interest in Tapped In". However, for Robert, Tapped In is more than a source of new lesson ideas for teachers. As he tells the story, "I fell in love with [Tapped In] right away. I think I designed my office within 10 days of joining, and created a bunch of ritual objects, and so on, and then just started attending sessions, and I really liked them..." Over the next six months he reports that he attended a total of 40-50 Tapped In seminars on topics ranging from social studies to science. "I can't say I really spend a lot of time socializing, just talking about the weather..." he adds; rather, most of his time is spent engaging with colleagues in the context of online educational seminars or informal conversations about educational matters.

When asked about who he interacts with on Tapped In, Robert first mentions Pat and Jenny, two staff members who are most often in the Reception area where new members arrive and where many informal discussions occur. Next are two non-staff people: Yuki who teaches Japanese in the US, and Hiro who teaches English in Japan and "often comes" to the seminars led by Robert. As in his local setting, Robert seeks out other language teacher online.

Robert values both the organized and informal social atmosphere of Tapped In. He notes that "the most important thing with Tapped In... is the ability to be able to come

in at almost any time and find people doing things, so it's always open. You don't have to just come for scheduled events." However, he also acknowledges the importance of structure. "Plus, there's the scheduled reception people like Jenny and Pat and Audrey who facilitate things, keep it rolling, help enroll new people, and so on." Similarly, Robert emphasizes his reliance on the events calendar "which warns about important sessions like Marty's regular InternetInquiry sessions, [and] social studies sessions." Thus, the efforts of a few staff people, a regular schedule of activities, and the communicative affordances of Tapped In offer Robert opportunities for both structured and informal interactions with a wide array of colleagues who share his interests.

It is important to note that Robert's collegial interactions and professional development span both online and local settings. Processes of professional change in one setting seem readily applicable in the other, akin to the issue of "transfer" in cognitive psychology (c.f., Bransford, Brown, & Cocking, 2000). From a sociocultural perspective, this transfer can be seen as an interpretive process in which the two settings are understood as being analogous in relevant respects (Pea, 1987).

In Robert's case, we might ask to what extent he perceives his roles and the settings of Tapped In and his local teacher training seminars to be similar. He explicitly acknowledges the connection between these settings when he says "I do teacher training in educational technology. Thus, my interest in Tapped In". Based on this and other descriptions of his online activities, it appears that Robert sought out a role in Tapped In that would facilitate his local professional development. Because Robert moved between online and local experiences on a nearly daily basis, it appears that he engaged in a dual process of negotiating new leadership roles in both setting concurrently. This pattern of

professional development is distinct from traditional weekend or summer in-service sessions in which newly learned skills and their application in other settings are separated in time. By contrast, Robert engaged in a very incremental process of changes in himself and his interpersonal relationships in two settings simultaneously. What could be seen as transferring a series of newly learned skills between settings, can also be seen as a process of negotiating two sets of similar roles and settings in which to enact them.

Robert as Expert

We now turn to a recent InternetInquiry seminar to illustrate in more detail the various roles that Robert plays on Tapped In. This is one of the monthly sessions led by Marty, the originator and expert on the InternetInquiry approach to web-based pedagogy. Approximately 15 people attended the seminar, which lasted one hour. It was preceded by a fifteen-minute period when we introduced the research project and gathered contact information for follow-up phone interviews and informed consent. Regular attendees of this meeting noted that this initial period was unusual and disrupted normal conversation, but that the seminar itself was typical. These reactions to change in normal functioning are an important source of data regarding the established norms, expectations, and cohesiveness of this group.

One of the roles that Robert assumed in this group was to orient newcomers to the normal patterns of activity, and to make sense of the unusual events. For example, at the end of the research introduction, Hugh, a first-time participant, complained "If this is how difficult it is to get to a session, then it doesn't seem worthwhile." In response, Audrey, a Tapped In designer and researcher quickly replied (15 seconds) directly to Hugh, "this is

a very unusual session". Similarly, Robert replied (27 seconds) to offer his reassurance and explanation, "Hugh, this is quite rare. Usually, we just walk in and start talking." A few minutes later when Hugh was having trouble with the interface ("How do you make the text screen larger. things are flying by."), Robert repeated Audrey's earlier public instructions for expanding the text window by whispering his advice, "hugh click on the "detach" button just above your text window." Also while the researchers were talking to individual participants, Robert suggested that the group starts with its usual routine, "Shall we do intros while we're waiting?" It was not until minutes later, when Audrey declared that the researchers were done and the seminar could start, that Marty repeated this suggestion, stating, "OK.... shall we start with the usual (Very Quick) self-introductions?"

During the substantive discussion, Robert expresses empathy with novices trying to understand the pedagogical approach of InternetInquiries. For instance, when the group is talking about some poorly designed InternetInquiries, he notes that some people "have scavenger hunts mixed up with InternetInquiries". Marty agrees, "yup", and Robert explains, "The specificity of the InternetInquiry model is not always easy to grasp. I heard the label "InternetInquiry" more than a year before I read the training material on The InternetInquiry Page and found out what they were really about."

While these activities are normally the duty of the designated seminar leaders and facilitators, Robert, as a participant, took the initiative to conduct them on his own. This sort of understanding of multiple roles within a community, awareness of group needs, and ability to respond is a sign that an individual has developed to be a relatively central member of a community (Rogoff, et al, 1995). Robert started as a newcomer in

August, and by March he interacts with novices like Hugh as an experienced member who is responsible for the group as a whole.

How does Robert interact with other experienced participants? Of the twenty-four (24) comments that he made during this seminar, eight (8) were oriented towards group process (e.g., "shall we do intros...") or social goals (e.g., "Thanks! See you soon."), while sixteen (16) were on the topic of InternetInquiry. One quarter of these were general comments about this approach or the day's seminar, while three-quarters were specific, substantive expressions of Robert's opinions on a particular website or issue.

When Marty showed a site that promoted a pedagogy of "retelling" information gathered from the Internet rather than engaging in true inquiry, several participants noted the limitations of this and offered alternatives [see appendix B for logfile]. Robert defends the pedagogical value of "retelling" as "an important first step" to which Marty agreed, but "wonders if that's a good use of \$2000 per desk". Later, Robert reported that he "wanted to come back on that, but it wasn't really germane to the way the discussion was going." The issues that Robert "would have wanted to discuss were more like InternetInquiry philosophy issues and that would be more e-mail type discussion than real time." Robert might have pushed his point and "talked over" others to pursue the debate during the seminar (as he said he used to do); instead, to help maintain the leader's direction, he "restrained" himself on this particular issue.

In this section we have seen in some detail how Robert constructs a professional identity of expertise and leadership in relation to local and online colleagues. Through interactions with local French educators, he has established himself as an authority on

educational technology and language learning. While it appears that this knowledge is unappreciated by most local colleagues, it is valued by a small group of fellow English language teachers who share his interest in learning technologies. Through exploration and interactions on the Internet, Robert develops the skills and knowledge that then structure his interactions with students in his classroom and less knowledgeable peers in his teacher-training workshops. Similarly, Robert takes on an expert role among online colleagues. During the InternetInquiry seminar he engaged in sophisticated debates about the details of a particular pedagogical approach with its creator and other colleagues, and guided newcomers into this professional discourse. In the next section, we examine the sociotechnical context in which this development has been possible.

Community Development: A New Seminar Emerges

Researching development in the community plane involves the examination of changes in institutional structures in relation to the generations of people who participate in the community (Rogoff, et al. 1995). Here we discuss the institutionalized structures of Tapped In that appear to be most influential in shaping Robert's online activity and professional development, the Help Desk and After School Online seminar series.

As mentioned above, when Robert talks about who he interacts with on Tapped In he first mentions the Help Desk staff, "...Pat and Jenny, usually in Reception." These are the people who help the guests and members of Tapped In learn how to perform various online actions, find resources and colleagues, and feel welcomed. "Reception" is the room where all guests first arrive, and it is "home" for members unless they reset it to be their office or other room. The tradition of the Help Desk is an essential component of

giving participants like Robert the feeling that Tapped In is "always open." The staff comprise a significant social presence themselves, and they facilitate the online activities of others. As a result, participants have the "ability to be able to come in at almost any time and find people doing things."

In the sociotechnical system of Tapped In, actions of Help Desk staff shape the roles of other participants. When Jenny greets new guests in Reception, she asks how she can help and offers to show them around if she has the time. She thereby makes a bid for a particular kind of interpersonal interaction and relationship--assistance from relative expert and for a novice. Guests may accept her offer, ask a question that brought them to Tapped In, state their preference to explore on their own, ignore the statement all together, or respond in any number of other ways. In this way Jenny and the guest negotiate their roles vis a vis each other. In some cases this interaction will have little relationship to later online activity, because the guest does not return to TI or establishes a pattern of activity that avoids the reception area. Other times, this first interaction may initiate a relationship of expanding interdependence between the guest and the established TI community. Like Robert, the guest may soon become a member of Tapped In, attend ASO sessions, assist newer members informally or as a volunteer Help Desk staffer, and create new online events. In this way, the norms and structures of Tapped In established over a relatively long time and across many individuals are present in the enacted roles of greeter and guest.

Along with the Help Desk, After School Online seminars are a central activity structure in Tapped In. ASO meetings are modeled after academic seminars, in which a leader facilitates discussion among a relatively small number of students or colleagues.

Typically there are eight to twelve participants, and occasionally up to twenty or more. ASO seminars have a clearly defined topic that is listed in the Tapped In calendar and "On the Tapis" email newsletter. The topic is defined by the session leader, who is usually a subject-area expert or interested practitioner. The seminars often take advantage of the project feature to examine and discuss particular websites pre-selected by the leader or offered spontaneously by participants.

While ASO leaders are typically experienced members of Tapped In, they need not be an experts on the technical features of TI or running an online seminar. Instead, members of the Help Desk staff are available to help plan and run the seminars. Audrey, Pat, Jenny and sometimes other experienced TI participants help greet participants as they arrive to a seminar. They often whisper special instructions, praise, or empathic comments to novices who seem unsure of how to interact in this context. They typically explain the less intuitive aspects of the TI interface, such as how to "detach" the text window so that participants can keep up with the scrolling dialog. Also, they prepare novices to expect their web browser to automatically display a second window with another website when the "project" command is given--usually by the leader but sometimes by a facilitator or knowledgeable participant.

Facilitators also help maintain a professional tone through their own interactions and by monitoring the discussion. For example, if someone starts chatting about an especially private matter before the meeting starts, they might whisper a reminder that the seminar is a public forum that is often recorded by participants. Likewise, if another group arrives in the meeting room unaware of the seminar in progress, the facilitators would explain the current discussion and help the new group join the seminar or find an

alternative meeting place. On the rare occasion of a person logging on to disrupt the discussion purposefully, the facilitators can disconnect the individual from Tapped In.

For a participant like Robert, attending ASO sessions and participating over time at increasingly sophisticated levels is a kind of apprenticeship model of learning how to lead one's own seminar. Indeed, after three months of participation in ASO seminars, Robert launched his own seminar designed around issues of language learning. This seminar has continued to meet weekly.

Technology: Affordances and Constraints

In this section we examine some of the technological features of Tapped In that support the kinds of interactions and meaning making evident in the previous sections. While the underlying technological infrastructure profoundly shapes how participants use the system, the specific technical details of how the system works (data types, programming languages, etc.) is beyond the scope of this chapter. Rather, here we focus on how the availability and use of particular symbolic systems mediate interpersonal interactions, reference to shared cultural models, and individual learning/development.

For Robert, part of the appeal of Tapped In is feeling like he is in a physical place. Specifically, he says that "it feels like I'm back at university talking to other grad students and researchers and things like that about subjects that I'm interested in. So, it works out well that way." How does this happen? According to Robert, "... you really have a sense of being somewhere because you see the room. You see the little heads for the people...you have a feeling that you're actually somewhere and that you're really

talking to people." Apparently, the perceived experience of being on a college campus evokes related cultural models of academic discourse, which supports ASO activities.

Other features that shape Robert's online experience are the whisper and page functions that allow for private dialog with other colleagues. For example, Robert whispered to Marty to negotiate a time when he could visit Robert's language seminar. He also whispered to a novice to explain how to "detach" the text window; and sent a "page" to someone in another room to announce the start of the seminar. These uses of whisper and page are consistent with the way Help Desk staff members use these functions to facilitate the meeting without disrupting the substantive discussion, and to help novices without embarrassing them publicly drawing attention to their lack of knowledge. Since these communications are private, they may be especially well-suited to interpersonal relationship building.

Web projections are especially important to many ASO seminars. In the InternetInquiry seminar they are essential. The discussion is structured around the set of InternetInquiry websites that Marty locates and prepares to show during a particular seminar. By allowing the participants to all easily view and explore the same website at the same, it functions to coordinate participants' attention and the content of the conversation. When asked what it's like using Tapped In technology, Robert replied:

Yeah, the sharing websites basically is the main thing. That's really good, I mean, it's something that you can't do on other sites that I've seen. I think it's really important because you can talk about the same thing instead of just talking and look at things together and say "click on that, see what that does?" "Oh, yeah, I like this because," and you're looking at the same thing so it gives you

more of the feeling of being in the same place with other people who are sitting at their computers across the other side of the planet.

For Robert, web projection evokes a sense of cohesion with others--looking at the same thing at the same time and discussing it evokes the feeling of being together with others despite the geographic distance. This is the experience of social connection that first motivated Robert to seek out computer mediated communication on the Internet, and it is part of what he finds satisfying about being a regular participant on Tapped In.

Robert's virtual office is the final feature of Tapped In that was prominent in his interview. As mentioned above, customizing his office was the first thing he did after joining Tapped In. During the interview, he joked about the interviewers joining him in his online office for a "virtual glass of rum." (One of the other experienced TI users whom we interviewed invited us into her TI office to continue our conversation where she felt comfortable and could interview us.) On a similar note, when the interviewers asked if they could visit his home page, he suggested they should "go into [his] office and click on the overhead project, and get into [his] site directly that way." Like whisper and page, the facility to have one's own personal space and to customize it with virtual objects seems to foster a sense of belonging and affords interpersonal interactions and relationship building.

Summary: A Sociocultural System Develops

Examining learning and development as the transformation of participation in sociocultural contexts has involved highlighting in turn, the personal, interpersonal, community, and technological aspects of Robert's activities on Tapped In. These multiple foci offer complementary views of Robert's professional development.

In the personal plane of analysis, we see how Robert's life trajectory from Iowa to central France is intertwined with his present day professional interactions on Tapped In. He connects to distant colleagues in part to avert certain kinds of isolation—to recreate his identity as an American and as an intellectual interested in serious educational issues more than idle socializing that he finds in some online chat rooms and local teachers' cliques. We also see how he has transformed his participation among colleagues, both in Tapped In and his local community. Online he became a leader of a new ASO session while concomitantly in France, he became a teacher trainer.

Both of these new roles are extensions of Robert's professional identity, not simply as an expression of private psychological change, but as new ways of being constructed in interpersonal interactions--both online and locally. Robert transformed from a Tapped In novice to expert in relation to the Help Desk staff, colleagues like Marty who led other seminars, and a host of new guests and members who accepted and benefited from his growing expertise (in the norms of ASO seminars and educational topics like InternetInquiry). During this same time, he also launched his career as a teacher trainer. Interacting with local French teachers interested in his technological expertise was a new role, an expansion of Robert's identity in his small town that draws directly on his online interactions and explorations.

From the community perspective, "Robert's" development extends beyond himself and his immediate interpersonal interactions to include changes in the sociocultural activity structures available in Tapped In and in the educational institutions in his region of central France. The most obvious development includes the addition of a new ASO seminar that, following Robert's professional interests, makes new kinds of

knowledge available to the Tapped In community. There are also likely to be myriad other more subtle changes that result from Robert's expanding online participation. Teachers who interact informally with him may be influenced by his knowledge of InternetInquiry to try this pedagogical approach with their students. Teacher educators who attend his ASO sessions may be inspired to start their own seminars, on Tapped In or elsewhere.

Similarly, we can only speculate about the new opportunities made available through the institutionalization of Robert's technology expertise in teacher training workshops. Whereas his efforts to inspire his local school colleagues often seemed to fall on deaf ears, perhaps those who choose to attend his workshops will take up new approaches to teaching their students or log on to Tapped In and try their hand at sharing their local knowledge more widely. Colleagues who had seemed uninterested in Robert's ideas may turn out to be willing to listen if he establishes greater status as a leader in his local community.

The technological plane of analysis highlights how the Tapped In infrastructure constrains and affords development in each of the other planes, and how the TI technology itself can develop. At the level of community, TI combines a set of technological features that tend to evoke particular cultural worlds in the imagination of participants, such as a US university campus. Graphic images of a campus, textual floor plans, written descriptions of the TI mission, and many other features lead participants to imagine themselves in an academically oriented setting.

From the interpersonal plane, we see how commands like *talk*, *whisper*, and *look* combine with public and private "rooms" to allow interpersonal interactions inside group

boundaries. Within this set of constraints, focused discourse is possible. Whether or not it occurs, of course, depends on the particular participants at a given meeting, the leader, choice of topic, web projections, facilitators, etc. The emergent discourse is then the source of individual learning and development.

The same features that support the community processes of a regularly meeting seminar group, when viewed from the perspective of the personal plane of analysis, can be seen to support processes of learning and development for individuals. Through interactions with more able colleagues, educators new to a topic like InternetInquiry gain a particular pedagogical lexicon of "rubrics", "journalistic tasks", and so forth. As we saw with Robert's leadership in the ASO seminar (e. g., explaining the difference between scavenger hunts and InternetInquiries), they may master this way of speaking and thinking, and take the role of leader in the group.

From the perspective of sociocultural theory (Rogoff, et al, 1995), being a leader in this online community also prepares participants to play parallel roles in other similar sociocultural settings. An essential question--both theoretical and practical--is what makes another setting similar and how an individual re-negotiates a similar role in a new context, whether online or off. For Robert, this process may occur because he came to Tapped In specifically to enhance his local professional practice and therefore interprets his Tapped In experiences as essentially linked to his local professional development. Teaching less-knowledgeable colleagues about learning technology, for example, involves enacting essentially the same role in both settings. In contrast to more isolated or generic professional development activities, Robert's personal choice of using Tapped In for his professional goals and the sort of collegial interactions he found there allowed

him to engage in essentially the same developmental process across ostensibly different settings.

We have seen how this process of reciprocal change unfolded with Robert. The academic campus metaphor in TI was very engaging for him, and he soon imagined his online interactions to be occurring in a cultural world of intellectual pursuit akin to his college days in Iowa and Quebec. His desire for intelligent discourse on the topic of education was satisfied in many of the ASO seminars he found on TI. Among them was the monthly InternetInquiry seminars where he developed a personal relationship with Marty, the originator of InternetInquiry, and several other English language teachers, like Hiro, and Yuki. While we have not studied the discourse of Robert's new Language seminars, we can imagine him leading this group in much the same way that he helped orient newcomers in the InternetInquiry session described earlier.

Regardless, it is clear that Robert built on his previous TI experiences to create a new seminar series, which was then available to the wider TI community. In this way we see development in the systems of activity of Tapped In from community, interpersonal, and personal perspectives. Likewise, the TI technology continues to develop. At the time of this writing, the TI infrastructure is undergoing a re-design, based in part on the research of Robert and the InternetInquiry seminars (c.f. Tatar, Gray, & Fusco, 2002). Hence, changes in Robert--which might be defined as the acquisition of new knowledge and skills--are intertwined with interpersonal, community, and technological changes around him. Understanding how change is co-constituted across planes of analysis may be useful in the design and facilitation of online communities like Tapped In.

Lessons Learned

In this final section, we examine how the particular details of Robert's experiences, considered through four analytic foci, may inform design, facilitation, and research in relation to learning, development, and online community. We use specific aspects of the present analysis to think about related issues in other settings. Our hope is that readers will further extend this process to examples they know.

Implications for Community Design & Facilitation

How might the sort of description and analysis presented here illuminate processes of design and facilitation in other online environments? Comparisons between Robert's case and others would likely take different forms depending on one's goals. As with established strategies like participatory design (Schuler & Namioka, 1993) and value sensitive design (<http://www.ischool.washington.edu/vsd/>), the process of launching a new community would start with an analysis of the target membership. From our sociocultural perspective, we might begin by looking for common patterns in personal identities and life trajectories, interpersonal interactions, and community affiliations as they relate to the themes of the planned community. From that perspective, specific features could be designed to build on the existing repertoire of social roles.

Alternatively, a designer or facilitator working in an existing online environment might start with a comparison of the technological features of Tapped In and their environment, and from that perspective consider the other planes of analysis.

Let us take the *whisper* feature as an example. In Tapped In it affords private interaction in the midst of public activities. In the case study of Robert we saw how he

used it to arrange for Marty to visit his Language seminar. This simple act is meaningful in relation to Robert's professional development along each of the planes of analysis. It is an interpersonal interaction that helps build a collegial relationship between Robert and Marty. As a whispered conversation, it was able to proceed in private, between the two individuals, without the possibility of interference by others. Nonetheless, the interpersonal interaction has a community dimension. Robert's role in this relationship has meaning in the wider community, namely being an educational leader with the status to interact as peers with a well established, senior member of the community. More personally, it may shape Robert's sense of himself as an educator and will likely prepare him to speak with authority when he leads teacher workshops on technology and learning.

Other community designers can consider details of this socio-technical system and compare them to similar features and activities in their settings. For instance, how might teachers investigating the use of classroom inquiry use similar private communication venues such as Instant Messaging, or private discussion threads? In light of Robert's motivation to discuss issues related to his professional development, the designer might ask what in their larger sociocultural setting would motivate the particular teachers involved? Are they early adopters who, like Robert, might want to use their online experiences to prepare for leadership roles in their schools? Alternatively, are they being required to learn new pedagogical practices, and want a private space to commiserate and discuss fragile new ideas with just one or two trusted peers?⁶

⁶ Barab, MaKinster, & Scheckler (this volume) hypothesize from their data that teachers inexperienced in sharing constructive criticism with colleagues do not post online critiques in order to avoid the appearance of attacking their colleagues' personal teaching style and online identity. By contrast, they suggest, receiving an invitation to offer specific feedback may shift the meaning of online critiques towards a more

Whereas Robert and Marty had sufficient common ground to carry out a private interpersonal negotiation of a future meeting, the designers might want to consider the interpersonal dynamics that would support the sort of goal they have for their community. Should the community infrastructure group teachers in particular ways? Should it encourage particular kinds of diversity? How should issues of affiliation and inclusion be approached? Participant information could be made public and searchable. Recommender engines could be used to suggest particular interpersonal relationships for joint projects. Alternatively, community designers could structure the environment according to pre-arranged groups, according to criteria such as: local affiliation (i.e. school building or district), shared background (e.g. grade level, subject) or non-academic interests.

Finally, designers might ask how these teachers see themselves in relation to the online community. Do the goals of the community designers align with the teachers' understanding of themselves in their current roles (vis a vis colleagues, administrators, students), and imagined career trajectories? What sort of changes does aligning with the community's goals require of teachers? Can the new roles draw directly on existing roles in some way? For example, if leading inquiry with students is the aim of the community, one might ask where in teachers' professional and personal lives they enact similar roles? Perhaps the personal, interpersonal, and social aspects of games like "twenty questions" or comparison shopping can be used as preparation for data gathering and analysis for the sake of scientific inquiry.

mutually supportive activity. This sort of (potential) transformation could be analyzed as the relationship

Implications for Research

Another approach to learning from Robert's case study is to distill research guidelines for the sociocultural study of learning and development in online communities. We organized our analysis around an extension of Rogoff's *three planes of analysis* approach (Rogoff, et al. 1995; Rogoff, 1990), and suggested options from other related theoretical perspectives such as *activity theory* (Engstrom, Miettinen, & Punamaki, 1999), the *dramatic pentad* (Burke, 1945; Wertsch, 1998), *figured worlds* (Holland, Lachicotte, Skinner & Cain), and *cultural models* (D'Andrade, 1987, 1995; Holland and Quinn, 1987; Shore, 1996; Strauss, 1992). However, at its core, the kind of analysis we are presenting involves three questions: How do members participate online? How do they make sense of the online activity? and, How are online and offline activities related?

These three essential questions provide a useful starting point for researchers who want to take a holistic view of learning and development in online community--that is, to understand online activity in the wider contexts of participants' lives. How do members participate online? What do they actually do, together and alone? These questions examining participation can draw on various methodologies such as computer-mediated discourse analysis (see Herring, this volume; Tatar, Gray, & Fusco, 2002) to emphasize linguistic and communicative patterns, or grounded theory (Glaser and Strauss, 1967) to describe and explain online activities in the terms used by participants themselves. Discovering how participants make sense of online activity--their own and others'--is likely to require the supplement of online texts (e.g. logfiles) with

between a new pattern of interpersonal discourse (initiated by a request) and subsequent development of interpersonal relationships, personal identity and agency, and shared (cultural) models for collegiality.

observational and interview data. While this approach provides a richer picture of online learning and development it may still miss much of the larger significance of these processes in the personal and professional trajectories of participants. In this sense, it is essential to gather data that illuminate how specific online and offline activities are related. Understanding how a group of teachers form a vibrant online community is not enough, if their goal is to enhance their professional practice in the classroom.

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Appendix A

Interview Guide
Introduction and Sample Questions

In each of the interviews we began by reviewing the research topic, confirming participant consent, and soliciting questions about the project. After answering participant questions and establishing rapport, we gathered some personal background information (e.g. age, city of residence, profession, education, etc.). Throughout the interview, we attempted to maintain an informal, conversational tone in which we could follow each interviewee's train of thought while still covering all the relevant topics. Hence, we occasionally varied the order of questions to facilitate the discussion, but addressed each of the questions in our interview guide. Below are sample questions in each of the major categories.

Tapped In Experience

What brought you to TI the first time? [a class, a listserv? what was your purpose in being there] When was that?

What do you usually do in TI? Who do you talk to? Where do you go?
<first timers> Did you do anything else on TI besides the WebQuest session?

If you had to label yourself, would you call yourself a regular, an occasional or an infrequent user of TI?

When you think about TI, what's important to you? What do you value about the environment?

People think of TI in different ways, to you, what is TI?
(What is TI most like in the "real world"?)

Specific Internet Inquiry Seminar

How many times would you say you have attended a TI seminar like the WebQuest?

Tell me about the Web Quest seminar. What was it like from your perspective? [what were the important events? What else happened?]

Who ran the meeting? Anyone else? How would you describe their roles?

Did it feel like a big meeting or a small meeting?
If you had to give me a guess, could you tell me how many people were there?

Do you remember the other participants? Know any from before the meeting?

For each: How long know? In TI? Outside TI? Meet f2f? Name?

[Note list of names for later use]

[prompt for Bernie, BJ, and any other facilitators]

Were there people there who seemed to know each other? (groups? interpersonal?)

How much did you feel a part of the group?

Did you feel excluded at times? [want to be a part of some conversation, but not able to?]

Did you have specific goals for attending this seminar? What were you hoping to get out of it?

Did you learn anything in the session? Did you share anything that you thought was of value to others?

...

Do you remember the Titanic webquest that DianaJH had made?

what did you think of it?

What did other people think of it?

Did you feel able to express criticism?

Earlier when she expressed some doubt about sharing it, Bernie said:

16:59:29 BernieD Awww... you're among friends here.

Do you think that's true?

Would you ever share something like that?

Participation

<if TI REGULAR / NON-FIRSTTIME>

What's your style of participation in TI? Do you usually lead sessions, facilitate, join in the conversation, just listen? How would you describe your role?

Have you always done this? How has your role change since you first started logging on TI?

<FIRSTTIMERS> We'd like to ask about your style of participation in TI. As you saw in the WebQuest session, some people lead, others facilitate, join in the conversation, or just listen. How would you describe your role?

<if NON-LEADER> Have you ever thought of leading a session?

Would you want to ever lead a session?

Are you in a leadership role in other areas of your professional life?
(do you mentor others? organize workshops? do others come to you with questions or
for assistance?)

Teaching

How did you come to be a teacher <or other occupation>?

When you think about your teaching practice, what values come to mind? (What's really important to you about teaching?)

Could you describe your goals for your teaching practice (your approach to teaching and learning) ?

What helps you meet your goals or make changes?

Does TI help you with that? How? What else do you get from TI?

Technology

In general, how do you feel about computer technology?
Do you tend to seek it out, or avoid it, or somewhere in between?

How do you feel about computer technology in educational practice?
What does it add or detract?

Appendix B

- 16:40:06 Bennet Right off the bat...a news report
- 16:40:17 Marty Ah... a journalistic task.
- 16:40:35 Bennet Have the students write from the perspective of victim/volunteer and so on
- 16:40:39 Barbara How about a mystery where we see the results of a disaster and have to figure out what happened?
- 16:40:50 Marty Cool, Barbara.
- 16:40:50 Robert Retelling tasks can be an important first step to WebQuest elements that will be completed later in the classroom with more student involvement.
- 16:41:00 Doug Being in role in many of these tasks is what makes them meaningful
- 16:41:16 Robert agrees with Doug
- 16:41:21 Marty agrees with Robert but wonders if that's a good use of \$2000 per desk
- 16:42:06 Marty Other task types that might lend themselves to disasterology?
- 16:42:19 Barbara Here's another one. You are part of the National Committee on something to prevent disasters and you need to make plans about earthquakes in Washington state?
- 16:42:36 Bennet Maybe have the learners design possible plausible escape routes
- 16:42:36 Marty Hmmmm... a design task perhaps.

16:43:03 Marty This is a well-informed crowd, I see

Figure 1.

The “Tapestry” graphical interface, including maps of the environment, point-and-click access to various functions, and optional images of individuals present in the same room.

