Network Community: Virtual Space for Physical Bodies

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Abstract: Increasing numbers of on-line venues for learning and engagement are emerging as virtual spaces become more accessible and commonplace. As analysts, we seek ways of talking about these spaces through a common language for understanding their organization and the nature of the interactions within them. This paper draws on a framework presented by Mynatt, et al., (1998) which provides a lens for viewing on-line community as a set of affordances. I apply this framework in a virtual educational setting, and conclude with a discussion of its applicability as a lens through which to analyze virtual community.

Keywords: on-line community, virtual community, CSCW, CSCL, social informatics

Introduction

As the accessibility and density of communication technologies increases, we ourselves become increasingly frequent participants in electronic interactions which supplement or even supplant face-to-face encounters. How can we characterize our interactions and relationships with the people and materials we encounter in these cybersettings? What sustains them over time, creating a durable sense of connection that is both distinct from and integrated with the physical settings in which we live and work? In short, what makes a community *workable* for its participants?

Past work has offered a broad range of rich approaches for answering these questions. Lombard and Ditton (1997) explore the nature of *presence,* identifying six ways in which presence in virtual settings can be conceptualized and instrumentalized. Bruckman (1998), taking a constructivist perspective on learning, presents an exquisitely-detailed picture of a MOO community characterized by rich, informal learning and iterative design. O'Day, et al., (1998) also focus on a MOO-based learning community, drawing connections between MOO affordances and design choices. Levin and Waugh (1998) illustrate the ways in which aspects of traditional, face-to-face apprenticeship forms of learning are brought on-line, while Haythornthwaite (1998) tracks emergent and changing patterns of social networks within a small subset of a virtual student body. The introduction to Koschmann (1996) situates these and other types of studies within a broader context of practice.

This paper examines these questions with respect to one particular distributed educational community, analyzed through a framework proposed by Mynatt, et al. (1998) for evaluating the affordances of a *network community.* Below, I first describe the setting upon which I draw. Following that, I outline the model itself, then apply the model to this particular setting. The concluding section discusses the contribution that models such as this one can make both to a more robust understanding of a particular setting and to the broader development of a common, comparative language within this intellectual community.

LEEP: An On-Line Educational Environment

The venue which informs this paper is LEEP, an internet-based Masters degree program in Library and Information Science offered through the University of Illinois at Urbana-Champaign (Estabrook 1999). Distributed interaction within this program is primarily textual, and takes place both in synchronous and asynchronous forums. About half of the students come from Illinois, and most of the rest are scattered across the United States, with a handful of students from abroad. Many already work within libraries and are now formally pursuing the masters degree for professional advancement. Although the program is primarily a virtual one, face-to-face contact helps create and sustain on-line relationships, starting with a two-week on-campus session prior to the start of a student's first semester, and incorporating one on-campus session per semester.

As in on-campus classes, coursework focuses on the development of technical and conceptual skills through readings, homework, groups projects, lectures and in-class demonstrations. Instructors combine asynchronous and synchronous media for different forms of interaction. They might assign a set of readings and post questions about them to a web conference, called a WebBoard™ . Throughout the week, students post responses and follow-ups, a form of discussion one instructor terms an "asynchronous shared experience." Other class WebBoards provide forums for posting class-related URLs, administrative information, reviews of related readings, etc. Additionally, LEEP-wide WebBoards provide a "virtual commons" for posting announcements, general information, and technical updates.

Instructors broadcast lectures using *RealAudio ™* . They lecture via this audio link while presenting an on-line "slide show" of images or overheads, created from existing URLs, PowerPoint® slides, or scanned images. A concurrently-running chat room offers a forum for questions and comments, including side conversations between students carried out in parallel to the virtual classroom activity (Ruhleder, 1999 forthcoming). Within the chat room, a "whisper" function allows for private conversation between individuals. All of this activity is text-based, except for the instructor's audio broadcast, due in part to the limitations of students' bandwidth. **Table 1** outlines key technologies and their uses.

Technology	Users	Features	Example
General WebBoards	all students faculty teaching assistants administrative staff technical staff	asynchronous text-based all may post all may read	An administrative staff member posts the new class schedule. A student asks about the availability of a specialty course.
Class WebBoards	enrolled students instructor	asynchronous text-based	The children's literature instructor posts weekly questions, and students post responses.

	teaching assistants	students+instructor post students+instructor read	
Class Chat Room	enrolled students instructor teaching assistants	synchronous text-based students+instructor post students+instructor read	Before class, a student asks about a copyright issues. Someone promises to send her a useful URL.
Audio Link + Web "Slide" Show	instructor teaching assistants students (for in-class presentations)	synchronous aural + visual all students hear & look instructor may speak & display	A TA periodically posts the next on-line "slide" of a scanned image during the instructor's lecture.

Table 1: LEEP Technologies and their Application

LEEP is representative of an increasing number of venues in which technologies enable people to intertwine real and virtual activities and to connect with both co-located and geographically distributed individuals. It serves as the fieldsite for several studies of on-going study of networked community, including work by Haythornthwaite (i.e., 1998) and myself. A team of graduate students and I have carried out participant observation of on-campus events, including the summer orientation and on-campus weekends. Additionally, we have interviewed instructors, staff and students, and have video-taped individuals at distributed sites during real-time audio sessions as they engage with others through LEEP technologies. To this we have added *virtual* observation by "attending" on-line courses through the same media which participants themselves define as the locus of interaction. Taken together, we are using these data to construct a picture of LEEP. In the next section, we draw on a model proposed by Mynatt, et al. (1998), to position LEEP within a networked community framework.

Modeling Network Community

Mynatt, et al., (1998) suggest three broad, defining features of community: that community is based on a *bounded, small-scale set of relationships;* that these relationships be *meaningful and multi-layered;* and that communities themselves are *dynamic and always under development.* They further suggest that one lens for the analysis of network, or on-line communities is the notion of *affordances,* particularly given the intertwining of the social and the technological which forms its community structures.

In the most general terms, affordances are properties of physical environments which support or constrain various forms of social interaction, introduced by Gibson (1977) who argued that people perceive the environment in terms of its actionability. In the case of network communities, this allows for a complimentary focus on the characteristics of both communication technologies and elements of the broader social structure which support certain kinds of human action while precluding others. An affordance can be both positive or negative from the point of view of the human user, depending on his or her purposes. For example, the lack of social context cues in text-based media can both be an asset and a detriment, depending

on the people using these media to communicate and the nature of their interaction.

Mynatt, et al. suggest a framework of five affordances of network communities which span technologies and uses in the Internet-based communities which they studied.:

- *Persistence,* in that they are "durable across time, users and particular uses, providing an ambient and continuous context for activity."
- *Periodicity,* which is "established and communicated through a variety of rhythms and patterns" within virtual and physical worlds.
- *Boundaries,* established through "mutually understood differentiation of units, from single to multiple, from proximate to remote."
- *Engagement,* in which "the social rhythm and density of engagement necessary for community-building," is enabled through diverse ways of coming together.
- *Authoring,* in which participants are able to "use and manipulate their space, whether as designers or users," through a broad range of flexible interactions.

In the sections below, this set of affordances is used to frame the arrangements, agreements, opportunities and limitations which emerge as defining characteristics of the LEEP program when viewed through this lens. They allow us to consider what makes LEEP "usable" to the participants, that is, how the features of the on-line environment created by the LEEP staff intersect with the needs, goal, and work practices of LEEP participants.

Application of the Model to LEEP

Persistence

Durability across "time, users and particular uses" offers a sense of continuity both across cohorts and across an individual's personal experience in a program which may take several years to complete. Of course, any discussion of persistence within LEEP must be understood within the context of a relatively young program. Nevertheless, there are some elements of the program which can now be traced over three cohorts, and which are likely to be maintained through the integration of the fourth cohort into LEEP. Persistence within LEEP comes from several sources, which serve as basis and backdrop for on-going interaction. It is maintained through a suite of LEEP technologies and the emergence of a set of common work practices.

Persistence of Technology

Action and interaction takes place through a set of synchronous and asynchronous "LEEP technologies" and, in particular, the LEEP WebBoards. The technologies themselves have changed over time. For instance, the first cohort used a MOO to meet with instructors and work in groups. Dissatisfactions with a text-only medium led to the current combination of RealAudio and chat. The look, feel and functionality of the WebBoards have also evolved over time. However, the *modes of interaction* within LEEP classes and across the program as a whole have stayed fairly constant, remaining primarily textual in nature for students, and coupling on-going asynchronous discussion with regular synchronous interaction. These on-line interactions are punctuated by face-to-face contact once each semester.

Persistence of Practice

LEEP technologies, artifacts, and work practices have also remained durable over time and users. Course homepages, set up by the LEEP staff, regularize the materials that form a class, providing links to a class WebBoard, chat room, syllabus and archive. Consistency of use and format is maintained structurally by facilitating staff support for specific uses of technology and forms of interaction. It is maintained culturally through emergent work practices. These clearly intersect, with technologies such as the WebBoard supporting particular ways of organizing activity. For instance, it has become common practice to begin a new conference for each topic/week under discussion, and to maintain a separate conference for announcements and course business. While the instructor creates the former (and receives complaints when this doesn't happen), the technical staff creates the latter when the original course web pages are generated. Consistent categories for LEEP-wide WebBoards have also emerged, providing an element of persistence in the public forums available to students, faculty and staff.

LEEP work practices and norms emerge around these on-line artifacts in a number of ways and contribute to a sense of persistence of behavior. Interviewees cite a "LEEP way" of doing things, which applies both to faculty and students. This "LEEP way" refers to a set of on-line interactional practices which reflect a deeper attitude towards community membership. For students, these practices include the ability to effectively participate in chat room and WebBoard discussions. For instructors, this means provide both certain kinds of on-line materials and certain kinds of on-line experience through their "appropriate" use of synchronous and asynchronous forums. Overall, the combination of particular technologies, configurations, and expectations about behavior combine to produce a certain sense of predictability when clicking on the LEEP pages and, in particular, when entering a LEEP classroom.

Periodicity

Rhythms of LEEP are driven by broader academic rhythms as well as by events specific to the LEEP program. Courses follow the same schedule as their on-campus counterparts. Instructors organize their courses around weekly readings, audio sessions, on-line office hours, etc., often following structures derived from on-campus versions of their classes. Postings on class WebBoards reflect course organization and rhythm. Postings on the general LEEP WebBoards are more frequent during the semester, than they are when papers are due or classes are not in session. Registration for courses and applications for financial aid are regulated by university guidelines for extramural students. As such, the virtual campus very much parallels the physical campus most students are familiar with through their undergraduate and prior graduate experiences.

Regular on-campus sessions have emerged as a mechanisms for maintaining students' sense of connection to each other and to the program as a whole. Originally designed as stand-alone events for each class, they have now become mid-semester, multi-day events incorporating face-to-face activities for all classes. They are coupled with social events such as a LEEP dinner attended by students, staff and faculty. Other events serve to maintain a sense of participation in the broader life of the Graduate School. For instance, the Dean "meets" with the students once or twice a year in the same way she meets with on-campus students to hear their concerns. She also conducts her annual salary negotiation workshop "live" for both on-campus students (live) and LEEP students (via RealAudio— also used to produce an archived version of her presentation).

Community Transition Points

Events marking entry into and exit from the community particularly serve to reinforce a sense of shared rhythm experience for the community as a whole. The initial LEEP event is the two week orientation or "boot camp" which takes place on-campus prior to the start of the Fall semester. It incorporates one of two required core classes with a set of technology workshops. With an increase in Spring semester admissions, a January orientation has been added. Orientation both shapes expectation and creates a common body of experience, often centered around adversity, such as late nights writing papers or struggling to learn the new technology. It also introduces students to the work practices of the community as they begin to incorporate the new technologies into their on-campus coursework.

The on-line graduation ceremony also reinforces this sense of periodicity and participation. Instituted the second year of the program, it links on-line students to the live ceremony. LEEPers who choose to travel to campus participate in the traditional way, walking down the aisle and receiving their diploma. LEEPers who elect to participate virtually hear the ceremony broadcast via RealAudio. At the appropriate moment, their names are read and their pictures projected onto a screen in the graduation hall. They can join other LEEPers in a graduation chat room, joking with each other as they listen to the ceremony. By enabling virtual participation in this ritual, the program sustains a key rhythm of academic life, that of entry into, maturation within, and final completion of a program.

Boundaries

While many portrayals of the Net cast it as a wide open communication space inviting connection between virtual strangers, LEEP interactions are tightly bounded. LEEP participants distinguish between community-wide and classroom activities, between interactions different with different audiences, and between the goals of their various interactional activities. Markers which facilitate these distinctions are often embedded in the technologies themselves. These virtual markers help individuals overcome the lack the physical markers present in face-to-face settings, which help people interpret experience and align themselves with other participants. Individuals must create their own boundaries between virtual classes and activities in the physical surroundings, requiring the commitment of colleagues and/or family members to recognize and respect their transitions in and out of on-line participation. Indeed, boundary maintenance is a recurrent theme among LEEPers in discussing the challenges of on-line participation.

Entry Points and Guideposts

LEEP provides an entry point through the LEEP home page. It is a structured space with access to information about the community (news items and links to people), organized activities (class home pages), on-going discussion forums (general WebBoards), and archival materials (past classes and guest speakers). Unlike traditional, face-to-face programs, LEEP can build in virtual space for past and/or concurrent events. Temporality as a form of boundary is thus transformed. While still used to create distinctions (last week’s class, the new cohort), the virtual nature of resources and activities loosens the temporally-bounded nature of relationship between them and LEEP participants. Archived class RealAudio sessions, for instance, are accessible at any time, can be listed to in any order, and can be interspersed with sessions from another semester.

Classes are distinguished by a nested set of boundaries, which draw the student from the top level (with gateways to all classes) down to the next level (choice of class materials and activities) down to the lowest level (configuration of specific activity-related space). The boundaries of a particular class are established in part through a uniform LEEP "look and feel" for the interface providing access to the course instructor, at which point the organization the instructor imposes on the WebBoards and that chat room provides structure for the class activity. For instance, the ways in which web conferences are laid out delineate appropriate topics and topic boundaries. In the chat room space, smaller sub-rooms allow for group exercise is called for and the "whisper" function allows students the ability to textually structure private experience. These technically created delineations shape the way in which students conceptualize and interact within the LEEP space.

Blending the Physicality and Virtuality

Aspects of the virtual space are shaped to approximate physical space. Earlier LEEP technologies in particular took this approach, with the MOO used in the first year constructed as a college campus with a GSLIS building. Within that building were a lounge, classrooms, faculty offices, and other spaces comparable to the GSLIS building on the UIUC campus. Classrooms had blackboards, faculty offices were outfitted with furniture, marking the virtual as an extension, but not a reconceptualization, of the physical learning environment. With the new technologies, this parallelism is less prominent, though the metaphors of bulletin boards and classrooms are retained.

Students must also negotiate physical and virtual boundaries at work and at home. For those who have access to computing at work, it may be possible to move between the LEEP space and the workspace periodically throughout the day. Students who attend class from home find that classwork may be embedded in family or other activities. People make dinner while listening to audio lectures, or miss parts of lectures as kids play choo-choo train or circus parade behind them. Boundaries formed by activity ("mother is in class now") rather than physical markers ("mother is not at home now") are difficult to convey to some family members, and virtual space embedded in busy physical space encourage forms of sidework which may detract from both experiences.

Engagement

Participants in the program engage faculty, staff, and each other through multiple forms of technology and on multiple personal and intellectual levels, forging a "social rhythm and density of engagement" that supports the building of community. Much of this engagement is necessarily organized around class activities and school-wide events. The technologies offered through LEEP enable both synchronous and asynchronous options for student and instructor interaction. The work practices which have developed around these media enable them to support interaction on multiple levels, sometimes simultaneously, with participants seamlessly interweaving task-oriented discussions, technical question, and personal exchanges. On the WebBoards, these discussion may move more slowly, with distinctly organized threads running for considerable lengths of time. The chatroom requires the opposite extreme of participants, who find themselves engaged in conversations woven together in real-time from multiple, overlapping and sometimes even intersecting threads. Students, staff and faculty thus come together in multiple ways for multiple purposes, with each opportunity for interaction supporting the others through

overlapping topics and reinforcement of community ideas and work practices.

Intersection with Face-to-Face

Engagement is organized around class activities, though students do take discussions and friendships "off-line" both in class and outside. The shared multilogues and private whispers of the chat room are key element of personal engagement between the members of the class. This engagement is strongly supported by, and perhaps even driven by, opportunities for face-to-face interaction. Formal face-to-face events include the initial two week orientation as well as the on-campus sessions. These sessions typically include the chance to carry out types of work that cannot be accomplished on-line. Some members who live near each other have also met face-to-face for social events, and alumni of the program have gotten together socially or professionally. In that sense, the program does offer possibilities for interaction beyond the classroom. Overall, however, engagement is task- and program-centered, and the distributed nature of the student body makes it difficult to engineer private face-to-face encounters.

Authoring

The extent to which authoring is possible depends on how one defines the ability "to use and manipulate" a particular space. LEEP participants have the ability to shape and construct on-line experience through their postings and through links to other materials. Instructors have some amount of leeway in constructing the interface to their courses and in shaping the in-class experience. However, the ability to manipulate the broader shape and nature of the space itself resides with the technical staff and with those who oversee the program.

Configurability

When LEEP first started, the primary form of real-time interaction took place in a MOO, where instructors both held class and office hours, and where student groups would meet for project-related discussions. The MOO offered an on-line re-creation of certain aspects of the Graduate School, including faculty offices for office hours and various classroom and meeting rooms. It also offers participants the ability to shape this space by creating shared objects and "decorating" offices. The move from the MOO to a chat room has eliminated this opportunity to play with space in ways which might be considered creative or fun.

Students still retain the ability to create personal extension of themselves by setting up their own web pages or creating elaborate on-line course projects, and many already have personal or work-related pages which often integrate multiple aspects of their lives. They can encourage instructors and staff to add or alter web conferences, or to change the structure of a course. They can also shape an on-line identity through the nature of their comments in the chatroom and postings to on-line forums. However, they cannot shape the classroom space or the LEEP space generally in a permanent way, and traditional roles of designers and the designed-for are retained among program students, faculty, and staff. This make LEEP a significantly different space from something like MOOSE Crossing (Bruckman, 1998), where the virtual environment is itself defined by personal efforts of construction, and where no real line exists between participant and designer.

Conclusions: Model as Common Vocabulary

Above, I have used a model proposed by Mynatt, et al. (1998), to present and explore particular

aspects of LEEP, a distributed, virtual degree program in Library and Information Science which casts itself as a community. As illustrated above, the model provides an effective framework of affordances for articulating aspects of interactions, artifacts, and expectations which shape a network community. It offers a language for talking about the organization of human encounters in virtual space. Of course, this is only a starting point for understanding the nuances of those encounters. Mynatt, et al., themselves go on to further develop a set of ideas around community development, and to suggest new avenues for research. Yet the above exploration highlights the utility of their framework for bringing out certain critical aspects of LEEP and similar "constructed communities" which are being created with the expectation of providing a certain set of affordances for their members.

The notion of affordances and the language of the model is particularly appropriate for LEEP, as the participants in this network community look to LEEP to help them achieve a set of instrumental objectives. LEEP thus becomes a tool for them, and one which is intended to teach them specific skills, foster their professional development and, ultimately, improve their employment prospects. What the LEEP program *affords* them, then, become of practical importance as well as theoretical interest. This model provides not only a springboard for further analytical discussion, but a concrete set of points from which multiple parties may engage in a discussion about specific program aspects and intentions, and the future design of constructed, actionable communities.

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Bibliography

Bruckman, A. (1998) Community Support for Constructionist Learning. *Computer Supported Cooperative Work: The Journal of Collaborative Computing*, Vol. 7, Nos. 1–2, pp. 47–86.

Estabrook. (1999) New Forms of Distance Education: Opportunities for Students, Threats to Institutions. Presentation at the ACRL National Conference, Detroit, Saturday, April 10. URL: http://www.ala.org/acrl/estabrook.html

Haythornthwaite, C. (1998). A social network study of the growth of community among distance learners. Information Research, 4(1). http://www.shef.ac.uk/~is/publications/infres/paper49.html

Gibson, J. J. (1977) Perceiving, Acting, and Knowing: Toward an Ecological Psychology. Hillsdale, NJ: Lawrence Erlbaum.

Koschmann, T. (1996) CSCL: Theory and Practice of an Emerging Paradigm. Mahwah, NJ: Lawrence Erlbaum Associates.

Levin, J., and Waugh, M. (1998) Teaching Teleapprenticeships: Frameworks for integrating technology into teacher education. *Interactive Learning Environments,* Vol. 6, Nos. 1-2, pp. 39-58.

Lombard, M., and Ditton, T. (1997) At the Heart of it All: The Concept of Presence. *Journal of Computer Mediated Communication,* Vol. 3, No. 2. http://www.ascusc.org/jcmc/vol3/issue2/

Mynatt, E. D., O'Day, V. L., Adler, A., and Ito, M. (1998) Network Communities: Something Old, Something New, Something Borrowed.... *Computer Supported Cooperative Work: The Journal of Collaborative Computing*, Vol. 7, No. 1–2, pp. 123–156.

O'Day, V., Bobrow, D., Bobrow, K., Shirley, M., Hughes, B., and Walters, J. (1998) Moving practice: from classrooms to MOO rooms. *Computer Supported Cooperative Work: The Journal of Collaborative Computing.* Vol. 7, Nos. 1–2, pp. 9-45.

Ruhleder, K. (1999, forthcoming) On the Edge: Learning through Sidework and Peripheral Participtaion in Distributed Settings. For presentation at the *3rd International Conference on Organizational Learning,* with the Academy of Management, June 6–8, Lancaster University, UK.

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