Creation and loss of sociotechnical capital among information professionals educated online

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Abstract

One goal of library and information science (LIS) education is for graduates to engage with the profession and interact with one another throughout their careers. The increase over the last decade in online distance learning options for LIS students presents a challenge to educators with respect to this goal: Are students who earn the degree online sufficiently connected with one another to encourage the growth of lasting and productive professional networks? This article examines this question by looking at creation and loss of sociotechnical capital among LIS distance education graduates. The findings indicate that LIS educators should consider sociotechnical capital issues at the individual, interpersonal, and cohort level to support shared, lasting professional contributions.

1. Background

While they were students, information professionals who earned their degrees in an online distributed learning environment built an online learning community together. In building the online community, the students also developed sociotechnical capital, which Resnick defines as "productive combinations of social relations and information and communication technology" (2002, p. 649).

Participants in online communities depart from those communities in various circumstances: the community was meant to end, or the individual drifts away, or leaves under negative circumstances, or is forcibly removed, or has gotten everything needed

from this community. Online learning communities are of particular interest in the study of departures because students who enter them know that the shared student experience should end at a predictable time. Unlike communities that expect to last forever, learning communities are intrinsically transient. When students graduate, an event most students anticipate happily, their shared experience changes. One characteristic of this change is a loss of sociotechnical capital. Sociotechnical capital loses its value for two intertwined reasons that may hinder future cooperation. First, members no longer engage in the sociotechnical practices in which they used their relationships and knowledge. Second, the social world in which those relationships and knowledge had meaning is either off-limits or dismantled altogether.

2. Problem Statement

The research question posed in this study asks: what happens to this sociotechnical capital when the community ends? The thesis of this paper is that when newly-graduated LIS professionals disengage from an online learning community, with all members disengaging around the same time and thus dismantling the online community, they leave behind social capital; and that because the social existence of an online learning community relies on ICT, the capital left behind is mostly sociotechnical. This research does not take the stance that the experience of online students is unique, nor does it attempt in any way to compare the online experience with the on-campus face-to-face experience, but rather focuses on the online experience since it is newer and increasingly common especially among LIS professionals.

3. Literature Review

Two primary areas of research literature contributed to the study reported here: online community departures and the intersection of social capital with information technology. Departures from online community are important because online students build and dismantle shared social worlds as they proceed through an ICT-supported distance learning program. As students build and dismantle their shared world, they transition from fellow students providing one another with emotional and school task support to professional colleagues sharing work practices and professional activities.

3.1 Online community departures

Studies over the past decade analyzed various aspects of online communities, their formation, maintenance, and effects on life offline. Fewer researchers of online community addressed what happens when members disengage from online communities. Fewer still examined disengaging in educational settings, so this review includes studies of departures in various types of online communities. Online communities designed for learning are not homogeneous, and may also differ from online communities in general in their infrastructure, administration, operation, and purpose. For many more details about the nature of those differences, the interested reader may begin study by consulting the volume edited by Barab, Kling, and Gray (2004), as well as one edited by Renninger and Shumar (2002).

Bruckman and Jensen (2002) addressed the accidental death of an online community called MediaMOO, which was not designed to be temporary, but ended for several reasons. Subgroups separated from the main group, splintering the community. The technology supporting the forum became outdated, primarily because the forum began in

1993 before the wide availability of graphical web browsers. The population of MediaMOO was not stable long term and was not replenished. The forum leader (Bruckman) decreased her participation in the forum, precipitating or hastening its demise. These findings indicate why communities that are intended for longevity end instead.

Kolko and Reid dealt with a different kind of "failure" in cyberspace (1998, p. 212), addressing intertwined issues of community failure and identity troubles. They concluded that "Losing any notion of the continuity of the self threatens community development, and the displaced and dispersed nature of virtual space reinforces the psychological fragmentation of the on-line self" (p. 226). Their conclusions addressed systemic issues inherent to the nature of collective activity online, and draw attention to issues of identity shift like those that occur when students become professionals.

Hampton (2003) focused on collective action by residents of Netville, a wired physical community, when the company supplying their high-speed Internet access abruptly withdrew the service. Residents used the online community to mobilize "real-life" collective action against the company. Over time, even with new high-speed access installed, residents relied less on ICT to connect with local friends. Hampton's findings about the loss of online community lead to questions about how online and offline activities intertwine in the trajectory of collective activities, like those among professionals who were once students together online.

Kazmer (in press) described the process of online students disengaging from their learning community when preparing to graduate. The twelve-step disengaging process

starts during the last semesters of the program and extends several months after graduation. Disengaging takes time and energy during the last months of participation, and shapes members' future relationships and activities. Her findings imply that support during disengaging can improve networks and shared practices among LIS professionals.

3.2 Social capital in ICT and sociotechnical capital

Social capital is an important concept in the study of ICT in general (Huysman & Wulf, 2004) and online community in particular (Blanchard & Horan, 1998; Preece, 2002; Quan-Haase, Wellman, Witte, & Hampton, 2002). Within the social capital arena, Resnick (2002) focused on sociotechnical capital, "productive combinations of social relations and information and communication technology" (p. 649). Resnick used constructions of social capital by Coleman (1988) and Putnam (2000) as bases for his work; in addition, Lin's (2001) explication of social capital informed the current work in the sense that it has a social network flavor (while not a social network analysis).

Resnick's work provides the primary analytical basis for this study of social capital in online community. His conceptualization of sociotechnical capital included six building blocks of sociotechnical capital (Resnick, 2002):

(a) removing barriers to interaction: ICT allow people to interact in places and times that would otherwise be inconvenient

(b) expanded interaction networks: ICT allow individuals to send and receive information from many people

(c) restricting information flows: ICT allow interactions where identities and other

personal characteristics may be hidden, and allow private interactions

(d) managing dependencies: ICT help people structure their work processes, independently and among groups

(e) maintaining history: ICT can store detailed traces of interaction and shared knowledge-building

(f) naming: ICT allow individuals or groups to represent their roles and identities

Resnick's conceptualization of sociotechnical capital also included five forms of sociotechnical capital:

(a) enhanced group self-awareness: histories maintained through ICT allow members of a group to visualize and analyze their shared interactions

(b) brief interactions: ICT make frequent brief interactions convenient enough to replace infrequent lengthy assemblies

(c) maintaining ties while spending less time: ICT allow individuals to stay tied to others via shorter interactions, multi-tasking while interacting, and/or occasional interactions

(d) support for large groups: ICT allows for coordination of effort, cooperative activity, and knowledge sharing among large numbers of people

(e) introducer systems: ICT can help connect people via semi-personal systems such as social network applications or group directories

Important points raised by the social capital and ICT literature contributed to the findings reported here (complete review of the social capital literature that does not focus on ICT

is beyond the scope of this article; see Adler & Kwon, 2002; Huysman & Wulf, 2004; Nahapiet & Ghoshal, 1998). Several concepts raised in the social capital and online community area acted as sensitizing concepts for this work. Preece (2003) highlighted the importance of trust in creating social capital in online communities of practice, implying the importance of exploring how carefully-built reserves of trust survive (or do not survive) the process of disengaging from online community. Cross and Borgatti (2004) pointed out that in the kind of information-sharing relationships that exist in online learning communities, a factor as basic as having access to other people is key to activating social capital. The quantitative portion of their study indicated that members' feelings of safety with each other are not significant in predicting information seeking. This finding suggests caution in examining assumptions about online learning communities as safe environments and how safety allows participants to act.

Quan-Haase et al. (2002) viewed online social capital as situated in a tapestry of online and offline activities, and of multiple kinds of relationships including friendship, kinship, and civic. Their findings helped shape the exploration in the current research of how students/professionals adjust communicative practices and relationship activities in a larger life context as they disengage from the online learning community. Blanchard and Horan (1998) highlighted the idea that virtual communities formed for educational purposes are places to examine social capital. Their distinction between physically-based virtual communities and distributed virtual communities draws attention to the ways online shared space contributes to the growth of social capital.

4. Intrinsic transience and online departures

Bruckman and Jensen (2002), and Kazmer (in press), highlight a distinction important to the research reported here: an online world can be transient or permanent. A permanent social world exists with an explicit or implicit assumption that membership has a long or lifetime term. While social worlds may segment or spawn subworlds, participants generally assume the social world will exist indefinitely (Strauss, 1978; Strauss, 1984). Many professions as social worlds assume permanence: barring catastrophe, a doctor will always belong to the social world of physicians.

In contrast to permanent social worlds are transient social worlds. Social world transience has three aspects that affect participants' activities and feelings in online community processes. First, transience may be inherent to the social world. Second, transience may be associated with the individual participant rather than the social world. Third, transience is not restricted either to co-located or to distributed social worlds, no matter what technology is used to support them.

The issue of transience versus permanence is important for this research because the online community studied was intrinsically transient. As with most online learning communities in degree programs, students approach this experience knowing it will not last indefinitely. Even so, students engage in resource-intensive and emotionally dense interactions during their time together.

There are many ways to bound the concept of intrinsic transience (e.g., How many people need to be involved? What are the shortest and longest time spans that are acceptable?). Here the focus is on two aspects of intrinsic transience: it is inherent to the social world and is mutually understood by all participants. Despite knowing from the beginning that

the community will be dismantled, participants engage in activities that build social capital.

5. Procedures

This analysis focused on the ways sociotechnical capital (STC) operates when distributed master's degree students in LIS prepare to depart from their online learning community. To do so, the researcher selected an online, distributed master's degree program; developed data collection methods; and analyzed the data as shown below. The content analysis of sociotechnical capital evolved from an initial grounded theory approach. During the grounded theory analysis, one dimension that emerged from the data was social capital; pursuit of this theoretical avenue via content analysis is reported on here (for a full report of the whole grounded analysis and the overarching model of online disengaging processes built as a result, see Kazmer, 2002, and in press).

5.1 Research setting

The master's level distance education option (called LEEP, http://leep.lis.uiuc.edu) offered through the Graduate School of Library and Information Science at the University of Illinois at Urbana-Champaign provided the setting for this research. To understand more about LEEP students and the world they occupy, it is useful to describe the basic operations of LEEP (for details about LEEP, see Haythornthwaite & Kazmer, 2004). Each summer, students begin LEEP with an intensive two-week on-campus session (called boot camp by the students). Students who attend boot camp together are called a cohort. After boot camp, individual students determine their trajectory through the program in terms of course load and course selection. As a result, some students

complete the degree faster than the majority of their cohort, and finish in as little as one year. Most students in a cohort finish within three years, with some taking longer (up to seven years) to finish. In the middle of each semester, students come to campus for required meetings, one day per course they are taking. Other research about LEEP indicates the face-to-face components of the program strongly influence students' experiences in the program (Haythornthwaite, Kazmer, Robins, & Shoemaker, 2000).

When LEEP students are away from campus, they use a variety of technologies including email, threaded web discussions, audio lectures, telephone and postal mail to support their course-related activities and social communication. LEEP also includes a synchronous component. Classes in LEEP generally include a weekly or bi-weekly synchronous session in which all students and the instructor gather in a chat room for discussion, during which the instructor can broadcast live audio to all students. Many classes in LEEP also require group projects. Students complete their first group projects during boot camp. Throughout their time in the program, working on group projects has a strong influence on each student's experience with LEEP (Haythornthwaite et al., 2000). When students have completed the program, students may participate in virtual graduation, a webcast of the on-campus graduation ceremony.

5.2 Data collection

Fifty-five semi-structured interviews were completed with 30 master's degree students close to graduating. Interviews averaged 75 minutes long and were completed by telephone, tape-recorded, and fully transcribed. Participants were identified by examining graduation lists, and by discussion with program administrators. Recruitment of

participants began in Spring, 2001, with short presentations to most LEEP classes during their March on-campus session. Further contact was made with LEEP students via email. Each student who met the requirement of being within two semesters of graduation (or intended graduation) was considered for the study. Every student who agreed to participate in the study was included.

Interviews began in June, 2001. Of students who graduated in May, 2001, six were interviewed once one month or two after graduation and again five or six months after graduation. Two May 2001 graduates were interviewed only once and did not respond to attempts to contact them for second-round interviews. These 14 interviews all captured post-graduation disengaging activities. Of students who graduated in August, 2001, eight were interviewed a month before graduation and again two or three months after graduation. Of students who graduated in December, 2001, 10 were interviewed a month or two before graduation and again three months after graduation. These 36 interviews captured disengaging activities that occurred during LEEP membership. They also captured changes that occurred in participants' activities, relationships, and emotions when they left LEEP. One student who intended to graduate in August was interviewed twice before graduating because that student did not graduate as planned. Three August 2001 graduates were interviewed only once and did not respond to attempts to contact them for second-round interviews.

The primary theoretical basis of the original data collection was grounded theory. The interview instrument was based on a grounded theory study of online community building (Haythornthwaite et al., 2000). The grounded theory that emerged from first

analysis of these data was a model of the online social world disengaging process (Kazmer, in press). Interview questions guided participants to talk about their experiences at the end of their time in LEEP (for complete interview schedules including rationales for each question and an extended discussion of the development of second-round instruments, see Kazmer, 2002). Questions emerged directly from the research questions and therefore from specific sensitizing concepts or theories; or, in keeping with grounded theory methodology (Strauss & Corbin, 1998), incorporated findings from the previous grounded theory study reported by Haythornthwaite et al. (2000).

Participants in this study were within two semesters of graduation. This created a broad range of time (measured by each student's stage in the master's program) for data collection. Talking with students during their ultimate and penultimate semesters shows the trajectory and acceleration of disengaging as it occurs over time. Also, it mirrors the prior study on community building in the LEEP environment, in which students were interviewed during their first two semesters.

Interview questions addressed preparation for post-LEEP experiences, and pressures and influences on disengaging from the LEEP social world and from other social worlds to which the student belonged. The first round of these interviews addressed disengaging activities that occurred while students were still in the program. The second round focused on disengaging activities that occurred after graduation. Interviews used the same semi-structured schedules for first- and second-round interviews, with slight adjustments to the wording to reflect the correct tense for a given participant (e.g., "What do you plan to do … " becomes "What did you plan to do …). Basic demographic and instrumental

data were collected to verify the participants were appropriate for this study (that they were students enrolled in the LEEP program who intended to graduate within two semesters or that they were graduates of the LEEP program who had graduated within the last two semesters) and to probe their attachment to, or engagement with, the LEEP social world. Second-round interviews were modified to reflect findings from the ongoing analysis of the first round. The modified interview schedule included three kinds of additional questions. One question verified whether or not the student graduated as expected, and why, to shed light on potential problems that prevent successful disengaging at a pre-planned time. A second set of questions allows tacit and explicit comparisons across interviews, asking participants to respond either to a similar question as in round one (tacit comparisons) or to compare current activities or emotions with their own remembrances of past activities, emotions, or expectations (explicit comparisons). Finally, some questions addressed new ideas that came out of first-round interviews. These concepts included social and sociotechnical capital accumulation and loss, faculty employment references, post-departure relationships with LEEP faculty and staff, graduation ceremonies and celebrations, and post-departure assessments of LEEP.

5.3 Data analysis

Original grounded theory analysis and the subsequent content analysis reported here were performed using the transcribed interviews and a FileMaker Pro database. One aspect indicated by the grounded theory analysis of these data was sociotechnical capital. The data were then re-coded and re-analyzed with a focus on sociotechnical capital, which is the content analysis reported on here. This analysis used 5 new codes developed from

Kazmer's (2002; in press) model of online social world disengaging that were related, as indicated by the literature described above that focuses on social capital in ICT-supported settings, to the concept of social capital: (a) reputations, (b) trust, (c) identity, (d) shared experience, and (e) technical expertise. Resnick's concept of sociotechnical capital provided 11 additional codes, based on the six building blocks and five forms of sociotechnical capital enumerated above. A random selection of the data was examined, using the final list of concept codes, by a second researcher. A summary of the highlights of this exploration of sociotechnical capital and online community departure follows.

6. Results

Participants encountered difficulties and opportunities stemming from leaving the community. Such difficulties and opportunities are intertwined with the ICT that students used to maintain the community.

The quotes from interviews in this section demonstrate how actual participants spoke about their LEEP experiences, and were selected because they exemplify sentiments expressed by other participants as well (i.e., they were selected precisely for their 'ordinariness', rather than for uniqueness). Quotes are identified by the pseudonym of the participant who made the statement. Pseudonyms reflect the gender of the participant. Some quotes contain the mark […], which means that identifying details have been removed from the quote in order to protect the anonymity of participants.

6.1 Reputations

Participants develop their reputations within the online community. Students in this study

were aware of their reputations, which included a range of instrumental and social functions. For example, some participants acknowledged their own reputations as HTML guru, capable project group leader, and social secretary. Jasper explains how his reputation shaped his experience in one of his last LEEP classes:

> This was a new group, and it was, basically people came to me. I don't know why, they weren't assigned. [B]asically they said that we wanted you, and right from the start, because not only was[sic] your web skills excellent but you tend to take charge of the group and mesh the group together. And that's what basically I did. I got the group together, made sure everyone understood their roles, and we went running out of the blocks. [Jasper, one week after graduating from LEEP]

Some types of reputation were built purposefully, while others arose from each individual's regular activities. Being aware of their reputations led students to be aware of losing those reputations when their time in the online learning community ended.

Reputation is different from identity; identity is attached to the person and his or her self-perceived and enacted identity, and is discussed below. Reputation attaches to characteristics of the student that they know others are aware of and that draw others to them, or that are proffered to third parties as information (Sarah tells Jane, "if you need help with topic X, you should certainly contact Amanda"). Reputation differs from identity in that it exists in a kind of third space around the person to whom the reputation applies. One can enact and feel an identity for oneself. Reputation holds sway only where there are others to hold it and act upon it.

Former students – in this case, LIS professionals – have a reputation in the online community but no longer belong to the social world that recognizes it. The value of that reputation may be slightly lower in some ways, for example, if fewer people think of a person when his or her area of expertise comes to mind. Reputation still exists among what remains of the social world left behind and among dispersed former members. Olivia indicates that she knows her reputation will last beyond the end of LEEP:

> You can really bond with people and you can really make enemies too by hurting people's feelings. And re-doing their work. Which, it's hard because the librarian community is very close-knit. You know, it amazes me when I go to events the people I run into. And I know I'm going to run into people in the future, and somebody's going to think well, she re-did my work, or they're going to have this impression of me. And it's kind of a harsh reality, but you try to be as nice as you can about it, and go from there. [Olivia, one month before graduating from LEEP]

There are two ways that reputation is lost in this setting. First, the social world that remains after one person departs will on occasion still recognize an individual's reputation but have no way to access that person or that person's knowledge. Second, when the social world is dismantled, the social processes though which reputation best functions – Sarah suggests to Jane that Amanda can help with Jane's problem – cannot be enacted because the people concerned are no longer communicating regularly.

6.2 Trust and situational friendships

Participants in this online community establish trust in other members, and others gain trust in them. LEEP students develop fast friendships and with them, fast trust. LEEP's boot camp creates a culture in which people purposely keep themselves open to making new friendships.

After online learners disengage, they are in a position where they have built trust with fellow students, but have few reasons to call upon it because they no longer share tasks. They are no longer in a circumstance where they must rely on one another for group work in which every person's grade depends on the performance of each group member. Even if they call upon one another for assistance, there is little trust necessary (other social factors come into play that make LEEP alumni willing to contact one another, see below) because they are no longer dependent on each other and are no longer in a position to inflict significant damage on one another's life goals if trust is breached.

6.3 Identity

Members construct their identities within the online community: whether they are sociable or shy, what kind of workplace knowledge they can contribute, whether they tend to initiate or respond to discussion, etc. These identities in turn become key components of participants' sociotechnical capital. When people join a new social world they assume the identity of a participant in that world but their new identity does not necessarily remain static. Members engage in ongoing adjustments to their identity. People move from being novices to experts, from excited beginners to jaded veterans. Brittany speaks from the perspective of jaded veteran, and also highlights the importance of individual identity in the online classroom:

I'm not being evaluated independently, except my class participation […]. And even when we are, the professors are really funny because they don't call us by name. Seriously, they'll say "someone said" or "someone asked," they never refer to us by name, even after we've had the on-campus. […]I find it really fascinating that they want to put a quarter of our grade as class participation but they don't acknowledge who we are as individuals. The other class is requiring an excess amount of work on an individual level. [S]o I've got one where it's this group situation that I keep feeling like I'm not participating enough, and I'm not being evaluated as an individual. And this other one where it's all on me, and it's really really huge.[…] It's the first time I've had classes with people who are new to the LEEP environment. [Brittany, one month before graduating from LEEP]

Several months after departure, participants have incorporated their identity as alumni of the online program into their professional and personal identities. At work, they act as contact points for prospective students. Alumni view their responsibility in recruiting to protect the program and the prospective student. They take care to screen potential applicants by discouraging people they believe are less likely to succeed from entering the online program. Conversely, they feel obligated to share honestly with prospective students the potential hardships of membership. Ex-members also act as technology gatekeepers, taking pleasure in demonstrating distance learning technology to others.

At the same time, after departure, graduates work to recapture aspects of their former selves, reasserting the identity they had before participating, as Evelyn describes here:

I've actually been rediscovering all of my old hobbies. I used to cross

stitch when I was in high school and I took up a project for my, well, it

was supposed to be a birthday present for my brother, but I anticipated that

it would take less time. I started tap dancing, I used to dance when I was in

high school and I went back to that. And I can finally, I always gardened

while I was in LEEP, but usually what happened was my husband ended

up having to do all the work. I'd make the plans, and I'd really try to do it,

but he'd take up the slack. So this spring I'm the one building the shed.

[Evelyn, three months after graduating from LEEP]

6.4 Shared experience

The shared experience of community building in LEEP, accomplished through the shared

trials of boot camp, is key to developing social capital. After departure, participants lose

their shared experience. While disengaging, being out of pace with one's cohort – being

faster or slower to finish the program – reduces sociotechnical capital. By this point in the

process, the long-ago memory of boot camp is not enough to sustain a sense of shared

experience. Sharing the here-and-now is hard when one is lagging the cohort, and thus

immersed with new cohort members struggling to maintain their own shared experiences.

It is also difficult when one is leading the cohort, going through a job search and the

emotional trauma of separating from the online program while most of the cohort is still

enjoying the warm glow of community.

Data in this study indicate that participants feel tied to the online social world, its culture

and their identity as a member, both during and after membership. Broader institutional

factors, such as the high reputation of this program among members of the profession, contribute to such ties. Such engagement with the social world is in addition to specific interpersonal relationships among students. Lorraine explains how this sense of belonging continues after graduation:

> And it also gave me inroads into that whole colleague connection type
> thing. That has been really cool. Because I know that no matter where I go
> in the U.S., there is a good chance I'll know somebody locally. And that
> has been one of the best parts of the LEEP program. It's that kind of
> national connection. I don't think you could get that in any other kind of
> program. I know that I could go to a national conference and find at least
> somebody who knows somebody. It really opens your eyes to the web
> that's out there, not the Internet Web, but the web of people connections
> that are out there. Because you know somebody who knows somebody
> down the line kind of thing. And when you're in a program that is that far
> spread, geographically speaking, it just becomes more obvious. [Lorraine,
> two months after graduating from LEEP]

Members who disengage successfully from the online community separate from the cohort, finishing membership in this world and starting membership in the next as an individual. Evelyn provides a concrete example of this separation, where a failure of technology policy underlines her emotional readiness to leave her cohort:

> I was included in a mass email by my cohort that they sent out just before
> the spring session, the spring visit, talking about a get-together because

our group always got together. And […]I think there were two of us who graduated, so they said something about that we'll be there in spirit. So I emailed back, and every single email bounced back to me. And I never got around to like emailing everybody again. I did post my alumni address once, but I'm not really sure what happened. So I made the attempt but the technology failed on me. […] but that doesn't really bother me cause I'm sure we'll keep in touch anyway just not as frequently. [Evelyn, three months after graduating from LEEP]

In 2001 and 2002 when these data were collected, policies for email forwarding for university alumni were newly-formed and in flux. Evelyn's overall confidence that she will be able to contact her friends again, or that they will find her, reflects her comfort with technology in that failure does not faze her. A technology failure is a temporary setback and will be surmounted over time.

Cohort members build a mutually beneficial learning world in which members proceed through many of the same classes, share similar experiences, and learn from one another. Though each member works toward the goal of graduation, most also focus on the progress of the cohort. When members start to disengage, many of the factors described above indicate members' shifting attention away from the cohort and its learning goals to their own individual achievement.

6.5 Technical expertise

By the nature of online learning, members of the LEEP community build extensive knowledge of many technologies and their implementation within the online

community. ICT play a tripartite role in this and many other online learning communities: a) ICT are used to deliver course content, b) ICT enable and support interaction among students, and c) ICT are an object of study.

Former students say technology skills and knowledge developed during membership provide more help to them than does continued use of specific programs and equipment. Of participants in this study, many elected to earn their master's degree online because they felt they already had significant technological expertise. Membership in the online community builds on that expertise in three ways that contribute to sociotechnical capital. First, members learn about functioning in an online environment made through technology, rather than just learning about technology. In this online environment, members use technology to sustain relationships long term. Second, members rely on technology for mission-critical tasks such as coursework and online class sessions. Knowing how to use technology to support mission-critical tasks helps them when looking for jobs, working in new positions, or assisting others in technology use. Third, alumni can explain and demonstrate that they understand not just how technology operates but the potential problems, benefits, and issues that might arise for users. Martha provides an example of how these aspects of sociotechnical capital are improving her work situation four months after she graduated from LEEP:

> And I mean one of the frustrating things about being a highly experienced
> [paraprofessional] is you know a great deal, and you have this huge wealth
> of knowledge and skills, but you really can't exercise it, and you have very
> little decision-making, I mean, you're really not empowered very much.

And it can be pretty frustrating. […] And now I'm starting to be added

onto, you know, I've got a few committees that I'm on now, and I've been

able to work in an advisory role on a technological issue that other

librarians were having trouble kind of getting their minds around, but I

seemed to be able to understand it. So I feel, not only am I making more

money, but I feel like I'm actually helping make my environment a much

better place. [Martha, four months after graduating from LEEP]

Using online learning technologies after departure helps smooth the transition to

generalized technological expertise. When exploring new technologies at home or at

work, former participants look to familiar implementations within the online community

as a basis for comparison and understanding. As they continue talking about Internet use,

many participants say they experience a change in location or type of use rather than a

change in quantity. That is, they use the Internet more at work and less at home, changing

the location where they use the Internet but not the total time they spend online. Also,

they add a greater variety of specific technologies to what they already perceived to be

fairly sophisticated Internet use. During online community membership they may learn

Web site creation or interface design, and add these activities to their technological

repertoire. Participants make their Internet use more directed and focused, using the

Internet for research rather than recreation.

6.6 Bases and forms of sociotechnical capital and disengaging

In addition to the five concepts that emerged from the grounded theory analysis and

directed attention to social and sociotechnical capital, the interview data were coded

using eleven codes derived from Resnick's discussion of sociotechnical capital. Analysis indicated that the building blocks of STC were available to participants in this online community, and that students built STC in acknowledged and novel forms.

Technology removes barriers to interaction among students and decreases barriers to interaction between students and faculty. Students are able to interact in multiple media and many modes (one-to-one, one-to-many, synchronous, asynchronous, etc.) with one another and with their instructors.

Participants in the online learning community frequently mentioned the trace of activity maintained by the technology. Students continue to use LEEP technology after their departure, when possible. Instrumentally, they use technology resources (email, web server) as long as access continues. Intellectually, they log on to the Web discussion boards and use content from there to keep in touch with other alumni and newer students, and sometimes to help them at work. Students refer to the online content as a knowledge base they feel happy to use as long as they have access. Some former students take a kind of job they did not expect, and need to refresh their memories about courses that seemed less important when they were students. They return to course materials, such as lectures and group projects, that might help in their new jobs. Hillary explains how she plans to use the LEEP trace of activity in her professional life:

> I'm still using, going back and listening to some old recordings of course
> work for classes. When I think, oh, now how was that done again? And I
> plan on continuing to do that once I start my new job, using all of that as a
> base of knowledge that I can continue to go back to. At least for as long as

it's still there. [Hillary, three months after graduating from LEEP]

Forms of sociotechnical capital emerged as well. Students disengage from the online learning community (which for them is primarily their cohort) and move to a larger social world of information professionals and LEEP program graduates from all cohorts. The sociotechnical capital built during membership in the online learning social world helps this larger social world function using ICT as the primary mechanism for interaction.

The importance of face-to-face experiences in LEEP, as well as online interaction, continues even after graduation. Students and alumni say they maintain their pattern of occasional face-to-face meetings. Some meet under the auspices of professional conferences. Others network professionally with other physically-local LEEP graduates. Dagmar provides an example of relationship dormancy that is activated via face-to-face meetings:

> One of our other classmates [who had graduated earlier] I ran into at [a professional conference] last fall, I guess it's in November, and that was a fun thing, because then we could, even though, again, we hadn't seen each other for six or eight months, it seemed like we knew each other very well, just as well as somebody who worked together on a daily basis, side-by-side. So, and I guess, the, I do expect that we'll be able to continue keeping in touch with people, and more through opportunities for professional development at the same time, as well as whatever is happening with you in the email. [Dagmar, one month after graduating from LEEP]

The ICT they used during their time in the online community, their comfort with approaching each other via mediated communication, and the social capital arising from a shared identity as former LEEP students combine to create the sociotechnical support for the new large social world of LEEP alumni.

7. Discussion

This research indicates that when departing from online community, participants experience changes that can be analyzed and explained in terms of sociotechnical capital. Viewing these changes allows them to be seen as losses but also as opportunities for participants' future interactions.

While students built the online community, they built social capital with other members, allowing them to trade knowledge and help with trusted others (Quan-Haase et al., 2002; Resnick, 2002). When disengaging, members lose identity and social capital they worked hard to create within the online community. They cannot easily transfer that identity to another world, as no other world will have exactly the same technologies or tasks. They have accumulated social capital within the online community, but while disengaging have lost the world in which that social capital had value.

7.1 Identity

Two facets of identity are important to these online learners: enacted identity, i.e., what identity a person is projecting; and internal identity, i.e., who the person feels they really are (Haraway, 1991; Turkle, 1994). Identity can be enacted by how people represent themselves in what they say and do, and how they speak and act (Goffman, 1959). When

in school, one acts like a student; when at work, one acts like an employee or professional or colleague; when at home, one acts like a spouse or parent (see also Merton, 1957). These roles are not purely location dependent or location specific, and sometimes overlap: someone may interrupt a business meeting to take a telephone call from a sick child, or draw professional knowledge into the classroom. Internal identity is the vision of self in the mind, no matter what the person is actually doing.

Enacted and internal identity can be different. For example, in this online learning world, people are students who are going to be professionals, but at some point while they are acting as students by going to classes and taking tests, they begin to feel like professionals. Their enacted selves are out of synch with their internal identities. Participation in this online community means creating and using both kinds of identity, which are not always the same as each other and do not stay the same over time.

When participants disengage from the community, the idea that "identity includes affiliation and separation" becomes important (Quinnan, 1997, p. 116). When acting out an identity, people reinforce affiliation by enacting the identity they want, and reinforce separation by not performing any actions of an identity they do not want.

A distinction important to separation is between non-involvement and past involvement. While disengaging, students separate themselves from the identity they worked hard to create, maintain, and adapt while they were in the online world. After their departure from the online community is complete, individuals use separation to indicate non-involvement, and to indicate past involvement. People separating from a social world create new identities in relation to that world while they change from active to past

participants. Past participants may incorporate their old affiliation into this identity after separation in order to distinguish themselves from non-participants.

Under some circumstances, helping participants recoup losses of identity may provide an opportunity for the organization supporting the online community. For example, people have developed identities in online games and sold the characters for real money to other players. Developing powerful characters in games takes time and expertise, and new players will pay for status in the game with money rather than time and practice (Castronova, 2004; Slagle, 2002).

For many online communities, retailing of identity is impractical, unethical, or not useful. However, this online gaming example demonstrates that people do attribute value to online identity. One way to leverage such value in an academic setting could be to provide additional venues such as alumni clubs in which members can use their online identities with familiar others. The value of online identity could also drive productive future contact among members. For example, researchers who work on a project together develop trust and knowledge of one another, and when the time of disengaging arrives they might therefore choose to work on another project together. In doing so, they eliminate having to build trust and knowledge with a new set of virtual co-workers. The imminence of social capital loss while disengaging has thus prompted additional productive work.

7.2 Cohort

When members join LEEP they create an interdependent learning social world. According to Glaser and Strauss (1971), such interdependence makes it a collective

world (see also Ashton & Levy, 1998). Glaser and Strauss contrast this with an aggregate world, where individuals proceed through a similar passage with little knowledge of or interdependence on one another. Findings from the current study suggest the disengaging process entails a shift from the collective to the aggregate, and that this shift helps mark successful disengaging. Although the cohort shapes members' experiences in the online community, for them disengaging means disengaging from the cohort, not disengaging from LEEP with the cohort. The shift from cohort to individual highlights the way an academic degree is ultimately an individual rather than a collective achievement (Arrow et al., 2000).

The process of online community disengaging for a cohort indicates that cohort leaders, who often finish the program in about a year, start to leave first. Most of the cohort remains, working within a basically intact online community, for another semester or two. At that point, most students from the cohort begin to disengage, in preparation for departure at semester's end. As they disengage, the online community gets dismantled. Participants shift their focus elsewhere, decrease communication with fellow members and pay less attention to social world activities, causing the online learning world to decline. Participants stop contributing to the community because they stop needing it; they have shifted their locus of support away from their fellow online learners and toward family, friends and co-workers in other face-to-face and online settings. Finally, when the majority of the cohort depart, the online community simply vanishes. The few students who lag behind their cohort spend their last semesters isolated, not privy to membership in following cohorts' communities but not having anyone with whom to share their own

experiences.

The form of STC that can manifest via "enhanced group self-awareness" (Resnick, 2002, p. 660) was not clear in findings from this study. This may have been an area where the research process interfered with the natural course of events for the online community. Second-round interviews indicated that students who participated in first-round interviews had increased awareness of themselves and their cohorts. Before participating in the research many students were already working through their own individual disengaging processes. After being interviewed they were also aware of the disengaging activities happening throughout their cohort. Cohorts began to create an electronic trace of their disengaging by taking leave of one another in public webboards, using multi-recipient emails to arrange final meetings, and ensuring continued one-to-one electronic contact.

7.3 Interpersonal ties

The culture of LEEP encourages students to welcome new friendships, much like the culture of transient resort workers described by Adler and Adler (1999). These friendships deepen more quickly than those between people who are assured of having extended time together. The rushed time frame is not the only reason online learners and transient workers bond quickly; they also share "differences … from more conventional others" in their lifestyles and values, and this commonality allows them to form friendships easily (Adler & Adler, 1999, p. 47). Adler and Adler use the term "situational friendships" for relationships between transients based on the unusual circumstances they share (1999, p. 47). Participants exit situational friendships easily. When transient resort

workers move on to their next job, they slip out of the close friendships they have made and quickly make new ones in the new location. Online learners also slip away from their situational friendships when they disengage from the community.

Students expect their careers to benefit from the social ties they made during their time as members. Social ties include not only close friendships, but also acquaintanceships, respect as a result of shared group projects, or simple name-and-face recognition from having been in the program together. During membership, people primarily interacted with and relied on a close circle of friends within the online community. After departure, participants shift what they say about former members to indicate a broader pool of available support than only their close friends. Former members believe that they could contact any former member of their cohort for help with job- or profession-related questions. They assume that the tie of going through the same online program provides sufficient basis for such contact, even if they interacted little during membership.

Relationship dormancy is afforded by the availability of, and familiarity with, ICT (Resnick, 2002). Students who maintain friendships via frequent ICT-supported interactions make the transition easily to dormant relationships where they exchange email as needed (Kazmer, in press). Such changes in footing (Goffman, 1959) take direct advantage of the technology affordances. These changes in relationship footing are extremely important to these students, their ability to disengage, and the usefulness of their ongoing professional networks.

8. Limitations

The findings from this research are subject to several limitations. The study is descriptive rather than predictive, and based on one narrowly-defined case. The processes identified focus on adult distance learners, and the graduate-level population differs from the general population in several ways that may limit generalization. LEEP students have completed an undergraduate degree and have been chosen for the LEEP program because of evidence of self-motivation and the ability to succeed academically. This research concentrated on a specific life event for a specific population. Factors such as age, marital status, education, race, etc. were not accounted for a priori either in participant selection or data collection. This research did not undertake any comparison with other populations, including other online or offline social worlds.

The findings of any study based on LEEP, including the one reported in this article, are unavoidably influenced by the extensive influence exerted by the face-to-face components of the program, the synchronous online class sessions, and the frequent assignment of group projects in LEEP courses. Any use or attempted generalization of findings about LEEP must account for these idiosyncratic and powerful aspects of its unique flavor of online education.

While this paper makes few claims for generalizability of the findings, the exploratory case study is descriptive of the phenomenon of sociotechnical capital in an online learning community and implies certain future activities for researchers and educators.

9. Conclusion

Design of online experience is both technological and social (Bresnen, Edelman, Newell, Scarbrough, & Swan, 2003; Preece, 2000). The findings of this study have implications

for both aspects of design. Maintaining a history of the shared experience of those who have left an online learning world means addressing prosaic technology problems. The easiest is storage space, which is inexpensive but not completely negligible in cost or in maintenance. More difficult is the organization of increasingly large collections of materials, which necessitates the design of organization schemes for repositories of virtual experiences – not just documents – in many formats and media (Buckland, 1991; 1997). Maintaining such a history brings to bear questions of policy and privacy about how such materials are stored and accessed (Lynch, 2002).

Participants in this study indicated that after graduation, they need to be able to blend technology with a different aspect of day-to-day life than they did while they were students. Technology was associated with at-home education activities; after graduation, technology must blend instead with at-work professional activities. Technology needs to blend with work standards by not running afoul of bandwidth limitations, firewalls, or download limits. So, perhaps a webboard coffee house is a better option than a VR coffee house for maintaining an alumni community. Technology also must blend with work environments; thus perhaps text chat rather than streaming audio is better for those in shared office environments. As well, maintaining a professional network of colleagues must become a continuing social norm that is also an intrinsic part of work behavior; the social norm pairs with the technological affordance to provide the sociotechnical benefit.

Part of the design of an online social world is creating behavioral norms. Attention to disengaging and social capital indicates that behavioral design should focus on personal expectations of how brief and infrequent interactions can maintain a relationship post-

departure. As well, such norming can address the process of footing changes and how to negotiate them. Some steps are administrative, such as making email forwarding and file transfer procedures clear and easy. Some are more social in nature, such as preparing people for the shift to personal norms of communication (e.g., frequency of email, tendency to stay on-topic or stray) once the online community's norms no longer hold sway.

LEEP has instituted some sociotechnical practices, including virtual graduation, alumni discussion boards, and LEEP Virtual Reunions, to allow its graduates to maintain their social capital. After data were collected for this study, university procedures for email forwarding were substantially clarified. LEEP graduates can not only keep in touch with people they knew, but with other LEEP graduates. As well, they can maintain an infrequent but useful connection to the new technologies and practices that are added to LEEP over time.

Allowing graduates of online LIS programs to maintain the social capital built during their time as students is important to the LIS profession, whose ongoing vitality relies on collective activity and interaction through professional communication. Adapting social capital over time, and away from the setting in which it was built, requires attention to social and technical factors. It entails providing technological infrastructures that are supported (and not undermined) by administrative procedures, that mesh well with social norms established by distance students, and that articulate successfully with work settings and the needs of the LIS profession.

Acknowledgments

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