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Assembly required: Self-employed workers' informal work-learning in online communities

by

Terrie Lynn Thompson

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Examining Committee

Dr. Margaret Haughey, Educational Policy Studies

Dr. Janice Wallace, Educational Policy Studies

Dr. Tara Fenwick, Educational Policy Studies

Dr. Alison Taylor, Educational Policy Studies

Dr. George Buck, Educational Psychology

Dr. Lesley Farrell, Faculty of Arts and Social Sciences, University of Technology, Sydney, Australia

Abstract

It seems that for many people, spaces on the web are an integral part of their lives. This may include seeking out learning opportunities in online communities. There is plenty of buzz about these cyberspaces whether they are part of new social media configurations or commercialized product-related spaces cultivated by enterprises. It is important to explore how online spaces may—or may not—create new locations of educational possibilities for workers. The subtle, and sometimes not so subtle, fusion of these technologies into work-learning practices warrants attention.

This research project focuses on online communities as sites of learning, with an over-arching question of: How do self-employed workers experience informal work-related learning in an online community? Community can describe a gathering of people online that is organic and driven by a shared interest. These online spaces may also be purposefully nurtured by professional associations, workplaces, or businesses. This research project focuses on these spaces—*outside* the auspices of formal online courses.

I draw on Actor Network Theory (ANT) to explore how work-learning is enacted in online communities and the implications of the intertwining of people and objects in multiple, fluid and distributed actor-networks. I also use the notion of legitimate peripheral participation from Situated Learning theory to explore how different possibilities for learning are shaped by locations and trajectories within a

work practice and larger community of practitioners. Data was collected by interviewing 11 self-employed workers and then "following the actors" as objects of interest surfaced.

This dissertation is a collection of five papers as well as introduction and conclusion chapters and a background chapter on ANT. Findings explore notions of online collectives shifting to more networked configurations, the complexity of work-learning practices unfolding in multiple spaces, contradictions between Web2.0 rhetoric and practices as different associations with knowledge and novel ways of knowing are enacted, and questions about the politics of technology that emerge from uncertainties around delegation, invisible practices, and necessary literacies. Given the need to pull objects out of the background and into critical inquiry, I also explored how a researcher "interviews" technology objects as participants in a study.

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I am especially indebted to my participants who so willingly shared their stories and experiences. This study explores our material relations with objects and so it is fitting that I acknowledge the role that they played in this endeavour: the delete button and chocolate spring to mind! While I will no doubt remember the many hours spent working in my office at home, this dissertation also unfolded in conversations and scribblings in coffee shops and cafes, on trains, in art galleries and airports, during long walks, while gardening, and in a myriad of online spaces, drawing on whatever media was closest to hand: somehow this odd collection of bits and pieces ended up drawn together and re-presented in this document.

Finally, I am most appreciative of the financial support provided by the Social Sciences and Humanities Research Council of Canada (SSHRC), the Killam Trusts, and the University of Alberta. This support enabled me to be a full-time Ph.D. student and it was indeed a privilege to have the space to immerse myself in every moment of this experience.

Table of Contents

Conclusion Chapter

Appendices

Introduction Chapter

Introducing the Research Project

The scale of collectives online is astounding. Yahoo (2008) alone reports over 113 million members in 9 million groups. There is plenty of buzz about online communities whether they are part of new social media configurations, such as Facebook, LinkedIn, or Twitter or commercialized online product-related spaces carefully cultivated by enterprises. Online communities appear to offer something: socializing, networking, support, business opportunities, or social activism. For many people, spaces and places on the web are part of their lives. But what practices in and around these spaces come to be labelled as learning?

Compared to a Google search, engaging in an online community is a different way of being online and a different practice of relating to knowledge and to others. Despite interest in building online community, and its perceived importance to learning, our understanding of how people engage in these cyberspaces remains murky. Although the term "online community" is applied to a myriad of online configurations, there are differences. Some online communities are structured, as in an online course, complete with tightly bounded membership and purposeful design strategies to attain desired learning outcomes. Because much of the online community literature is situated in these kinds of spaces, there is a need to better understand the more emergent online communities outside the purview of formal education, spaces not yet well researched (Gray, 2004; Ross, 2007; Sloman & Reynolds, 2003).

Beyond the walls of formal learning spaces, there are compelling examples of vital, self-managed, thriving, knowledge-creating communities, open to all (McLoughlin & Lee, 2007). Community can describe a gathering of people online that is self-managed, organic, driven by a shared interest or need, and highly social (i.e., Boyd, 2006). These online communities form because someone is interested in talking about a topic and searches for others on the Internet who are also interested. These kinds of spaces may also be purposefully nurtured by professional associations, workplaces, or businesses. This research project focuses on spaces such as these—spaces *outside* the auspices of formal online courses.

Online configurations are evolving, in part because of new technologies, but also because of different relationships individuals are seeking with both people and objects. Because the Internet has become an everyday technology, we often do not think twice about the complex work that goes into "being online". Introna (2007) writes that folded into the "nexus of human and technology relationships are (un)intentions, (im)possibilities, (dis)functions, affordances/prohibitions that renders possible some ways of being and not others, that serves the (il)legitimate interests of some and not others" (p. 15). Given this ambiguity, there is reason to be cautious about how new relationships between people and technologies are changing ways of knowing.

Waltz (2006) writes that mythologizing the Internet with claims that it revolutionizes social intercourse "inhibits a more careful accounting of how nonhumans interact with the full scope of other participants with which it is involved" (p. 57). Waltz's statement reflects the contemporary turn to the relational and material. Postings, RSS feeds, avatars, archives, Facebook profiles, viruses, an online CV, Google, computer screens, the delete button: online learning practices are caught up in and shaped by artefacts such as these. Pels, Hetherington, and Vandenberghe (2002) proclaim that objects are back in strength: "Talking to intelligent machines … being glued to mobile phones, roving around in cyberspace … is to mingle our humanity with not-so-mute, active, performative objects in a way which we find equally fascinating as disconcerting" (p. 1). Yet, it seems that things are often overlooked as incidental, rather than problematized and enlisted as important participants in qualitative research projects.

It is not surprising that workers are clicking their way into all sorts of cyberspace networks. Edwards and Usher (2008) suggest that information and communication technologies (ICT) enable new forms of knowledge production, connections, and opportunities for learning. The most heralded shift of web technologies is a re-positioning of people from *consumers* to *producers* of information and knowledge. The emphasis is on creation rather than consumption of information, collective intelligence that harnesses the power of the crowd, decentralisation of content and control, and fostering of communities (Anderson, 2007; Madden & Fox, 2006). Although *Web2.0* is an imprecise label, it points to the emergence of the "participatory Web", including social software, which Alexander (2006) describes as a group of applications and services that are "especially connective" (p. 33). The importance of ICT in adult learning is reflected in government reports, such as this statement from a European Commission Report which declares that "a new vision of 'ICT and learning' is needed that takes into account the shifts that are transforming the way people work, learn, make sense of their world and have fun in a digitized, networked, and knowledge-based society" (Punie & Cabrera, 2006, p. 9).

Of interest in this study is informal work-learning. Not only does much work-learning happen informally (Hughes, 2001), informal learning and work have become important in adult learning research as well as government policy debate (Sawchuk, 2008). In 2003, Statistics Canada and HRSDC reported on informal learning for the first time in the *Adult Education and Training Survey*, signalling that it is noteworthy to policy makers. Organizations are also paying attention. Bratton, Helms Mills, Pyrch, and Sawchuk (2004) write that informal learning "is now often considered a key job activity and perhaps even a major asset of the corporation" (p. 170). Informal learning and ICT are often intertwined. Sophisticated web-technologies, such as Web2.0 and social media, are believed to accelerate more connected and social forms of informal learning (Wihak & Hall, 2008). In the *Development and State of the Art of Adult Learning and Education* report, prepared by the Canadian Council of Ministers of

Education for the 2009 UNESCO adult education conference, priorities include increased awareness of the importance of informal learning alongside growth in the use of ICT for this learning (CMEC, 2008). Yet, the use of technology for informal learning is greatly under-explored (Hague, 2009).

There is much to learn about how web-based technologies are changing informal work-related learning practices. While many studies acknowledge the influence of technologies, few probe how they redefine everyday learning activities and require working adults to re-negotiate the material, social, and political aspects of online spaces. Despite the rhetoric, it is important to explore how online spaces may—or may not—create new locations of educational possibilities for workers. The subtle, and sometimes not so subtle, fusion of these technologies into work-learning practices warrants attention.

Workspaces are increasingly becoming hybrid spaces—temporally, spatially, and relationally—and the self-employed workforce is often perched precariously on the leading edge of these changes. Markedly different from the conventional workplace, their workspaces have undergone tremendous changes in the wake of a renewed lifelong learning discourse, quantum changes to technologies, and reorganization of work. Yet, Edwards and Nicoll (2004) comment that the workplace often described is not that of the self-employed. The self-employed are a significant part of the labour force. Industry Canada (2009) states that, in 2008, the self-employed represented 15% of all employed workers in Canada: 2.6 million people. Although there is increasing interest in informal learning and reports that informal learning is the primary learning mechanism for the self-employed (Hughes, 2001), there is a need to better understand the nuances of their informal work-learning practices and how their work spaces encourage or discourage learning. This study makes this contribution.

This research project brings the work-related learning practices and experiences of the self-employed worker to the fore. It focuses on self-employed workers, a group of people perhaps more likely to turn to online communities for work-related learning given that they work outside the sphere of the conventional workplace and are often left on their own to create a place and space for their learning activities. The over-arching research question is: How do self-employed workers experience informal work-related learning in an online community?

Having introduced the study, I will next elaborate the theoretical frameworks guiding the research: Actor Network Theory (ANT) and situated learning theory. An overview of methodological considerations follows, including a synopsis of the participants and the online spaces in which they engaged. Three key concepts in this research project—online community, self-employed workers, and informal work-learning—will be explicated. The chapter ends with an outline of how this paper-based dissertation is organized and a brief overview of each of the five papers in this collection.

Theoretical Framework

Practice-Based Theories

I draw on both ANT and Situated Learning theory for theoretical, conceptual, and analytical guidance. Edwards and Usher (2008) group ANT alongside situated learning theory and activity theory to highlight the increased importance of relationality for framing understandings of learning. Despite their different views on the nature of knowledge, Fenwick (2006) explains that all three link learning with practice, view learning as "individuals with and/or in activity", and have been used to analyze learning in work contexts (p. 290). As Lave and Wenger (1991) argue, learning is not merely situated in practice "as if it were some independently reifiable process that just happened to be located somewhere". It is "an integral part of generative social practice in the lived-in world" (p. 35). Knowing is therefore a "situated activity and knowing-in-practice is always a practical accomplishment" (Gherardi, 2009, p. 117).

My understanding of learning is influenced by these practice-based theories. Intertwined with engagement in everyday activities, learning is enacted within organic fluid practices. I envision learning as social and collective in nature, emerging through inter-actions between people and objects. Learning is not something confined to the individual. People, objects, and knowledges are more connected than this. In this sense, learning is a highly material activity. My conceptions of learning have also been influenced by the infusion of ICTs, particularly web technologies, into ways of knowing, learning, living, and working. I now see learning as an expression of multiple ways of knowing, resulting from entanglements within networks of people, objects, ideas, resonances, and contradictions. Learning is a result of ongoing (re/dis) assembly of these networks. Learning is knowledge making, including (re)generating knowledge into new practices. As such, it entails both consuming and creating—both taking and giving pedagogically—but always within a network. This more distributed, networked, and mobile conception of learning necessarily raises questions about what kinds of knowledges are negotiated and legitimated through these learning activities and by whom/what.

Situated Learning

Lave and Wenger (1991) position situated learning as a theory of social practice, suggesting that "learning, thinking, and knowing" are found in the "relations among people in activity in, with, and arising from the socially and culturally structured world" (p. 51). The cornerstone of situated learning theory is legitimate peripheral participation (LPP). LPP refers to the way newcomers to a practice learn to become full practitioners through their interactions and immersion with the larger community of practitioners (CoP). As they learn, "peripheral participation" differs from that of a full practitioner yet is a legitimate part of the learning process.

In this research project I use situated learning, and particularly the notion of LPP, to explore what (and how) these self-employed workers are learning as they engage in online communities. Situated learning theory brings a strong theoretical grounding for studying how people learn through and with others in everyday practice. The concept of LPP creates opportunities to explore how different possibilities for learning are shaped by locations, trajectories, and ways of participating within the practice and larger community of practitioners. There are, however, several critiques of situated learning theory which need to be taken into account.

First, LPP is often assumed to be a linear trajectory towards a goal of full-fledged membership in a CoP. Handley, Sturdy, Fincham, and Clark (2006) suggest that portrayal of the successful journey from novice to master is contradictory, especially if one considers the way people move in and between multiple communities. In later work, Lave (2004) proposes learning trajectories that do not lead to an idealized "full" participation (as cited in Handley et al., 2006). The competitiveness of the work world and the increasing commodification of learning also make the notion of LPP problematic. Referring to CoP within an organization, Roberts (2006) asserts that competition between workers is likely to discourage the collaboration required to establish and maintain a successful CoP as traditionally defined. Wenger's (2006) proposal of a second instalment of CoP, which includes a stronger emphasis on multiple communities and notions of multimembership and various modes of belonging, is timely.

Second, conceptions of CoP are shifting. As Cox (2005) explains, the original conception of a CoP was of people working together on a common enterprise (i.e., working together to build a boat). However, "CoP" is now frequently used to describe a collective in which everyone is interested in the same practice but works on their own project. In other words, rather than working together to build one boat, each person has their own boat building project. In addition, situated learning theory emerged when web-based technologies were not as sophisticated. People are now able to opt in and out of online communities at will, assume varying degrees of anonymity and disguise, and assemble and re-assemble in different configurations with a few clicks. This presents a markedly different context than the largely face-to-face (F2F) construction envisioned by Lave and Wenger (1991). These changing conceptions and use of web technologies tug at the original conceptions of a CoP and raise questions about the utility of the theory to address more fluid configurations.

Third, some argue that deeper analysis of power relations is warranted (Huzzard, 2004; Roberts, 2006). Nespor (1994) declares that "communities" are networks of power because they are "ways of *producing and organizing* space and time and setting up patterns of movement across space-time" (p. 9). While Lave and Wenger (1991) acknowledge power issues are important, they admit that unequal power relations must be included more systematically in their

analysis. Huzzard explains that although power was clearly identified in Lave and Wenger's initial writing, it has become "lost as the notion of CoP has been subsumed within the organizational learning literature" (p. 359).

Finally, other researchers argue that situated learning theory has difficulty examining rapidly shifting configurations and non-proximate relations that characterize self-employment (Fenwick, 2004). Fox (2000) writes that situated learning struggles to explicate how practices change or how people collaborate with artefacts. Moreover, difficulties attending to the relational, provisional, and material dimensions of work-learning practices are amplified by the often inconspicuous ways in which technologies and informal learning are woven into day-to-day activities.

Despite these criticisms, situated learning helps to theoretically frame the study of everyday practices. Lundin and Nuldén (2007) state that the skills we learn are inherently connected to the practices in which they are located. Situated learning theory brings a strong practice orientation. Unfortunately, as the notion of CoPs was taken up enthusiastically in the 90s, it became somewhat removed from theoretical underpinnings. Contu and Willmott (2003) argue that the radical elements of Lave and Wenger's (1991) work have been conveniently overlooked as LPP has been "recast as a *technocratic tool* of organizational engineering" (p. 289). What was originally conceived as an organic process has become, according to Roberts (2006), a construct that can now be leveraged for strategic advantage. Several writers point to the need for a renewed emphasis on the theory itself (Contu & Willmott, 2003; Fenwick, 2006; Roberts, 2006). Theoretically, LPP helps to frame explorations of the legitimacy-peripherality of knowing-in-practice. Lave and Wenger explain that "the form that the legitimacy of participation takes is a defining characteristic of ways of belonging" and therefore a constituent element of learning (p. 35). This matters when trying to understand online learning which further pushes notions of peripherality and therefore, why this study draws on the theoretical groundings that situated learning has to offer.

Yet, the form that legitimate participation takes is inescapably tied to shifting configurations of people, ideas, and objects, amplified by web-technologies. The criticisms identified above are germane to research studies of online informal work-learning practices and suggest that other theoretical prowess is also needed. ANT concentrates on *how* questions as it probes the specificities and materialities of the fluid. By attending to how actants (human and non-human) become "knit together" and what is circulating and mobilized in these networks, ANT is able to study relational, provisional, black-boxed, shifting, and non-coherent practices. Although ANT is not a learning theory per se, studying the effects of particular webs of relations helps researchers understand how ways of knowing and knowledges are distributed and enmeshed in work-learning practices. The emphasis on the importance of objects and attentiveness to the juxtaposition of non-human and human actants drew me to ANT. Having made significant contributions in Science, Technology and Society (STS), ANT has

been taken up in health, organizational studies, economics, and geography, and more recently, education. Using conceptual and analytic tools from ANT offers different avenues to produce insights about the research questions.

About ANT

Law's (2009) statement nicely introduces the "intellectual concerns" of the actor network tradition: "precarious relations, the making of the bits and pieces in those relations, a logic of translation, a concern with materials of different kinds, with how it is that everything hangs together if it does" (p. 145). ANT is a unique collection of relational and material understandings, concerned with associations between human and non-human actants in day-to-day practices. ANT is not easily pinned down. It is described as a theory, approach, method, sensibility, and/or toolkit. Recently, Law (2009) depicts ANT as a "disparate family of material-semiotic tools and sensibilities" (p. 141). He explains that ANT takes the semiotic insight that entities are produced in relations and "applies this ruthlessly to all materials—and not simply to those that are linguistic" (Law, 1999, p. 4)

An object-oriented philosophy, ANT advocates that objects, such as grass can do things in the world, just as atoms and Popeye do (Harman, 2009). Actants—human or non-human—are co-constituted in these webs of relations. ANT maintains that an object is what it is and does what it does because of the retinue of relations in which it is entangled. Actants are co-constituted in webs of relations with other actants. Actor-networks are thus comprised of actants. Callon (1987) explains that "an actor-network is simultaneously an *actor* whose activity is networking heterogeneous elements and a *network* that is able to redefine and transform what it is made of " (p. 93 emphasis added). Latour (2005) differentiates between mediator and intermediary actors. An intermediary transports meaning without changing it; outputs resemble the inputs. In contrast, mediators transform "the meaning or the elements they are supposed to carry" (p. 39). As researchers "follow the actors" they look closely for "mediators *making* other mediators *do* things" (Latour, 2005, p. 217). As associations are traced, a network is outlined.

Relations are paramount. It is because of ties between entities that an actor-network exists. Latour (2005) starts with the assumption that groups are constantly performed, which means that one "follows the actors themselves … to learn from them what the collective existence has become in their hands" (p.12). Yet, being interconnected is not enough. The movement, flow, and changes are what is interesting (Latour, 2005). Through this work, Latour (1988) argues, both human and non-human actors create new sources of power and legitimacy as they renegotiate who is acting in the world, who matters, and who wants what.

ANT is interested in how alliances come to be and how actants end up juxtaposed with others. It asks: How has this collection of actants come to be assembled? Or disassembled? Or re-assembled differently? Associations are entered willingly, under coercion, or unknowingly. It is through a series of

translations that actants become linked together. Harman (2009) describes translations as an interface between actants that enable communication and connection. Some of these connections, and the configurations they generate, stabilize and last for awhile. Others are more fleeting. While actants are joined together, "stuff" (ideas, practices, actions, intentions, inscriptions, innovations) circulates in the conduits.

As stated earlier, ANT is a philosophical orientation, not a learning theory. Nevertheless, by studying the specificities and materialities of particular webs of relations, researchers can understand how ways of knowing are enmeshed in work and learning practices. Of importance are dynamic and multiple networks and the effects of these constantly shifting configurations, ways of associating with fluid knowledges, the hybrid nature of human and object entanglements, and the interplay between people and objects in attempts to stabilize fluidity or upset certainties. Because ANT emphasizes interactions between actants, "things are always the effect of a network of relations between an array of heterogeneous entities" (Singleton, 2005, p. 774). Learners are therefore participants in networks of practices and learning emerges as an effect of the network (Fox, 2009).

In this study, these networks may be comprised of postings, RSS feeds, avatars, archives, Facebook profiles, viruses, Google, computer screens, and the delete button as well as "newbies", "wannabes", colleagues, "big names", celebrities, competitors, lurkers, employment recruiters, and clients. Humans are not the only actant in the network. Indeed, Michael (2000) writes that "imbroglios of humans and nonhumans are becoming increasingly part of our everyday life" (p. 25). From an ANT perspective, online communities are not *containers* for online activities, such as learning, but rather *networks* of relations in constant flux: spaces which are shaping, and shaped by, worker-learners and their practices. This relationality leads Edwards and Usher (2008) to suggest that it is useful to articulate the learner as a "hybrid subject shaped by other networks and flows in which they are enfolded" (p. 92). Learning, if it occurs, is a network phenomenon. ANT provides a way to study networks and flows, an understanding especially relevant to the technology-mediated work and sinuous learning practices of the self-employed. In the Situating ANT chapter, I will gather together several significant ideas put forward by Bruno Latour and John Law, influential ANT intellectuals.

Overview of Methodological Considerations

The over-arching research question of this project is: How do self-employed workers experience informal work-related learning in an online community? To help explore this question, four questions were posed:

- How do the self-employed engage in online communities for work-learning?
- What kinds of learning emerge through the work-learning practices of self-employed workers in online communities?

- How is work-learning enacted in online communities?
- How do inter-actions between web technologies and self-employed workers unfold in online communities?

As I worked on this research project, another question also became relevant:

- How might a researcher "interview" technology objects?

Data Collection

In 2006, I completed a pilot study of my proposed research as a course assignment in a graduate-level Workplace Learning course. Participants in this study were own-account self-employed workers (contractors and consultants who do not have staff). Five participants signed a consent letter agreeing to be interviewed. Semi-structured telephone interviews were conducted, recorded, transcribed, and transcriptions sent back to participants for verification. Conducting this pilot study enabled me to define the parameters of my proposed research inquiry, finesse my research questions, try out a methodological approach, and construct initial findings of this very rich data. As per my PhD research ethics application, I subsequently asked these five participants for permission to: (1) use their data thus far and (2) participate in another interview as part of my PhD research project. Four agreed. With no response from the fifth person, I deleted all her pilot study data to ensure it was not incorporated into my PhD corpus of data.

I then recruited seven more participants, first employing purposive sampling to "select unique cases that are especially informative" and then snowball sampling as the initial participants suggested others who might be willing to talk with me (Neuman, 2000, p. 198). As I found people who were interested in participating in the study, I set up 20-minute telephone calls, which enabled me to introduce the study, find out more about them and their work to ensure fit, answer questions, and most importantly, start to build rapport. I also used these calls to initiate the informed consent procedure. Please refer to Appendices A to D for documentation related to the ethics approval, information letters, consent forms, and interview guides.

Because the audience was geographically dispersed, 10 interviews were done by telephone. One participant lived in Edmonton and we met face-to-face for his interview. These semi-structured interviews varied in length from one to two hours. Follow up dialogue, either by e-mail and/or conversations, generated more data. Interviews were recorded and transcribed. Transcriptions were sent back to participants to ensure they had an opportunity to reflect on our conversation and feel comfortable with what they said. Participants were invited to verify and edit the transcripts. I also posed several clarification questions within the transcripts for them to answer. Pseudonyms were assigned and chosen in consultation with the participants.

Solomon, Boud, and Rooney (2006) acknowledge that the very act of researching informal learning requires "formalizing or codifying in order to identify, articulate, and manage it" (p. 7). The same is true with the concept of "online community". I kept my definitions of online community purposefully vague. About midway through each interview I introduced the term and asked the participant what "online community" meant to them and how the interactions they had described forged a community (or not). In so doing, I hoped to better understand how they imagined and experienced online collectives rather than imposing pre-set ideas.

Data Analysis

Data collection, analysis, and writing went hand-in-hand. The first two papers in this collection follow the interpretive tradition in qualitative research. I conducted a thematic analysis to generate findings and will discuss a few methodological considerations here and then expand on the analysis process in the first two papers in this collection. Coffey and Atkinson (1996) explain that different questions necessitate using a variety of techniques. Given the nature of the research questions I draw on conceptual and analytical ideas from ANT in Papers 3, 4, and 5 to explore the data. Although ANT research often differs significantly in terms of methodology and analysis (McLean & Hassard, 2004), one common theme is attention to the local, specific, and particular. Latour (2005) refers to ANT as a "science only of the particular" (p. 137). Because the use of ANT is a unique approach relatively new to education researchers, one paper in this collection specifically addresses how to "interview" objects as qualitative research participants and explores four heuristics that were used in this research project. In addition, the specific ANT analytic framework and the use of anecdotes will be elaborated upon in subsequent papers.

Due to the number of online communities and experiences the participants talked about, I created what I called *community sketches* for each participant in order to synthesize the characteristics of their online communities and the ways in which they engaged. I also drafted a profile for each participant that included data about their self-employment, use of web-technologies in their work, and other (informal) learning strategies. These documents enabled me to construct a more comprehensive understanding of each person. I returned to these individual constructions throughout the analysis and writing stages to help avoid the fragmentation of individual narratives that can occur with extensive coding.

Given the diversity of participants' work and the eclectic nature of their online experiences, I was immersed in multiplicity. Thematic analysis involves the "search for and identification of common threads that extend throughout an entire interview or set of interviews" (Morse & Field, 1995, p. 139). Therefore, analysis was a careful and creative process that reflected attempts to understand a multitude of experiences. Thematic analysis was a process of understanding my data, systematically identifying key concepts and links between them, and developing more abstract theorizing of the data. The process I followed was

influenced by Coffey & Atkinson (1996), Merriam (2001), and Wolcott (1994). Wolcott describes an analytic process of description (what's going on?), analysis (how do things work?), and interpretation (what is to be made of it all?). These are not mutually exclusive stages but rather reflect different emphases by the researcher at different points in the project. According to Wolcott, description is the sorting, sifting, and labelling. Analysis is about following systematic procedures in order to identify essential features and relations. Interpretation begins when the researcher begins to probe into what is to be made of the data and analysis. Coffey and Atkinson (1996) describe this theorizing as being prepared to

> speculate about the data in order to have ideas, try out a number of different ideas, link one's ideas with those of others, and so move conceptually from one's own research setting to a more general, even abstract, level of analytical thought. (pp. 142-143)

The Participants and Their Communities

> Brad engages in online communities in order to have access to valuable information hard-to-find anywhere else and people who have the experience in the field. Dorothy got involved out of sense of isolation, being at home alone with her daycare business, and stayed involved as she began mentoring others. Ben is in the Pixelator community because this is an exciting new use of technology and he sees unique possibilities for his specialized digital art work. Ava is online looking for business intelligence—seeing what makes online communities click as she plans to set up her own online spaces. Mia is sorting out the next steps in her career and her online communities reflect how she is carving out her own personal digital space for this work in self-constructed anonymity. Oliver wants to stay on top of his field and systematically scans other fields. Ryan uses online communities to help him carry out due diligence in his work. Liz is also active in these spaces to stay on top of her field. She has used online communities to explore how she might turn a hobby into a career but is now turning to F2F relationships. Yasmin is not active in online communities anymore—they are not for her. Amy is trying to find spaces that will actually be productive learning experiences. Her first forays have been disappointing. Sophie engages in her online space to explore a philosophy she draws on in her consulting work and values the exposure to ideas and people she would not get otherwise.

The four male and seven female participants varied in the self-employed work they did and their work-learning needs. Participants ranged in age from 35 to 51 and had been self-employed anywhere from 6 months to 21 years. Ten were based in Canada and one in the UK; three did extensive international work. They worked in a variety of fields: consultants (in international development, organizational change, leadership development or occupational health); the learning field (e-learning designer, corporate trainer, sessional university instructor); one was a sport psychologist, another was a graphic artist, and another a daycare provider; two were entrepreneurs in the midst of (re)defining their

business. Seven of the participants spent at least 70% of their time working from home. The other four divided their time between home offices and the client site, albeit spending most time at home.

Participants engaged in a range of online communities, turning to these spaces at various stages in their career, and reported an array of positive and negative experiences. Each shared their experiences in at least two online spaces, although the interview data is rich with references to many online communities either discarded, peripheral or just popping up on their radar screen. While six participants had been involved in a space for as long as five to 10 years, others had engaged for two to four years. One participant had tried several online communities in one to six-month spurts over seven years and recently decided it was not for her.

Although all participants publicly posted at least one question, comment or response to a posting, some referred to themselves as "lurkers". Three commented they were on the "outskirts" of a community. Several described themselves as active users and/or active contributors. One referred to himself as "top dog". Another was known as "little boss". Half took a leadership role in an online community, either moderating, setting up the technological infrastructure, or designing the online space.

The size of the online communities discussed by participants ranged from 20 people to several thousand; a few had over 50,000 members. Technologies used included ListServs, discussion boards and forums, Yahoo groups, e-mail, blogs, and RSS feeds. Eight participants mentioned venturing into Facebook, LinkedIn, Ning, and/or 43 Things—popular social networking sites—with mixed reactions. For the most part, these were not the kind of online spaces sought for work-related learning but perceived as places for socializing and networking. Half of the participants were also active in online communities related to personal interests in hobbies, health, politics, and religion.

Key Concepts

In this section I draw on my reading of the literature to explicate the key concepts which frame this study: online community, self-employed workers, and informal work-learning. Relevant literatures are also explored throughout the collection of papers.

Online Community

The e-learning literature is replete with references to all kinds of virtual (learning) communities. De Souza and Preece (2004) assert that although the concept of "online community" seems intuitive, there is no agreed upon definition. Shumar and Renninger (2002) draw attention to the critique that the term "community" now denotes so many concepts that it no longer holds any meaning. However, given its fluid nature, a standard definition may not enhance

understanding of this concept. As Baym (1998) states, it is "fundamentally reductionist to conceptualize all 'virtual communities' as a single phenomenon" (p. 63). Perhaps the proliferation of labels and meanings is not surprising as practitioners, researchers, and participants themselves grapple with how they understand online community. Often conflated with the idea of collaboration, community seems to be a popular way to frame how we want to explore social interaction online. Conrad (2005) agrees that, beyond its usefulness to distance learners, it is not well understood.

Nevertheless, it is important to understand the nuances of these online spaces given the array of possible configurations, goals, and strategies. One prevalent form of online community, reported widely in the e-learning literature, is a formal online university course in which creating a community of learners is a key pedagogical strategy (i.e. Conrad, 2005; Lapadat, 2007; Maor, 2003; Schwier & Daniel, 2007). However, the Internet is rife with many other kinds of online communities. I use the term "informal" to distinguish these spaces from the "formal" learning communities associated with online courses. Informal spaces are more *organic* and self-sustaining. Not created under the auspices of a formal organization, these formations occur when someone interested in a topic searches online for like-minded others, forming a group that then evolves in an organic way, rather than being scripted in advance (Boyd, 2006; de Souza & Preece, 2004; Ross, 2007). These kinds of online communities are ostensibly voluntary and one opts in and out at will.

Another face of these more "informal" groups is the product or *firm-hosted commercial* online community (Wiertz & de Ruyter, 2007), carefully, and sometimes hopefully, cultivated by commercial enterprises to build brand awareness or even co-opt users to provide free technical support (Shumar & Renniger, 2002). One blogger describes these groups as "the ecosystem of users and abusers that forms organically around a great product" (Sarkar, 2006, ¶1). In a third configuration, online communities are *organizationally sponsored* by a professional association, workplace, or other institution. Providing the web real estate and a varying degree of community-building services, the organization believes in the value of cultivating a community but participation by members is ad hoc. These three online communities—the organic, commercial, and organizationally sponsored—are the focus of this research project.

"Community" can refer to a reason to congregate, such as shared interests. It also refers to a state of being or state of mind—feeling connected with others through a sense of kinship and camaraderie. Hence, Conrad's (2005) mention of "community in the heart". Community also encompasses the act of communicating with others in a certain way and/or space. Fernback (1999) frames community as "the communicative *process* [emphasis added] of negotiation and production of a commonality of meaning, structure, and culture" (p. 205). I regard online community as both a space *and* a process. Community sensibilities are about gathering and dialogue. Some bond—a common interest, project/goal, or

connection to others—draws and keeps people engaged. The community as a collective entity emerges out of the pursuit of shared dialogue or activity.

Self-Employed Workers

According to Industry Canada (2006), self-employed workers "earn income directly from their own business, trade or profession. … [as] working owners of a …business, persons who work on their own account but do not have a business and persons working without pay in a family business" (p. 24). Self-employed workers can include home-based "knowledge workers", small firms in the high-tech sector, independent artists, or those running small retail or personal service businesses (Hughes, 2001). How to describe individuals who work for themselves garners much debate. Terms—independent contractors, self-employed workers, small business owners, entrepreneurs, free agents—are often used interchangeably even though they can mean different things (Hughes, 2005). Hughes (2005) explains that a distinction is made in Canada between own account self-employed (OASE) and employer self-employed workers. The former designates individuals who work alone and the latter are workers who employ others. The focus in this study is the OASE.

Hughes (2005) maintains that notions of boundaryless or portfolio careers, non-standard or contingent work, and vulnerable or precarious work signal an important shift to more flexible forms of work organization increasingly detached from traditional employment relationships. This detachment means that self-employed workers are faced with re-constructing their relationship to "employers" along with many facets of their work and workplace. For example, Fenwick (2008) writes that paradoxically, the term *boundaryless* acknowledges the way workers must construct the "*boundaries* [emphasis added] defining their work knowledge, work activities, environment, identities, and the specific services they are selling" (p. 12).

In addition to trying to label "self-employment", it is also challenging to define "work". Just as workspaces are increasingly hybrid spaces, work is distributed across varying dimensions of space-time, physical-virtual presences, play-learning activities, and fluid-bounded sensibilities. Indeed, distinctions between life and work, learning and production, community and enterprise are blurring (Boud & Garrick, 1999). So too is the notion that work is confined to the jobsite. In a report prepared for the *Canadian Policy Research Networks*, Livingstone (2002) identifies three spheres of work: paid employment, housework and community volunteer work. Describing how conceptions of work are multiple and resist synthesis, Fenwick (2010) explains that work has been analyzed as "paid and unpaid, linked to the formal economy or not, visible and invisible, based on organizational action, household chores, care-giving, or individual reflection, distributed across multiple sites and even continents, virtual or continuously mobile" (p. 106).

Informal Work-Learning

Because workplace learning is seen to be essential for economic success, both work and the workplace are now regarded as important sites for learning. Bratton et al. (2004) articulate how the design of paid work is one form of informal "pedagogy", while Billett (2002b) has long argued that the pathway of activities and goals in a workplace structure the workplace curriculum and learning experiences. As Mulcahy (2005) writes, "far from being a simple distinction, 'work' and 'learning' are dependent on one another. Each carries the other's possibilities within itself. Essentialist accounts will not do because work and learning are endlessly recreated" (p. 9).

Given the interdisciplinary nature of the work-learning field, there are many ways to understand learning at work. Edwards and Usher (2008) declare that the learning required by "the changing nature of work and employment is not simply bounded to that domain, but also flows through the wider social order" (p. 80). Butler (2001) aptly captures this fluidity:

> Learning for and about work is social, political, economic, and cultural. It is public and private. It moves between and across zones of time and place. It crosses so-called sectors of education (formal-informal, compulsory-postcompulsory, institutionalized-community). Work-related learning is everywhere and, perhaps, also nowhere. (p. 62)

A growing body of research takes a critical approach to workplace learning, recognizing that learning takes place in arenas in which work designs and lived experiences are the outcome of resistance, negotiation, and cooperation (Bratton et al., 2004). Indeed, opportunities are not uniform across workforces (Fuller, Munro, & Rainbird, 2004). Moreover, work-related learning is not a wholly human endeavour. Sociomaterial sensibilities suggest, for example, that self-employed workers and web-technologies used for work and learning are *co-constituted* in work-learning practices. ANT advocates that it takes both human and non-human actants to enact any practice. Work-learning is no exception. The intertwining of objects and people in networks goes beyond instrumental views of objects (computers, pencils, policies, or cubicles) as mere tools which exist only to support human-centric activities. Instead, sociomaterial perspectives advocate that it is through the inter-actions of actants in shifting networks (which either stay together or break apart) that work, knowledge, learning, or even workspaces are performed. Gibb and Fenwick (2008) see work-learning as "emergent, embodied and embedded in joint activity, a process of relations and dynamics *among* individual actors and collectives" (p. 4).

Work-learning can be informal or formal. Much has been written about the nature of informal learning, including a quagmire of definitions. International policy documents, national strategies, organizational mandates and practices, and personal beliefs all interpret informal learning in a multitude of ways. Attempts to distinguish informal and formal learning are often contested. For example, Billett (2002a) argues that describing learning environments as informal or formal is

arbitrary, non-productive, and inhibits the development of a workplace pedagogy and curriculum, because: (1) it suggests that the setting alone determines the kind of learning that occurs; and (2) informal learning is usually characterized by what it is not (not formalised or not structured). In their extensive analysis of literature to identify features of informal learning, Colley, Hodkinson, and Malcom (2003) conclude that attributes of formality and informality co-exist in all learning situations, vary on a situational continuum, and interrelate differently in various learning situations. Thus, *informal*, *non-formal*, and *formal* learning are not discrete categories. Acknowledging the lack of definitional precision and respecting the intersections between these concepts is important. Despite this messiness, some distinctions are important in this study in order to keep the research project focused.

Livingstone (2001) led the *New Approaches to Lifelong Learning* project, a major empirical research project which examined the informal learning practices of adults in Canada. He suggests that the primary distinctions between formal and informal learning are based on whether the directive control of the learning experience rests with educational agents or the learner. Livingstone defines *informal learning* as "any activity involving the pursuit of understanding, knowledge, or skill which occurs without the presence of externally imposed curricular criteria" (p. 5). The objectives, content, learning strategies, duration, and evaluation of outcomes are "determined by the individuals and groups that choose to engage in it" (p. 5). In contrast, formal learning entails a structure and a clearly defined educational plan determined and led by an educational agent. *Formal learning* entails formally structured, institutionally sponsored, classroom-based activities (Watkins & Marsick, 1992). The teacher has the authority to determine a pre-established body of knowledge and teach this curriculum (Livingstone, 2001). These are the understandings I use in this research project, which have been helpful to delineate the work-learning practices of interest.

Much work-learning seems to happen informally. The Survey of Self-Employment (SSE), conducted by Human Resources Development Canada in 2000, included both own-account and employer self-employed workers. According to the SSE, the self-employed depend on informal learning. Over half of respondents report relying on only informal training with another 26.5% using a combination of informal and formal training (Hughes, 2001). Although the SSE confirms the importance of informal learning to the self-employed, what remains unclear is the prevalence of turning to online communities. The SSE asked about three informal training strategies, presented here in order of reported usage: discussion with others, studying publications in print or electronic format, and observing colleagues (Delage, 2002). Drawing on the SSE data as well as data from 14 focus groups, Hughes (2001) further illuminates that the self-employed also searched for information on the Internet, networked with people in the same field, listened to speakers, and travelled. She explains that extensive use of discussion by the OASE suggests "they have colleagues and networks on which to draw and may not be as isolated as is often assumed" (p. 21). While the SSE data

reveals that the self-employed do reach out to others, there is no sense of *how* they are connecting to others, how prevalent online communities are as a source of learning, and what is happening in these spaces from a work-learning perspective.

Despite increasing interest in informal learning and reports that informal learning is the primary learning mechanism for the self-employed, empirical studies on the online informal learning practices of self-employed workers are limited and somewhat contradictory. Barley and Kunda (2004) conducted an extensive ethnographic study of self-employed technology contractors in the Silicon Valley during the high-tech boom in the late 90s. Barley and Kunda found that the contractors in their study did form and participate in online networks. Community building was described as "usually spontaneous and informal, driven less by conscious design than by contractors' efforts to solve immediate problems" (p. 301). However, Fenwick's (2001; 2002; 2003; 2004; 2008) extensive research on the learning practices of the self-employed do not seem to highlight the use of web-based technologies to reach out to others, despite findings that these workers rely heavily on networks and report struggling in isolation. Given the nature of their work and learning, this would seem to be a logical choice and yet it appears to be largely untapped and/or not functional or effective. However, technology was not the focus of this research, so it is difficult to ascertain to what degree they might have used web-based technologies.

Perhaps reaching out to online communities is not just simply whether someone *can* because they have the tools or do IT-focused work; it takes something more. Drawing on survey and interview data from a large study of adults in the UK, Selwyn, Gorard, and Furlong (2006) questioned how computers and the Internet are used in adults' self-education. Keeping in mind that this research sampled the general adult population and not self-employed workers, the researchers report a contrast between the computer's symbolic potential as a source of learning and its everyday use. The researchers also note that only occasionally was the technology used as a means to learn from others; in most instances it was a solitary endeavour. In contrast, strong practice-oriented needs, in Ross's (2007) study of an institutionally independent "organic online learning community", created the reason for cabbies-in-training to congregate online. This site, "created and operated by learners, for learners" was started by one "cabbie" when he found nothing to help him in his "cabology" studies (p. 307). It is now populated by London cabbies-in-training. Ross found that the creation of an online back-region became a beneficial sanctuary for taking academic and social risks. In Ross's study, learning was not a solitary endeavour.

This Dissertation

This dissertation takes a paper-based or multi-paper format, which Grant and Reed (2006) describe as an alternative format centred around three or four publishable articles. In contrast to the traditional chapter-based dissertation, the paper format is thought to more easily facilitate the dissemination of knowledge

(Grant & Reed, 2006). Kamler (2008) draws attention to the problem of doctoral research not being disseminated widely through peer-reviewed journal publication. Girardin (2009) comments that constructing several journal papers as a dissertation, rather than an integrated monolith, is especially helpful in disseminating knowledge that links several research communities. The juxtaposition of papers is well suited for my dissertation work. Because this study is the intersection of several research literatures, each paper has been crafted with a particular audience and research question in mind. Because a multi-paper format also allows for an interplay of methodologies and conceptual frameworks (Girardin, 2009; Grant & Reed, 2006), it also creates the space for me to explore my research questions by incorporating ANT in several papers while also drawing on situated learning in another.

This dissertation is a collection of five papers as well as introduction and conclusion chapters and a background chapter on ANT. All five papers have been presented at conferences over the past four years as works in progress. Four are currently being reviewed by journals and one has been accepted for publication. The papers are constructed as stand-alone articles and may be read independently. That said, the papers do follow a train of thought and the chapters woven throughout provide a structure for the overall dissertation. The first paper describes how these self-employed workers engage in online communities and orients the reader to the participants' experiences as well as the nature of their online collectives. The next paper draws on situated learning theory to focus on the kinds of learning that are emerging in these cyberspaces.

The collection of papers then shifts. Because the remaining papers draw on ANT, there is a brief chapter to introduce this change and provide additional background on ANT by tracing the development of key concepts over the past three decades. The third paper in the collection elaborates on the re-positioning required for a qualitative researcher to use ANT and offers some pragmatic considerations. Paper 4 continues to explore learning by examining how informal work-learning is enacted in these spaces. The final paper turns to a closer examination of the relationship between human actants and the objects that are important in work-learning practices. The conclusion chapter offers insights that emerged from this collection of five papers, explores the different openings created by using both ANT and situated learning theory, and closes with implications of this research. Finally, Appendix E contains a guide to the acronyms used throughout this dissertation. Appendix F provides a glossary of key ANT terms for quick reference.

Work-Learning in Informal Online Communities: Evolving Spaces

In this paper I explore how the self-employed engage in informal online communities for work-learning. This paper distinguishes between "informal" online communities and the more formal configurations often integrated into online courses. Learning in online communities is highlighted in the literature

review. In this paper I introduce the participants and their communities. A thematic analysis highlights that the self-employed workers in this study engage in online communities in ways that leverage fluidity, fit with expectations of online community, play with boundaries, and mesh with work. The discussion focuses on how these self-employed workers attempt to (re)configure online spaces—in multiple ways—to create the degree of connection and learning they need and/or want. The contrast between these cyberspaces and more formal learning communities is explored. The paper ends with a discussion of how notions of online community are changing to more networked configurations. Several implications for research, policy, and practice are presented. A version of this paper has been submitted for publication.

Self-Employed and Online: (Re)Negotiating Work-Learning Practices

Highlighting the work-related learning practices of self-employed workers, the second paper studies what kinds of learning emerge through their online experiences. Using a practice-based theoretical lens, issues related to the online work-learning practices of the self-employed are explored. Findings indicate that these self-employed workers are learning work practices, the viability of doing particular work, how to participate in online communities for work-learning, and how to participate in fluid knowledges. The discussion highlights how "what" people learn is interwoven with "how" they are learning. The significance of developing work-learning practices is emphasized, particularly as they unfold in multiple spaces on and offline. The impact of multiple and peripheral positionings is explored using the concept of legitimate peripheral participation (LPP) from situated learning theory. The paper concludes with a discussion of the utility of LPP for contemporary learning practices made very fluid by web technologies. This paper has been accepted for publication by the *Journal of Workplace Learning* (2010).

The Materiality of Objects in Pedagogy: Navigating Research Practices

Things are often overlooked as incidental rather than problematized and enlisted as important participants in qualitative research projects. How a researcher engages objects in a qualitative study is the focus of this paper. I outline four heuristics that I employed when "interviewing" the objects in this study: follow the actors, study breakdowns and accidents, untangle tensions, and employ co(a)gents. The "delete button" is introduced in order to explore these heuristics. The paper concludes with commentary on the entanglements of the ANT interviewer/researcher, including potential pitfalls of ANT and a reflection on the researcher's role in such undertakings. This paper has been extracted and expanded from a paper I co-authored with Cathy Adams, which we presented at several conferences and we have had accepted for publication by the *International Journal of Qualitative Studies in Education*.

(Re/Dis)Assembling Learning Practices Online with Fluid Objects and Spaces

In this paper, ANT is used to help examine how working adults are re-negotiating the social and material aspects of work-learning spaces online. Specifically, how is work-learning enacted in online communities? Literature is presented to explore notions of the workspace of the self-employed as hybrid, distributed, and shifting; the sociomateriality of work-learning; and how ANT has and can be used to frame these kinds of questions. A description of how I used ANT to analyze and write these papers is provided, with an emphasis on the analytical framework I developed. Configurations, as well as associations and circulations in these configurations, which enact and are labelled as "informal learning" or "online community" are described, using the posting—an (im)mutable mobile—as an entry point. The informal learning that is enacted in this study is the effect of multiple networks and attempts to stabilize fluidity. Different associations with knowledge and novel ways of knowing were also enacted, although there are contradictions between Web2.0 rhetoric and the practices of these self-employed workers. This paper suggests that practitioners and researchers should not be too quick to paint work-learning practices in online communities, or even the notion of online community, with a broad brush. A version of this paper has been submitted for publication.

Who's Taming Who? Tensions between People and Technologies in Cyberspace Communities

This paper draws on ANT to explore the inter-actions between web-technologies and self-employed workers engaged in work-learning practices in online communities and the implications of this intertwining of people and objects. The paper begins by examining the promises of web technologies especially those around changing ways of knowing, the importance of foregrounding objects in qualitative research studies, and the co-constitutive relationship between human and non-human actants. An overview of the way that I used ANT in order to analyze my data is presented, with an emphasis on the use of anecdotes. The remainder of the paper explores the configurations that emerged as I followed the actors and describes various passages and journeys that enact participation "in" an online community, stabilizations and upsets, questions of who's taming who, and re-thinking socio-technical constructions. The paper concludes with questions about the politics of technology that emerge from uncertainties around delegation, invisible practices, and necessary literacies. A version of this paper has been submitted for publication.

The papers in this research project come together to explore the complexities enfolded in online communities and the informal learning practices of self-employed workers in these spaces. Texts that move, online cyberspaces in which people dip in and out, the fusion of work and learning activities, the often invisible nature of informal learning, the momentary coalescing of ideas,

technologies and people: these are challenging phenomena to study. Learning online entails a mishmash of entanglements, alliances, resistances, and willing partnerships between technology objects and (non)human actants. This study brings relational and material practices to the fore.

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Work-learning in informal online communities: Evolving spaces[1]

Introduction

Latour (2002) writes that "technologies bombard humans beings with a ceaseless offer of previously unheard-of positions—engagements, suggestions, allowances, interdictions, habits, positions, alienations, prescriptions, calculations, memories" (p. 252). If so, technology and people may be brought together in innovative ways, doing things online never before thought possible. And then again, maybe not. Online learning communities, often linked to formal courses and organized under the auspices of an educational institution, are increasingly popular. But once we click outside these organized spaces there are a gamut of other online configurations and perhaps more possibilities for "previously unheard-of-positions".

I wonder how informal pedagogical moments are being renegotiated by the technologies woven into our lives. Regarding online communities as rich learning spaces seems to make sense. Internet rhetoric promises "a renewed sense of community and, in many instances, new types and formations of community" (Jones, 1998, p. 3). But as ubiquitous web-based communication tools align with people to shape spaces, the hype and assumptions surrounding online community raise many questions.

The term "online community" is applied to a myriad of configurations. One configuration is an online university course in which creating a community of learners is a key pedagogical strategy. These are reported widely in the e-learning literature (i.e., Conrad, 2005; Lapadat, 2007; Maor, 2003; Schwier & Daniel, 2007). However, the Internet is rife with many other kinds of collectives, including those which are more organic. For example, one configuration is created when someone interested in a topic searches for others and forms or joins an online group (i.e., Boyd, 2006; Ross, 2007). Another face of these more "informal" groups is the "firm-hosted commercial online community" (Wiertz & de Ruyter, 2007) carefully cultivated by businesses. In a third configuration, online communities are created by a professional association, workplace, or other institution which provides a varying degree of community-building services. These three configurations—the organic, commercial, and organizationally sponsored—are the focus of this research project. I use the term "informal" to distinguish these spaces from the "formal" learning communities associated with online courses.

This study explores how workers engage in informal online communities for work-related learning and how these ways of engaging contribute to deeper understandings of evolving online configurations. Despite interest in building online community, and its perceived importance to learning, our understanding of

[1] A version of this paper has been submitted for publication.

how people engage in these cyberspaces remains murky. Much of the online community literature is situated in formal online courses, highlighting the need to better understand the nuances of more informal learning spaces online (Gray, 2004; Ross, 2007). This research, therefore, focuses on self-employed workers, a group of people perhaps more likely to turn to online communities for work-related learning given that they work outside the sphere of the conventional workplace.

Positioning in the Literature

Cyberspace and Connectivity

New technologies are believed to contribute to novel—namely, more connected—ways of knowing and learning. For example, Anderson (2007) writes that "a new 'social fabric' is being constructed" with "collaboration, contribution, and community the order of the day" (p. 4). One appeal of these new technologies is the ability for users to self-create spaces that are driven by the bottom-up interests of community members rather than top-down mandates of organizations (Klamma et al., 2007). By learning through such networks, Wiberg (2007) asserts users invent channels for their own social learning processes and can, therefore, contribute to and use the knowledge being constructed through the interactions of all users and their extended networks. The emphasis on connectivity is prevalent in the buzz around *Web2.0*. Although Web2.0 is an imprecise label, it points to the emergence of the "participatory Web", including social software, which Alexander (2006) describes as an especially connective group of applications and services.

Community

Increasingly, online communities are seen to offer the potential to facilitate learning, knowledge creation, and information exchange across geo-organizational boundaries (Daniel, O'Brien, & Sarkar, 2007). Klamma et al. (2007) comment that such collaborative learning platforms enable people to connect to other people and to the right knowledge. Behind the increased interest in community is the call to create more effective online learning experiences. This move is reinforced by the growing body of research that touts the pedagogical benefits of online (learning) communities (Chapman, Ramondt, & Smiley, 2005; Haythornthwaite, Kazmer, Robins, & Shoemaker, 2004; Moisey, Neu, & Cleveland-Innes, 2008; Riverin & Stacey, 2008; Tu, 2004).

Community is a contested concept and apolitical notions are problematic. Hodgson and Reynolds (2005) state that idealized interpretations of online community ignore its more problematic aspects: "limitations in relation to difference, the oppressive aspects of conformity, and the obstacles to participation given inevitable inequalities and conflicts of interest" (p. 17). Jones (1998) writes that electronic spaces are not necessarily democratic, egalitarian, or accessible. With respect to accessibility, Edwards and Usher (2008) question who is able to

benefit, cautioning that only those with the "necessary skills and those located within the necessary practices …[will be able to] take full advantage of the Internet for learning" (p. 131). Haythornthwaite (2008) points to many ways online communities are idealized, such as the "overstatement of knowledge that may be present in such communities, the imbalance in who does the work and who benefits, and the actualities of altruistic contribution necessary to maintain critical mass and sustain working knowledge communities" (p. 599).

"Community" can refer to a reason to congregate, such as shared interests. It also refers to a state of being or state of mind—feeling connected with others through a sense of kinship and camaraderie. Hence, Conrad's (2005) mention of "community in the heart". Community also encompasses the act of communicating with others in a certain way and/or space. Fernback (1999) frames community as "the communicative *process* [emphasis added] of negotiation and production of a commonality of meaning, structure, and culture" (p. 205). I regard online community as both a space *and* a process. Community sensibilities are about gathering and dialogue. Some bond—a common interest, project/goal, or connection to others—draws and keeps people engaged. The community as a collective entity emerges out of the pursuit of shared dialogue or activity.

Alongside notions of online community are visions of more networked configurations of online engagement. Baym (2007) declares that "community" may not exist in single sites but is instead built by creating a network of sites. Ryberg (2008) goes further, describing online communities as focused on "interaction, shared interest …and communication" while networked participation entails a "constant traversing of different types of networks with strong and weak ties" (p. 661). He adds that these networked architectures enable people to construct individual, but deeply relational networks, often through social media.

Research on Online Communities

In this section I explore some of the research that informs this study. Although there is limited research on work-learning in *informal* online communities, other studies of work-learning in organizationally sponsored online communities and studies of online communities within the context of formal education provide helpful starting points.

A few studies focus on work-learning in informal online communities. Ross (2007) studied an "institutionally independent organic online community" populated by London cabbies-in-training. Hara & Hew (2007) focused on the types of knowledge shared, and the factors that sustain long-term knowledge sharing, in an online community interested in advanced nursing critical care. Researching a successful open source project community, Hemetsberger and Reinhardt (2006) explored how this community initiated and fostered learning processes at the individual and collective level. These three studies explore a rich array of different online spaces and focus on understanding the kind of learning going on and the factors that facilitate and frustrate knowledge building efforts

within the unique parameters of each of these online cyberspaces. The utility of "informal" learning spaces is also explored as are the nuances of participation from initiation through to longer term involvement.

Although not yet widely researched, several studies explore work-learning within online communities established by professional associations or workplaces (i.e., Allan & Lewis, 2006; Cornelius & Macdonald, 2008; Gray, 2004; Riverin & Stacey, 2008; Sloman & Reynolds, 2003; Thorpe, McCormick, Kubiak, & Carmichael, 2007; Wasko & Faraj, 2005). Most of these online communities were set up to facilitate professional development and/or provide a support network. Although the workers in these studies were often not self-employed, this research draws attention to how some online spaces are indeed viable for learning purposes. There is also a body of research that explores a wide range of experiences in truly emergent online groups (i.e., Baym 1998, 2000, 2007; Boyd, 2006; Ducheneaut, 2005; Preece, Nonnecke, & Andrews, 2004). While most of these studies do not have an overt learning focus, they draw attention to the cornucopia of cyberspaces and inform the discussion about tensions and interesting developments in these spaces, including what community "is".

Most research about learning in online communities is situated within formal educational institutions (i.e., Charalambos, Michalinos, & Chamberlain, 2004; Conrad 2002, 2005; de Laat & Lally, 2003; Garrison, Anderson, & Archer, 2000; Guldberg, 2008; Kazmer & Haythornthwaite, 2004; Palloff & Pratt, 1999; Rovai & Jordan, 2004; Schwier, 2001). Although these are different online spaces than the ones explored in this study, these reports nevertheless document the kinds of participant engagement that allow online community to form, thrive, and/or fail and the impact of community configurations on learning. Keeping adult students engaged and learning is a key theme. This research also delves into the tension between attempting to "design" an online community and nurturing the conditions under which it can emerge.

Thorpe et al. (2007) write that the "feasibility of using networked communication to foster work-related learning has worked synergistically with the growth of social models of learning and interest in learning outside formal institutional contexts" (p. 350). Schwier (2001) suggests several questions that need to be explored: How do people make use of virtual communities for learning? What are the pedagogical issues in these spaces? What value do people place on these spaces? (p. 17). Yet, with few exceptions the studies listed above focus on one online space rather the interplay of multiple spaces and online networks. If online communities are a viable learning forum for people with work-related learning needs, then it is important to understand what is happening in these spaces, and assemblages of these spaces, from a learning perspective. Dron (2007b) argues that even small improvements could "bring immense value to lifelong learners for whom they are an increasingly significant form of information" (p. 63).

Methodology

Data Collection and Analysis

This study asks: How do the self-employed engage in online communities for work-learning? Participants were own-account self-employed workers (contractors and consultants who do not have staff) and selected by first employing purposive sampling to "select unique cases that are especially informative" and then snowball sampling as the initial participants suggested others who might be willing to talk with me (Neuman, 2000, p. 198). Semi-structured interviews, which varied in length from one to two hours, were conducted with 11 self-employed workers; 10 by telephone and one face-to-face (F2F). Follow up dialogue, either by e-mail and/or short conversations, provided additional data. Interviews were recorded, transcribed, and sent back to participants for verification. Pseudonyms were assigned to protect the anonymity of participants.

Thematic analysis was a process of understanding my data, systematically identifying key concepts and links between them, and developing more abstract theorizing of the data. The process I followed was influenced by Coffey and Atkinson (1996), Merriam (2001), and Wolcott (1994). Analysis was a careful and creative process that reflected attempts to understand a multitude of experiences. Wolcott describes a process of description (what's going on?), analysis (how do things work?), and interpretation (what is to be made of it all?).

Category construction began with the first set of notes. Notations were made by potentially relevant bits of data in the transcripts as I jotted down questions, tentative interpretations, and possible connections. After working through the notes, "like" comments and notes were grouped together and a running list of these groups created. The next transcript and related data was treated similarly, and the list of notes and groupings then compared to the first set. Applying this process for each transcript led to a set of categories derived from the data. These categories were named and then made "more robust by searching through the data for more and better units of relevant information" (Merriam, 2001, p. 185). The data was very fluid at this point. Coding encouraged new ways of seeing connections and I engaged in ongoing explorations to find supporting as well as dis-confirming evidence. Consistent with Morse (1994), my experience of data analysis at this point was a process "of conjecture and verification, of correction and modification, of suggestion and defense" (p. 25).

Participants and Their Communities

The four male and seven female participants varied in the self-employed work they did and their work-learning needs. Participants ranged in age from 35 to 51 and had been self-employed between 6 months to 21 years. Ten were based in Canada and one in the UK; three did extensive international work. They worked in a variety of fields: consultants (in international development, organizational change, leadership development or occupational health); the

learning field (e-learning designer, corporate trainer, sessional university instructor); one was a sport psychologist, another was a graphic artist, and another a daycare provider; two were entrepreneurs in the midst of (re)defining their business. Seven of the participants spent at least 70% of their time working from home. The other four divided their time between home offices and the client site, albeit spending most time at home.

All rated their computer literacy as good. One participant had no computer skills and in fact, *hated* computers when she started using the Internet. She has nevertheless learned a great deal through her engagement in online communities and went on to create her own message board for her clients as well as become the technology "guru" in her family. Participants reported a range of computer use: one person spent one hour per day at the computer, while half spent 95-100% of their work time in front of the screen. A few noted that the considerable amount of work time they spent online tempered their involvement in online communities because they sought time *away* from the computer.

Participants engaged in a range of online communities, turning to these spaces at various stages in their career. Each shared their experiences in at least two online spaces, although the interview data is rich with references to many online communities either discarded, peripheral or just popping up on their radar screen. While six participants had been involved in a space for as long as five to 10 years, others had engaged for two to four years. One participant had tried several online communities in one to six-month spurts over seven years and recently decided it was not for her.

Although all participants publicly posted at least one question, comment or response to a posting, some referred to themselves as "lurkers". Three commented they were on the "outskirts" of a community. Several described themselves as active users and/or active contributors. One referred to himself as "top dog". Another was known as "little boss". Half took a leadership role in an online community, moderating, setting up the technological infrastructure, or designing the online space.

The size of the online communities discussed by participants ranged from 20 people to several thousand; a few had over 50,000 members. Technologies used included ListServs, discussion boards and forums, Yahoo groups, e-mail, blogs, and RSS feeds. Eight participants had ventured into Facebook, LinkedIn, Ning, and/or 43 Things—popular social networking sites. For the most part, these were not the kind of online spaces sought for work-related learning but perceived as places for socializing and networking. Half of the participants were also active in online communities related to personal interests in politics, religion, health, and hobbies.

Findings

Findings in this study suggest that these self-employed workers were trying to (re)configure online spaces to create the degree of connection and learning they needed, although not always successfully. These ongoing (re)configuration efforts highlight that there seems to be no "one" or "right" way for engaging online. That said, four themes describe ways of engaging in online communities which: leverage fluidity, fit with understandings and expectations of online community, play with boundaries, and mesh with work.

Leverage Fluidity

Participants described tremendously fluid ways of engaging: dipping into communities to explore and experiment, moving in and out of online spaces in waves, and feeling a sense of freedom to participate as they chose. As spaces, online communities were also in a constant state of flux. Moreover, one online space was often a stepping stone to other communities, people, and resources. This kind of hyerconnectivity led to mixing of multiple communities, online and F2F encounters, different media, other learning experiences. All this blending, as Oliver explained, led to a meshing of online activities: "My online life is not clearly segregated into online communities. It all blends together and I don't even think about it as being online." In describing these fluid ways of engaging in sinuous spaces, the data suggests that, at times, these workers attempted to "leverage" this fluidity—make this fluidity work for them—in order to meet their needs.

Throughout the data is mention of how fluidity was both constrained and amplified as these workers attempted to manage their time and maximize the relevancy of these spaces for their changing needs. Mia explained:

> It's all around how the interactions go when you first join. … And if that is not done in a way that is credible and appropriate to your needs then its like well, I'm not going to invest the time because it's not actually worth it.

At times, fluidity was muted as these workers struggled to manage the endless possibilities of online interactions. Oliver explained:

> I'm acutely aware of how my time can just evaporate if you sit in front of the computer and get on to websites and e-mail and RSS feeds. Two hours have gone by and you feel like you haven't got anywhere.

It is as though these workers carefully weighed the *return on investment* (ROI) for time spent in, and commitment to, any cyberspace.

Occasionally turning away from a space—"turning it off" until needed—was common. Although opting out was more drastic than pulling off to the sidelines and lurking, this seemed to be a pragmatic time management strategy and another way to leverage the elasticity of their engagement. Perhaps this practice reflected the freedom of those engaged in "informal" learning to pace their own learning activities. Many of these workers were happy the online community was there even if they were not drawing on it at the time. Oliver

stated, “I wouldn’t say I was part of it but I can see that it exists and it is nice to have it there and I kind of lurk on it.”

Fit with Expectations

The data suggests that participants engaged in ways that fit and matched with their understandings and expectations of an online community. Yet, expectations varied in terms of what a community should offer, especially around degree of connection with others. Most participants did not use the term “online community”, instead using phrases such as the “board”, the “group”, or the “list”. They did refer to “community” as a bond that brought and held people together. However, there was great diversity in what “community” meant to them and how they interacted in these spaces. Several recounted shortfalls of online spaces, highlighting a tension between their actual experiences and their hope of what it would be like.

Data from the participants brings forward a range of expectations and experiences in an online community. For example, Liz commented about one space:

> It’s a place I can post and learn from people about a particular subject but it’s not a community in the same sense as some of the others where we knew about each other’s lives, and the ups and downs, and “sorry you’re having a bad day” which to me is more of a sense of community.

For some, it was important to know something about the other people in order for it to feel like a community. However, Amy mused: “It’s a matter of getting comfortable where you don’t know who’s out there. For everyone to have a face and a name you’re really limiting the size … that goes against what we’re trying to achieve with the web.” Yasmin highlighted a tension between the individual and the collective, saying:

> It’s not bad, but you’re going to find a lot of people who just are looking and then they leave. … At the end of the day we’re in it for ourselves. If we can help someone else that’s great. But a lot of it is, what can I take away from this and use?

Decisions about how much and when (or if) to commit, seemed to align with participants’ expectations of an online space. Three spoke of purposefully choosing the periphery, engaging just enough to get some benefit. Mia retained the stance of “separate but sharing” and valued one space she referred to as a “community by distance”. An early decision appears to be whether or not to lurk. An exception, Yasmin jumped enthusiastically into every online community she joined but quickly became disillusioned when the novelty wore off and her level of effort was unsustainable. One surprising finding is the amount of benefits that these workers felt they attained through *lurking*. Lurking was common. It seemed to be a comfortable location and did not detract from feeling connected to a space or attaining some learning benefits While lurking often has negative connotations, participants in this study used this term unapologetically—it described what they did and, moreover, what many others in their online communities also did.

Most online communities described by these participants appeared to serve as learning spaces, business tools, and/or support mechanisms as well as forms of entertainment or diversion. Each self-employed worker looked for and configured these elements differently—in one online space or across several. Although "learning" carries a range of meanings, participants did point to ways of engaging that they labelled as learning. For some, engaging in an online community was driven primarily by learning needs. Brad shared, "I've had to look for more informal learning opportunities to develop that skill base that I need … There are some fairly robust ListServs and discussion forums that I belong to. I have found that they have been invaluable". The idea of learning "goals" was vague and less of a motivator for three participants. Ava commented that she is not in online communities for learning purposes but rather to stay connected with a group of people; nevertheless she has achieved significant learnings. Liz noted a change in her focus: "I used to go to communicate with people with similar interests figuring I might learn something or be able to help somebody else learn something. Nowadays I have a specific focus. I'm on there to learn something specific."

As a business tool, the data provides examples of how online communities helped participants gather business intelligence, develop aspects of their business strategically, and to network. This informal way of quickly reaching out to many people was seen as an advantage and one reason they were there. As a support mechanism, participants indicated that they valued the companionship and opportunity to connect with others. Most participants commented that participating in these online spaces helped them feel less isolated, gave them opportunities to help others, and/or provided a sounding board to see if what they were thinking was on track.

Boundary Play

Boundaries in this context refer to "lines" that demarcate separate spaces, activities, or sensibilities, such as private-public or leisure-labour. The data describes how workers attempted to delineate these spaces while also negotiating which distinctions were important or feasible, given the elasticity of cyberspace. A sense of boundaries "in-play" enabled participants to explore and experiment. However, blurring work-personal and professional-social boundaries created some uneasiness. What private and personal information was suitable to share in a work-related space was often questioned. Ryan, an occupational heath nurse, wondered whether others were bound by the same confidentiality and privacy rules. Ben separated his online spaces, addressing his social networking needs through Facebook and e-mail and turning to his professional online communities "for things related to what I want to learn". To some, however, the mix of personal sharing and socializing made the online space a community and a place they wanted to be.

Two participants told stories of how lines were crossed—unwelcome forays by others into their private lives as a result of online interactions. In play here was the degree of closeness that was acceptable. To most participants it was important to know the others beyond just a name and a title. They seemed to question: Who are you? Do you know who I am? Two participants, active in online groups set up by their professional associations, commented on the lack of personal information available about the others. Being able to quickly link to people with similar interests and knowing who specializes in what helps the self-employed worker determine credibility, relevance of others' contributions, and who they will approach directly: an important function often curtailed, according to the data, by current technological set-ups and community cultures.

Given how these online spaces were tied to professional interests, most participants expected to use their real names and job titles. In some instances, aliases were the norm. Although this level of anonymity was sought by a few, it did create problems for others around trust and authenticity. Large online groups were carved into smaller intimate networks of five to six others, explaining how a ListServ of 800 people could feel like a community. Participants indicated that they drew some of their own lines around little sub-groups in order to connect with the right people. Mia stated, "I don't need to feel close to the whole community but I need to feel close to a few people within it to feel that there is a relationship." This was not always possible. The data suggests that participants became attuned to their position within the community and this influenced how they interacted. Ben seemed to know where he was positioned: "I'm fairly inexperienced at these programs. I am somebody who is there to learn. My contributions are minor critiques or praise. I don't think I'm capable yet of teaching anybody anything with the programs." Sophie alluded to this awareness of "location" as she explained why she did not post more publicly:

> Just that whole exposure thing and I don't consider myself an expert. The people who do post a lot either have a real passionate interest or a lot of expertise in that particular topic or they are just a little bit more courageous and generous than the rest of us.

Mesh with Work

The data offers insights into how the nature of participants' work and workday influenced engagement. The impact of being self-employed and largely home-based surfaced. Although the need to associate with a larger group of practitioners varied, perceptions of isolation, either because of limited F2F contact with peers (mainly due to working out of a home office) or degree of specialization of work, often drew workers to online spaces.

However, the work-related—rather than leisure—focus of their engagement seemed to create several challenges. One challenge was dealing with sensitive topics and this raised concerns and complications, particularly when professional ethics were called into play. Second, a few participants mentioned the "intimidation factor". Big names, titles, and degrees added credibility to a

space but may inhibit some from participating. This was offset in some spaces by an insistence on respectful dialogue rather than one-up-manship or criticism. A third challenge was the amount of social chit chat that was acceptable; the fine line between being a time waster and building a sense of connection that facilitated learning. Fourth, for two of these self-employed workers, engaging in online communities was not high on their list of learning options. Yasmin commented that she can get her learnings F2F and so turned away from online communities. They were not worth the effort or risk.

How participants choreographed their online engagement was also tempered by questions about protecting their "intellectual property", highlighting tensions between meshing work knowledge and activities with ways of engaging online. Amy commented: "It would be neat to talk to people doing the same work as me and to share ideas. But how do you share experiences with competitors?" Brad asked:

> How much do you share? You're going to dilute your brand. You're going to give away content that has maybe taken you years and a lot of money to develop and once its out in the ether its there. It's permanent. … How could it not have an impact on a business especially if it relies on the intellectual capacity of the practitioner?

Dorothy had no problem sharing, although she has been surprised at what people take: "One woman copied every damn thing. I did say take what you need. She took it word for word. My policies. My handbook. What do you do? She's just using it for daycare. But I still give out stuff." For Ben, the Internet changed perceptions about sharing:

> I grew up in a competitive commercial art world where you held your secrets and experiences close. You didn't necessarily want others to capitalize on all the time you put into something. … But I found the Internet art community was all about sharing, getting things out there.

These findings show that self-employed workers participated in online communities for work-learning in ways that leveraged fluidity, fit participation with expectations, played with boundaries, and meshed with work. The way in which these participants leveraged the fluidity of their work, the Internet, and their learning preoccupations, seems to signal that there is no one way to engage in online communities for work-learning. Different arrays of cyberspaces were sought for different reasons, often shaped by the nature of their work and workday. Some of these self-employed workers indicated that they were excited about the online spaces in which they engaged; others struggled to find a fit. Some relied on online communities to stay current while others wanted a place to bring problems or see what challenges others were dealing with. Some talked about having very specific needs related to learning new things while, for others, whatever knowledge making occurred was a good by-product. Some engaged as a way of "trying" on particular work while others were actively doing the work (see Thompson (in press) for an extended discussion of the kinds of learning that

unfolded in these cyberspaces). Assessing the ROI led to strategic ways of participating, which included all-out participation, lurking, and everything in between. More detached stances appeared to reflect attempts to play with boundaries and, at times, to seek out more peripheral locations. Workers withdrew from online communities when the space did not feel quite right or they needed to re-establish a boundary.

Discussion

Even though "online community" was not a phrase often used in our conversations, the data suggests that it had resonance and meaning. These self-employed workers seemed to know when they experienced it, although as the findings highlight, there was no consensus on what it was. Participants were quick to differentiate online communities from web sites populated only with information or a ListServ pumping out announcements. Because the opportunity to connect with others and their ideas was important, there is a sense that engaging in these spaces materializes differently than other online activities. However, given the flip-flopping in the findings over understandings and expectations of an online community, it is not surprising that a space that functions as an online community for one person will not necessarily do so for another. The sensibilities of "online community" are in the eye of beholder, which is consistent with Shumar and Renninger's (2002) comment that one's "definition of community informs the image held, the words used to describe community, and the sets of expectations concerning what community can be" (p. 4).

These findings support other research reporting that "informal" online communities provide a viable and valuable work-learning space. Afonso (2006) writes that virtual communities offer "collective goods in the shape of social capital, knowledge capital, and communion" (p. 156). The participants in this study intimated that they valued and sought these collective goods. Interacting with other practitioners is important and these kinds of online communities support the informal learning activities of professionals and development of their professional practice (Allan & Lewis, 2006; Cornelius & Macdonald, 2008; Hara & Hew, 2007). The learners in Ross's (2007) study had few options for forging peer relationships as they worked to become a practitioner in a difficult field. The data in this study reinforces Ross's finding that because the web can put people in touch with hundreds of peers, "it remains the simplest and most efficient means of finding collegial relationships" (p. 322). As Brad shared, "If you have an information need you have to go somewhere to solve it and an online community is probably one of the most user-friendly and quickest ways to do it."

The cyberspaces described by these self-employed workers contrast with the more enclosed spaces of a learning community housed within an online course. This study explores how participants participated in much less pedagogically inscribed spaces and foregrounds several issues related to online engagement: managing exposure, force-feeding community, and navigating multi-

purpose spaces. Delving deeper into ways of engaging online, the discussion that follows then considers how online configurations and ways of engaging are evolving, possibly beyond the notion of "online community".

Exposure

Navigating and negotiating public-private boundaries is an important issue for people engaging in more informal learning spaces. Although it is debated as one tension within formal online communities, the boundedness of those spaces seems to mitigate the impact of the private becoming far too public. Introna and Brigham (2007) muse that virtual communities paradoxically force us to encounter virtual strangers who "are brought closer, by unexpectedly and often without invitation popping up on our screens" (p. 174). Evident in this study were the efforts of participants to keep boundaries in play and manage their degree of exposure. Urry (2009) explains that much of what was private now exists "outside the 'self' [which] is hugely distributed across various databases spread through time-space" (p. 491). To some degree, all participants expressed concern over leakages between public-private/social-work spaces and questioned what was alright to share with whom: how much of their "self" is, and should be, distributed and intermingled in multiple networks. Their concerns resonate with recent writings about privacy intrusions, data mining, and individuals' capability to determine and manage online identity as digital technologies become more pervasive (i.e., Anderson, 2007; Manders-Huits, 2010); a phenomena van Dijk (2010) describes as "relations between property, privacy, and personhood in the digital age" (p. 57).

Force-Feeding

Conrad (2002) explored the experiences of adult learners in an online undergraduate program and found that these learners constructed community as a necessary tool for the completion of tasks. She states that their "measured and calculated participation fed community as needed" (para. 39) and was often deemed as inconvenient and taxing. Although a different context, these pragmatic forms of engagement are strikingly similar to the participants in this study. One significant difference is that most of these self-employed workers did value the deep connection that seemed to be missing in Conrad's setting. Indeed, Haythornthwaite et al. (2004) argue that in time-limited groups such as online courses, "we need to bootstrap community … to accelerate a process that might occur on its own, given enough time" (p. 52). This comment points to a classic dilemma of online community: what is designable and what must be left to the natural progression of creating meaningful relationships. Community in these informal spaces was not "force-fed" in order to support learning. It was either present in a way that worked for the self-employed worker or it was not and they went elsewhere.

In this study, lurking was a translation of many forms of peripheral participation: uncertainty about the benefits of more full-on engagement, being parsimonious with time, acknowledging one's position as novice, and gathering

market intelligence. It seems lurking is widespread (Baym, 2007; Preece et al., 2004). These findings support other research that suggests lurkers can feel a sense of community (Moisey et al. 2008; Nonnecke & Preece, 2003). According to the workers in this study, lurking did not seem to prevent learning. However, for some participants, these more detached stances were untenable. Despite the fluid way of engaging in these spaces, some participants described how they spent years in an online community building connections and caring, an activity that they did out of desire, no matter how pragmatic they were about managing their time. Ensuring that participants do not fade away is debated widely in the formal online community research. Yet, in the informal cyberspaces described in this study, little can be done given the voluntary nature of participation. It largely rests on people's perceptions of the obligations of "membership" and what it means to "join" an online space.

Multi-Purposing

Just as participants had a range of reasons for engaging in one (or several) online communities related to work-learning, in many of these spaces, learning was not the main priority. As Schwier (2001) points out, "given the right circumstances, any community can act as a learning community. … But most learning communities do not focus exclusively on learning" (p. 7). How the richness and contradictions that this multi-purposing creates vis-à-vis learning efforts has not yet been well studied. In formal online learning communities, learning is the *raison d'être*. Further research is needed to better understand the learning potential of these more loosely structured cyberspaces in which learning is one dimension amidst a mix of other activities.

Network Moves

This research touches on how online configurations are evolving, in part because of new technologies, but also because of the relationships individuals are seeking with both people and objects. This study explored self-employed workers' engagement in online communities and is not focused on understanding all aspects of their online and offline practices related to work-learning. However, participants made references to all kinds of online collectives and activities as well as offline and F2F entanglements. Wittel (2001) describes community as entailing "stability, coherence, embeddedness, and belonging" while, in contrast, network sociality represents (dis)integration, an immediate intersubjectivity, and social relations which are "informational" and ephemeral rather than "narrational" (p. 51). The network metaphor does not privilege the closeness of community but instead embraces a range of relationships (Jones & Esnault, 2004).

The data in this study suggests that online communities are not passé as has been posited (Kim, 2004; Ryberg, 2008; Wittel, 2001). However, there is evidence that these self-employed workers are engaged in many different ways online. The findings are consistent with Baym's (2007) research on a Swedish fan community. She asserts that online communities (interest-based groups) have not been "replaced" by ego-centric networks and then highlights how people in her

study are not congregating on single sites but rather "build community through a network of sites" (para. 26). Rather than seeing this shift as an example of "networked individualism", as put forward by Wellman (2001) and Castells (2001), she prefers the term "networked collectivism" which she describes as "loose collectives of associated individuals who bind networks together" (para. 58). The self-employed workers in this study had several online spaces for their work-learning activities—primarily out of necessity. There was no one online community for workers doing international development work, sport psychology, or daycare. Moreover, the web-technologies-in-use, the amorphous nature of cyberspace, and the slippery notion of "community" suggest that online communities are best regarded as constantly shifting networks of relationships rather than an entity.

There are indications in the data that these workers are moving toward more networked architectures of online participation; a shift that captured my attention. Many will likely continue to include online communities in their configurations, despite the inherent tensions. As illustrated in this study, closeness and connection to others is important for some people. Schwier (2001) suggests that "many learning environments do not require a community of learners. … But there are cases where intimate engagement with others is important for rich learning to happen" (p. 8). Online communities provide a sense of place for these kinds of interactions. How these spaces will continue to change is open to debate.

Conclusion

For some self-employed workers, turning to an online community was the only viable learning option. For many of the participants in this study these informal spaces were rich learning experiences. However, this was not true for every participant. In addition to lack of appeal and ineffectiveness, online presence brings challenges: protecting privacy, reputation management, figuring out where to go, assessing relevancy and credibility of people and resources, intellectual property protection, and being both a worker *and* learner in the same space. It is timely to question what these more informal spaces are like as learning spaces.

"Online communities" are not uniform entities and yet this term is often used in a "one size fits all" manner. Is this broad brush terminology problematic? Self-employed workers were learning through their engagement in online communities—in all their diversity. Although the phrase "online communities" is used to describe a plethora of configurations, there is also a proliferation of labels and meanings around this term, which is perhaps not surprising as practitioners, researchers, and participants themselves grapple with how they understand community. Indeed, a standard definition may not enhance our understanding of this assemblage given its fluid nature. As Baym (1998) states, it is "fundamentally reductionist to conceptualize all 'virtual communities' as a single phenomenon" (p. 63).

"Informal" online communities encompass many possible configurations. Worker-learners in this study were enrolled into these spaces via membership in a professional association, by buying or having an interest in a product, through some kind of Internet presence, and/or affiliation with a workplace. As more research is conducted on the learning practices unfolding in informal cyberspaces, future studies will be better positioned to compare these experiences. Researchers are beginning to do this work. For example, Daniel et al. (2007) contrast formal and informal online communities in their typology (see Daniel, Schwier, & McCalla, 2003 for an earlier version). Dron and Anderson (2007) distinguish between groups, networks, and collectives based on relationality and map different social software to these different groupings.

It is not the remit of this study to build a typology of informal online communities. However, the findings highlight the range of cyberspaces these self-employed workers inhabit with others. The diversity of online communities is hard to contain in any typology and the categories used at the outset of this paper—organic, commercial, and organizationally sponsored—are not mutually exclusive. However, these efforts to differentiate are not in vain. In his blog, Dron (2007a) argues that "we should get away from talking about communities and networks as though they were just one kind of thing" (para. 3). To ensure pedagogical relevance, it is important to recognize that an array of cyberspaces are utilized for work-learning and each will offer different possibilities for connection and learning, while at the same time demanding something different from the members, the collective, and the organization (if any) which may be "shepherding" the community. Whether participating in, designing, or researching these spaces, attending to and articulating the nuances of the space is critical.

Implications for Research

This research brings forward the need to attend to the nature of relationships in and between different cyberspaces. One way to explore more networked configurations of online engagement is through "personal learning environments" (PLEs). A way of mapping learning strategies, PLEs highlight new ways people are using technologies to communicate and learn (Attwell, 2007; Bryant, 2007; Downes, 2007). Downes sees PLE's as learning networks: "engagement in a distributed environment consisting of a network of people, services and resources" (p. 24). By engaging in more networked configurations of people and spaces, workers are constructing their own learning environments that include a mix of individual and collective, close and distant, formal and informal learning spaces. This concept is a promising area of further research into the experiences of worker-learners.

Although this may become more prevalent in the next few years, there was no evidence in this study that commodification of relationships is as rampant as Wittel (2001) asserts. However, there is still reason to be cautious about how some of these new entanglements between people and technologies are changing

ways of knowing. For example, Anderson (2007) cautions that "business concerns are increasingly shaping the way in which we think and potentially act on the Web" (p. 2). Research could be undertaken to explore how these kinds of online groups are being mined or designed for commercial ends and the impact this has on the learning possibilities.

Implications for Policy

Policy implications include acknowledging critical information and media literacies particularly as these online spaces become more complex and intertwined with political, social, cultural, economic, and material implications. Other policy imperatives emerging from this research include the pressing need to attend to privacy, online identity, data security and ownership, and intellectual property protection issues. For instance, the recent announcement by Canada's federal privacy commissioner, which introduced broad changes to the way Facebook stores and shares information about its users, is very significant (see Denham, 2009). As Hartley (2009) reports, this decision will not only impact Facebook's 250 million users but also the "one million application companies around the world crafting software for the site to collect and use" this kind of user information (para. 9).

Implications for Practice

There is a growing interest in nurturing virtual communities for ongoing professional development and lifelong learning initiatives. Although the parade of new web-technologies seems endless, if adult educators can better understand how these collective cyberspaces work, they are better positioned to more critically evaluate new technologies and determine, if and how, they could be leveraged to create new, and perhaps stronger, forms of connectivity that will support learning efforts.

Given the interest in web-based community, it is timely to examine how researchers, practitioners, policy makers, and citizens are constructing understandings of community. As the development of online community becomes increasingly linked to learning, all of these groups need to be clear about why community is promoted and expectations of how it will enhance the learning experience. The findings in this study suggest that online community is both a process *and* a space. It is also clear that it continues to garner much attention.

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Self-employed and online: (Re)negotiating work-learning practices[2]

Introduction

There is much to learn about how web-based technologies are changing work-related learning practices. While many studies acknowledge the influence of technologies, few probe how they redefine everyday learning activities and require working adults to re-negotiate the social, material, and political aspects of learning spaces online. There is plenty of buzz about online communities whether they are part of new social media configurations, such as Facebook, LinkedIn, or Twitter, or commercialized online product-related spaces carefully cultivated by enterprises. Online communities appear to offer socializing, networking, support, business opportunities, or social activism. But what practices in and around these spaces come to be labelled as learning?

Regarding online communities as learning spaces seems to make sense. However, educators are still wrestling with how to best facilitate the collective learning of such spaces (i.e., Riverin & Stacey, 2008); a challenge magnified in the informal communities outside the purview of formal education (Gray, 2004; Ross, 2007). Some online communities are structured, as in an online course, with tightly bounded membership and purposeful design and pedagogical strategies. However, beyond the walls of formal learning spaces, McLoughlin and Lee (2007) write that there are compelling examples of vital, self-managed, thriving, knowledge-creating communities. Community can therefore also describe a gathering of people online that is self-managed, organic, driven by a shared interest or need, and highly social (i.e., Boyd, 2006). These collectives form because someone is interested in a topic and searches for like-minded others on the Internet. These kinds of spaces may also be purposefully nurtured by professional associations, workplaces, or businesses. This research project focuses on spaces such as these—spaces *outside* the auspices of formal online courses.

This research project concentrates on online communities as sites of learning; more specifically, the kinds of learning that emerge through the informal work-related learning practices of self-employed workers in these cyberspaces. Self-employed workers are perhaps more likely to turn to online communities given that they work outside the sphere of the conventional workplace and its organized learning resources. The self-employed are a significant part of the labour force. Industry Canada (2009) states that, in 2008, they represented 15% of all employed workers in Canada: 2.6 million people. Yet, Edwards and Nicoll (2004) argue that accounts of the workplace often do not reflect the workplace of the self-employed. Given increasing interest in informal learning and reports that informal learning is the primary learning mechanism for the self-employed (Hughes, 2001), this study makes a contribution to better understanding their

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informal work-learning practices. It is timely to question how informal pedagogical moments are being renegotiated by the technology woven into our lives. A critical look at the tensions in these cyberspaces is important when they become, perhaps even unintentionally, important sites of learning for some workers. Insights from this inquiry may help facilitate a more careful look at the nuances of online communities and offer insights for people engaging in these spaces.

Positioning in the Literature

Given the interdisciplinary nature of the work-learning field, there are many ways to understand learning at work. Indeed, the concept of work-learning as well as work and workspaces reflect diverse, often contested, understandings. A practice-based perspective guides the conceptualization of work-learning in this paper. Although it is not surprising that workers click their way into all sorts of cyberspaces, there is not yet much research on these nascent online work-learning practices. However, there a few studies which inform this exploration of work-learning in online communities and these are presented.

Informal Work-Learning

Work-learning concerns itself with the kinds of learning "embedded in particular sociocultural activities, tools, and communities in which people participate" (Fenwick, 2006, p. 192). Much work-learning seems to happen informally. Indeed, informal learning and work have become important in work and adult learning research as well as government policy (Sawchuk, 2008). The nature of informal learning, and even the term, has been widely debated. Despite the lack of definitional precision, some distinctions are important in order to delineate the type of learning of interest in this study. Livingstone (2001) defines *informal learning* as "any activity involving the pursuit of understanding, knowledge, or skill which occurs without the presence of externally imposed curricular criteria" (p. 5). Pursued by individuals or collectives, the objectives, content, learning strategies, duration, and evaluation of outcomes are "determined by the individuals and groups that choose to engage in it" (p. 5). In contrast, formal learning entails a structure and a clearly defined educational plan determined and led by an educational agent.

According to the Survey of Self-Employment (SSE), conducted by Human Resources Development Canada in 2000, the self-employed depend on informal learning. Over half the respondents report relying on only informal training, with another 26.5% using a combination of informal and formal training (Hughes, 2001). While the SSE data reveals that the self-employed do reach out to others, there is no sense of *how* they are connecting to others, how prevalent online communities are as a source of learning, and what is happening in these spaces from a work-learning perspective.

Learning in Cyberspace

Learning online introduces yet more flux to already fluid self-employment practices. Edwards and Usher (2008) write that "in cyberspace learning can stretch and be stretched … across time and space in unexpected and … rhizomatic ways" (p. 131). Farrell and Holkner (2004) suggest that as old and new technologies intersect in hybridized workspaces "new communicative practices shape what kind of person we can be in our workspaces" as well as "the kinds of communities we can build and what kinds of knowledge we can make" (pp. 135-136). Self-employed workers are on the cutting edge of hybrid workspaces. They have long worked in a different space from the conventional workplace: a space that has undergone tremendous changes in the wake of a renewed lifelong learning discourse, quantum changes to technologies, and reorganization of work. How these new ways of learning are experienced by self-employed workers is far from clear as there is little documented research.

Few studies focus on work-learning in informal online communities. Barley and Kunda (2004) conducted an extensive ethnographic study of self-employed technology contractors in the Silicon Valley. Although their focus was not online communities, they found that the contractors did form and participate in online networks in ways described as "usually spontaneous and informal, driven less by conscious design than by contractors' efforts to solve immediate problems" (p. 301). Ross (2007) studied an institutionally independent "organic online learning community" started by one "cabbie" when he found nothing to help him in his "cabology" studies. It is now populated by London cabbies-in-training. Similar to Barley and Kunda, practice-oriented needs drew workers to these spaces. Ross found that the creation of an online back-region became a beneficial sanctuary for taking academic and social risks. Hara & Hew (2007) also found that voluntary contributions in a non-competitive environment are important. They studied an online community of professionals interested in advanced nursing critical care and conclude that knowledge sharing was sustained by validation of one's practice with others in a similar working situation and a need to gain better understanding of current best practices. Hemetsberger and Reinhardt (2006) conducted a more detailed examination of individual-collective learning practices in a successful open source project community and conclude that learning depends on whether the community manifests knowledge in a way that enables re-experience—active experimentation online.

Although not yet widely researched, several studies have explored work-learning within online communities established by professional associations or workplaces (i.e., Allan & Lewis, 2006; Cornelius & Macdonald, 2008; Gray, 2004; Riverin & Stacey, 2008; Sloman & Reynolds, 2003; Thorpe, McCormick, Kubiak, & Carmichael, 2007; Wasko & Faraj, 2005). Most of these online communities were set up to facilitate professional development and/or provide a support network. Although the workers in these studies were by and large not self-employed, this research draws attention to how workers use online spaces for learning purposes. For example, Allan and Lewis found that members in their

four-year case study used the online community as both a launching pad and a secure place to retreat "with like-minded professionals when pressures in the real workplace were stressful" (p. 850).

Situated Learning: A Practice-Based Conceptualization

Lave and Wenger (1991) position situated learning as a theory of social practice, suggesting that "learning, thinking, and knowing" are found in the "relations among people in activity in, with, and arising from the socially and culturally structured world" (p. 51). The cornerstone of situated learning theory is legitimate peripheral participation (LPP). LPP refers to the way newcomers to a practice learn to become full practitioners through their interactions and immersion with the larger community of practitioners (CoP). As they learn, *peripheral* participation differs from that of a full practitioner yet is a legitimate part of the learning process.

This research study does not set out to examine CoP but rather the broader notion of collectives in cyberspace. Thompson (2010b) highlights multiple forms of community, many of which do not have all the attributes of a CoP as defined by Wenger (1998), and yet still fulfil the role of situating learning in practice (Cox, 2005). Nonetheless, situated learning theory, and particularly LPP, brings a useful theoretical framing for studying how people learn with others in everyday practice. Lave and Wenger (1991) describe LPP as an analytical perspective: a way to speak about relations between people and "about activities, identities, artifacts, and communities of knowledge and practice" (p. 29).

Situated learning falls under the rubric of practice-based theory. Although "a loose but nevertheless definable movement of thought" (Schatzki, 2001, p. 13), most practice-based theories hold that "practices are embodied arrays of activities organized around a shared practical understanding or 'way of doing'" (Bjørkeng, Clegg, & Pitsis, 2009, p. 146). Lundin and Nuldén (2007) state that the skills we learn are inherently connected to the practice in which they are located: "in this way, learning and knowing are connected to and part of practice" (p. 223). Therefore, knowing is a "situated activity and knowing-in-practice is always a practical accomplishment" (Gherardi, 2009, p. 117).

Intertwined with engagement in everyday activities, learning is enacted within organic fluid practices. Such learning is social and collective in nature, emerging through inter-actions between people and objects, and is not confined to the individual. As Lave and Wenger (1991) argue, learning is not merely situated in practice "as if it were some independently reifiable process that just happened to be located somewhere". It is "an integral part of generative social practice in the lived-in world" (p. 35). Learning *is* knowledge and practice making; knowing-in-practice. LPP helps to frame explorations of the legitimacy-peripherality of knowing-in-practice. It creates opportunities to explore how different possibilities for self-employed workers' learning are shaped by locations, trajectories, and ways of participating within the practice and larger community of practitioners.

Inquiry Methods

Data Collection

This study asks: What kinds of learning emerge through the work-learning practices of self-employed workers in online communities? Participants were own-account self-employed workers (contractors and consultants who do not have staff) and selected by first employing purposive sampling to "select unique cases that are especially informative" and then snowball sampling as the initial participants suggested others who might be willing to talk with me (Neuman, 2000, p. 198). Semi-structured interviews, which varied in length from one to two hours, were conducted with 11 self-employed workers; 10 by telephone and one face-to-face (F2F). Follow up dialogue, either by e-mail and/or short conversations, provided additional data. Interviews were recorded, transcribed, and sent back to participants for verification. Pseudonyms were assigned to protect participants' anonymity.

Data Analysis

Thematic analysis was a process of understanding my data, systematically identifying key concepts and links between them, and developing more abstract theorizing of the data. The process I followed was influenced by Coffey and Atkinson (1996), Merriam (2001), and Wolcott (1994). Analysis was a careful and creative process that reflected attempts to understand a multitude of experiences. I continually asked, "What is the data saying and how does this differ or resonate with what other data suggests?" Given the diversity of participants' work and the eclectic nature of their online experiences, I was immersed in multiplicity. Wolcott describes a process of description (what's going on?), analysis (how do things work?), and interpretation (what is to be made of it all?), which are not mutually exclusive stages but different emphases by the researcher at various points in the project.

Category construction began with the first set of notes. Notations were made by potentially relevant bits of data in the transcripts as I jotted down questions, tentative interpretations, and possible connections. After working through the notes, "like" comments and notes were grouped together and a running list of these groups created. The next transcript and related data was treated similarly, and the list of notes and groupings then compared to the first set. Applying this process for each transcript led to a set of categories derived from the data. These categories were named and then made "more robust by searching through the data for more and better units of relevant information" (Merriam, 2001, p. 185). As Savage (2000) writes, coding is a mixture of "data reduction and data complication—a way of expanding the data to develop new questions and interpretative ideas, in which … the focus shifts from analysis … to interpretation" (p. 1496). The data was very fluid at this point. Coding encouraged new ways of seeing connections and I engaged in ongoing explorations to find supporting as well as dis-confirming evidence. Consistent with Morse (1994), my experience of data analysis at this point was a process "of conjecture and

verification, of correction and modification, of suggestion and defense" (p. 25). As I began to describe and write my findings, there were more shifts and re-alignments of sub-themes and themes as data was juxtaposed in fresh ways.

Participants and Communities

Participants ranged in age from 35 to 51. They had been self-employed for 6 months to 21 years and worked in a variety of fields. They engaged in a range of online communities, turning to these spaces at various stages in their career, and reported an array of positive and negative experiences. While six participants had been involved for as long as five to 10 years, others had engaged for two to four years. One participant had tried several online communities in spurts over seven years and recently decided it was not for her. Technologies used include ListServs, discussion boards and forums, Yahoo groups, e-mail, blogs, and RSS feeds. Eight participants mentioned venturing into Facebook, LinkedIn, Ning, and/or 43 Things – popular social networking sites. For the most part, these were not the kind of online spaces sought for work-related learning but perceived as places for socializing and networking.

Turning to online communities was one informal learning strategy and it seemed to fit with their overall approach to work-learning and view of themselves as a "self-managing" learner. These participants indicated that they valued informal learning, although one participant, Amy, was a recent Ph.D. graduate and at a bit of loss as to where her professional development was coming from now that she was no longer in an intensive formal educational setting. Other learning strategies mentioned included: reading (print and online), networking, dialogue with colleagues and clients (F2F and via e-mail), attending workshops, conferences, and courses, doing online tutorials, learning through experiences, reading blogs and contacting people, and hanging out in bookstores and/or the library.

Findings

Although I talked extensively with participants about what "online community" meant to them, I did not specifically ask them how they understood "learning". I was open to the practices they described as they talked about their experiences in these spaces, what prompted them to turn to and stay engaged in online communities, and what knowledge they were generating. Nevertheless, "learning" was a word they used a great deal and applied to a cornucopia of purposes and processes. Four themes illustrate the kinds of learning described by the self-employed workers in this study: (1) work practices, (2) the viability of doing particular work, (3) how to participate in online communities for work-learning, and (4) how to draw on and participate in fluid knowledges. Refer to Thompson (2010a) for a closer examination of how the enactment of different sociomaterial dimensions of work-learning online can lead to different ways of knowing and work-learning practices.

Because this study focused on "informal" work-learning practices, it is not surprising that these self-employed workers often described learning as an "always there process". Ryan commented about not really having "ah ah moments" in his 10 years online, but rather "just things that kind of mould you as you work". Others spoke about "lots of little impacts", "nothing stands out", "its just sort of fluid throughout my day". Learning, at times, was an activity that floated below the surface. Yet, their descriptions also suggest learning was driven by very conscious and pragmatic needs to solve a pressing problem. Learning, in this wrapper, conveyed a sense of efficiency, determination, and management of information. "Keeping up" and "staying on top of things" were familiar refrains. Most participants indicated that tracking down credible and useful information was very important. At the same time, there was a sense of unplanned but fortuitous discoveries and shifts in understandings. Purposefulness and serendipity appeared to be held in some kind of fragile balance as learning was interwoven into many overlapping and often ill-defined networks.

Given the interest of this study in the online collective, mention of the relational nature of learning—"give and take", "sharing ideas and resources", "getting out of my own little world", "hanging out in these groups"—was apt. The elasticity of cyberspace amplified the hyperlinked and connected nature of what was happening: starting here, clicking there, trying this, now that, going back. Learning, as some indicated, happened in short bursts; sometimes serving as a welcome online diversion when they needed a break. There was no mention in the data of instructors or curriculum, although the data does not convey the impression of completely incoherent activities: the structure of whatever "informal" pedagogy emerged seemed to be the effect of being embedded in one kind of network or another.

Work Practices

Through their online interactions participants indicated that they learned about and developed work practices. In addition to reaching out to online communities to address day-to-day aspects of their work and learning, participants shared many examples of how they were being encultured into the larger practice of their particular work, be it sport psychology, digital graphic artistry, organizational change management, or daycare provision. For these workers, learning a practice meant staying on top of the field to ensure currency of knowledge as well as ways of working and thinking. Online communities were seen as particularly useful for this. Workers spoke of the importance of quick turn-around and how their online communities were invaluable when they were in a crunch. When Amy needed advice, the first place that sprung to mind was her online community. She wanted to reach out to 700 people with one e-mail. Although there was one person she could speak to locally, she was not sure he would respond and she knew she would wait for a reply. She explained: "I believed there was more expertise on the ListServ than available to me here." Online communities were seen to offer access to expertise quickly and informally.

There was a sense in the data that workers gained confidence that they could do their work and "be" a consultant, e-learning developer, etc. Amy, a sport psychologist, shared:

> When I started out, I was thinking I'm not being very effective. I don't really know how to deal with this. But when you start seeing other people's responses that are really helpful it does make me feel I can do this and I am good at this.

Others reported that their online discussions helped them resolve doubts about how to approach a problem along with a sense of validation: their thinking "fit" with others. However, a tension between *being* and *becoming* was reflected in online spaces that were not just for learning but also a work space—a place to find contracts and project partners and to make a statement about who you are and your capabilities. While it was advantageous to access so much in one space, this multi-purposing created challenges. Several participants indicated that they experienced the tension of "becoming" a practitioner while also under the expectation of already "being" a practitioner; constantly constructing the public face of competence while also trying to learn. Brad shared his struggle:

> Do you really want to be going out in a very public forum with the persona of somebody of "Oh, I'm just learning" and also trying to look for work and business at the same time? It's a difficult thing. I'm not convinced that it can be done well, quite frankly.

Through their engagement in online communities, it seems that most participants built understandings about where they were positioned in a work practice and the corresponding possibilities with respect to power, influence, and credibility. They learned what contributions they could make and what they still needed to learn. However, positioning was sometimes not easy to ascertain. Ryan, an occupational health consultant, shared, "The trouble with online groups is that you're never really sure who has access or about others' level of expertise. If they are all physicians you might be the dumbest one in the group."

The Viability of Work

The second theme focuses on how these self-employed workers figured out the viability of various fields of work and ways to extend work possibilities. For most participants, engaging in online communities was about envisioning new ways of working or new services they could offer, increasing reach, or stepping outside a narrow field. Ben, a digital graphic artist, commented that he got back into online communities two years ago because "the new generation of tools forced me, in order to get caught up, to get back into communicating." Ben saw it as a competitive advantage to enhance his skills in this way. But because there is no online community for document security—a "small secretive world"—he turned to related spaces, such as digital modelling software sites. Some participants portrayed online communities as forums for showcasing skills. Liz noted that although this was not how she used the group,

> There are some people on here that post prolifically and that's probably part of their networking. They are self-employed as well. I think that

allows them to give people a sense of who they are and so people can see they know what they are talking about. They probably end up getting contracts that way.

According to these workers, online communities were regarded as valuable forums for building knowledge about new career possibilities: assessing what it would feel like to do xyz, figuring out next steps and career goals, getting oneself launched in a career trajectory, and networking with other practitioners. Half of the participants purposefully used their participation in online communities to explore new business ideas or build a strong skill set. Ava dipped into online communities to assess their viability as a potential target market for an Internet-based business she wanted to set up. She saw these online forums as a "tremendous resource that's right there and very useful for entrepreneurs". Her engagement in online communities also gave her a competitive advantage: "I see possibilities I never saw before. I don't believe many other people in my line of business see them because they haven't had that kind of experience getting comfortable online and working in that virtual context."

How to Learn in Online Communities

Although it is not clear whether participants ventured into online communities seeking this, they did build substantial knowledge about learning in these spaces. Participants conveyed that learning to be strategic in how one uses online communities was extremely important and tied to the nature of self-employment, with its incessant emphasis on billable time. Experienced online participants described how they learned to scan postings quickly, stay on top of what is going on, be selective, and delete the non-relevant. These practices convey efforts to "tame" the unruliness of the web and its notorious reputation for distraction and information overload. Becoming skilled at managing time and weighing the relevance of different spaces was vital. Oliver spoke about the importance of being disciplined and strategic, although he did make room for the unexpected: "Sometimes I say I'm just going to cruise around for awhile because sometimes you get this serendipitous learning and you'll just hit on something quite by accident that is actually really valuable."

Participants indicated that they learned what kinds of online spaces were more conducive to learning, commenting about the "tone", respect for others' time, and a sense of focus and purposefulness. In one of Liz's online groups she noted that, "there is a lot of good information that goes back and forth. People are supportive, offering suggestions, digging down to the bottom of why something is not working and what else they might try. It is non-critical." Likewise, Sophie's community was "not about one-up-manship. While there are some fairly interesting and very thoughtful discussions and critical analysis of what each other says in terms of some of these things, there is no criticism." In contrast, wondering if people will think your contribution or question is stupid, a clique-like gang mentality, no immediate uptake on something you post, and defensive and judgmental comments were brought up as things that turned these participants

off. For at least two participants, online communities were not high on their list of learning options. In our second interview, Brad, an avid user of online communities for informal learning, admitted he was most surprised by the lack of learning. This was not an issue in our first interview a year earlier. He stated:

> I thought if I was on ListServs that were with professionals there would be more information exchange, more opportunities for informal learning. And it was much less. It was a lot of fairly general conversations and a lot of social banter. But the actual knowledge transfer was frankly, nil.

Some did not stay. Yasmin realized that online communities were not a viable forum for her and returned to more familiar F2F experiences. Others raised questions about online presence. For two participants, discovering how to participate safely emerged out of negative online experiences. Liz inadvertently gave a stranger in her online community too much information: "I was shocked at the amount of information he had about me. I got spooked right away. I didn't respond to it and tried to lose sight of him. But it took a lot of time." Others did not mention online safety at all, perhaps suggesting they were well versed in safety protocols or had not yet had an online encounter come back to haunt them.

Participating in Fluid Knowledges

The data provides indications of how these workers were learning to participate in the knowledges circulating in their networks. For example, access to information layered with others' experiences was highly valued. Brad explained:

> This is information that isn't really out there in the academic press but practitioners know this based on their experiences. Maybe I could find this information somewhere but it would take an awful lot of work and time and I don't know how accurate it would be. Because these people have actually done this work, they get to the nub of the issue and go, "No, these are the 2-3-4 pressing issues on your project we think you should be looking at." I can tap into people who have done this work for 20 years.

For the most part, participants appreciated accessing other people's ways of thinking and how they approached work issues. Ryan, an occupational health consultant, explained: "People rely on each other to figure out what to do in a specific case. It is part of due diligence." He shared an example of a drug addiction case in which he was not sure how many rehab opportunities to provide to a person, an issue widely debated in their field. He needed to reach out to as many people as possible in a short time without repeating the story 10 times and so he turned to his online network:

> About a dozen people responded. They gave me a lot of insight as to why they thought this person was not being rehabbed properly. Things I hadn't considered before which didn't have anything to do with the addiction. People referred to their experiences and if they were successful or not. I kind of had an answer already in my mind. I just wanted some help from people saying, is that realistic or is that appropriate in this case. We ended up firing him. But it wasn't related to the addiction issues. The others

picked up on that right away because they are used to dealing with addicts. They knew exactly what I was going through and they said, "Ryan, you've got to cut your losses and just fire him."

These findings suggest that in addition to learning things that helped them with day-to-day work activities, participants were building knowledge about particular "practices" as well as the viability of certain work. They were also figuring out how to draw on and participate in fluid and mobile knowledges. A surprising amount of learning was focused on developing skills related to learning in these online spaces. In the next section I explore how what they were learning is interwoven into the practices of learning online.

Discussion: Practices of Learning Online

Because social media extend connectivity in ways that both fulfil and transgress our expectations, it is important to take a closer look at the nuances of the work-learning practices described in the findings. LPP is used to guide this analytic work. I first explore the kind of "learning" activities associated with online communities, the way workers are often positioned in multiple ways across multiple spaces, and the implications of peripheral, partial, and part-time engagement. What is considered *legitimate-peripheral-participation* is still evolving within the context of relational networks that increasingly rely on web-technologies to facilitate, challenge, and change ways of knowing. I conclude with a discussion of the usefulness of LPP for this kind of analytic work.

The Learning

The participants in this study indicated they wanted to be with others who could provide information, advice, support, guidance, and pointers to resources. Most also recounted how they assisted the learning efforts of others. Similar to the participants in Cornelius and Macdonald's (2008) study, rapid responses to practical questions, up-to-date information, and discussion of current issues is valuable to busy professionals. Consistent with the nurses in Hara and Hew's (2007) study, these workers struggle to keep up with rapidly changing knowledge. The currency of information and immediate reach to others is what drew many of these self-employed workers to their space and kept them engaged. Once there, it was helpful to realize that others were experiencing similar things. My findings also support Hara and Hew's report that validation of one's practice with others who share a similar working situation is important in these spaces. The nurses in their study referred to "benchmarking" practices, which were especially useful for more isolated members (i.e., the sole critical care nurse in their organization). A significant benefit of engaging in these spaces is value-added knowledge not easily accessible elsewhere—information layered with others' experiences and opinions. Other research has found that stories, cases, and narratives imbued with experiences and the circumstances of events help to develop a shared practice (i.e., Gray, 2004; Guldberg, 2008; Thorpe et al., 2007).

This study highlights that "what" people learn is interwoven with "how" they are learning. Getting questions answered, discussion of topical issues, problem-solving, practical short cuts and new approaches, socializing, emotional support, being informed about what is going on elsewhere, and dissemination of information have been shown to be valued work-learning activities in these spaces (Cornelius & Macdonald, 2008; Thorpe et al., 2007). However, these studies focus on the interactions of workers in *one* space. This study of work-learning extends these findings, illustrating how learning was frequently spread among multiple collectives, often with a blend of online and offline interactions. Online work-learning practices were therefore constructed in a multiplicity of ways and locations. Relations and ways of knowing were sinuous and mobile as people engaged with others in an array of networks.

This description fits with Wenger's (2006) recent emphasis on the importance of *multiple* communities. The focus is moving away from a particular community to "trajectories, connections and relations across and between different practices" (Ryberg, 2008, p. 660). Huzzard (2004) critiques the narrow assumptions in situated learning that both the "practice" and the "community" are ongoing. Although my research is not focused on CoPs *per se*, it highlights the fluid and intermittent nature of learning when both practice and community are constantly renegotiated across different spaces, sequentially and simultaneously. These findings are consistent with practice-based theorizing which is not interested in "isolated islands of practice" but rather "movement through the dense strands of practices that hold together worlds of knowledge" (Nespor, 1994, p. 12).

The significance of developing a work-learning practice, particularly in online communities, should not be underestimated. The participants in this study indicated they experienced successes, failures, and mediocrity. Feeling connected to others and their ideas contributed to successful online experiences. The absence of these connections, outright rebuffs, and lack of meaningful exchanges constituted failures. Mediocrity was reflected in impressions that the spaces they were in were better than nothing, but not really worth expending too much time or energy. Handley, Sturdy, Fincham, and Clark (2006) state that situated learning sees learning as more than developing one's knowledge and practice; "it also involves a process of understanding who we are and in which CoP we belong and are accepted" (p. 644). This is no small feat.

Nolan and Weiss (2002) write about curricula of initiation, access, and membership in virtual learning communities. They assert that "a certain level of sophistication is required to find virtual communities" (p. 315). Accordingly, their curriculum of access refers to the kinds of learning that takes place in order to become a member. Finding and choosing an online community, making an entrée, and being able to assess whether this is a good space for "situated learning" are important skills not well addressed by LPP. Nespor (1994) maintains that LPP gives no attention "to the trajectories that bring people to the peripheries of

particular communities in the first place" (p. 12). These are trajectories fraught with challenges, especially when the vast number of options online is considered.

Multiple Positionings

There is no one online community for workers doing international development work, e-learning development, or daycare. Findings suggest that learning these practices is the effect of cobbling together several approaches and collectives. Workers flipped in and out of an array of online spaces, many of which were not confined to cyberspace. Online spaces were often stepping stones to other learning opportunities: side conversations and tangents, offline and F2F discussions, and other online resources and forums (see Thompson, 2010b). Recent scholarship suggests that online communities are taking innovative forms as participants spread across multiple online and offline contexts (Baym, 2007; Ryberg, 2008). As Longmate (n.d.) states, the concept of a community which exists solely online is too restrictive given that people are "increasingly integrating technology into their physical communities [and] the adoption of personal technologies" (para. 1).

Workers took on multiple positionings across several spaces, including degrees of peripherality. Ryan was "top dog" in one occupational health space, rookie in another. Some participants were in spaces directly related to their work, others engaged in an array of tangential spaces. For example, Liz was active in several collectives related to her e-learning work but also spent time in online communities related to hobbies that might lead to her next career focus. Allan and Lewis (2006) advise that the "development of a new community provides the possibility of creating a new social context in which individuals may explore and develop different ways of thinking that may have an impact on their identity" (p. 844). Perhaps the opportunity to explore different ways of thinking, adopt unique positions, and engage in diverse practices is part of the appeal of being engaged in many spaces. Although these self-employed workers were often aware of their position in an online community, the line between expert and novice is more fluid than the original conception of LPP suggests. As Hamilton (2006) asserts, a person can be "novice at one moment, expert the next, with a change of situation or topic" (p. 131).

Haythornthwaite (2008) argues that the participatory learning evident in spaces created by new web technologies encourages a new form of co-learning pedagogy, bringing into question what expertise is when learning practices change from *transfer* (from expert to novice) to *collaborative peer-to-peer* learning and discovery (pp. 600-601). Similarly, Wenger (2006) refers to the "horizontalization" of learning in which knowledgeabilities are negotiated. He explains that there is less emphasis on the "vertical relationship between a producer and a recipient and more on the horizontal interactions required for the negotiation of mutual relevance" (p. 28). While there was some evidence that participants were engaged in a way similar to Haythornthwaite's co-learning pedagogy, others wanted access to experts when they needed them and were

drawn to a particular online group because of the big names and the expertise they brought. Haythornthwaite raises valid questions about what "expertise" is valued in these kinds of online collectives.

For some of these self-employed workers, the being-becoming tension was pronounced, highlighting questions about what kind of participation as a "learner" is legitimate among peers. Boud and Solomon (2003) also note the "politics around naming oneself a learner" (p. 330). Few studies address this, especially in informal online cyberspaces which are often multi-purposed, with learning nestled alongside a host of other business and social-related activities. Boud and Solomon examined four workgroups in a F2F organization, questioning the circumstances in which a worker can identify as a learner without negative consequences. They found that being identified as a "learner" can create tensions and is sometimes associated with being a person who has yet to be accepted as a fully functioning worker. In contrast, interactions in the online community examined by Ross (2007) provide examples of "learners openly describing their progress and understanding to be inferior to that of their online peers" (p. 319). This space was voluntary, pseudonyms were used, candid sharing was the norm, and there were no prying "institutional" eyes. Ross concludes that these factors created "the possibility for a more honest reappraisal of skills in a way that face-to-face contact might not" (p. 319). Being seen as a learner did not seem to create tensions as everyone was at some stage of completing "The Knowledge" (extended self-managed training to become a licensed taxi driver in London). Indeed, Ross describes this site as "created and operated by learners, for learners" (p. 307).

The self-employed workers in the current study were situated somewhere between these two cases. Although there were tensions between overt declarations of being a novice and presenting a public face of competence to one's peers, the online space provided some latitude for how public one was with respect to their positioning as a learner. Being a learner is not always an unwelcome label. The findings in this study reflect a multiplicity of possibilities that seem to depend on the nature of the work, peer expectations, and the architecture and affordances of the collective in the online space. More research is needed to better understand this significant tension in a work-learning context.

Peripheral, Partial, and Part Time

What these self-employed workers learned was, to some degree, shaped by how they positioned themselves or perceived themselves to be positioned by others. By shaping the interactions they had with others and with circulating knowledges, these positionings impacted ways of knowing. Participation in online spaces was often peripheral. Even those participants who were most engaged and active in their online communities indicated they experienced some kind of peripherality—partial and part-time engagement—at one time or another.

Lave and Wenger (1991) state that peripherality is a dynamic concept that can have positive connotations. Wenger (1998) suggests that peripheries are not discontinuities but continuities: "to areas of overlap and connections, to windows and meeting places, and to organized and casual possibilities for participation offered to outsiders or newcomers" (p. 120). Understanding peripheries as continuities may explain why some of the participants in this study did not seem to be generally bothered about being on the periphery. It was less about being excluded and more about being included in ways that fit with these workers' ways of working and learning: fluid, integrated with other things they were up to, and freedom to pursue the connections they most valued. They seemed to appreciate the "windows and meeting places" and opportunities for more "casual" participation. There were learning opportunities at the periphery—perhaps not as rich in some instances, but still useful.

Jubas and Butterworth (2008) disagree that the centre of a CoP is always the ideal goal. Their examination of the alternative informal learning pathways of women in the IT field illustrates that "individuals can develop critiques of the centre and construct, through their learning-in-practice, legitimate and well reasoned identities based in peripheral locations" (p. 524). These assertions are consistent with the findings of this study: Some of these self-employed workers (both experts and newbies) preferred what they describe as peripheral participation and had no expectations of "full" membership. Findings also reinforce Wenger's (1998) assertion that the mix of participation and non-participation shapes how we locate ourselves in a social landscape, what we attempt to understand/choose to ignore, with whom we seek connections/avoid, and how we attempt to steer our trajectories (pp. 167-168). Participants in this study played consciously with their blend of (non)participation.

The "periphery" and "peripheral participation" are not synonymous. The former is a location; the latter conceptualizes a form of engagement. Lave and Wenger (1991) argue that there is no place in a CoP designated "the periphery", there is no single core, and the endpoint of participation is not a uniform "center" (p. 36). They also suggest that peripherality entails "multiple, varied, more- or less-engaged and –inclusive ways of being located in fields of participation" (p. 36). This more fluid positioning seems relevant to the work-learning of the self-employed. Peripheral participation is not limited to the periphery.

The Utility of LPP

Lave and Wenger (1991) explain that LPP brings questions about the sociocultural organization of space into places of activity, the circulation of knowledgeable skill, and conflicts and intersecting interpretations of participants vis-à-vis their changing participation and identities (pp. 55-56). LPP helps to frame explorations of the legitimacy-peripherality of knowing-in-practice. Lave and Wenger explain that "the form that the legitimacy of participation takes is a defining characteristic of ways of belonging" and therefore a constituent element of learning (p. 35). This is why it matters. The form that legitimate participation

takes is inescapably tied to the shifting configurations of people, ideas, and objects, amplified by web-technologies. In more networked, distributed, technology-mediated collectives, I suggest that the notion of LPP must take on an uber-flexibility in order to be more analytically relevant.

To be relevant to more loosely and tighter knit mobilizing configurations, in part orchestrated by web-technologies, but also by the unique working practices and spaces of the self-employed, the notion of LPP could be expanded to encompass dimensions presented in this research. For example, the work-learning practices of these self-employed workers were distributed and yet often woven into some kind of do-able configuration as workers engaged in multiple practices. Notions of LPP, therefore, need to span multi-community multi-media configurations of people, ideas, and objects that are continually re-negotiated. These are not one-stop "practice shops" which are "found" with a quick Google search. LPP needs suppleness to take into account ways of knowing-in-practice that are mobile and malleable as workers continue to re-invent their practices. This includes acknowledging the tensions of fluid participation that embraces dipping in and out in ebbs and flows, sometimes fully engaged and other times more passive. Legitimate peripherality would be seen as more than the first stage of a trajectory pre-set to "full" engagement and on course to becoming an "expert". As findings in this study illustrate, learning trajectories are often fragmented, reflecting multi-layered participation.

Would this uber-flexibility translate LPP into something it was never meant to be? I have used LPP as an analytical tool to examine configurations other than a CoP, instead focusing on "community" in a broad sense. Yet, LPP is not a cut and dried concept. Lave and Wenger (1991) have even mused that "there may well be no such thing as an '*illegitimate* peripheral participant'" (p. 35 emphasis added). Their rumination creates openings for adding more elasticity to this concept in order to better examine the knowing, relations, and activities that comprise work-learning practices in online collectives.

Conclusion

This research brings work-related learning practices of the self-employed worker to the fore. Framed by practice-based theory, this study examined what kinds of learning emerge through their practices in online communities, networks of enough of the right people, ideas, objects, sensibilities, and caring to be useful. What these workers learned was intertwined with how their learning was enacted. Moreover, learning practices were juxtaposed with the turbulence created by the endless possibilities of cyberspace. Despite the way "digital technologies have come to dominate the domestic and commercial spaces of our everyday lives" (p. 7), Beer (2005) argues that they have become so embedded in our lives that they are often camouflaged and urges a more reflexive approach toward digitalization. Web-technologies and shifting configurations of online collectives shake up notions of expertise, beliefs about who is able to produce and consume

information, and where one locates themselves in order to build work-learning practices. Multiple positionings across several online communities (which are not bound to cyberspace) and ways of participating that are peripheral, partial and part-time (but nevertheless, often still meaningful and productive) re-orient discussions of learning.

Gherardi (2009) describes practice as "knowledgeable collective action that forges relations and connections among all the resources available and all the constraints present" (p. 117). This study highlights the practice of work-learning online, a practice tightly meshed with ways of working and not yet well defined or understood. Participants shared reasons why an online space does not work as a learning space: discussions that are too broad or not focused on problem solving and more critical thinking, lack of questions that prompt sharing of experiences, too many non-learning related distractions in the space, not able to figure out who has expertise or information, too many non-participants, and the intimidation factor. Not an exhaustive list, it highlights many factors that may inhibit learning in these kinds of cyberspaces.

There is growing interest in nurturing online communities for ongoing professional development and lifelong learning initiatives. Farrell and Holkner (2004) urge adult educators to attend more to technological practices rather than specific technologies. Better understanding the nuances of collective cyberspaces enables adult educators to more critically evaluate new technologies and determine if, and how, they could be leveraged by worker-learners to create new relations with others and their ideas. This understanding also enables a questioning of what comes to be construed and labelled as learning. When a "community" is not bound by space, co-location, or time, ambiguities emerge. Who names what is useful learning when there is not one CoP, but multiple communities and practices? When work-learning is not one thing but many different practices and opportunities? Learning in online collectives is a complex undertaking.

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Background Chapter: Situating ANT

The next three papers in this collection shift in orientation as Actor Network Theory (ANT) steps in to guide the analysis. Latour (2005) states that that the first three sources of uncertainties on which ANT draws—groups are made, agencies are explored, and objects play a role—are also relevant in situated learning theory. However, he adds when it comes to ontological positionings and the actual performance of the research, situated learning theory and ANT part ways. Understanding the ontological departures starts by recognizing that ANT is relationist in its ontology: a thing is defined entirely by its relations (Harman, 2009). As explicated throughout the following commentary, "things" are also enacted. Law (2009a) explains, "we are no longer dealing with *construction*, social or otherwise: there is no stable prime mover, social or individual, to construct anything, no builder, no puppeteer. … Rather we are dealing with *enactment* or *performance*" (p. 151). Latour (2005) is leery of notions of social constructionism in which social scientists replace what reality is made of with "social stuff". To Latour, this conceptualization diminishes the object to mere human meanings and interpretations. Harman (2007) explains that it is very important to Latour that "everything that exists must be regarded as an actant …. all entities are on the same footing"; an inherently democratic metaphysical perspective (p. 33).

ANT creates different openings for researchers and is best suited to help me address the questions I pose in the next three papers: (1) How might a researcher "interview" technology objects?; (2) How is work-learning enacted in online communities?; and (3) How do the inter-actions between web technologies and self-employed unfold in online communities? This chapter builds on the brief introduction to ANT in the opening chapter and was written with two purposes. First, to provide background on ANT in order to help the reader situate several key theoretical premises. Key ANT themes related to this research project are also further elaborated and intertwined with empirical data in the following papers. Second, to highlight how ANT thinking has unfolded over the last three decades. Two ANT theorists who have shaped my thinking are Bruno Latour and John Law, both influential ANT philosophers. I will work through important contributions of each, drawing attention to development of key ideas, and then conclude with a short discussion of areas of convergence and divergence. Literature on ANT is extensive and both Latour and Law have made prolific contributions for several decades. I am not attempting an exhaustive review of all the ANT philosophical writings, but rather a gathering together and distillation of significant and influential ideas put forward by these two men, particularly views that informed this study. In addition, Appendix F is designed as a quick reference point for key ANT concepts introduced throughout this dissertation.

Bruno Latour

Bruno Latour is one of most insightful philosophers and the key thinkers associated with ANT. According to his website, he is a philosopher, an

anthropologist, and a sociologist. His lively and evocative writings intertwine all three disciplines. I will explore two of his earliest works, *Laboratory Life* (with Steve Woolgar, 1979; 1986) and *The Pasteurization of France* (1988), which began to paint a very different picture of scientific practices. These studies describe the work required by chains of human and non-human actants to translate scientific discoveries into widely circulated facts; facts which are accepted and integrated into day-to-day practices. I then discuss some of his writings focused on morality and technology and conclude with a review of key ideas from his 2005 book, *Reassembling the Social*, which consolidates many of the shifts in his thinking about ANT over the past two decades.

Early Works

In *Laboratory Life*, Latour (1986) develops ideas and methodology that will resonate throughout his work. His passionate and unapologetic attention to objects is critical in this analysis. An excerpt from the opening vignette illustrates:

> Diagrams are scribbled on blackboards. Large numbers of computers spill out masses of print-out. Lengthy data sheets accumulate on desks next to copies of articles scribbled on my colleagues. By the end of the day … a few slides, like Chinese ideograms, have been added to the stockpile. … One or two statements have seen their credibility increase (or decrease) a few points, rather like the daily Dow Jones Industrial Average. Perhaps most of today's experiments were bungled, or are leading their proponents up a blind alley. Perhaps a few ideas have become knotted together more tightly. (pp. 16-17)

Latour's emphasis on the importance of studying day-to-day practices is evident in the way he became part of the laboratory and its daily practices in this two-year ethnographic study. Latour and Woolgar were interested in how a body of practices, widely regarded by outsiders as well organised and coherent, were in fact a chaotic array of bits and pieces with which scientists struggled to produce order. Influenced by Michel Serres, they conclude that disorder is the rule and order the exception. This realization fuels ANT interest in ordering mechanisms.

Defining a network as "a set of positions within which an object has meaning", Latour and Woolgar (1986) posit that the "facticity of an object is relative only to a particular network or networks" (p. 107). By tracing how the TRF(H) peptide was constructed as fact, they describe how this molecule depended on the scientists' movement of inscriptions obtained from instruments within the laboratory. Samples extracted from rats were put into apparatuses that produced a sheet of figures, which was then input into a computer and outputted as a data sheet, followed by a transformation of this data into a curve on a graph which eventually found its way into a publication. Thus, inscriptions in the laboratory were introduced into networks of scientific journals and funders. Circulations in these new networks, in turn, created their own inscriptions through translations: either "stabilizing" statements or letting them drown in the "noise". And so, "every time a statement stabilizes, it is reintroduced into the laboratory

(in the guise of a machine, inscription device, skill, routine, prejudice, deduction, programme, and so on)" (Latour & Woolgar, 1986, p. 243).

The first part of *The Pasteurization of France* traces Pasteur's conquest of infectious microscopic enemies. In this work, the reader begins to see the ANT lexicon in use. Indeed later on, Latour (2005) cites this work as one of the three documents in which ANT started in earnest, the other two being Law's (1986b) work on ships and Callon's (1986) work on scallops. The notion of translation, a concept which describes actions and alliances that bring two actants together, is prominent in this work. Much of this book unpacks and describes the allies (i.e., hygienists, drains, Agar gels, chickens, farms) and the translations necessary for Pasteur to succeed (p. 147). Latour (1988) states that:

> An idea, even the idea of a genius, even an idea that is to save millions of people, never moves of its own accord. It requires a force to fetch it, seize upon it for its own motives, move it, and often transform it. (p. 16)

Irreductions.

The 228 principles arrayed in the four chapters that comprise the second part of *The Pasteurization of France* are a challenge to summarize. The work is a circulation through, and elaboration of, many ideas. More recently, Latour (2005) acknowledges that the presentation of his philosophical foundations in this treatise was difficult to grasp. He does introduce his principle of irreducibility: "nothing is, by itself, either reducible or irreducible to anything else" (p. 158). An entity is what it is; it does not contain any other entity. The ideas Latour (1988) articulates here begin to weave together the threads of his relational philosophy, which resonate throughout all his work. A significant point for Latour is that actants are defined solely by their alliances and the effect of networks of alliances. Thus, an actant gains strength only by associating with others. One can see how power now emerges as an effect of these alliances.

Morality and Technology

Important to Latour are questions of how morality is delegated and interwoven in relations between humans and technological objects. In Latour's (1992) article, "Where are the Missing Masses?", he argues the importance of attending to mundane artefacts: door grooms, seat belts, speed bumps, a meat roaster named "le Petit Bertrand", and the Berliner key. These objects are examples of what Latour describes as the missing masses: strongly social and highly moral, found everywhere but overlooked by sociologists. He argues that to balance accounts of society, we must also look at nonhumans.

To discover the missing masses he unravels this small handwritten notice on a door: "The Groom Is On Strike, For God's Sake, Keep The Door Closed". He starts with a description of the door and then traces how the function of closing the door is delegated to human and non-human actants. Acknowledging that most sociologists are upset by his fusion of humans and nonhumans, he nevertheless presses on. Latour works through similarly detailed and entertaining

ANT analyses on other mundane objects, making several important points. First, Latour argues that humans delegate values, duties, and ethics to objects and that no human is as relentlessly moral as a machine. For example, he must wear his seat belt because it has become impossible to drive without being strapped in. Second, he declares that the distinction between people and things is less interesting than examining the *chains* of actants embroiled in programs of action, sections of which are endowed to humans and others entrusted to nonhumans (morality is thus extended).

A decade later, Latour (2002) refers back to his 1992 article, stating that although it was a giant step forward to recognize that a substantial part of our everyday morality rests upon technological apparatuses, this piece only touched the surface because the techniques and moral actions considered were focused on the routine (i.e., seat belts that strap people into cars, doors that do not stay closed). In this article, Latour presses the point that technologies belong to the human world in a modality other than that of instrumentality or materiality. They are not just tools; means to an end. It is morality that prevents ends from becoming means, mediators from becoming simple intermediaries. Latour posits that the mediation of technology experiments with *being-as-another* or *alterity*. Without technological detours—translations—the "properly human cannot exist" (p. 252) because, Latour argues, a human is never "for itself or by itself, but always *by other things* and *for other things*" (p. 256). He concludes that both morality and technology increase the entities that must be taken into account and that we must learn to reassemble.

ANT as a Practice

Key ANT thinkers seem determined to reflect on the "theory" itself, no doubt contributing to its many twists and turns. This is evident in the edited collection by Law and Hassard (1999): *Actor Network Theory and after*. In this edition, Latour (1999) wants to recall much of ANT, identifying four difficulties: the words 'actor', 'network', and 'theory', and the hyphen. First, Latour explains that 30 years ago the word "network" was used to describe a series of transformations. Now, with the metaphorical baggage of the WWW, "network" problematically suggests transport and unmediated instantaneous access to information without deformation or translation (p. 15).

Second, "actor-hyphen-network" is a coupling of terms that is too close to the traditional binaries between agency and structure, micro and macro. Latour (1999) explains that actor and network were meant to designate two faces of the same phenomenon, not present binaries or hierarchies. Latour believes that the most useful contribution of ANT has been its transformation of the "social from what was a surface, a territory, a province of reality, into a circulation" (p.19). The third nail in the coffin is the word theory. Latour states that ANT, like ethnomethodology, was a way to be faithful to the idea that we have to learn from actors what, how, and why they do what they do. ANT was conceived "as a method and not a theory, a way to travel from one spot to the next" (p. 20). Latour

is a harsh critic of social scientists, stating that their vocabulary has contaminated their ability to let the actors build their own space. He returns to this theme throughout his writings. Interestingly, Latour (2005) has recently recanted some of what he said here about the lexicon, stating that these elements do work and the ANT acronym, in particular, is an apt description of his ways of working.

Reassembling the Social.

Latour's (2005) book, *Reassembling the Social*, is a significant and timely contribution as it traces many shifts in his thinking about ANT over the past two decades. It pulls disparate ideas together into a more coherent package and highlights Latour's current pre-occupations. This is also a how-to book and Latour makes several pronouncements about conducting research. Although it is sub-titled as an introduction to ANT, it is more than that. Latour talks about "presenting the intellectual architecture of ANT" (p. ix) and ends the book with the comment that "at least now nobody can complain that the project of ANT has not been systematically presented" (p. 262). Because ANT defines itself as a dynamic assemblage of ideas and conceptual tools, this book is a mere snapshot of ANT at one particular moment, but it is a well-focused snapshot, nevertheless.

Latour (2005) positions ANT as the "sociology of associations" (p. 9). ANT is interested in what is circulating within the alliances between actants and how translations of these associations produce a shifting series of networks and different circulations. Latour passionately argues that the "social" is what needs to be explained, criticizing traditional sociology approaches for "confusing what they should explain with the explanation" (p. 8). For example, "society" is not the context in which everything is framed but rather "one of the many connecting elements circulating inside tiny conduits" (p. 5). In his view, "society" and "social explanations" are shortcuts. Instead, ANT researchers must first do the slow and painstaking work to untangle connections between uncertain assemblies of actors before jumping to explanation. Therefore, in the first part of the book, Latour explicates the importance of analysts immersing themselves in five major uncertainties: how groups are made, how actions and agencies come to be, the role played by objects, ontological positionings, and the actual performance of the research with its attendant emphasis on description of the particular.

The second section explores how to follow the actors to see how *they* stabilize those uncertainties. Latour's (2005) response is to keep the social flat through three moves: localize the global, redistribute the local, and connect the sites. He is not interested in maintaining the local-global binary. The micro is not embedded in the macro like nested dolls, but rather the macro is an equally local place. Because interactions overflow with ingredients from other times, spaces, and agents, every site becomes the "result of the action at a distance of some other agency" (p. 219). In other words, Latour has transferred the global, contextual, and the structural inside tiny points alongside the local and the specific. The third section draws attention to Latour's politics. Latour maintains that ANT's distinctive touch is to highlight how relations come to be stabilized so that matters

of concern are not quietly and prematurely turned into matters of fact. He concludes that now that ANT has re-sensitized people to the sheer difficulty of assembling collectives, he is concerned about what happens if the new associations do not form a liveable assemblage. He compares ANT to the "new" bottle that is needed for the "new wine of new associations" (p. 260): a dusty old flask will not do for this new understanding of the collective that he has outlined via ANT.

Throughout the book, Latour (2005) makes several pronouncements about conducting research. He denounces researchers positioned as all-knowing and the artificial divide between the social and technical. He announces: follow the actors (which include objects as well as humans), un-black box and untangle associations, write the research text knowing it is another form of translation, and reconsider the research relationship by giving actors back a voice. He urges researchers to "feed off uncertainties rather than deciding in advance what the furniture of the world should look like" (p. 115). One of his strong dictums is "to follow the actors":

> Catch up with their often wild innovations to learn from them what the collective existence has become in their hands, which methods they have elaborated to make it fit together, which accounts could best define the new associations that they have been forced to establish. (p. 12)

John Law

The work, thinking, and writing of John Law has been intertwined with Bruno Latour over the past two decades. Interestingly, Law translated Latour's (1988) early treatise, *Irreductions*. Both are firmly grounded in STS studies, although Latour is more outward facing as he develops his object-oriented philosophy beyond STS. Collectively, Law and Latour's contributions have shaped ANT and after-ANT thinking and practices. Based on my readings, Law's foremost innovations focus on: (1) ANT as a practice—systematic review, critique, and explanation of ANT; (2) the politics of ANT research methods; and (3) fluidity, fluid objects and ontological politics.

Early Works

One of Law's first major contributions to ANT is an edited book: *Power, Action & Belief: A New Sociology of Knowledge?*, published in 1986. It is significant because it includes his empirical analysis of 15th and 16th century Portuguese maritime practices, a piece he continues to re-analyze even today. It also includes one of the ground-breaking ANT studies by Michel Callon (1986) on marine biologists and the scallops and fishermen of St Brieuc Bay, a much cited and challenged work. Lastly, Law (1986a) makes a reference in his opening chapter to Callon's piece as presenting "in concise form an approach to social analysis—the so called theory of the 'actor-network'—that has hitherto been relatively inaccessible to English-speaking sociologists" (p. 15). In this collection, readers are witnessing the introduction of ANT to a larger audience.

In his chapter about Portuguese expansion, Law (1986b) describes how documents, devices, and people are interwoven into networks that enable a small number of people in Lisbon to secure trade agendas, global mobility, and durability of their vessels. Law argues that it is necessary to develop a form of analysis capable of handling the social, technological, and natural in order to understand the Portuguese attempts at long-distance control. Although this chapter is not populated with ANT lexicon, Law unravels the networks of the vessel, navigational system, and the Portuguese imperial system. In this work, Law engages with early articulations of networks, inscription devices, and the importance of unpacking relations between actants.

ANT as a Practice

Law's work is distinguished by his reflections on the evolution of ANT as a collection of ideas, practices, and sensibilities. Through these conversations, one gains a sense of the issues important to actor-network theorists, critiques and reactions, and changes in the discourse. Given ANT's diasporic threads and diverse approaches, this kind of reckoning is helpful not only to new researchers making their foray into ANT, but also to more experienced practitioners keeping a finger on the pulse of ANT.

One of his first such pieces was an article which explored the theory of the actor-network. Law (1992) argues the importance of thinking about society as a heterogeneous network, explores agency as a network effect, explains punctualization (which Latour refers to as black boxing), and outlines translation as a precarious form of social ordering and a strategy. This article gathers together the main ANT ideas and vocabulary, well articulated in contrast to writings in the 80's. Seven years later, Law co-authored a book with John Hassard, *Actor Network Theory and after*, which brought together central ANT thinkers of the time, including Latour, Callon, and Mol. Much has happened in the ANT world since his 1992 article. ANT has clearly become some *thing*. In his opening chapter, Law (1999) points to "the naming of the theory, its conversion into acronym, its rapid displacement into the textbooks, and the little descriptive accolades" (p. 2). He is troubled with the translation of ANT into a smooth and consistent "theory" that has been too easily applied. He is concerned that the tensions that *were* actor-network have been displaced by simplicity. This unease over the use of "theory" to describe ANT is an issue Law returns to over the next decade.

More recently, Law has written two more "state-of-the-field" pieces. His 2008 article, "On Sociology and STS", explores the importance of material semiotics to traditions within STS such as ANT and concludes with an exploration of the implications of performativity for the politics of research methods. For those encountering ANT through routes other than STS, this is an informative piece on the origins of STS and provides pertinent background about ANT. Law (2008) argues that ANT can be understood as a version of post-

structuralism, albeit in a particular and materially-oriented mode. Law (2008) explains that: "ANT is what resulted when a non-humanist and post-structuralist sensibility to relationality, process, enactment and the possibility to alternative epistemic framings bumped into the theoretically informed, materially-grounded, practice-oriented empirical case-study study tradition of English language STS" (p. 638).

An important point made by Law (2008) is that STS practitioners (including ANT authors) rely on the case study. Theory is done in the form of case studies, which as Law acknowledges can be frustrating when one just wants to read the literature to understand ANT and ends up wading through case studies about X, Y or Z. Law zeroes in on ANT developments in this decade, mentioning the growth of new analytical and critical possibilities, notably performativity, multiplicity, and ontological politics. These three concepts, which occupy much of his recent writing, are encapsulated in this article.

In the second article, Law (2009a) begins with familiar arguments about ANT: it is not a theory—it is descriptive, not foundational; it is a toolkit for telling interesting stories; it is a sensibility to the messy practices of the relational and material. He now prefers the term *material semiotics*, arguing that it better captures the openness and diversity of the most interesting work. In this piece he offers an account of what he calls "ANT 1990" (the version that populates textbooks). Law then explores how aspects of ANT have been re-invented since 1995. In true ANT fashion, this article is written as a series of case studies, revisiting past ANT empirical work. The new ANT directions he focuses on are enactment, multiplicity, fluidity, and an ontological politics. A significant shift for Law is the notion of fluid objects, *mutable* rather than *immutable* mobiles. Latour (1990) developed the notion of the immutable mobile, which he maintains is necessary to fix ideas (and practices, statements, and actions) in place so that they can circulate and mobilize other networks. However, Law's conceptualization of mutable mobiles opens several new possibilities: objects that reconfigure themselves, different realities loosely rather than rigidly associated, and multiple actor networks.

The Politics of ANT Research Methods

A second pre-occupation for Law is method. His 2004 book, *After Method: Mess in Social Science Research*, is based on the premise that attention to method is important because methods do not just describe social realities, they help create them and therefore have political implications. Law (2004) argues that social sciences need to be better equipped to deal with mess and disorder, the ephemeral and the irregular. Throughout this book he raises issues pertinent to an ontological methodology: enactment, multiplicity, fluidity, and resonance.

Law introduces the notion of the *method assemblage*, arguing that these assemblages need to be more than representations. Instead, with a sensitivity to *ontological politics* (a concept developed by his colleague Annemarie Mol, 1999;

2002), one might hope to "interfere, to make some realities realer, others less so. The good of making a difference will live alongside—and sometimes displace—that of enacting truth" (p. 67). As enactments of relations, method assemblages make some things "present 'in-here', whilst making others absent 'out-there'" (p. 14). After a strong focus for over a decade on the network and actants *in* the network, this shift to explore the "stuff" *not* present is striking. Law writes that we need a way of talking that helps us to recognize the fluidities and leakages. Latour (2005) has also become interested in the "absent" and introduces the notion of plasma to describe the unknown in between the meshes of the network circuitry.

Fluidity and Fluid Objects

Law has written extensively about objects, particularly as they relate to fluidity and spatiality. By evoking fluidity and spatial conceptions, Law seems to be signalling that it is time to move beyond some of "stabilities" inherent in current ANT theorizing. The first work I will discuss is an article written for a special issue of *Theory, Culture & Society*, focused on the object. Tackling objects and spaces, Law (2002) begins his article by stating the classic ANT position: objects are the effect of stable networks of relations and they "hold together so long as those relations also hold together and do not change their shape" (p. 91). However, Law argues that enacting objects enacts spatial conditions, which include *regions* and *fluids* as well as networks. Using the example of a ship, he illustrates how the ship maintains its shape if it is sustained within a stable network of relations with other entities. It is a network object. However, in Euclidean space (a region), a ship is also a "constant set of orthogonal co-ordinates" because the relative positions of the prow, keel, stern, and mast are held fixed as it moves through geographical space (p. 95). The ship (object) inhabits both regions and network spaces. Law goes on to argue that while this ship can move within Euclidean space it must remain immobile within network space. If it moves within network space, relations between other actants are ruptured and the ship is no longer the same object in the same network.

Law (2002) then approaches the notion of fluid space, drawing on the empirical study of the Zimbabwe bush pump (de Laet & Mol, 2000), which seems to be one of his favourite ANT works. As de Laet and Mol argue in their study, the bush pump was designed to be adaptable. It is a changeable object able to be differently configured in the villages in which it is installed and keeps pumping clean water even if parts fall off or are repaired in innovative ways (i.e., leather seals replaced by pieces of old tyres). Law explains that because it holds its shape in a fluid manner as it adapts to local circumstances, it helps to enact a fluid form of space. This conclusion implies that in fluid space no particular structure of relations is privileged and that relations change bit by bit rather than all at once; change and continuity are both necessary. Law asserts that fluid work is often invisible and draws attention to the spaces and objects that lie *outside* networks. He argues that although networks depend on fluidity, because they gravitate towards stabilization they tend to "other" fluid objects. Thus ANT sets spatial limits to its understanding of objects.

Law takes this thinking even further in an article co-written three years later with Vicki Singleton. In this work, the object is alcoholic liver disease (ALD). They set out to map the trajectory for treating a patient with ALD. However, accounts were so different that it became impossible to construct a "typical" trajectory. Law and Singleton (2005) came to realize that ALD is a messy object and so turn to ontological possibilities in order to understand these messy objects. Conceptualizing objects as regions or volumes, networks, and fluids will be familiar to those who follow Law's work. However, Law and Singleton muse that ALD is more than a fluid object and step up the ontological radicalism by advancing the notion of the *fire object*. Maintaining that not everything can be brought to presence, fire objects depend upon otherness. Returning to their data, they illustrate how different versions of the disease hinge around a series of different absences and presences, concluding that the three versions of ALD are three fire objects. Each is made in a series of absences but each is made differently. For example, in the hospital, ALD is a lethal condition that implies abstinence. In the substance abuse centre, it is a problem that implies regulation and control. In the GP's surgery on a low-income housing estate, it is a reality that is better than hard drugs (p. 346). Law and Singleton conclude that attending to differences and othernesses with a spatial way of thinking acknowledges objects which are messy and cannot be narrated from one location.

Convergences and Divergences

Focusing on significant contributions of Bruno Latour and John Law, I have shared concepts that give ANT its vitality. The object-oriented ontological character of ANT, which Latour and Law have done so much to bring to light and prominence, raises many interesting ideas as this discussion has highlighted: relations between objects and humans; notions of power and legitimacy as allies enrol others and networks become black-boxed; otherness and difference (what is not in the network). Spatiality, morality, multiplicity—these are current ANT preoccupations. Interwoven throughout all these discussions are questions about enacting method when researching the relational and material and attending to the provisional, proximate, non-coherent, specific, shape-shifting, and black-boxed.

Since the mid-1980s, the work of Bruno Latour and John Law has been intertwined, both converging and diverging as they weave in and out of the ideas presented here. I will now explore a few of these moments. Latour is truly an object-oriented philosopher, whose work has provided some of the exciting theoretical grounding for ANT. As a philosopher, Latour is interested in objects and giving them an ontological dignity. This orientation surfaces, for example, when looking at how he positions the political work of ANT. Latour consistently acknowledges the moral tenor of objects and the place of non-human actants within a political remit (making "things" public). To Law, the political work of ANT pursues another vector. Law, along with his colleague Annemarie Mol,

focus on ontological politics, which recognizes the performativity of multiple and contested networks and realities, including those evoked by researchers.

Throughout their writings, both Latour and Law have much to say about methodology. Latour has been a vocal critic of the shortcomings of the research methods used by traditional sociologists. Some of his pronouncements of how to change approaches to research are outlined above. Many of these assertions link back to his own first-hand experiences with his early research projects. Methodology seems to have become a rallying point for Law. He too has made significant, but different, contributions, such as his 2004 book, *After method: Mess in social science research*. The premise is that attention to method is important because methods do not merely describe social realities; they help create them and weave further webs. Trying to know something also brings it into being: this is the performativity of method. To Law, research is highly political and he has taken on the challenge of wrestling with how one researches, and thus becomes entangled in networks, which are ephemeral, indefinite, messy, and irregular.

Over the past two decades, both Latour and Law have continued to explore the object in relation to other human and non-human actants. Harman (2009) has recently taken Latour to task for his insistence that an object exists and is defined only because of its relations in the moment. In so doing, Harman argues that an object is thus denied an essence that is its own; something held in reserve. Meanwhile, Law has been exploring alternatives as well, such as more radical spatial conditions that impact the configuration and fluidity of an object. Hence his interest in the immutable mobile, fluids and regions, fluid and fire objects. Interest in the non-visible—the black boxed, the absent, the othered—seems to be increasingly prominent in both the work of Latour and Law, although they have different lexicons. As I wrote above, after a strong focus for over a decade on the network and actants *in* the network, this shift to explore the "stuff" not present is striking. In *Reassembling the Social*, Latour (2005) introduces the notion of plasma. Latour compares plasma to a hinterland of that which is not yet formatted, measured, socialized, covered, surveyed, mobilized or subjectified or engaged in metrological chains (p. 244). Law brings a different sensibility to the question of the (in)visible, one that resonates with Othering and not fitting and getting lost. The tension between presence and absence seems to have been on his mind for awhile. On his website a few months ago, Law (n.d.) writes that he increasingly thinks about the elusive and things that do not quite fit. He adds that he is bothered by deletions that happen because of Othering and what happens when things escape and do not fit.

Throughout their writings, both Latour and Law have reflected on ANT as "theory", at times concerned with how it is being taken up and "translated". Both seem to take on the responsibility, especially recently, for laying out ANT's intellectual framework and shifts over the past two decades. Their conversations, and the conversations their writings have inspired, have helped to shape the

theoretical auspices of ANT. That said, each seems to have interests that transcend ANT: Latour's object oriented philosophy and Law's new interest in material semiotics and other ways for thinking about heterogeneity (i.e., Law, 2009b). In this chapter, I highlighted several of their ideas in order to provide background on key ANT themes relevant to my research project and also to show some of the twists and turns in ANT thinking as it has unfolded.

Given the emphasis on objects in this research project—particularly those related to web-technologies—the next paper questions how a qualitative researcher might "interview" technology objects in an effort to disclose their material agency in co-constituting teaching-learning worlds. How work-learning is enacted in these cyberspaces is the focus of the fourth paper. The final paper examines how the inter-actions between web technologies and self-employed workers unfold in online communities.

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The materiality of objects in pedagogy: Navigating research practices[3]

Introduction

Postings, RSS feeds, avatars, archives, Facebook profiles, viruses, an online CV, Google, computer screens, the delete button: online learning practices are caught up in and shaped by artefacts such as these. These objects are participants in my research study of the informal work-related learning practices of self-employed workers in online communities. Yet, it seems that *things* are often overlooked as incidental rather than problematized and enlisted as important participants in qualitative research projects. This is hardly surprising. Commonsense grants little or no agency to inanimate objects. This omission is rather ironic given that technology "has never ceased to introduce a history of enfoldings, detours, drifts, openings and translations" (Latour, 2002, p. 255).

Actor Network Theory (ANT) provides a way to study what is constructed through the interactions between actants (people and objects) and the creation of fluid relational networks across space and time, an understanding especially relevant to the technology-mediated work and learning practices of the self-employed. Pels, Hetherington, and Vandenberghe (2002) declare that "objects need symbolic framings, storylines and human spokespersons in order to acquire social lives; social relationships and practices in turn need to be materially grounded in order to gain temporal and spatial endurance" (p. 11). This is the opening created by ANT: object and human actants are placed on an equal analytic level. Harman (2007) explains that Latour argues that everything "must be regarded as an actant … [and that] all entities are on the same footing", an inherently democratic metaphysical perspective (p. 33). I was drawn to ANT because I required a framework in which technology is acknowledged on par with other actors.

How a researcher engages objects in a qualitative study is the focus of this paper. Verbeek (2005) affirms the importance of investigating the role played by particular technologies in certain contexts. Including technologies-in-use as key qualitative research participants brings them into critical inquiry, allowing the researcher to begin to trace, as Introna (2007) asserts, "the contingent simultaneity of intentions, decisions, affordances, interpretations, uses, codes, programmes…to reveal the nexus that co-constitutes the ethico-political site of technology" (p. 22). However, approaches to studying non-humans are not well developed (Bruni, 2005). Further, the researcher's toils and turmoil in this respect are not often evident in ANT accounts. Luck's (2003) conference presentation aptly highlights

[3] This paper has been adapted from a paper co-authored with Cathy Adams, Interviewing objects: Including educational technologies as qualitative research participants, which was accepted for publication by the *International Journal of Qualitative Studies in Education* (Adams & Thompson, 2010). This adaptation extracts, consolidates, and extends my own writing on this topic.

this dilemma: "You think you have problems with your research participants? My research subjects don't have a pulse!" As Sandelowski (2002) writes, analyzing objects and people as embodied relationally connected actors "allows us to see the paradoxes and contradictions embodied in the things we use" (p. 111). Such a stance entails asking: How might a researcher "interview" technology objects?

Luck's (2004) research drew on ANT as a conceptual framework and focused on the design and implementation of educational technologies to support teaching in higher education. She declares that it is not possible to interview a non-human actant. Yet, she observed a camera in a videoconferencing room *in situ* and as it was being used; read inscriptions about video cameras, such as manuals and advertising materials; and interviewed people about their interactions with the camera. Perhaps it depends on what it means to "interview" a research participant. Cathy Adams and I refer to the etymological origins of the word *interview*. It derives

> from the Old French verbal noun *s'entrevoir*, composed of two parts: *entre-*, meaning mutual or between, and *voir*, to see, which together mean "to see each other, visit each other briefly, have a glimpse of." Thus to "interview" an educational artefact, is to catch insightful glimpses of the artefact in motion, as it performs and mediates the gestures and understandings of its employer, involved others, and associations with other objects. (Adams & Thompson, 2009, p. 2)

In this spirit I outline four heuristics which qualitative researchers might employ when "interviewing" objects. I view heuristics as a problem solving model based on experience and meant to be used as "a starting point for further experimentation or refinement" ("Heuristic Methods", n.d., para. 17). This is not a prescriptive approach on how to use ANT methodologically, but rather my experiences using various ANT concepts to engage the objects in my study. Throughout this paper I draw on empirical examples from the data in my research project of how self-employed workers experience informal work-learning in an online community. I then explore the challenges of using ANT as a qualitative researcher and implications for the researcher's role.

About the Data

Participants in this study were own-account self-employed workers (contractors and consultants who do not have staff). Semi-structured interviews, which varied in length from one to two hours, were conducted with 11 self-employed workers; 10 by telephone and one face-to-face. Interviews were recorded, transcribed, and sent back to participants for verification. Pseudonyms are used to protect participants' identity. Human participants ranged in age from 35 to 51. They had been self-employed for 6 months to 21 years and worked in a variety of fields. They engaged in a range of online communities and reported an array of positive and negative experiences. While six participants had been involved for as long as five to 10 years, others had engaged for two to four years. One participant had tried several online communities in spurts over seven years

and recently decided it was not for her. Technologies used include ListServs, discussion boards and forums, Yahoo groups, e-mail, blogs, and RSS feeds. Half of the participants were also active in online communities related to personal interests in politics, religion, health, and hobbies.

Heuristics

Latour (2005) acknowledges that no matter how important or efficient an object, it quickly becomes an intermediary, receding into the background. This is why, he adds, "specific tricks have to be invented to *make them talk*—that is, to offer descriptions of themselves, to produce *scripts* of what they are making others—humans and non-humans—do" (p. 79). Latour maintains that much of the ANT scholar's fieldwork is to multiply the occasions of momentary visibility and he offers five suggestions, including looking for accidents and breakdowns. Studying accidents was especially useful in my research and one heuristic I will explore. I also propose following the actors, untangling tensions, and constructing co(a)gents.

Heuristic #1: Follow the Actors

This heuristic derives from the popular ANT imperative to "follow the actors". Harman's (2007) analogy is apt: "we cannot discover the nature of a thing by looking into its heart, but must follow the blood that circulates from that thing through all its arteries and far-flung capillaries" (p. 44). The delete button is an interesting actor-network to unravel. As Aanestad (2003) explains, the capacity for action is relational, dynamic and collective rather than embedded in particular network elements. Elements achieve their form and character in relation to the others (Law, 2008). The delete button is connected to both human and non-human actants and enmeshed in an array of relations. It is a prominent object in the accounts of these self-employed workers' inter-actions with others in cyberspace collectives. It is a key we press or a button we click when we want to get on with things. Yet, it is more than a tool. When we accept its invitation, we enter into a socio-material assemblage: we are "deleting" and we could not do this without our delete button. There is even an online group dedicated to sharing personal stories about "loving the delete button" (www.experienceproject.com/groups/Love-The-Delete-Button/111561).

People delete with glee or guilt. Sometimes it is a powerful feeling. After all, we often "hit" the delete button. A person may delete with or without reading the posting in the online community space. They may delete everything by a particular person they do not care for. They delete when overwhelmed or as a matter of "cleaning house" and making space. They delete once a useful posting has been "used". Follow the flow, says Latour (2005): "Object and subject might exist, but everything interesting happens upstream and downstream. … Follow the actors themselves or rather that which makes them act, namely the circulating entities" (p. 237). The interviewer probes what is happening further up and down the chain of action. The delete button is used when people feel overwhelmed by

all the "stuff" that stares them in the face when they login. Or, it may be part of a methodical disciplining of one's Inbox; something done every day as part of a routine. Perhaps a person does not delete. Some people like to save things, just in case.

The delete button makes things happen. It mediates and coordinates a range of other objects, enrolling other actants as needed to get the job done. It communicates through digital codes, coordinating with other bits and pieces of "digitalia". Sometimes, deleting is delegated to filters so people never even see messages and postings and there is no need to press the delete button. It is not just postings: Contact lists, including names and addresses are also deleted from various databases. The delete button removes these objects from sight, keeps them out of the way, makes them invisible. The delete button is a workhorse with a moral mandate to keep things in control, to be efficient, and to stem the flow of undesired objects be it postings, spam, viruses, excess information. Filters, Inboxes, subject lines, the name in the "From" box, the Trash can: just a few of the objects which are enlisted by, or enlist, the delete button actor-network.

Donna Haraway (2004) compares following the actors to "pulling-out-the-threads". In this metaphor she sees entities "as balls of yarn …as points of intense implosion or as knots". As these knots are exploded, untangled, somehow loosened up you are led to "whole worlds, to universes, without stopping points, without ends" (p. 338). Already one can see how following actors is a daunting task as more inter-actions and actants emerge. The point is not to create an exhaustive list of all possible entities in an actor-network but rather to look for "mediators *making* other mediators *do* things", human or non-human (Latour, 2005, p. 217). Bruni (2005) describes his approach as "shadowing" non-humans, which requires the researcher to "orient his/her observations to the material practices that perform relations" (p. 374). In order to do this, he plotted "the connections among different courses of action and determined how actions and subjects define each other in relations" (p. 374). In Thompson (2010), I traced the circulations associated with a posting. These attempts to follow the actors help me catch glimpses of these objects in motion as they (dis)assembled with other (non)human actants and a multitude of practices related to learning and being online. I continue the interview by looking for configurations of actants and asking, how did they come to be configured this way? What gets "related" to what and how? How are people and objects brought into proximity with each other?

The interview proceeds: The *deletebutton-worker* actor functions like a shut-off valve or pruning shears to mediate between a person and the online world. It is a line of defence against information overload, it arbitrates relevance, it is form of control, and it is a safeguard against intrusion. It often asks if you are sure you want to delete something, offering that opportunity for sober second thought. The delete button can be enlisted to block or it can sit idle until a decision is made about who to listen to and when. At times it anticipates, popping up and offering to delete something, ever eager to assist and mobilize its network

of technologies. The deletebutton-worker navigates the waters between managing the online interactions and opting out. After all, too much deleting and it is the "un-subscribe" feature that jumps into action. As Ryan says, "Sure you can hit delete all the time but then what's the point of belonging if you just hit delete?" What would these self-employed workers do without a delete button? Objects continually press into the network. The tsunami of information, contacts, and postings on screens everywhere mobilizes the need for a delete button. The delete button responds. Because we have this feature and can become "delete-ers" it seems that the deletebutton-worker is deemed able to cope with all that comes their way. The onslaught is legitimized. Information, postings, people, and the delete button: knit together to revel in and stay on top of information and in the process, hopefully generating relevant knowledge for one's work.

Heuristic #2: Study Breakdowns and Accidents

One strategy for catching glimpses of objects in motion is to study accidents and breakdowns. Michael (2000) comments that when intermediaries break down

> we suddenly become aware of their mediating role: all the work … [and] arrangements that enable them to be ordinary, invisible, become spectacularly apparent. They are mediators, mediating complex, heterogeneous assemblies that otherwise would not be seen, would be assumed, would be "black boxed". (p. 24)

How intimate alliances, knitting people and things together in everyday practices, are enacted may be revealed. Taking a closer look at these alliances facilitates examination of "how things are normalised and hence are made 'inevitable'" (Singleton, 2005, p. 784): important work for qualitative researchers.

The over-riding assumption of self-employed workers in this study is that people in a particular online community were engaged in the same kind of work. Why else would they be in this space? This assumption binds actants together. It "normalizes" the notion of an online "collective". However, in this study, an array of actants continually challenges this assumption and creates passages that both open up and close down online spaces. I turn to an anecdote from the data:

> Nancy is a new member in Dorothy's online community of home-based daycare providers, a close-knit group of women. Some members have recently started to have face-to-face meetings with the others that live close by. Nancy invites Dorothy over to her house—her workspace—to get some advice. After all, Dorothy has been running a daycare for 12 years and is known as the "little boss" on the online board. Getting together in person is a recent change in the configuration of this online community, which used to restrict itself to online encounters. Arriving at Nancy's house, Dorothy is taken aback. This isn't a daycare at all. Dorothy is confused. Nancy's comments, questions, and empathetic understandings in the online conversations sounded like they were coming from someone who was running a daycare. Dorothy reports this fabrication to the woman who owns the board and the membership list is

> quickly culled. Calling it "housecleaning", the online space is made private. A new password is set up and given only to the core group of 40 people. Nancy is purposefully excluded.

This online community experiences a breakdown. Resetting passwords and a shorter membership list are examples of how technologies (objects) re-establish boundaries. The password is enlisted purposefully to exclude participants and in so doing, a stronger sense of inclusion, belonging, and connection between those remaining is created. Something new starts circulating through this network. A reaffirming of what "should" be is mobilized: a reinforced belief among the 40 people that, "*We* are legitimate daycare providers".

It is not only major breakdowns that can be revealing. Michael (2000) explains that "in the interstices of the everyday where mundane technologies quietly go about their business of sustaining normality, we find all manner of little 'abnormalities'" (p. 4). Take for example, Ava, who dips into online communities in order to assess their viability as a potential target market for a budding Internet-based business. She explains:

> One of the markets I considered was people in the IT profession who have been downsized and are looking for work. This was a very active group online and a number of them have open forums for people to contribute. I was able to go in there and really see the interaction and dialogue of these people … Although I could certainly empathize with them by reading those forums I didn't ever make a post. I didn't feel actually that I was really a member of that community and I wasn't committing to being in that particular group. … I'm researching, and exploring what's out there. … I was able to move very deeply into that space of those people who could be a potential target market.

Ava's actions are not unusual. All the self-employed workers in this study dip into online collectives to get something they need. The unemployed IT worker community does not experience a breakdown. But a "little abnormality" becomes more apparent. Pseudonyms, Google searches that point the way to forums accessible with just a click of a mouse, and technologies that enable the public sharing of postings, make it fast and convenient to find online forums, slip in, observe the interactions, and then slip away. Entering and leaving become effortless. The same technology used by community members to share their stories about being unemployed IT workers also enables Ava to mine their discussions for market research. The technology becomes a market research ally. In this instance, the same technology and actants are used for different ends. A posting of support and sharing between colleagues is translated into a source of business intelligence and market research for someone else. Whether studying an outright breakdown or puzzling over an everyday action, it becomes possible to catch glimpses of objects in motion, especially when action, as Latour (2005) expresses, is felt as "a node, a knot, and a conglomerate of many surprising sets of agencies that have to be slowly disentangled" (p. 44). By helping to illuminate

objects in action, breakdowns expose the multiplicity—the conglomerates—of networks and more importantly, the work that is being performed continuously to sustain the links between actants in these networks.

Heuristic #3: Untangle Tensions

In Dorothy's online community, the sense of being infiltrated by an outsider leads to a stabilization. Purposefully excluding some cuts the network and shapes a new configuration—there is a re-ordering. Latour (2005) argues the importance of attending to what networks become stabilized, given that a "normal" state of any actor-network is one of change. Stability and instability are linked. Through the re-orderings generated by upsets and resistances, stabilizations may ensue. Latour suggests that ANT accounts map controversies about matters of concern. As a qualitative researcher, paying attention to the efforts of entities and circulations to stabilize and disrupt is another way to catch a glimpse of objects in inter-action and helps to map many tensions and contradictions: Latour's "matters of concern". Both stabilizations and disruptions are a necessary tension. Singleton (2005) suggests that tensions are productive because they "expose the fluidity of boundaries and work against the stability of categories" (p. 775).

For example, one tension highlighted in Dorothy's anecdote is about belonging: Who belongs in a particular online community and who makes this determination? Rather than closing ranks, another stabilization might have been to open up the space and invite people who had a more peripheral interest in home-based daycares. An unsettled space is created by the unexpected contradiction when the *Nancy-as-daycare-provider-online* network intersects with the *Nancy-as-pseudo-daycare-provider-offline* network. This space and its new partial connections cannot be sustained. Issues of authenticity and trust are strong: Who are the others in your community and how do you discern this in an online space? Both the opaqueness and transparency of web technologies can be enlisted to reveal, hide, and alter the other. Objects, such as passwords and membership lists extend a human's ability to verify and gate keep. As Introna and Brigham (2007) suggest "in, and between, virtual communities the boundary between the inside and outside is always at stake, continually disrupted as virtual strangers continue to 'pop up' on our screens" (p. 174). Tentative management of the familiar, strange, and the Other leads to perturbations. Ongoing negotiations then attempt to stabilize networks or lead to further upsets.

By attending to stabilizations and disruptions, several tensions emerge. Introna (2007) asserts that the "politics and ethics" of technology are diffuse and multiple which is "why we have a moral obligation to *disclose* them on an ongoing basis" (p. 22). For example, the plethora of information available in online collectives is tempered by increased efforts to sort out validity, credibility, relevance, and manage both information overload and online security. Both human and non-human actants enlist various technologies in these efforts, including the delete button. But this tension leads to doubts about "who's taming

who." Untangling contradictions, such as these, helps to identify tensions in the way human and non-human entities become intertwined, particularly within the materiality of an online "community".

Heuristic #4: Co(a)gents

Throughout these ANT accounts, I focus on several objects: the posting, one's digital trail, and the delete button. However, after studying the networks and configurations in which these objects are enmeshed, I began to see hybrid entities or socio-technical constructions: *combinations* of humans and non-humans. Michael (2000) writes that "imbroglios of humans and nonhumans are becoming increasingly part of our everyday life" (p. 25). Given the "ambiguous interplay of subject and object in the lifeworld" (Rosen, 2006, p. 24), the delete button might be better represented as the *deletebutton-being*. When we are "deleting" we become entangled with the delete button and its related networks.

Michael (2004) describes a *co(a)gent* as humans and non-humans operating together to produce patterns of connection. He adds that the co(a)gent is an analytical fabrication that adds value when it illuminates otherwise hidden processes. To use this heuristic to interview objects, qualitative researchers conceptualize different co(a)gents and then trace the patterns of connections that make up these different co(a)agents. One example Michael (2000) studies is the "couch potato": a co(a)gent comprised of person, sofa, TV, and remote control. Using this construction he then asks, "What is the relationship between body, agency and technology that the remote control mediates?" (p. 96). Other interview questions to catch glimpses of the remote control in inter-action include: When does the couch potato make its appearance? In what ways is this routine? What would happen if one of the constituent parts (i.e., the remote control or the sofa) disappeared? Which discourses construct the couch potato as a bad entity? Which celebrate it?

Similar questions can be posed to the hybrid socio-technical constructions important in this study. The posting, the deletebutton-being, and the digital trail each mediate an array of relations between private and public, trust and distrust, and control and chaos. Using the deletebutton-being as an example, the researcher could pose interview questions such as: How does the delete button mediate what is kept private or made public? Or, what would happen if there was no delete button? Or, when does the deletebutton-being fail or succeed at keeping online work-learning practices manageable? Once I perceived some of the objects in this study as more than objects, and instead, as hybrids of human and non-human actants, I began to see perspectives of relations, conduits, and circulations that were different than what I observed when just following the actors. Indeed, Michael (2000) explains that deploying this analytical strategy is a move away from following the actors, and instead following the hybrids, which assumes agency to be "distributed, pluralized, contingent" (p. 42).

Tangles and Entanglements of the Interviewer

Using ANT

There are several critiques of ANT as a methodological approach. Although ANT claims to be inclusive by studying both humans and non-humans, a first critique is that these claims do not leave space for the non-included, elusive, or other (Neyland, 2006). ANT is therefore perceived as having limited ability to cope with difference and otherness; the spaces and objects that lie outside networks. (Law, 1999; Law & Singleton, 2005). On his website, Law (n.d.) states that he increasingly thinks about the elusive, things that do not quite fit, and the "deletions in this Othering" that happens when things escape. He writes that "things that don't quite fit help to make the things that do, but then they get lost". This invisible work concerns him.

Second, ANT accounts are criticized for not examining "the moral and political issues underlying the technologies they study" (McLean & Hassard, 2004, p. 510). Law (2009) points to Haraway's critiques that ANT was not very aware of the political agendas of its own stories. This is Haraway's (1988) criticism of "the god trick of seeing everything from nowhere" (p. 581). Nespor (1994) points out that it would be "a mistake to emphasize the fluidity of the world without noting that it flows at times in very deeply worn channels" such as class and gender domination (p. 15). As ANT draws everything together it performs a kind of centring or manageralism. Law and Singleton (2005) explain that early versions of ANT were overly focused on standardization and rigid networks that attempt to achieve centralized control.

A third critique is how actors' voices are often constrained or absent (McLean & Hassard, 2004; Neyland, 2006). McLean and Hassard also raise questions about how actors should be represented within ANT accounts. For example, must objects rely on human spokespersons? Perhaps we are able to reach the non-human only through the human. Although ANT-based research generates accounts that include both objects and people, is re-presentative symmetry possible? Clearly, a challenge for ANT researchers is to bring objects out of the background—analytically and in texts.

These criticisms delineate challenges for researchers using ANT. Some of the critiques are reflective of older ANT approaches. In a recent article, Law (2009) traces the shifts between what he calls "Actor Network 1990" and current ANT preoccupations. Law (2009) explains that earlier ANT knew in theory that ANT stories do indeed enact realities but sometimes forgot this in practice. He acknowledges the wake up call of Donna Haraway's more "explicitly political material semiotics" (p. 154). Law (2008) also maintains that more recent "after-actor-network" studies have started to recognize difference and ontological multiplicities. Neyland (2006) suggests that instead of a fixity, ANT could be treated as "an ongoing flow that incorporates a range of (possibly shifting)

entities" and opportunities for ambiguity (p. 43). Law (2009) agrees, referring to the "openness, uncertainty, revisability, and diversity" of ANT work (p. 142).

However, Law and Singleton (2005) write that although "various post-ANT studies have loosened up on networks, considered fluidities and explored the ambivalences and displacements that (sometimes) keep networks in place", there are still questions about difference and colonization of the Other (p. 341). Law and Singleton point out that it is what ANT does *not* see in networks and relations that are of critical importance. They argue that not everything can be brought to presence. Drawing on Mol's (1999; 2002) work on ontological politics, Law advocates more ontological radicalism to attend to difference. After a strong focus for a decade on actants *in* the network, there is a noticeable shift among ANT theorists to explore the "stuff" not present—the invisible. In Latour's (2005) latest book, *Reassembling the Social*, he introduces the notion of *plasma*, the unknown which is in between the meshes of the network circuitry. Harman (2009), a Latourian scholar, calls attention to Latour's stance that objects are only defined by their relations; in other words, by what they are in a network. He writes that "the articulated social world of relations leaves so much unarticulated: monsters and angels seep from the plasma" (p. 133). Harman is a firm believer that actors are not fully formatted by alliances and instead hold something in reserve; there is something more beyond their relations with other things.

Researcher's Role

Choosing which entities to follow, networks to untangle, and circulations to explore are political decisions made by the researcher. Even recognizing there is "plasma" is a form of acknowledging othering. McLean and Hassard (2004) assert that as a researcher cannot follow actors everywhere, they end up ordering, sorting, and selecting—excluding and including along the way. Suchman (2007) describes cutting the network as "a practical, analytical and/or political act of boundary making" (p. 284). Suchman explains that methodologically, one question is how any object of analysis—human or non-human or a combination—is extricated from the more extended networks of which it is part. A second question is how far our analysis extends in its historical, temporal, and spatial reach. An ANT-researcher must make and explain these decisions.

Additionally, researchers need to account for their positioning within their research project. Law (2008) urges that the "turn to performativity robs us of the belief, the hope, or the pretence that our methods simply describe. … They help to *enact* realities" (p. 640). Yet Clarke (2002) observes that in most ANT accounts there is little reflexivity about the researcher's interests in constructing a particular network, consideration of the position from which they tell stories, or accounts of the relationship between them and the researched (p. 11).

As a researcher exploring the (informal) work-learning practices of self-employed workers in online communities, I was implicated in the creation and perturbation of several networks. In their research, Leander and Lovvorn (2006)

acknowledge that "interpreting circulations and configurations is not separate from the practice of actively creating them" (p. 304). All my participants had some association with online collectives or they would not have participated in my study. Nevertheless, by making "online communities" the focus of my research project, it became an entity fit for analysis and took on a more concrete shape. Exploring these actor-networks legitimized these kinds of collectives and their presence in them. As Solomon, Boud, and Rooney (2006) reflect in their study of everyday learning at work:

> On the one hand we were seeking to 'uncover learning' that is everyday or informal learning … while on the other hand the act of uncovering requires an intervention, an intrusion, a judgment, and a formalizing or a codifying in order to identify, articulate, and manage it. (p. 7)

As well, I received several invitations to become part of my participants' LinkedIn networks and Facebook groups and so am now connected to them in a different way; our relationship mediated by technologies that were not part of our initial alliance. I am more networked with my participants than I initially imagined.

Another perturbation is how I enrolled ANT to suit my research interests, the actor-networks I explored, and the quirks of the objects I "interviewed". Verbeek (2005) muses that "striving for an 'authentic' way to deal with ANT would be a parlous task." He argues that "translations", such as his reworking of ANT work, are a cornerstone in ANT theory and not problematic (p. 148). I did not re-work ANT in such a substantive way, but I did choose to use an eclectic mix of concepts. In this paper, I described how the heuristics I used framed the issues explored in this research. The objects I focused on were ones that kept appearing in stories. Because of my methodology, it was not feasible to follow the trail of all the interesting actors which emerged in the stories and therefore deciding which actor-networks to explore was often influenced by the data I was able to collect. Cutting the network was a practical decision

To some degree, I do presume to speak "for" some objects, such as the delete button or posting. Luck (2004) acknowledges that researching non-human actants comes with risks, including descriptions that might give nothing but the researcher's perspective. Nevertheless, drawing on an array of data in order to attend to the inter-actions between these objects and other actants introduces other perspectives and brings the object's "voice" to the fore, in some fashion. The experiences of my human participants, inter-acting personally with many of these objects, and drawing on other research studies contribute to more nuanced descriptions. Using ANT demands attention to reflexivity, dialogical relationships with participants, multi-voicing, re-presentational forms, and authenticity: all of which are widely discussed in the qualitative research literature. Clearly, these are important issues researchers must address regardless of whether their participants are human or non-human entities.

Conclusion

Bruni (2005) writes about the moment in his research project when he realized he "could not evade the objects" (p. 374). And so it was with me. He describes how he concentrated on "shadowing" the Electronic Patient Record in a hospital: "[I let] the software guide me through the organization and confront me with other actors and processes, whether human or artificial" (p. 363). This description sketches out a substantially different positioning for the researcher.

Regarding objects as legitimate research participants changes a research project. Suchman (2003) explains that new technocultural formations "expand the space of interaction from the interface narrowly defined, to the ambient environments and transformed and transformative subject/object relations that comprise the lived experience of technological practice" (p. 10). The expansion beyond narrow perceptions of technology as a tool in the background, to something much more complex and inter-related with a myriad of objects and other human actants, transformed what I attended to in this research study.

As Pels et al. (2002) affirm, "the modes, spaces, contradictions, mediations, and ethical dilemmas of this co-performance of sociality/materiality" need to be explored (p. 2). Considering objects as research participants is easier said than done. Nevertheless, it is possible to give artefacts a voice and several heuristics are outlined in this paper for "interviewing" objects and catching glimpses of them in motion: follow the actors, study breakdowns and accidents, untangle tensions, and construct co(a)gents. These heuristics are not mutually exclusive and researchers will no doubt blend them as their actor-networks beckon.

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(Re/Dis)assembling learning practices online with fluid objects and spaces[4]

Introduction

The connectivity possible in cyberspace brings unprecedented opportunities to engage with others for work-learning. Edwards and Usher (2008) suggest that information and communication technologies (ICT) enable new forms of knowledge production, foster new connections among people, and create new opportunities for learning. It is, therefore, not surprising that workers are clicking their way into all sorts of cyberspaces. Facebook, Twitter, and LinkedIn are popular social networking sites. Professional associations provide online discussion forums for exchange among colleagues. Businesses are keen to create excitement and so they support online spaces where groups of people who have bought a product or service can gather. The scale is astounding. Yahoo (2008) alone reports over 113 million members in 9 million groups.

However, as ubiquitous web-based technologies align with people to shape spaces, the accompanying hype and rhetoric bear examination, especially from a pedagogical perspective. Therefore, this study asks: How is work-learning enacted in online communities? Online communities appear to offer something, be it socializing, networking or support. But there is much to explore about these places as sites of learning, especially once we click outside the organized spaces attached to online courses. For example, the notion of community is not unproblematic and an online context adds layers of complexity. This study explores how self-employed workers are re-negotiating the relational and material aspects of work-learning spaces online, how these online spaces are enacted through these practices, and how new ways of knowing are unfolding (or not). These insights will help adult educators and learners attend to the complexities of this form of learning.

Actor Network Theory (ANT) brings unique ways to conceptualize learning, learners, and online spaces. The technologies-in-use in an online community are not merely background, but rather, important participants also engaged in these networks. Because ANT emphasizes interactions between actants, things are always the effect of these networks of relations. Learners are therefore participants in networks of practices and learning emerges as an effect of the network (Fox, 2009). This relationality leads Edwards and Usher (2008) to suggest that it is useful to articulate the learner as a "hybrid subject shaped by other networks and flows in which they are enfolded" (p. 92). If so, it is important to understand the networks and flows in which self-employed workers are engaging for work-learning. Thus, online communities are not *containers* for online activities but rather *networks* of relations in constant flux: spaces which are shaping, and shaped by, worker-learners and their practices.

[4] A version of this paper has been submitted for publication.

Work-Learning and ANT

In this section, I discuss some of the current thinking on the hybrid and fluid nature of the workspace and the sociomateriality of work-learning. Workspaces are hybrid spaces—temporally, spatially, and relationally. Farrell and Holkner (2004) describe hybrid workspaces as a meshing of physical and virtual spaces mediated by a range of new and old communications technologies. Solomon, Boud, and Rooney (2006) see a meshing of work, social, and learning spaces. In her ethnomethodological study of an airline's operations rooms, Suchman (1996) begins with the view that the workplace is "not so much a locale as a complex but habitual field of equipment and action, involving intimate relations of technology and practice, body and person, place and activity" (p. 36). Clearly, workspaces are disparate amalgams, perhaps more so when considering the workspaces of the self-employed.

Partial fusions between people and objects, proximities, fleeting and shifting spaces: this description of the workspace and ways of working of the self-employed also applies to ways of work-learning. As Mol (2002) observes in her work on disease, knowledge is located in daily practices: "the activities, events, buildings, instruments, and procedures" (p. 32). ANT is well suited to examine work-learning. Edwards and Nicoll (2004) state that, in addition to loosening "the spatio-temporal orderings of workplaces and education", there is value in examining the mobilizations that emerge as different knowledge-building networks are formed through the use of ICT (p. 170). By following circulations, ANT senses "a world of partial connection in which all kinds of constantly shifting spaces can co-exist, overlap and hybridise, move together, move apart" (Bingham & Thrift, 2000, p. 299). ANT methods thus enable exploration of the choreography of overlapping work, work-learning, and workplace spaces.

More fluid and distributed ways of working are amplified by web-based technologies. Because our work and learning activities are increasingly knit together with technologies in a rapport of shaping and adapting, it is important to attend to these relations. As technology becomes "portable, pervasive, reliable, flexible, and increasingly personalized, so our tools become more and more a part of who and what we are" (Clark, 2003, p. 10). Waltz (2006) argues that the "disregard for material actors, the objectification of these actors and the overdetermination of them preclude more careful theoretical and empirical inquiry into the ways in which the persons and technologies are involved with one another" (p. 58). Bigum and Rowan (2004) argue that how to deal with humans and non-humans is "*the* important consideration in any theorizing of innovation or the adoption of new technologies in education" (p. 219). This kind of theorizing is ANT's forte.

ANT is a unique collection of relational and material understandings, concerned with associations between human and non-human actants in day-to-day practices. ANT advocates that both people and objects are legitimate research participants. And so, the technologies-in-use in an online community are not

merely background, but rather, important participants also engaged in these networks. Actants (human and non-human) are co-constituted in webs of relations with other actants. An object-oriented philosophy, ANT maintains that an object is what it is because of the retinue of relations in which it is entangled. Actor-networks are thus comprised of actants that become involved in ensembles. It is because of these ties that an actor-network exists. Relations are paramount. Yet, being interconnected is not enough. The work, movement, flow, and changes are of interest (Latour, 2005). Through this inter-connected work, Latour (1988) argues, both human and non-human actors create new sources of power and legitimacy as they renegotiate who is acting in the world, who matters, and who wants what. By attending to *how* actants become "knit together" and what is circulating and mobilized in these networks, ANT is able to study relational, provisional, black-boxed, and non-coherent practices.

Although ANT has been used widely in other disciplines, it is just making an entrée into education and learning. A rich dispersed body of work, ANT-influenced literature spans a range of empirical work, including the Science, Technology and Society (STS) field. Careful exploration of a range of ANT-inspired studies helped me develop an understanding of the kinds of research questions asked, what ANT concepts are used and how, and how an ANT account is produced. ANT-influenced research usually unfolds in case studies. Law (2008) writes that because "abstraction is only possible by working through the concrete", theory and data are created together in these case studies (p. 630). Consequently there is much to learn from these case studies and several different ways to read them. The way ANT has been taken up in the last 20 years has shifted, in part because it is a very fluid network of ideas, and in part, to address critiques. Law (2009) suggests that the post-1990 ANT—which he calls the new material semiotics—is caught up in new intellectual tools, sensibilities, and questions: enactment, multiplicities, fluidity, realities, and ontological politics. For this reason, I focused more on recent ANT empirical work.

A few ANT-based studies focus on work-learning such as Gherardi and Nicolini's (2000) research into organizational safety knowledge, Mulcahy's (1999) work into competency-based training, and Farrell and Holkner's (2004) work on hybrid workspaces. There have been a variety of studies with a learning theme (i.e., Bigum & Rowan, 2004; Fox, 2005; Luck, 2003; Mulcahy, 2005; Nespor 1994, 2006). ANT has also been taken up in studies of literacy practices and policies (Clarke, 2002; Hamilton, 2001; Leander & Lovvorn, 2006). Some ANT-based research focuses on information and knowledge processes such as Neyland's (2006) study of strategy processes in universities and Law's (2007) exploration of lessons learned about the 2001 outbreak of foot and mouth disease in the UK. Both Introna's (2007) work on search engines and plagiarism detection systems and Ducheneaut's (2005) study of the socialization practices of online communities, focus on human entanglements with ICT.

STS studies explore a vast array of object-human interactions. I found many ANT studies informative, even if they did not directly examine work-learning, self-employed workers, or online communities, as they provide ways to think about the implications of object-human associations. This includes Moser and Law's (1999) study of Liv, a woman with a disability confined to a wheelchair, Aanestad's (2003) case study of the introduction of multimedia technology into a surgical operation theatre, Singleton's (2005) exploration of public health policy, Young's (2006) analysis of distance as an actor in rural economies, and Latour's (1992) noted work on a few "mundane" artefacts, such as the door groom, keys, and seat belts. While there is a small, but growing, number of work and adult learning researchers employing ANT sensibilities, ANT studies from other fields often explicate knowledge creation and mobilization. Although ANT is not a learning theory per se, studying the effects of particular webs of relations helps researchers grasp how knowledges are enmeshed in work and learning practices, even if not explicitly stated as such. Latour's laboratories, Law's Portuguese ships, Mol's outpatient clinics—these groundbreaking ANT studies are located in workspaces and help to inform ways of thinking about work-learning.

Inquiry Strategies

Participants in this study were own-account self-employed workers (contractors and consultants who do not have staff). I focused on self-employed workers wondering if they might be more likely to turn to online communities given that they work outside the sphere of the conventional workplace and its organized learning resources. Semi-structured interviews, which varied in length from one to two hours, were conducted with 11 self-employed workers; 10 by telephone and one face-to-face. Interviews were recorded, transcribed, and sent back to participants for verification. Pseudonyms are used to protect participants' identity. Follow up dialogue, either by e-mail and/or interviews, enabled me to gather more data. Most participants also wanted to share something of their online space with me, such as postings they had made, the site "rules", the URL of public online groups so I could see what the space was like, documents they had found about participating in particular online communities, their own website, and samples of online "siggies" (signatures) and avatars. I also received several invitations to join people's Facebook groups or LinkedIn networks.

Male and female participants varied in age, period of time they had been self-employed, and the kind of work they did. They engaged in a variety of online communities, turning to these spaces at various stages in their career. Participants reported a range of positive and negative experiences in their online communities. While six participants had been involved for as long as five to 10 years, others had engaged for two to four years. One participant had tried several online communities in spurts over seven years and recently decided it was not for her. Technologies used included ListServs, discussion boards and forums, Yahoo groups, e-mail, blogs, and RSS feeds.

Analytical Framework

Reading ANT-influenced research studies I was struck by the lack of information about methodology. Although several researchers state that they used an ethnographic approach, many do not provide detailed descriptions of how they analyze data. This is consistent with McGrail's (2005) observation that the practical difficulties for those engaged in ANT studies are often obscured. Initially, I gathered six case studies to serve as insight cultivators into the process of using ANT to analyze and write my study. This collection grew over time. I was reassured to later find an acknowledgement of this struggle by Law. Law (2009) explains that because ANT is grounded in empirical case studies, we comprehend ANT by understanding how these case studies work in practice.

In their study of youth literacy practices, Leander and Lovvorn (2006) describe their analytic process as "an interpretation of relations" shaped in a dialogue between the data and ANT. This led to an analytic framework with five dimensions, which they describe as an "emergent, incomplete, yet productive heuristic" that they used to identify and compare configurations and circulations of objects in different activities (p. 305). Using their idea of an analytic framework, I developed three ANT-inspired questions to provide some structure to my exploration of how work-learning is enacted in online communities: What arrays of actants and configurations are being described? How are actants brought into relationship with each other? What is circulating between actants in the enactment of informal work-learning? Several sub-questions deepened the analysis and included: What passages are (dis)ordering relations? What ongoing negotiations maintain or upset network continuity? What social practices are occurring around objects? This framework was then applied to a series of anecdotes developed from the data about learning practices.

Singleton (2005) writes that methodologically it is "crucial to examine *practices* in order to make visible the complex work of relationality and materiality. It is also important to expose the specificity of such work" (pp. 781-782). As Mol (2002) suggests, I became focused on the topography of the relations in work-learning practices, taking notice of the techniques that "make things visible, audible, tangible, knowable" (p. 33). The process of tracing associations became more complex as new actor-networks emerged. Analysis was an iterative process. The questions I used to probe the data changed and I drew on other stories from the data. I became interested in how online community was being enacted alongside enactments of learning practices. At various points, I cut the network, focusing my analysis on particular sociomaterial assemblages; an action which Suchman (2007) declares is a practical and analytical act of boundary making. Neyland (2006) describes the analysis of strategy in his study as "necessarily messy, partial, ambiguous, and contingent" (p. 42). This was also my experience.

(Re/Dis)Assembling

The decision to engage in an online community for work-learning merges a self-employed worker into an assortment of configurations. A configuration describes the particular way "texts, practices, objects and bodies are arrayed … in the course of activity" (Leander & Lovvorn, 2006, p. 300). Learning practices keep a number of continually shifting networks in motion—assembling, dis-assembling, and re-assembling. In this study, one purpose of this assembly work is to maintain a sense of community conducive to learning. The inherent instability of these networks suggests that actants are continuously (re)enrolled into contingent practices and networks that are enacted and labelled as "informal learning" or "online community".

The Posting

Latour (2005) advocates "following the actors", noticing what an actor—either human or material—is compelling other entities to do. Callon (1987) explains that "an actor-network is simultaneously an *actor* whose activity is networking heterogeneous elements and a *network* that is able to redefine and transform what it is made of " (p. 93 emphasis added). Many actor-networks are involved in the informal work-learning practices in an online community. The actor I begin with is the posting.

A posting is usually text, often accompanied by attachments or weblinks, and sometimes embedded with graphical and animated elements, even viruses. It moves via a web-based conduit: as part of a thread in a discussion forum, an RSS feed, an e-mail message, or blog comment. Readers go to URLs to read postings or arrange for them to arrive automatically. Either way, it appears on a computer, cell phone or iPod screen. Postings are fluid in time and space—read by one or many in seconds, minutes, or days after they have been written. Some postings are valued and others regarded as a nuisance. Some are amusing, others intimidating. A number arrive heralded by music and flags. Many slip into oblivion in cluttered Inboxes or forums. Along the way, a few may acquire ratings. Fingers hover over the delete button as the subject line, author, and the clock are consulted before time is spent with the posting. Many are deleted or glossed over without a second glance. Others are savoured, read intently, and saved. Postings are written with expectations of readers, responses, and reciprocity. Indeed, the collection of postings in an online space provides a public barometer of the richness, visibility, and viability of an online community. Postings and responses to postings—"digitized flows" (Urry, 2009, p. 481)—traverse from one-some-many to one-some-many linking colleagues, strangers, competitors, lurkers, the online paparazzi.

As a complex actor-network, the posting knits an array of entities together. It is one actant that all human participants interact with as producers and/or consumers. It is also connected to an array of other objects. It is important to the participants in this study to have a good configuration of actants—other people, expertise, time, and workable technologies—in order to benefit from the best

possible value-added knowledge (making). Reading, composing, or replying to a posting is done to bring a configuration of actors into play. Postings enrol other actants and are used by both human and non-human actants for this purpose. A posting requires a network of allies in order to circulate. But not all entities in this network are faithful intermediaries. Many entities, including the posting, are mediators, changing meanings, elements, and configurations. Latour (2005) explains that mediators transform "the meaning or the elements they are supposed to carry" (p. 39). In contrast, an intermediary is like a black box, transporting meaning without changing it.

(Im)Mutable mobiles.

Some objects in ANT accounts are described as *immutable mobiles*, an object which maintains its form as it travels (Latour, 1990). A posting is an immutable mobile. It is easily packaged into online missives which can be distributed globally in the blink of an eye and also tagged and archived for future readers. Law and Singleton (2005) refer to immutable mobiles as network objects: mobile while also holding their shape in a network of relations.

But a posting is also more fluid than this. It can change as it moves about. Ryan, an occupational health consultant, is rattled when a snippet of a posting he made—in what he thought was a private forum for health professionals—comes back to him with questions about how he got this information:

> I was talking about a particular worker and I mentioned the workplace … I can talk to another nurse or physician about a patient *ad nauseum* and know they are bound by their professional guidelines. Not so with others …. Sometimes when you post a message you never really know where it's going to end up.

A posting's compact digitized form makes it easy to share, modify, and forward. Ryan's posting is changed so only a certain paragraph circulates. It is sent by someone in his forum to a person outside the online community and arrives back in his Inbox via an e-mail. It becomes a mediator, changing meanings, and things do not go as planned. Postings do not always stay intact and are not necessarily read only by those for whom they are intended.

In their study of the Zimbabwe bush pump, de Laet and Mol (2000) describe the bush pump as a changeable object that is not too rigorously bounded and so is adaptable and responsive. The bush pump changes shape (bits and pieces fall off or are added) and works in different ways in different villages. Leather seals are replaced by old tyres, bolts by steel bars, and yet it keeps operating. Law and Singleton (2005) use this example to argue for the notion of a fluid object, which they also call a *mutable mobile*: an object as a set of relations that gradually shifts and adapts rather than holding itself rigid.

The posting is also a fluid object, a mutable mobile. It shifts and adapts as it gets entangled in other networks. It can be taken up in different media: posted

on a website, archived, buried in an Inbox, printed on paper. It can be carved up into snippets and re-distributed. It can be divorced from the context in which it was written, the sender's name and even the thread in which it was composed, obscured or removed. A posting is both constant and fluid. It may be suspended in a stable network of relations or change shape gradually as the relations around it shift too. It is possible that some postings may even be what Law and Singleton (2005) term *fire objects*: objects that jump and are discontinuous. Perhaps the snippets of Ryan's posting that re-circulate in different networks are more suddenly and markedly different rather than a gradual re-shaping. Nevertheless, both fluid and fire objects, according to Law and Singleton, are spatial forms that are different and yet partially connected. As Ryan's posting was enacted differently, it helped to enact different spaces.

Only in Relation

Figuring out interconnections was a first step. Now the focus shifts to circulations. By "following" the posting, we see that it is both an immutable and mutable mobile, entangled in an array of actor-networks as it moves. Law (2008) states that elements in a system achieve their form and character in relation to the others. An object is therefore a performance, rather than a substance (Harman, 2009). Latour (2005) emphasizes that it is the work, movement, flow, and changes that need to be stressed. How do relations between actants in these online work-learning configurations come to be and what is circulating in these conduits? Continuing to follow the actor—the posting—necessitates attending to how it is implicated in forming or fragmenting actor-networks and how it influences what flows in the network conduits.

Amy expects more in-depth discussion in her online group and makes postings to try to get other sport psychologists talking about overlooked topics. Mia wants a "community by distance" and enlists avatars and online aliases she does not use anywhere else in order to maintain a high degree of anonymity. Here, postings are purposefully aligned with other actants in order to achieve a purpose, be it a different level of discussion or increased anonymity. For Amy, her postings are attempts to engage other colleagues in order to expand the network of participants and to change the content that is circulating. For Mia, postings are linked to other objects to create a screen so she can explore new conversations without others in her current professional network knowing. According to Callon (1986), translation is a "definition" and "distribution" of roles and the "delineation of a scenario" which "establishes more or less stable relationships between entities" (p. 26). Attempts by these self-employed workers to (re)configure their online spaces and interactions are translations.

Postings are also traces left in cyberspace to bump into other objects and people. Mia comments, "the way you select what you're interested in, connect your blog to others, your deli.cio.us tags to resources, defines your interests and who potentially may be interested in linking to you". These traces form webs in cyberspace. Texts such as postings, which continue to float—to be enrolled into

new configurations—create opportunities for sustained engagement. But in two instances participants hesitate because they do not want to stay connected with their posting. They want to disconnect from the network and what is circulating. Liz explains:

> You make one posting but it lives on in time and you may find yourself having to continue to attend to the fallout. … Sometimes if you post something and you have people coming back with questions and more questions you have to keep posting. You can't just make one post and say that's it.

Wanting to be present. Wanting to be absent. Postings juxtaposed with other actants in different ways make this happen. Some participants become enrolled in online communities through the "wow" factor of the actants and strength of a particular actor-network: the "big names" and the richness of technical features and tools. Forums without a lot of new postings look tired and do not enlist new actants. Well maintained archives and up-to-date resources, on the other hand, do. Sophie's group enrols objects such as the ListServ, the search engine, and archived postings to simplify the process of welcoming newbies. The online community is thereby kept fresh and current: a circulation highly valued by the workers in this study. Postings link both presence and absence. Law and Singleton (2005) assert that "an object is a pattern of presences and absences" (p. 343). Postings plus the presence of an array of the "right" actants creates a buzz and attract others. Postings also become "stand-ins", helping to enrol people in online conversations by compensating for absent actants such as the water cooler or physically co-located co-workers.

So far postings can be both immutable mobiles (network objects) and mutable mobiles (fluid objects). Postings are translated into indicators of the liveliness of an online community. Postings are translated into online breadcrumbs that wait for others to stumble across them. A posting is a performance. But it is only a performance because it is enacted in a network of relations with other actants—humans and non-human. In so doing, postings help to enact work-learning practices. As a posting moves in and out of different actor-networks it is implicated in attempts to order and dis-order. For example, postings are used by self-employed workers in attempts to (re)configure online spaces and their use of these spaces to achieve the sense of community most conducive to their purposes by extending the network, changing the discussion, or creating screens to ensure privacy. These are endeavours to order. As heterogeneous entities are ordered, work-learning becomes "an achievement, a process, a consequence, a set of resistances overcome, a precarious effect" (Law, 1992, p. 390). The posting-object is a multiplicity. It is not confined to one space and time and so it can be juxtaposed with any number of other things in limitless ways. The posting is often considered the cornerstone of online discussion and learning. Yet, this analysis highlights how many different things a posting is and does. Learning in online communities is not always as simple as posting a question or reading a reply—there are more detours and bumps in the road to consider.

Enacting Informal Learning

In this section, I explore how informal learning practices are enacted by taking a closer look at the work-learning practices in which the posting (and other actants) circulate and the kinds of work these actants are doing in those practices. The learning practices of these workers are enactments: "occasion[s] in a location, a set of actions with a series of effects" (Law, 2000, p. 349). To appreciate how these enactments unfold, I will explore how workers both welcome and try to contain fluidity, the effect of multiple networks, and how ways of knowing take different forms in various enactments of "online community".

Stabilizing Fluidity

Participants want fluidity in how they engage in their online communities. The anywhere–anytime promise of the Internet is appealing and suits ways of working. Yet, they also want to learn efficiently and to do so, some stability and predictability from the technologies-in-use and practices within the online community are needed. Young (2006) found that actors in his study tried to "counter complexity by seeking out and establishing stable and predictable arrangements with persons, organizations, and technologies" (p. 260). This takes work. In his study of strategy building processes, Neyland (2006) draws attention to the importance of processes that establish "durable, repeatable, but flexible, routes for information and for the entities connected in the process of strategizing" (p. 33). In this study of work-learning, creating and keeping these "routes" functional takes constant negotiation. Suchman (2007) argues that "despite the seeming automaticity of relations, they do not run by themselves but must be continually reiterated and reproduced" (p. 21). Webs of relations only hold if they are enacted again and again (Law, 2008).

Workers in this study are constantly renegotiating routes and relations. Although the human actants take a strong role in trying to keep these actor-networks aligned, objects are volunteered, or even step in, to do this. For example, digests of the day's postings, which arrive regularly in an Inbox, are one attempt to routinize engagement. Technology is enrolled to faithfully transport a compilation of people's contributions. Digests "translate" online conversations in order to make it easier for people to stay engaged. But they are disjointed and not characteristic of how a discussion unfolds. Amy declares, "If you just check in once a week and suddenly you respond to everything, you're not really discussing. You're putting your input in after the conversation is done."

Nonnecke and Preece (2003) point to shifts between dialogue, data, and content. Here again, the posting is a fluid object, changing as the network of other actants around it changes. Each shift, from dialogue to digest and back again, is a translation, which necessarily entails recruiting other actants. When postings are packaged into the digest version, conversations are translated into snippets. Therefore, additional actants, such as the archives, must be recruited to re-construct the dialogue. Digests might be more convenient if you wish merely to

scan postings, but more difficult to manage if you wish to engage. Sophie explains:

> You can get a digest … but that's a bit more challenging because you don't get them in order of the time they arrive. You might follow a conversation from A to D to B to C and go, OK, I think I've got that. If it's important to get it you can always go into the archives.

Although the digests are a popular time saving strategy and provide some measure of "discipline" by conveniently arriving at the same time every day, several participants comment that they feel more engaged when getting the actual messages. Signing up for the digest version is sometimes an indication that engagement is on the wane. If so, the posting in "digest" version has a weaker ability to enrol other actants.

An Effect of Multiple Networks

Because actor-networks do not stay put in one cyberspace location, or indeed, in cyberspace, these networks are not space and time-bound. Objects, such as postings, are not the only actants caught up in multiple networks. When Amy, a sport psychologist, needs to create a race plan for running injured in the Boston Marathon, she makes a posting. One response is especially valuable. She shares:

> That e-mail [posting] helped me re-conceptualize what I was thinking when I went into the race. I'm not sure it really all set in until I was running the race. Then I think I got what he was saying, which I hadn't really got beforehand.

A deeper learning is felt a few years later when she starts teaching running seminars and helping others in similar situations. For Amy, learning is the effect of several networks: the online space, the assemblage of the marathon, and a running seminar. The enactment of this learning is made durable once it is brought into networks other than the one she instigated in the online community.

These are not merely sequential networks. As Latour (2005) argues, any interaction overflows with ingredients from other times, spaces, and agents and these can be traced. ANT attends to the local and the particular. When Amy counsels another runner about how to run a race when injured, ingredients are drawn into this network from other configurations that reflect different places, spaces, and times: her injury, the SportPsych ListServ, the posting she received, the Boston Marathon. Nespor (1994) writes that as "people stretch out in many directions at once and intertwine with other people and things distant from them", the effect is "knowledge in motion" (p. 21). Actor-networks can thus become richer and more layered as knowledge circulates. Online communities are not singular networks. Work-learning does not unfold in stand-alone networks.

Although multiple networks can enrich the learning possibilities, as in Amy's case, sometimes they create unwelcome complexity. Aanestad (2003) writes that the extension of the network intensifies network dependencies. The learning practices described by the self-employed workers point to attempts to

extend the network by reaching out to many more human actants and being tied into numerous technologies (objects). Inter-dependencies become more complex, which may help to explain both the resiliency and fragile nature of an online community. However, expanding a network can create an unwieldy entity. Liz explains why she is less engaged in online communities: "Viruses, spyware, Trojans, spam, commercialization (business sites that write scripts to change your home page) means a computer connected to the Internet now has higher demands in terms of maintenance. The cost-benefit balance has shifted." Work-learning practices entail a constant assessment of return on investment of one's time and energy. Liz does not welcome the many unwanted, demanding, and labour-intensive objects linked to internet security. Spending more time online translates into enrolling more technology objects—extending her network and dependency on other elements—in order to fight off unwanted entrants such as viruses, spyware, and spam. For Liz, stabilizing fluidity is achieved by opting out of the network. Overloaded, it was one network too many.

Knowledge Associations: Ways of Knowing

Building on Mulcahy's (1999) analysis of how representations of competencies are incorporated into everyday practices, findings in this study of self-employed workers suggest that the enactment of learning practices in online communities is best regarded as managing multiplicities and tensions between materialities. What implications does this have for how ways of knowing are enacted? I return to the posting to help explore how participants in this study inter-acted with the circulating knowledges. Both Amy and Dorothy turn, in different ways, to online communities via postings, to solve work-learning needs.

Amy is using Adobe Professional to create an electronic form and encounters an issue. She goes to the Adobe forums:

> No one answered my question but reading through the discussion forums I solved my problem. There was obviously a core group of people. For them I would say this was a community where they went for help and it helped them in their jobs. … I popped in and out. … I was expecting that I would post my question and within an hour I've got a whole bunch of answers from all these brilliant people. That wasn't the case. But I went in there with a purpose and I came out with my problem solved. I would never say, "Oh yes, I'm part of that community."

Dorothy has run a home-based daycare for 12 years and is a moderator on a small close-knit online community of other daycare providers. It is right after lunch and the children are napping. She does not know what to do with one of them:

> She's biting me and throwing poop at me. I am almost bawling my eyes out on in this post: "I don't know what to do. Is it me?" The responses start to come back in 10 minutes. "Don't beat yourself up. You know she needs special care." At that moment I realized, "I can't fix everybody and I have to protect the kids that are in my care." And they just made me feel

> like that's normal. It's not you, it's the situation and you've got to do something about it. I really value this support. Here's me with all this experience going why can't I deal with this kid? … The group can talk to each other in real time to chat but we don't. We'll post. The conversation goes on during most of nap time because by then a few of the others have logged on. When someone's in a real crunch like I was, people don't get off their computer. They sit and talk. I'm wondering, "How should I tell the dad?" Throughout the week the group helps me compile a letter saying that this little girl's needs go beyond my capabilities and she might need a special caregiver. By Friday, the letter is drafted and I give it to the child's father.

These anecdotes describe different ways of knowing. Amy needs help and poses her question to an online group that will know best. Although she does not get a direct response she finds the information in their archived discussions. For Amy, the posting is a "piece" of valued information she can use elsewhere. In contrast, Dorothy has been in a tight-knit group for years. Faced with an issue, she works with her online community to construct an understanding of how to handle a difficult situation, a dialogue which also builds their collective practice as daycare providers. For Dorothy, the value of a posting emerges from the *process* of how it comes to be and what it *evolves* into as others add to it and move it along. As the week unfolds, the posting blossoms into a conversation, a problem solving session, and a way others support and coach her. A letter is produced and becomes part of the assemblage. Dorothy has invested time and energy in this space over the years. Yet, even though the posting is enacted in the practices of this online space and is tightly enmeshed with an array of other actants to create this specificity, anyone can come along next week, read it, and take it into their own space, such as Amy did when she visited the Adobe group.

Mol (2002) argues that objects have a complex present "in which their identities are fragile and may differ between sites" (p. 43). Similarly, as the data in this study has illustrated, postings are fluid objects and may take various forms. Imagine that Dorothy did not go through the process just described. What if someone else, say Fran, had turned to her online community and engaged with them for a week to figure out how to tell a father she is not equipped to care for his child. Imagine now that Dorothy realizes she too has this problem, but instead of turning to a close online community, she searches on the Internet and *voila* finds Fran's discussion group, complete with Fran's postings, the responses of the others, and the draft letter. In this scenario, the posting that Dorothy comes across is not the same as the one Fran created—it enacts a different reality. One reality is enacted by finding a useful posting in the archives of an online group. Read in a different space and time from which it was composed, it is a record of a conversation. The other reality is enacted through an online dialogue; the postings and the circulations they mobilize stay tightly knit to the network of people and objects. These are not the same objects but rather, two partially connected objects ensnared in two different sets of relations.

To return to Amy and Dorothy's original stories, the posting, to use Law's (2004) phrase, is not the same object but rather, "different objects produced in different method assemblages" (p. 55). In her analysis of atherosclerosis, Mol (2002) describes the disease as two objects, one enacted through talk between a patient and physician in an interview in the outpatient clinic and the other through a physical examination of the patient by the vascular surgeon. She explains that the difference between these two locations "may not attract attention as long as the objects they enact coincide, but as soon as they contradict each other, it becomes apparent that the clinic is two places. The interview. And the physical examination" (p. 51). The same realization applies in this study of work-learning practices online. Some workers will drop into an online space to harvest postings. Others will go through a dialogic process to build these online conversations with others. The fact there are different enactments is not always problematic, but sometimes the differences do highlight contradictions, such as tensions between Web2.0 rhetoric and practice.

Much has been written about how Web2.0 is leading to more networked ways of living, working, and learning. The most heralded shift is a re-positioning of people from *consumers* to *producers* of information and knowledge. In this view, the emphasis is on creation rather than consumption of information, collective intelligence that harnesses the power of the crowd, decentralisation of content and control, and fostering of communities (Anderson, 2007; Downes, 2007; Madden & Fox, 2006). This is consistent with Farrell and Holkner's (2004) view of knowledge as social action: When people "generate new knowledge [or] maintain … the knowledge they have, they do so through their relationships with each other, mediated through their intimate engagement with the materials and technologies" (p. 137). Yet, in this study, participants frequently found information in an online forum and treated it no differently than "static" information on a web site. Does this reflect the rhetoric of new ways of learning and knowing online: re-mixability, co-production, participation, dialogue, distributed authorship?

Haythornthwaite (2008) argues that information is too often treated as "a static, one-off, unchanging token" (p. 599). She adds that "ideas of easy access [to information in online forums] become far more problematic … when the knowledge to be retrieved entails practices, argumentation, and evolution instead of simple retrieval of data bits" (p. 599). Hemetsberger and Reinhardt (2006) agree: it is often the line of argument, not the content, which provides the most valuable insights. Neyland (2006) explains that although information is often regarded as an extant thing, which can be passed along while still retaining the same identity, his study of university strategy processes suggests that the flow of information "could be conceptualized as a series of sociotechnical connections, each connection forming an opportunity to confirm the continuity of information usage or to reconstruct … the information itself" (p. 35).

In this study of self-employed workers, information and knowledge is treated, at times, as a "thing" that is transferred, rather than a dynamic circulation within an online configuration. Hence, the common practice of harvesting pieces of information. Pels, Hetherington, and Vandenberghe (2002) state that facts become "thinglike entities [when] actors fail to calculate their own performative contribution to them and continue to treat them as things" (p. 11). The data in this study confirms these practices. However, this actor-network analysis also shows that networks are multiple and not bound to cyberspace. Although workers "take" from an online community, they often then shape this knowledge in their own work and workspaces, including interactions with others offline. As Neyland (2006) suggests above, in these instances, knowledge may not be treated as an extant thing, but rather this movement into a person's workspace is an opportunity to affirm the continuity of, or to reconstruct, the information. However, such actions are not seen in the public spaces of an online community and would be interesting to trace in future research.

Mol (1999) emphasizes multiplicities, which can overlap. Multiplicities call attention to the different materialities of an (online) workspace. In Dorothy's work-learning practices, the posting stays enmeshed in the actor-network (aka online community) as it develops. This online space and the actors within it, such as the posting, take on specific materialities *as* Dorothy's work *and* workspace. In Amy's material organization of work-learning practices, the posting shifts out of the Adobe forum into another configuration closer to her work and workspace, losing and gaining actants in the process. As the posting sheds some of the trappings of the Adobe forum, it must then be juxtaposed with other actants more aligned with her work and workspace. Amy's brief foray into the Adobe forum does not imbue that forum with the materiality of being *her* workspace in the same way that Dorothy's extended interactions do.

In her exploration of multiple ontologies, Mol (1999) writes that a disease takes various forms that cannot merely be described as perspectives seen by different people. Rather, they are "different versions, different performances, different realities, that co-exist in the present" (p. 79). Ways of knowing similarly take different forms. Amy and Dorothy do not just do different things to arrive at the same outcome. The different relationality and materiality of the postings with which they engage leads to the enactment of different ways of knowing and different work-learning practices. Despite these different objects, assemblages, and practices, the net effect is learning for both Amy and Dorothy.

Conclusion

Workers will tap into any credible online resource to get the job done. However, it is not always "static" information they are seeking. It was important to the participants in this study to have a good configuration of actants—other people, expertise, time, and workable technologies—in order to gain the best possible value-added knowledge making opportunities. These self-employed

workers enacted work-learning in online communities because of the richness of the configurations and circulations. Online community also was enacted. The findings of this study are consistent with Mulcahy's (2005) observation that "education becomes an accomplishment of a network rather than an individual" and as such, the relations between actors and the way some entities circulate is critical to what unfolds (p. 3). The relations that connect them to other actants count. Compared to a Google search, for instance, this is a different way of being online and a different practice of relating to knowledge even though many of the same actants (i.e., web-based objects) are implicated.

Fluid objects. Multiple spaces. Fluid objects creating fluid spaces with erratic boundaries. No wonder the work-learning practices of the self-employed are sinuous. There is no one way that learning is *done* in online communities. However, in his exploration of collective learning, Law (2007) concludes that patching practices together takes patience, effort, and work. Amy had to work at this, just as Dorothy did. Perhaps Amy had to work even harder as she choreographed bits and pieces from all over. The postings she used do not constitute her workspace in the same way they did for Dorothy. Law explains that some of the pieces in his learning space belong to, redo, extend, and translate practices done elsewhere. But because they also belong to "elsewhere" practices, there are tensions and ambivalences.

This study suggests that practitioners and researchers should not be too quick to paint work-learning practices in online communities, or even the notion of an online community, with a broad brush. Using the posting as an entry point, I explored how it was implicated in a vast array of actor-networks (re/dis)assembling in the pursuit of work-learning practices. These practices depend on a continued crafting of people, techniques, texts, technologies (borrowing from Law, 2004), including the continued shaping of online community as a complex actor-network. As this study illustrates, these practices are far from being a seamless or singular experience. Rather, they reflect multiplicities and remind adult educators about the importance of attending to the complexities of this form of learning.

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Who's taming who? Tensions between people and technologies in cyberspace communities[5]

> We routinely live at different scales, in different contexts, and at different settings—Default, Phone-only, Avatar On, Everything Off—on a number of screens, each with its own size, interface, and resolution, and across several time zones. We change pace often, make contact with diverse groups and individuals, sometimes for hours, other times for minutes, using means of communication ranging from the most encrypted and syncopated to the most discursive and old-fashioned, such as talking face-to-face …. We isolate ourselves in the middle of crowds within individual bubbles of technology, or sit alone at our computers to tune into communities of like-minded souls or to access information about esoteric topics. (Antonelli, 2008, pp. 15-16)

How does one come to be connected with others? How do people negotiate the materiality of screens and settings; discussion boards, RSS feeds and chat forums; passwords and Facebook profiles? The scale of the collective on the Internet astounds. Yahoo (2008) reports over 113 million members in 9 million Yahoo groups. In the *State of the Blogosphere*, Technorati (2008) reports 900,000 blog posts made every 24 hours. In 2009, more than 200 million active users can be found on Facebook spending more than 5 billion minutes on this site each day. Surprisingly, the fastest growing demographic is those 35 years old and older (Facebook, 2009). A year later, this number has doubled to 400 million active users (Facebook, 2010). According to YouTube (2010), 24 hours of video are uploaded to their site every minute, the equivalent of Hollywood releasing over 137,000 full-length movies each week. It would seem that for many people, spaces and places on the web have become an integral part of their lives. This may include seeking out learning opportunities in online communities.

This paper explores how inter-actions between web technologies and self-employed workers unfold in online communities and the implications that these profound forms of connectivity between people and objects provoke. In an effort to bring these web-technologies to critical inquiry, they are treated as key qualitative research participants in this study, which helps to surface several questions about the politics of technology entangled in work-learning practices. Actor Network Theory (ANT) frames this research and forwards two key assumptions. First, "online community" is *enacted* as a network of relations in constant flux rather than a predetermined entity. Second, the *principle of symmetry* emphasizes heterogeneous networks composed of people (humans) and objects (materials), both of which have analytical parity. Pels, Hetherington, and Vandenberghe (2002) proclaim that objects are back in strength: "Talking to intelligent machines … being glued to mobile phones, roving around in

[5] A version of this paper has been submitted for publication.

cyberspace … is to mingle our humanity with not-so-mute, active, performative objects in a way which we find equally fascinating as disconcerting" (p. 1). ANT creates an opening for regarding "technology" as one actant entwined in relation with other actants—human or non-human.

Attending to Materiality

To study inter-actions between web-technologies and self-employed workers, I begin with how relationships between technologies and humans are positioned in the research literature. This section examines the promises of web technologies especially regarding changes to ways of knowing, the importance of foregrounding objects in qualitative research studies, and the co-constitutive relationship between human and non-human actants.

The Promise of Web Technologies

There is much said about how technology is changing our lives. In this segment I discuss the recent buzz around *Web2.0*, which includes the much heralded social media, and assertions about how web technologies are framing new conceptions of online communities and ways of knowing. Labelled the participatory Web, Web2.0 ostensibly offers openness, user control, dynamic participatory bottom up construction of knowledge, sharing, and collective intelligence. However, it is an amorphous term. Alexander (2006) explains that Web2.0 is often applied to a mix of familiar and emergent web services which are "perceived as especially connective, receiving the rubric of 'social software': blogs, wikis, trackback, podcasting, videoblogs and social networking tools like MySpace and Facebook" (p. 33). Others argue that Web2.0 is not just a set of technologies, but a set of new *practices* (Bonderup Dohn, 2008; McLoughlin & Lee, 2007).

The promise of online communities is wrapped up in the Web2.0 rhetoric and thus constructed by the popular media, developers of "community" software, the research literature, and even educators. Beyond the growing commercialization of the socially connected Web, Grossman (2006) believes the new Web is "a tool for bringing together the small contributions of millions of people and making them matter" (para. 4). However, others are wary of the online collective, believing that we are arriving at "one bland, master description of reality" (i.e., Wikipedia), blogs leading to divisiveness that resembles clan membership, entrepreneurism and "monetizing" online activities, getting lost in groupthink, and the potential of turning into a "mean mob" ("Beware", 2006, para. 6-11).

One assertion is that ways of knowing are changing because of the shift in how people use and create knowledge; a shift facilitated by web-based technologies. People can now be producers rather than merely consumers of information and knowledge. In this sense, knowledge becomes "decentred, multiple and less hierarchical" (Edwards & Usher, 2008, p. 120). As relationships

between people and these technologies are transformed, we are witnessing a change in our relationship with knowledge and what is meant by learning. McLoughlin and Lee (2007) outline four affordances of social software tools that offer new possibilities for pedagogical models: connectivity and social rapport, collaborative information discovery and sharing, pre-eminence of content creation over consumption, and knowledge aggregation and modification (re-mixability) (p. 667).

The emphasis on collective knowledge construction is strong in the online learning literature, leading to the premise that community is an important characteristic of a quality online learning experience (Garrison & Kanuka, 2004; Haythornthwaite, Kazmer, Robins, & Shoemaker, 2004; Moisey, Neu, & Cleveland-Innes, 2008; Riverin & Stacey, 2008; Tu, 2004; Wang, Sierra, & Folger, 2003). Bryant (2005) explains that the major shift in the way we communicate and collaborate "is not the technology itself—there is remarkably little that we can do now that wasn't possible five years ago—but rather the critical mass of connectivity between people that we are finally reaching" (para. 4). The real story, he adds, is about ease of use, availability, culture change, and network effects.

Is it a matter of being at the right place at the right time, finally connecting a critical mass of people? It would seem, to some degree, that it is the practices, or to use Young's (2006) phrase, the "sociality" *around* Web2.0, not the properties of the technology itself, which drives this reconfiguration of ways of knowing (p. 257). Rather than any one technology actant driving changes in how we conceptualize knowing, it is the way a range of inter-connected people, objects, ideas, resistances, and resonances take up, downplay, or translate various knowledge making practices. Access to social media applications and services will not automatically transform someone into a producer of knowledge. It is only when these new technology objects link to other objects and people that there is potential for these networks to generate new ways of knowledge (re)creation: knowledge with its own social-material life. As this paper will illustrate, this is an uncertain, fractious, and fluid process.

Overlooked but Not Forgotten

Several issues become apparent in the emerging Web2.0 literature: (a) although there are cautionary voices, there is much rhetoric generated by technology enthusiasts and commercial agendas; (b) empirical work on how web technologies address pedagogical needs is a nascent area of research, with much of the current focus on incorporation of these technologies into formal classrooms; and (c) technologies are often backgrounded or treated in an overly deterministic way. This paper will address the third critique by foregrounding relevant web-technologies and objects that knit together with human actants to form and sustain a sense of online community. A few points highlight why this presencing of materiality is important.

It is clear that connectivity in cyberspace entails a mishmash of entanglements, alliances, resistances, and willing partnerships between technology objects and (non)human actants. Urry (2009) states that Science, Technology and Society studies (STS) have shown how "humans are intricately networked *with* machines, software, texts, objects, and databases" (p. 487). These constantly shifting assemblages affect learning practices in online collectives. Because objects "require new ways of interacting with them even as they find new ways to interact with us" (Waltz, 2006, p. 56), it is important to untangle the alliances between technologies and human actors.

Although society is saturated with objects, with technological devices in particular playing profound role in what we do, Verbeek (2005) argues that materiality is often neglected within theory. Objects are sidelined in many educational studies. Yet, web-technologies are significant, as the literature above suggests, given how they are enmeshed in changing ways of knowing, learning, and working. Many people, including self-employed workers, are venturing into online communities of all shapes and sizes. It is therefore important to attend to these experiences. ANT brings relevant objects to the forefront along with human actants and so offers a different way to examine work-learning practices in online communities.

Invitations-Refusals

Humans are entangled with objects. However, socio-material practices are not without tensions, especially regarding whom and what is in the network. I will explore the dance between invitations and refusals briefly in this section. Alliances between objects and people are often complex and contradictory, or as Pels et al. (2002) suggest, sometimes even a love-hate relationship. Pels et al. write that it is time to notice once again "the sensuous immediacy of the objects we live, work and converse with, in which we routinely place our trust, which we love and hate, which bind us as much as we bind them" (p. 1). Latour (2002) agrees that technologies belong to the human world in modalities other than "instrumentality, efficiency or materiality" (p. 248). Technologies are

> not mere intermediaries; sometimes they verge on being jokers, involving only diffuse orderings; sometimes they are parasites, disrupting and transforming the messages that flow between designers and user, and amongst users. Now we can begin to think of technology in its ambiguity—not only does it contribute to order …it also resources disorder. (Michael, 2000, p. 41)

This is clearly a two-way exchange. Adams (2008) writes that once we respond to the invitation of a thing we enter into a rapport with it and become ontologically engaged. However, just as an object may encourage, discourage, and coax the one who grasps hold of it to participate in the world in prescribed ways, we simultaneously interpret, use, and misuse artefacts to serve our own intentions (Thompson & Adams, 2009). Verbeek (2005) writes that "artefacts invite particular actions while discouraging or even rendering others impossible".

Human actants are not always receptive to the invitations and refusals extended by objects (such as web technologies) and visa versa.

Latour's notion of the detour is apt. It is best, Latour (2002) argues, to speak about technologies "in the mode of the *detour*" (p. 251). He explains that the mediation of technology experiments with *being-as-another* or *alterity*. Without these technological detours "the properly human cannot exist" (p. 252). Verbeek (2005) writes that the subject and object are mutually constituted in their interrelation and only in these relations does an actant "become". Hybrid subject-objects "emerge" within networks. Introna (2007) uses the example of a consultant using a mobile phone. In using the mobile phone, the phone and the consultant are reconstituted. The phone "is no longer 'merely' an object and the consultant becomes a human that embodies the possibility to contact and be contacted at a distance" (p. 14). Thus, technologies and people fold into each other. Chefs and knives. Doctors and stethoscopes. Human and non-human actants are in a co-constitutive relationship.

Exploring Actor-Networks

The participants in this study include: postings; avatars; tool bars; menus; emoticons; archives; community member profiles; the search term in Google or the URL that takes you to the cyber location; viruses; hyperlinks; the delete button; passwords; the technology that delivers postings such as e-mail, discussion forum, or RSS feed. Human actants include: "newbies", "wannabes", colleagues, "big names", celebrities, competitors, posers, lurkers, people looking for work, clients, friends, strangers, product marketers, and the online paparazzi. ANT is up to the task of attending to this array of participants implicated in work-learning practices. Michael (2004) argues that entities should not be "spoken 'about', 'for', or 'of'". Instead, the researcher "speaks 'with', 'by', 'through', and 'as' these entities" (p. 20). Therefore, my task as researcher was to collect data *with* these objects. Although it is difficult to sit an object in a chair and have a conversation, I developed several heuristics for "interviewing" objects which I addressed in Thompson (2010a): follow the actors, study breakdowns and accidents, untangle tensions, and employ co(a)gents. One could argue that ANT researchers must become adept at conducting such interviews with non-humans. For example, in the footnote of an article about "mundane" objects, Latour (1992) thanks a colleague for letting him *interview* his key and key holder.

Participants in this study were own-account self-employed workers (contractors and consultants who do not have staff). Semi-structured interviews, which varied in length from one to two hours, were conducted with 11 self-employed workers; 10 by telephone and one face-to-face. Interviews were recorded, transcribed, and sent back to participants for verification. Pseudonyms are used to protect participants' identity. Latour (2005) writes that much of the ANT scholar's fieldwork is to multiply the occasions of momentary visibility of objects. One strategy is to study accidents and breakdowns in order to reveal the

alliances knitting people and things together in everyday practices. Anecdotes, from the interview data, depicting some kind of breakdown of informal learning in an online community were therefore developed for analysis. Michael (2000) explains that the anecdote "allows one to start from an incident and trace out a range of associations" (p. 14). He adds that as a fairly detailed episode, the anecdote enables glimpses of mundane technologies in use and how the meaning and functions of these artefacts are negotiated. It is not only major breakdowns that are revealing. Michael explains that "in the interstices of the everyday where mundane technologies quietly go about their business of sustaining normality, we find all manner of little 'abnormalities'" (p. 4). Consequently, several anecdotes that simply described everyday online learning activities were also developed for analysis using the heuristics above.

Latour (2005) advises not starting with a pre-defined group but rather following the actors and see what happens. In this spirit I tried to articulate the actor-networks implicated in the practices described by these self-employed workers and then follow them to see what connections they were making with other entities. I began with a list of 30 incidents and developed 11 into anecdotes. I then used an iterative framework of ANT-inspired questions to examine these anecdotes. The anecdotes served as entry points into the analysis and became layered as new associations came into focus. In Latour's (2005) terminology, these anecdotes enabled me to create conduits into the rest of my data. I was prompted by the data to pull in other participants' experiences either because they offered a contrasting perspective or suggested similar configurations. Similar to Michael's (2000) description of his methodology, these anecdotes were material entities that circulated and connected with other material configurations (p. 13).

In order to examine how evolving inter-relationships between technologies and people shape work-learning practices in an online community, one of my first realizations was that participating "in" an online community was a series of journeys and passages. It also became apparent that these passages or moves towards stabilizing tenuous actor-networks were countered by unpredictable disruptions, creating ongoing orderings and disorderings that transformed networks. I begin with these explorations in the next section. I then examine deeper entanglements between human and non-human actants. As participants in this study attempted to "tame" the technology, the technologies-in-use were doing their part to tame other actants. However, these relations did not reveal two separate camps, but rather, hybrid or socio-technical constructions of humans and non-humans. This paper concludes with an exploration of the political questions invoked by this kind of connectivity.

Passages and Journeys

Actants move. Networks shift. Relations stretch and sometimes rupture. Work-learning in online communities is far from being a smooth or singular experience, as this anecdote illustrates:

> Liz is part of a close online group that has recently moved from communicating via group e-mails to a "proper" discussion forum. The discussions are lively, people check in throughout the day, and they are learning. Their group has become popular and new people are asking to join. But these new people do not seem to participate. "We ask them to introduce themselves. Invite them to share their questions and opinions. Nothing." Behind the scenes, the original nine are disgruntled and e-mail each other back and forth. "This is not a community for lurkers", they say. With no public announcement they make a sudden move back to dialoguing by e-mail. Several years later, they are still e-mailing and a few of them get together. They have moved on in their careers, their work changed, the conversations different, but the relationships continue to grow stronger. Liz has no idea what happened to the discussion forum.

Even though this network is constantly mutating, it seems to be searching for a workable configuration of technologies and people to keep them connected in the way they want. This ongoing journey suggests a "nomadic" actor-network. There is no sense of a distinct beginning or a definitive end to this journey, only movement towards the next resting place. Moser and Law's (1999) exploration of dis/ability as the performance of specific passages between specific material arrays is helpful here. Brought into focus are the "character of the materials which en/able those passages and the arrays which secure or do not secure them" (p. 201). Moser and Law explore "necessary passages" which order relations. Good passages are described as "moving smoothly between different specificities and their materialities. Bad passages are about awkward displacements, movements that are difficult or impossible" (p. 205). However, they explain that not everything is as it seems. Passages may be presupposed or normatively prescribed and public smoothnesses often conceal both work and private disruptions.

The assembly of actants described by Liz shifts several times, evoking a number of passages. First, a small group connects by e-mail, then a larger group with many new people interacts in an online discussion forum, then the small core group moves back to e-mail, and now, a smaller shifting constellation is led by an array of other actants to keep them connected: e-mail, telephone, birthday cards, and get-togethers over dinner. Moving to the discussion forum transforms their daily exchanges into a fishbowl: a few people discussing and the rest looking on anonymously. This passage is not welcome. Instead of colleagues they become performers and audience. The closing of ranks and movement back to e-mail is a necessary passage for this small group to keep the camaraderie, collegial exchange, and caring in circulation. Despite changes in the shape of these different configurations—or different specificities (in Moser & Law's (1999) terminology)—they are surprisingly fluid passages.

Mol and Law (1994) suggest that social space may behave like a fluid: "neither boundaries nor relations mark the difference between one place and another. Instead, sometimes boundaries come and go, allow leakages or disappear

altogether, while relations transform themselves without fracture" (p. 643). This description helps explain Liz's "nomadic" actor-network. The series of configurations outlined by Liz suggest a series of passages, one version of a network gently morphing into another version. The core group of people, conversations, and camaraderie stay intact, withstanding the disruptions of new people, the fishbowl configuration, and the discussion forum technologies. Law (2002) suggests that fluid objects help to enact a fluid form of space, in part due to mobile boundaries. He is careful to point out that sometimes things and relations can change so much that they become unrecognizable. Liz's actor-networks do not change beyond recognition. Although each passage brings the possibility that the actor-network might break apart, there is something about the fluidity of the passages that keeps the enactment of the most important relations and conduits intact.

In their study of the Zimbabwe bush pump, de Laet and Mol (2000) conclude that its characteristics as a fluid actor—not too rigorously bounded, adaptable, and responsive—may make it stronger than a more rigid object. Leather seals are replaced by old tyres, bolts by steel bars, and yet the pump keeps operating. The online communities enacted by Liz's group are also fluid and a testament to the resiliency of associations, which have lasted 12 years. Although each passage brings about a different enactment of online community, these *necessary* passages serve to maintain the most valued connections and circulations.

Stabilizations and Upsets

Liz's collective is looking for a home, trying out configurations and moving on until it feels right. "Good" passages enable this network to navigate new specificities. Despite ongoing (re/dis)assembly, this actor-network seeks stability. There are many instances throughout the data of how both the self-employed workers and web technologies-in-use acted to stabilize enactments of an online community. However, such networks are unpredictable and fraught with resistances. ANT theorists attend to both the stable and the fluid. Latour (2005) argues the importance of attending to what network elements have been stabilized, given that a "normal" state of any network is one of flux and unpredictability. Establishing and maintaining durable networks is a move to stability. However, small refusals and disconnections are evident in this study. These tensions will be explored in this section.

Attempts to stabilize.

In Liz's nomadic community, the sense of being infiltrated by outsiders has ripple effects throughout the network and leads to a stabilization. Purposefully excluding some cuts the network and shapes a new configuration which draws a tighter circle around a smaller group. A heightened sense of inclusion results. Enrolling objects to help the group close ranks is done purposefully. For example, e-mail addresses are generally made available only to select people. They are not shared with all. When the group reverts back to e-mail, this bundle of

technologies (objects) re-establishes boundaries. By excluding the new people who merely lurked, a new circulation is mobilized: a reaffirmation that, "*We* are all equally committed to this group and participate accordingly. *We* don't lurk." New actants, such as birthday cards and dinner invitations, help stabilize this new configuration.

Latour (2005) explains that "every time a connection has to be established, a new conduit has to be laid down. … What circulates ... 'inside' the conduits are the very acts of giving something a dimension" (pp. 219-220). Young (2006) states that "actors that are best able to configure distances (to establish stable and/or durable patterns, to access or configure networks …) will be at a significant advantage" (p. 263). What are the circulations in this study that helped maintain a durable connection and configure distance? Possibilities include:

- the prevalence of web-based ways of working;
- value-added information perceived as highly credible and not easily accessible elsewhere;
- feelings of caring, support, and companionship;
- valued connections that cannot be obtained as flexibly elsewhere;
- ongoing negotiations that confirm this is worth an investment of time and energy; and
- *need* for this online space for work-related learning.

Interrupted by upsets.

Upsets and refusals can lead to stabilizations through a re-ordering of elements. Changing media is a resistance by Liz's group to the upset of "infiltration" by outsiders. Re-ordering leads to a new and stable configuration. However, stabilizations are ongoing negotiations. As Nespor (1994) writes, "networks expand, contract, and shift configuration over time, and even the most stable and predictable of them are constantly being reappropriated and redefined by the nature of the flows that animate them" (p. 12).

At times, these networks are too porous. Entities are easily hijacked and moved into different configurations which creates upsets and disruptions; for example, when snippets of Ryan's posting travel into the wrong hands. To make an online space conducive to learning, people share. Making postings, sharing attachments, sending and reading private messages, and disclosing personal information are common. In the following anecdote, these kinds of texts flow freely until an incident:

> Lee feels very comfortable in his online community. It is a close knit group and they are online almost every day. One day he opens an attachment from a new community member only to discover it is loaded with viruses that proceed to attack his hard drive. It also contains personal and private information about him. He spends the next year trying to erase all records of his identity on the Internet.

This is an upset. This is not supposed to happen in an online community. Lee becomes more cautious. His relationship to other web-based technologies (objects) changes. Artefacts strewn over the Internet now seem to reveal rather than just share—they have become things that need to be hidden, destroyed, and managed. Information is translated from something that is shared, in order to build a connection with others, into something that reveals. His online practices change. One's Internet presence—the places you have been and the things you said and did—is amalgamated and translated into a *digital trail*, which is public and not easy to alter. As Lee discovers, "Once you are on the Internet and you're posting it's very hard to remove that information." Lee resists this intrusion, and tries to prevent future incidents by making his Internet presence less ephemeral so he can better control it.

This is a passage about digital trails and online security. It is not an easy journey. There are ongoing negotiations of boundaries as Lee wrestles with how much public exposure he is comfortable with. Attending to online security and its related technologies (objects) becomes a necessary passage. Ongoing negotiations to be protected, unexposed, and virus-free become more onerous. The perception of connection to others with just a click of a key is a black box, binding together all sorts of assumptions and alliances. Lee's experience un-black-boxes some of these, revealing that there can be a price for this sense of connection online.

Who's Taming Who?

Instability is inherent in stable relations between actants. Actants juxtaposed in an actor-network come and go, change, want different things. Networks assemble, re-assemble and dis-assemble. The degree of stability that different actants are seeking remains uncertain. Some of these self-employed workers indicated that they are looking for predictable online interactions. For others, it is more important to find a place in which they can drift in and out, engaging as needed; a sort of "fluid stability". Although "fluid stability" might seem oxymoronic, it reinforces Law's (2002) warning not to romanticize fluidity and to recognize that the constancy and strength of stable relations in a network is also crucial. For most of these self-employed workers, there is a sense of wanting to be able to control the interactions in their online communities enough to reap the benefits efficiently, while at the same time being open to the serendipitous way of learning offered by the Internet. The unpredictability of what one might find is part of the appeal of being online.

Both stabilizations and upsets are a necessary tension in the work-learning practices of these self-employed workers. Lee attempts to manage his digital trail; to put some kind of wrapper around the array of objects (the virus, his e-mail address, discussion archives, old postings) that are turning what was private into something far too public. However, the tension he encounters is that his digital trail—electronic footprint—has cohered into an amalgam of associations over which various technologies hold sway. His digital trail reveals how inter-

connected the bits and pieces of his life really are and in some cases, beyond his reach to retrieve and (re/dis)assemble despite his best attempts.

The actants' stories are rife with attempts to tame or discipline; attempts to order. As human actants attempt to tame the technology (and by extension, their cyberspace community), the technologies-in-use are doing their part to tame other actants. Participants want to control their online interactions and work hard to make them efficient and predictable. They are well aware that time online can get out of control, resulting in billable time lost and unproductive distractions. Numerous objects are enrolled or step to the forefront in this quest: filters, the delete button, subject lines, the clock, clicking on "unsubscribe", and opting for digest versions of online conversations.

At the same time, the technologies-in-use in this research study are doing their part to discipline other actants. One such strategy is to make things (appear to be) easy to do. Reliance on default settings and delegating tasks to the technologies (objects) is apparent. Some people stay in an online community simply because by default the technology continues to keep them connected: messages just keep coming into an Inbox. Discussed in Thompson (2010b) are digest versions of online conversations, a delegation to technology to amalgamate and forward—daily or weekly—a compilation of all the contributions to the discussion forums. Similarly, Adams (2006) explains that when we navigate an unfamiliar environment we gladly accept the most accessible invitation, which in the case of software, are the default settings.

Socio-Technical Constructions

Both technologies and human actants are busy taming each other in attempts to (dis)order passages, but not in a deterministic way, as ANT moves past that thinking. The data describes entanglements between humans and non-humans that make it very difficult to separate the two. Efforts to discipline the "other" fold back into complex negotiations and inter-relationships. In other words, these self-employed workers and the web-technologies-in-use are not two separate bundles, but rather *co-constituted* in the work-learning practices described. Michael (2000) suggests that rather than speaking of humans and objects as two distinct entities, perhaps both can be regarded as *socio-technical constructions*. Suchman (2007) concludes that it is not about "assigning agency either to persons or to things but to identify the materialization of subjects, objects, and the relations between them as an effect … of ongoing sociomaterial practices" (p. 286). Both human and non-human actants are therefore socio-technical constructions of some sort: hybrid human and object entanglements. Different terms are used to convey the notion of hybridity: Latour (1993) refers to *quasi-objects* and *quasi-subjects*. Michael (2000) refers to *co(a)gents*.

Michael (2000) uses the example of the "couch potato", arguing that "specific technologies, bits of bodies, aspects of nature, parts of culture, and traditions of discourse come together in the production of co(a)gents [hybrids]

such as the 'couch potato'" (p. 2). The couch potato is a co(a)gent comprised of person + sofa + TV + remote control. In this study of how inter-actions between web-technologies and self-employed workers shape work-learning practices, several socio-technical constructions are evident. For example, one's digital trail includes text/images + the screen + hyperlinks + the person. It is a set of specificities about online presence—what we have said and done that has somehow been captured, amalgamated, and archived. Doing a Google search on yourself enables you to see the Google version of your digital trail. As Lee discovers, this socio-technical construction mediates relations between private and public, trust and distrust, and revealing and hiding. Given the complexity and sophistication of the hybrids in circulation, such as one's digital trail, these entanglements raise political questions, which I will explore in the next section.

The Politics of Technology

This paper has explored sociomaterial inter-actions between web technologies and self-employed workers. The co-constitutive nature of online work-learning practices has implications. Holkner (2007) argues for the importance of understanding the social and political implications of the technologies people use in their work contexts. ANT contributions to this debate come from Bruno Latour's insistence on acknowledging the place of non-human actants within a political remit and John Law and Annemarie Mol's work on ontological politics which recognizes the performativity of multiple, overlapping, and contested networks and realities. I now explore three issues highlighted by the data in this study and critical to work-learning practices in online communities: delegation, invisible practices, and necessary literacies. Each presents opportunities for further study.

Delegation

Introna (2007) states that decisions and actions are often delegated to technology because it is convenient or necessary. For example, Chesher (2004) explains that when a person clicks on a hyperlink "an unimaginably complex set of events" is translated into an apparently simple task (p. 3). I appreciate this convenience! However, Introna posits that we always delegate more than we realize. He adds that while we can appreciate the gains in usefulness, efficiency, or convenience, awareness of the subtle changes in our ongoing way of being emerges over longer periods of time. Chesher (2002) declares that when learning new software, "I transform myself into the particular subjectivity of a user. I have tied myself to an upgrade path. The tasks become habitual and I can no longer perform them without this software" (p. 7). Think about the ubiquity of e-mail and how many of us have tied ourselves to being an e-mailer. Juxtaposed with web-computer technologies, our way of communicating and being changes subtly over time.

When a person participates in an online collective, they delegate the job of distributing their commentary to various technologies. This is both convenient and

necessary. These technologies take on the role of archiving, indexing, and amalgamating this content. Some of these delegations are more visible than others and a person may be given some options. Nevertheless, these bits and pieces of one's activities become black boxed by technologies into something more opaque than transparent. Indeed, ubiquitous computing is designed with the premise that technologies will fade into the background, weaving themselves into the fabric of our everyday lives (van Dijk, 2010).

It is the arrival of the virus that sparks Lee's realization of how revealing his digital trail is. The virus forces Lee to open a black box. Yet, this digital trail is part of being online. Boyd (2006) states that "from the flow of text in chatrooms to the creation of Profiles, people are regularly projecting themselves into the Internet so that others may view their presence and interact directly with them" (p. 14). As Mia observes, "the way you select what you're interested in, connect your blog to others, your deli.cio.us tags to resources, defines your interests and who potentially may be interested in linking to you." One's digital trail is important professionally. As a self-employed worker it is logical to expect that potential clients or partners will Google you to get a sense of who you are. Without engaging with an array of objects and web technologies it is impossible to be someone who is connected online.

There is much discussion around privacy, security, and ownership of Web and email data (Oblinger, 2008; van't Hooft, 2008). Anderson (2007) speculates that if some of the more negative aspects of Web2.0 persist, "it is quite possible to envisage … 'Web 3.0' as a backlash to Web2.0: where software that 'cleans up' after you, erasing your digital path through the information space, and identity management services, are at a premium" (p. 52). Diligently opening black boxes is crucial to managing the potential negative implications of delegating done in the cause of "online presence". Latour (2005) maintains that ANT's distinctive politics can highlight how relations come to be stabilized so that "matters of concern" are not quietly and prematurely turned into "matters of fact".

Invisible Work

In her research on a public health initiative, Singleton (2005) concludes that "the practices that construct the mundanity and accessibility [of the program] also serve to make the complexity and heterogeneity of the work of practice invisible" (p. 782). Because the Internet has become an everyday technology—mundane and accessible—we often do not think twice about the complex work that goes into being engaged online. Haythornthwaite (2008) draws attention to how the hype over online communities ignores the efforts and techniques embedded in roles which are "now swept away as every individual is [her/his] own teacher, journalist, librarian, writer, and publisher" (p. 599). Star (1991) argues that when invisible work is recovered, a different network is discovered.

The work that Lee now takes on daily to ensure a safe online presence is not something that most self-employed workers include as billable time. The work

that Liz's group did over the years to build a connected and supportive collegial group is largely invisible to, and perhaps not appreciated by, the new people who entered en masse. The efforts that go into finding and joining an online space are likewise sidelined. The moments snatched here and there by all the participants in this study to build online literacies are expected and unremarkable, despite the significant outlay of time, money, and effort. For some, I suspect that tied to this invisible work is invisible anxiety. Anderson (2007) cautions that with so many different ways of accessing information online, people may worry that they do not understand or use all of these media, leading to anxieties about whether they are as fully connected as they *should* be. Should a worker be spending *more* time figuring out new media—more invisible work?

There are several concepts within ANT to help explore invisible work. The classic ANT approach is to open black-boxes. Latour (1987) explains that when many elements are made to act as one, a black box is created. By patiently tracing threads between human and non-humans actants that appear to be unified and/or foolproof, ANT researchers unpack networks of alliances, often reawakening controversies (Harman, 2009). The invisible is made momentarily visible. Un-black boxing shows how things are normalised and made inevitable (Singleton, 2005). After a strong focus for a decade on actants *in* the network, there is a noticeable shift among ANT theorists to explore the "stuff" not present—the invisible. Latour (2005) introduces the notion of *plasma*, a term he now uses to describe the unknown which is in between the meshes of the network circuitry. Harman, a Latourian scholar, comments that this shift in Latour's thinking intimates that actors are not fully formatted by their alliances and relations after all. My reading of this move suggests that actants are not quite so invisible when not embroiled in assemblages and that there may be value in exploring what is in the plasma. Attending to the *not so visible* is a political move. Law (2004) advocates more ontological radicalism to attend to difference and to reach the elusive, absent, and Other.

Information and Media Literacies

Singleton (2005) maintains that when access and competence are unevenly distributed, different capacities to negotiate specific technologies and materials become evident, thus creating a political issue. The same is true in this study. Despite the wide-open nature of the Web, there are differences in the way people are able to access and leverage learning opportunities. Discontinuities include uneven distributions of: pre-existing knowledge and networks, ease grasping and working within community norms, capacity to connect with the right people, skill in framing questions, and ability to participate online (and take it offline) in ways that enhance learning. Although the technology for the most part is not overly complex, it did create complex situations for some participants around online safety, anonymity, and privacy. Being disciplined and strategic is an essential aspect of informal learning practices in an online context. This seemed to be easier for some than others.

The data highlights how configurations do not always successfully align to achieve the sense of community most conducive to these workers' purposes. Law (2007) writes that learning is filled with tensions; if practices do cohere as learning practices, this is only temporary, and paradoxically, if practices look streamlined then it is because the bits that do not fit and the choreography that holds it all together is not visible or understood (p. 126). In this study, the notion of "community" is well-known and the technology in many instances is little more complicated than e-mail. Yet, as this study has shown, the enactment of online communities comprises new objects, relations, and mobilization of practices. Adult educators risk underestimating the literacies required to participate in these online spaces if we continue to see them as little different than e-mail or chatting on Skype.

The importance of media literacies has emerged in the literature, particularly with reference to youth in formal education settings. However, Oblinger (2007) writes that "becoming net savvy isn't a one time affair—it's a lifelong educational process—and something that should be integrated into all aspects of our lives" (p. 13). Although most of the participants in this study described their computer literacy as high, these were skills they developed as adults. Moreover, these literacies encompass more than being able to use technology. They include ethical and responsible use of the Internet, attending to safety on the Internet, and ability to navigate complex intellectual property, privacy, data security, and authenticity issues (Oblinger, 2008; van't Hooft, 2008).

Conclusion

In their capacity to interact with us, the objects that were part of this research study were at times fluid, approachable, elastic, prickly, or opaque. It is apparent that people are negotiating new relationships with web-based technology objects as they change their conceptions about the role objects play in the flow of online learning inter-actions. The hype of web technologies is ever-present. Web2.0 (and whatever comes next) offers fascinating and powerful ways to re-think how we experience learning, knowing, and connecting with others. To cut through the rhetoric, it is clear that sorting out the negotiations between different materialities and specificities is paramount in understanding the experience of work-learning online.

This paper explored the sociomaterial inter-actions between web-technologies and self-employed workers engaged in work-learning in online communities and the implications of this intertwining of people and objects. The participants in this study were learning work practices, the viability of doing particular work, how to engage in online communities for work-learning, and how to participate in fluid knowledges (Thompson, in press). The data in this study illustrated how participating "in" an online community was a series of journeys and passages. Moves towards stabilizing tenuous actor-networks were countered by unpredictable disruptions. Fluid stability was sought. Latour (2002) muses that

"we never tame technologies, not because we lack sufficiently powerful masters, not because technologies, once they have become 'autonomous', function according to their own impulse … but because they are a true form of mediation" (p. 250). We are never "in ourselves" but rather co-constituted with the objects around us. The nature of the co-constitutive relationship between people and web-computer technologies complicate work-learning practices online and encourage researchers to bring these web-technologies to critical inquiry.

The networks explored here depict online communities as arrays of sociomaterial specificities. These complex actor-networks, labelled by some as online communities, are places constantly enacted through ongoing stabilizations and upsets. Massey (2005) explicates that places not only implicate us in the lives of other humans but "in our relations with nonhumans they ask how we shall respond to our temporary meeting-up. … They require that, in one way or another, we confront the challenge of the negotiation of multiplicity" (p. 141). These "meeting-ups" and multiplicities raise political questions and this paper explored implications of delegation, invisible practices, and access to critical information and media literacies—avenues for further research.

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Conclusion Chapter

I have wondered how people negotiate the relational and material aspects of being online and how this (re)negotiating is reshaping informal pedagogical moments. My work and research over the past 12 years has focused on online learning communities organized under the auspices of a formal or non-formal organization, such as a university, workplace, NGO, or professional association. But once one clicks outside these organized spaces there are a gamut of other online configurations and practices. I became interested in how people learn in these everyday spaces. Specifically, how people might use web-based technologies to tap into online communities, especially for work-related learning. I am also intrigued by the self-employed. Many adults work outside the sphere of the conventional workplace and are left on their own to create a place and space for their learning activities. Without the benefit of training departments, they engage in learning, but often in very different ways. I am one of these workers, having been self-employed throughout my working career. Additionally, some of my work has focused on the self-employed and entrepreneurs (owners of micro, small, or medium businesses) in the global south. My impressions are that this important segment of the labour force is entangled in quite different work-spaces and ways of working than workers in standard employee-employer relationships.

This research project set out to explore how self-employed workers experience informal work-related learning in an online community. The first paper examined how the self-employed engage in online communities for work-learning. The next paper looked more closely at what kinds of learning emerge through their work-learning practices in online communities. A short background chapter traced the development of key Actor Network Theory (ANT) concepts over the past three decades. Given the emphasis on objects in this research project—particularly those related to web-technologies—the third paper questioned how a qualitative researcher might "interview" technology objects in an effort to disclose their material agency in co-constituting teaching-learning spaces. How work-learning is enacted in these cyberspaces was the focus of the fourth paper. The final paper examined how inter-actions between web technologies and self-employed workers unfold in online communities.

In this chapter I offer some commentary on insights that emerged from this collection of five papers. I will also discuss some of the challenges and limitations of this research project. I then explore how using both ANT and situated learning theory created different openings for me as a researcher. In the last section I conclude with reflections on political and ethical questions of web-based technologies as well as the implications of this research for policy, practice, and future research endeavours.

Commentary

This research study focused on "informal" online communities: organic, commercial, and organizationally sponsored configurations. Popular and

pervasive, these spaces *outside* the auspices of formal online courses are not yet well researched from a pedagogical perspective. To the self-employed workers in this study, online communities were networks of enough of the right people, ideas, objects, sensibilities, and caring to be useful. The achievement of "online community" was not just about the technology or the people. Instead, it was about the relations and interactions between them. Findings in this study illustrated that these self-employed workers attempted to (re)configure online spaces to create the degree of connection and learning needed. There was no one "right" way to engage in these cyberspaces, lurking was prevalent, and there was a sense, for some, that communities could be "turned" on and off as needed. By exploring how participants engage in these much less pedagogically inscribed spaces this research foregrounds issues of managing exposure, force-feeding community, and navigating multi-purpose spaces.

This research project brought the work-learning practices of the self-employed to the fore, highlighting the distributed, hybrid, and fluid nature of these practices. It provided an opportunity to examine how workers learn with, and support, others and the kinds of knowledge that is legitimated in different online cyberplaces. Woven throughout this collection of papers is evidence that ways of knowing take different forms and are, in fact, different practices in various enactments of "online community". Learning in online collectives is a complex undertaking. As the tracing of the posting in Paper 4 indicates, the posting is a fluid object, not confined to one space and time, and juxtaposed with any number of other things in limitless ways. By tracing the posting, I showed how it was implicated in a vast array of actor-networks (re/dis)assembling in the pursuit of work-learning practices, playing a part in shaping the complexity of learning online.

The practice of work-learning online is tightly meshed with ways of working and not yet well defined or understood. For these self-employed workers, developing both a work practice (i.e., daycare provision, e-learning design, or occupation health consulting) and an online work-learning practice was the effect of cobbling together several approaches and collectives. Participants indicated that they experienced successes, failures, and mediocrity. It was important to the participants in this study to have a good configuration of actants—other people, expertise, time, and workable technologies—in order to gain the best possible value-added knowledge making opportunities. Yet, this was often easier said than done. Patching practices together, choreographing bits and pieces from here and there, and juxtaposing elements in a meaningful way takes a great deal of work (Law, 2007).

This study drew on the relational and material ontology of ANT to study work-learning. It is not just the "social" aspect of online communities that is important. The "social life" of any web-based technology and practice is also significant. Because the Internet has become an everyday technology, we often do not think twice about the complex work that goes into being engaged online. The

ANT-inspired papers described how self-employed workers and the web-technologies-in-use were *co-constituted* in the work-learning practices. Online communities are places and spaces. Massey (2005) writes that what is special about place is the "throwntogetherness, the unavoidable challenge of negotiating a here-and-now … and a negotiation which must take place within and between both human and non-human" (p. 140). The last three papers explored this co-constitutive relationship between human and non-humans. These complex inter-relationships led to uncertainties around delegation, invisible practices, and necessary literacies. These papers also argued for the importance of foregrounding objects in qualitative research studies, and Paper 3 offered some heuristics which may be useful to other researchers using ANT.

This assembly of papers helps to address some of the paucity of research which looks specifically at the ways technology can be used to support informal learning of adults. For some self-employed workers in this study, turning to an online community was the only viable learning option. For many of the participants, these informal spaces were rich learning experiences. However, work-learning in online communities was not a rich experience for all. Bjørkeng, Clegg, and Pitsis (2009) write that established practices are gateways and conduits that direct the flow of learning. These self-employed workers drew on familiar practices to facilitate their entrée into online communities. E-mail, and the norms that go along with it, were already familiar. Participants were versed in other ways of learning, formally and informally, which included learning from conversations with colleagues and searching for information in books or online via Google or Wikipedia. To some degree, practices of work-learning online were fashioned out of established ways of working and learning. However, this study highlighted several unique challenges faced by self-employed workers when they go online, indicating new tensions to navigate and practices to be developed: managing private-public boundaries, reputation management, figuring out where to go, assessing relevancy and credibility of people and resources, intellectual property protection, and being both a worker *and* learner in the same space. Adult educators risk underestimating the literacies required to participate in these online spaces if we continue to see them as little different than e-mail or chatting on Skype.

Challenges and Limitations

In Paper 3, I outlined challenges for researchers drawing on ANT, including:

- choosing which entities to follow, networks to untangle, and circulations to explore;
- knowing where to cut the network in order to focus analysis on particular sociomaterial assemblages;
- accounting for my positioning within this research project; and
- wrestling with how to genuinely reach the non-human.

I will not repeat the discussion of these challenges here but, instead, highlight a few other challenges and possible limitations. Attempting to study learning practices of the self-employed is a big undertaking. One strength of this research study could also be a limitation. These participants did a wide variety of self-employed work, engaged in an immense array of online spaces, and had very different experiences in, and opinions about, online communities. This diversity provided incredibly rich data but also made it more challenging to identify patterns and commonalities as I was forced to constantly attend to the many nuances in this data. There was almost always a dis-confirming example! I am grateful that this prevented me from jumping to conclusions and neatly summing up experiences. Perhaps more focused studies on a particular group of self-employed workers in more a tightly defined type of online community (i.e., those set up by professional associations) might enable more contextualized findings. Nevertheless, this study is an example of how ANT enables a researcher to attend to difference and non-coherence and the messiness and ambivalences of research.

Another potential limitation of this study is that it was not feasible to follow the trail of all the interesting actors which emerged. For example, in Paper 4 I describe how Ryan (an occupational health consultant) makes a posting in a private forum for health professionals about a workplace situation. It comes back to him with questions about how he got this information. His original posting was carved up by someone in the group and a snippet forwarded to a person outside the group tied to the workplace mentioned by Ryan. To truly "follow the actors" I would have set out to talk to the workplace person as well as the community "member" who forwarded Ryan's e-mail. While tearing around on the Internet (and face-to-face) to follow actors may allow researchers to pursue interesting trails, there are practical and ethical questions that need to be considered. I also wonder whether all of these kinds of conversations would be necessary to understand the posting as an (im)mutable mobile. I have come to appreciate that I was at times, dealing with networks that were inaccessible to me as a researcher. Yet, by patiently tracing the objects and interactions I was able to access, I did glimpse significant bits and pieces of those networks.

I might also have asked Ryan if he saved the original posting he made and/or the one that was returned back to him so that I could "interview" these objects. One challenge with researching online learning in the everyday is that these kinds of objects fade from view quickly. Digital objects, in particular, are easily deleted. I had not designed my study to collect artefacts in this way and so did not feel comfortable asking Ryan if he had these old postings. Nor would I have access to a private members-only online forum. Moreover, there are ethical research considerations around "dropping" into these spaces uninvited. In my conversations with participants it was clear that comments made in forums are one in a myriad of everyday texts navigated by these people. One exception was Amy, who had saved all the postings that were generated when she posed her question about running injured in the Boston Marathon. She thought she might write about the competitive running experience one day. Otherwise, these too

would have faded away. In future studies, it could be useful to include some "artefact" collection, where practically and ethically feasible, as part of the methodology.

Another related potential limitation of this study is reliance on human interview data. These are narratives that people thought to tell about themselves. The everyday materialities of their activities might not be something that they were able to highlight, given its often implicit nature. Despite these challenges, the interview data was rich. I encouraged participants to share experiences and then worked with them to tease out as many details as possible, including evoking objects. Our conversations, and the subsequent analytic work I did, eventually surfaced objects such as the delete button, digital trails, and the posting, but sometimes through more circuitous and indirect routes. For example, I did not talk with each participant about how they used the delete button. In fact, I did not even appreciate how important this actor-network was until I was quite far along in my analysis. In some of my early analyses, it was online signatures that caught my attention and I did have a short follow-up interview with one participant specifically to probe siggies, avatars, and blinkies. She sent me several of these digital artefacts. Upon further analysis, I realized that other objects, such as the delete button, were more important and pervasive in the interview data. Fortunately, several of the objects participants spoke about were familiar and accessible in some form to me: My computer has a delete button and I have sent and received many postings. Unlike Latour's foray into the scientific laboratory, objects of interest in my study were not totally foreign or kept behind closed doors.

Interviews enabled me to talk with people about an array of spaces and their experiences in those spaces and to see how "online community" unfolded through a complex blend of media, online spaces, and online and offline encounters. When I think about how I might design future studies to explore online communities, or the more loosely connected networked architectures of online participation that are becoming more common, I am not convinced that "camping out" in online community spaces would provide better data: different data, yes. As made clear throughout these papers, ANT researchers start with the assumption that one should not limit in advance what comprises an actor-network, but rather trace associations between entities and see what emerges. Even from a non-ANT perspective, Baym (2007), an experienced online community researcher, concludes that while it has been the norm to go to online communities in order to study them, it is no longer clear this is an appropriate strategy given the increasingly distributed nature of community. Law and Urry (2002) posit that current social science methods deal poorly with the fleeting, distributed, multiple, non-linear, and chaotic (p. 10). These words aptly describe "online community" and "informal learning", phenomena that were the focus of this study and yet very ephemeral at times. While ANT is suited for studying these kinds of fluid practices, practical questions about methodology do stare the researcher in the face.

ANT and Situated Learning

In this research study I drew on both ANT and situated learning (SL) theory to understand how self-employed workers experience informal learning in an online community. I drew on the SL notion of legitimate peripheral participation (LPP) to explore what self-employed workers were learning. I used conceptual tools from ANT to explore how informal learning is enacted and how inter-actions between web-technologies and self-employed workers shape work-learning practices. My purpose in using both perspectives is not an attempt to fuse different theoretical views. Rather, in opting to use a paper-based format for this dissertation I was able to draw on appropriate conceptual and methodological approaches in order to best explore my different research questions. Throughout my work on this research project, it became evident that ANT and SL created different openings for me as a researcher with respect to framing questions, analytic methods, conceptual tools, attention to objects, and the ability to explore the fluid.

Framing Questions

SL theory brings a useful theoretical framing for studying how people learn with others in everyday practice. Lundin and Nuldén (2007) state that the skills we learn are inherently connected to the practice in which they are located: "in this way, learning and knowing are connected to and part of practice" (p. 223). People are thus enmeshed in practices. The concept of LPP creates opportunities to explore how different possibilities for learning are shaped by locations and trajectories within the practice and larger community of practitioners. ANT focuses on *how* questions: How objects, people, ideas, and actions come to be aligned. Or, how something, such as learning, is enacted. Wanting to explore the informal learning practices in online communities became a question of how it is enacted, which led to an exploration of multiple networks, attempts to stabilize fluidity, and ways of associating with fluid knowledges. I do not think I would have formulated these kinds of questions from a SL lens.

Analytic Methods

Because communities of practice (CoPs) are an integral element of SL theory, the unit of analysis revolves around community as an entity. In contrast, ANT shies away from assuming that a pre-determined group exists. Rather, by "following the actors", the researcher starts with one actant—a posting, the delete button, a self-employed worker—and from there tries to trace the actor-network(s). Data collection and analysis strategies remain necessarily fluid and emergent. The list of actants and actor-networks unfolded throughout the study and could not be completely determined in advance. As illustrated throughout this research project, deciding which actor-network to follow, and how far, becomes a complex pragmatic decision. Although there is nothing inherent in SL that would preclude a micro-level of analysis, in ANT, analysis of the local, particular, and specific is fundamental.

Conceptual Tools

ANT conceptual tools enrol the researcher into a particular kind of analysis. One searches for actor-networks, alliances, black boxes, (im)mutable mobiles, multiple ontologies, translations, stabilizations, and disruptions. The key conceptual tool in SL is LPP, which is tied to concepts of peripherality, legitimacy, participation, trajectories, expertise, practice, and CoP. These are different, but overlapping, lists. For example, consider the notion of "community". An ANT researcher would not assume a pre-existing entity such as an online community. Latour (2005b) cautions that the researcher must not "limit in advance the shape, size, heterogeneity, and combination of associations" (p. 11). Because groups are constantly being performed, connections first need to be traced. Although Lave and Wenger (1991) explain that the term community does not necessarily imply a well-defined, identifiable group, it often seems to take on a more substantive form. The CoP is often regarded as the *context* in which an individual develops practices. According to ANT, although an online community may be realized as an effect of a network, *after* the hard work of "associology" (Latour, 2005b) is completed, it cannot be a starting assumption.

Attention to Objects

Attending to objects (ANT) and artefacts (SL) is important. The elevation of non-human actants to analytical parity with human actants within ANT has been explored throughout this research project and creates unique openings for researchers. The delete button or a posting become legitimate entry points for analysis. I have not yet encountered many SL studies that draw this degree of specific attention to objects. One exception is the study by Lundin and Nuldén (2007) which examines how professional tools used by Swedish police officers (i.e., police cars, weapons, radios, computers, forms, pepper spray) trigger workplace learning. Their analysis brings out many salient points about how the significance of these tools is interwoven into social practices as police officers talk about (police) tools and their use of these tools. However, an ANT-account would also include more descriptions of the tools themselves and how objects-people and objects-objects come to be tied together. An ANT account would also likely unpack the "practice" and the "community" which are assumed as background contexts in Lundin and Nuldén's study.

Ability to Explore the Fluid

ANT is well-suited to explore the mobile, shifting, and indeterminate. Networks are presumed to be in flux. Stabilizations are the exceptions which demand attention. ANT thrives on opening black boxes, taking a look at what alliances are lurking inside, and the work going on to sustain or upset these alliances. Texts that move, online cyberspaces in which people dip in and out, the fusion of work and learning activities, the often invisible nature of informal learning, the momentary coalescing of ideas, people, and technologies: these are challenging phenomena to study. The basic premise of ANT is to explore actants bumping around in networks which enact fluidity, multiplicity, and mobility. Starting from the "uncertainties and controversies about who and what is acting

when ‘we’ act” (Latour, 2005b, p. 45), creates expansive openings for the researcher. Although changes in a community, practices, notions of expertise, and positioning of individuals and the collective are examined effectively using SL, the notion of LPP itself is imbued with locations and movements. For example, the periphery is a location that evokes another location—the center. Becoming a practitioner has temporal and spatial connotations as one moves from “new-comer” to “old-timer”. A trajectory implies linear movement, although Wenger’s (2006) recent assertions suggest that a trajectory can be more convoluted. Nevertheless, LPP is a more bounded concept which is less malleable to the exploration of the constant (re/dis)assembling of actor-networks.

In this study, ANT created different openings and ways to think about the phenomena I was interested in researching. I used SL theory to initially frame this study. ANT became more and more interesting as I started to draw on its conceptual ideas and tools. To use an analogy, it is as though SL opened the door and then ANT made it an event by introducing me to interesting people, things, and novel discussions. Latour (2005b) himself draws attention to the compatibility between ANT and SL—up to a point (see Situating ANT chapter). Each theoretical perspective creates different openings.

Implications of This Research

This research raises questions about work-learning practices online, particularly with the juxtaposition of learning, working, and the turbulence of cyberspace. As technologies also have politics and can be moral actors, I will briefly frame a few of these issues. This chapter concludes with an explication of how findings from this research project could be used to help inform policy and public debate, practice, and future research initiatives.

Sophisticated web-technologies, such as Web2.0 and social media, are believed to accelerate more connected and social forms of informal learning (Wihak & Hall, 2008). However, if and how the Internet, and particularly Web2.0, is fundamentally changing ways of knowing and learning practices is important to examine. Beer (2009) observes that we have not yet explored how new forms of power are enacted in the new participatory web, with its “context of apparent ‘empowerment’ and ‘democratization’” (p. 985). Shifting and fluid online configurations shake up notions of expertise, beliefs about who is able to produce and consume information, and where/how one locates themselves in order to build work-learning practices.

The link between informal learning and work has become increasingly prevalent in policy statements and debate. Recent reports suggest that informal learning is seen as a way to respond to the many economic and workforce development changes and challenges facing contemporary society (Hague, 2009; Wihak & Hall, 2008). Xu and Carter (2005) suggest that the re-emergence of

interest in informal learning in Canada has taken a "public policy dimension, largely due to the positioning of skills development as critical to economic competitiveness, social equality, and citizenship engagement" (p. 276). In the *Development and State of the Art of Adult Learning and Education* report, prepared by the Canadian Council of Ministers of Education for the 2009 UNESCO adult education conference, priorities include increased awareness of the importance of informal learning alongside growth in the use of information and communication technologies (ICT) for adult learning (CMEC, 2008).

However, the juxtaposition of online (informal) learning practices with the turbulence created by the endless possibilities of cyberspace raise questions about what comes to be construed and labelled as learning and who names what is useful learning. The self-employed workers in this study traversed multiple spaces, specificities, and materialities, sometimes within a mere 60-minute time span. Law (2007) writes, that "if learning practices hold, they hold, tensions and all, only for the moment" (p. 126). As this collection of papers illustrates, these actor-networks do not obey online-offline distinctions. Instead, one can see a hybridization of online and offline relationships, mediated by all sorts of technologies in a range of public-private interactions. Given this hybridization, it is not surprising that actants are drawn into presence and absence in many ways. The significance of developing a work-learning practice in these kinds of fluid spaces should not be underestimated. Law warns against "techniques of learning that hold out the promise of effortless travel" (p. 144). Online learning is often positioned in this way, which is problematic. Learning in online communities is not always as simple as posting a question or reading a reply.

In this study, work-learning seems to be a complex interweaving of many practices which depend on a continued crafting of people, techniques, texts, and technologies. In Paper 2, participants' understandings of learning appeared to be tied to what they were learning about and how they were going about it. Learning was about many things and entangled in many activities. Learning was being able to solve a problem *and* being surprised by a serendipitous finding. It was a bounded distinct activity *and* embedded in the everydayness of just doing one's work. It was purposeful management of information *and* creative knowledge making. It was both giving *and* taking. It was done by oneself *and* with others. In Paper 4, I explored how the different relationality and materiality of the postings with which two self-employed workers engaged led to the enactment of different ways of knowing and different work-learning practices. Despite different objects, assemblages, and practices, the net effect was learning.

The participants in this study gave the impression of being quite aware of other actants in their networks. The relations that connected them to other actants counted. Compared to a Google search, for instance, this was a different way of being online and a different practice of relating to knowledge even though many of the same actants (i.e., web-based objects) were implicated. I am not clear, however, whether they viewed their entanglements with objects as creating hybrid

subject-object entities, or whether objects, such as web technologies, were regarded primarily as instrumental tools. The sinuous socio-materiality of work, work-learning, and workspaces is important to continue to study, especially given the technology-imbued nature of so many contemporary practices. In the next section, I focus on the political and ethical implications of such materiality.

The Politics of Technology

In Paper 5 I explored the sociomaterial inter-actions and co-constitutive nature of the relations between web technologies and self-employed workers engaged in work-learning. Such extensive and provocative connectivity between people and objects has implications and I outlined three issues highlighted by the data in this study: delegation, invisible practices, and necessary literacies. In this section I continue this discussion, drawing on ANT, as well as philosophers of technology, to delve into political and ethical implications of omnipresent digital technologies in work-learning practices. This is only a brief foray in order to bring forward several ideas for future research and debate.

> Start by considering search engines. According to Google (2010), its mission is to "organize the world's information and make it universally accessible and useful" (para. 1). But does it? Summarizing Introna's (2007) argument, it seems that through its undisclosed algorithms, Google ends up constituting the conditions that make some web pages attractive or visible and others not. Users then reinforce these conditions by accepting this "as the way it works" and by the way they search (i.e., clicking on links that show up only on the first two pages of Google search results). A particular WWW is "unwittingly being constructed that (in)excludes the interests of some and not others" (p. 19; see also Introna & Nissenbaum, 2000).
>
> Or Ambient Intelligence. Van Dijk (2010) describes objects in our everyday environments, interconnected and embedded with smart characteristics, that enable the system to "automatically" make decisions about how to serve our profiled preferences, often without us being aware this is happening (p. 67). Consistent with principles of ubiquitous computing, well-functioning technologies are designed to fade into the background.

Given the proliferation of distributed systems in which ICTs collaborate alongside individuals, questions are increasingly asked about the role of information technologies in our lives (Levy, 2007) and there is a growing emphasis on digital artefacts and morality (Turilli, 2007). From a work perspective, Levy muses that many people now worry about technology's unintended and unwanted effects on everyday life: information overload, interrupted styles of working, and speedup in work practices and expectations.

This study of work-learning practices in online communities also brings forward several questions about the politics and ethics of technology in such practices.

Learning is political. Technologies are political. ANT contributions to this debate come from Bruno Latour's insistence on acknowledging the moral tenor of objects and the place of non-human actants within a political remit (making "things" public) as well as Annemarie Mol and John Law's work on ontological politics, which recognizes the performativity of multiple and contested networks and realities.

Latour (1992) worries about the unnoticed "missing masses": the non-humans that are everywhere, strongly social and moral, but nevertheless overlooked by researchers (p. 227). Latour (2005a) cautions that all too quickly matters of concern become solidified into matters of fact: backgrounded, black boxed, and locked down. This includes objects. Arguing against such a pronounced human-centric focus, Latour (2002) positions both technology and morality as other forms of *alterity* or ways of *being-as-another* (p. 254). He explains that "these two modes of existence ceaselessly dislocate the dispositions of things, multiply anxieties, incite a profusion of agents, forbid the straight path, trace a labyrinth" (Latour, 2002, p. 258). Notions of keeping "matters of concern" open, multiplicity, uncertainty, making the invisible visible, and wanting to extend (rather than limit) the list of actants (both humans and non-humans) is strongly political and resonates with some of Law's work on mess, Othering, absence-presence, and the irregular.

Work by Mol (1999; 2002) and Law (2002; 2004) on *ontological politics* is also helpful for this discussion. Ontological politics posits that fluid and open realities work against notions of singularity and definiteness and that these multiple realities often evoke contested choices. Mol (1999) uses the term ontological politics to assert that "the conditions of possibility are not given" and to draw attention to the politics which underline the active shaping going on as various performances are enacted (p. 75). It is these enactments of relations, Law (2004) maintains, which should encourage researchers to attend to mess and othering. Law (2004) states that "matters are relational: what is being made and gathered is in a mediated relation with whatever is absent, manifesting a part while Othering most of it" (p. 146). The Othering—the excluding or ignoring—is highly politicized.

I turn to the findings in this study. Changeable objects. Multiple spaces. No wonder the work-learning practices of the self-employed are sinuous and flexible. The open "in-motion" self described by Swan and Fox (2009) was, in this study, enmeshed in "open in-motion" networks, and highlights how workers perform flexibility. Even though several participants indicated they were excited about their participation in these flexible and fluid actor-networks, others were uncertain. Fenwick (2003) points to how the notion of the "enterprising self"—which includes characteristics such as "initiative, risk-taking, self-reliance, and

self-responsibility"—has become more pervasive (p. 168). Self-employed workers used this language when talking about their purposeful engagement in online spaces. Being able to figure out how to tap into the "right" cyberspaces and benefit from what was happening depended on their ability to take initiative, assess and assume risk, and self-manage all aspects of their online presence, even when faced with incursions into their private worlds. Ironically, flexibility is increasingly an *inflexible* requirement (Swan & Fox, 2009).

Law (2007) cautions that when learning practices look streamlined it is because we have not looked at the choreography holding them together. What happens when these practices are un-black boxed? Flexibility has relational and material aspects, going hand-in-hand with web technologies which enable people to stretch their presence across space and time in unprecedented ways. Edwards and Usher (2008) write that "with flexible learning comes the 'flexible' learner" (p. 90). One way the participants in this study enacted flexibility was by engaging in online communities to "stay on top of things"; multi-tasking work, learning (and even play, for some) through their online interactions. Mol (1999) writes that even when it appears one thing is at stake, there are often many issues and realities involved and thus political tensions ensue.

Perhaps these workers were not just enacting flexibility. What else might be at stake? The threat of "information overload" was ever present. Information overload can be described as "access to more information than is conducive to human wellbeing" (Himma, 2007, p. 266). One can appreciate how the delete button is enlisted to help manage the thin line between control and chaos, between information-rich and information-overload. The tsunami of information, contacts, and postings on screens everywhere mobilizes the need for a delete button. And because workers can become "delete-ers" it seems that workers are deemed able to cope with all that comes their way. The onslaught is legitimized. Flexibility expectations ratchet up a notch.

In Paper 3, the actor-networks entangled with the delete button were explored and I suggested that the delete button enacts many (overlapping) realities: a thin line between control and chaos, legitimization of the flow of information that comes our way, and/or a way to presence or absence other actants. What happens when there is so much information that it intimidates rather than informs? Who or what decides we should have this much information with the click of a mouse? How do the politics of the delete button change as more actants become enrolled to sort, assess, profile, store, mine, and filter information: when the delete button on its own is just not enough? To Latour (2005a; 2005b), an important—and political—question is whether assemblages, once assembled, are actually liveable. *Is* the assemblage just described liveable?

Himma (2007) questions whether information overload can be solved by a technology solution. Perhaps other objects and alliances would enable the worker to be more attentive to what's important, helping to create some kind of

(un)cyber-refuge from uber-flexibility and excessive information. Levy (2007) writes about sanctuary rather than flexibility:

> [Given] today's experience of overload and acceleration, the answer would not be to prevent the proliferation of information or to slow down the pace of life across the board …our aim would rather be to cultivate unhurried activities and quiet places … practices that encourage *alternative* [emphasis added] habits and patterns of information production and consumption. (p. 234)

In this assemblage, some actants simply disappear, new ones become present, and novel alliances are brought forward. Perhaps we need to consider different assemblages of information and technology, ones (to use Latour's 2005a words) that move from mere juxtaposition to a more intertwined form of (liveable) cohabitation (p. 40). This is a different reality. Law (2004) adds that reasons for enacting one kind of reality over another—making some arrangements more probable and stronger—are political. I wonder what would need to happen to bring forward alternatives to assemblages of "armies of technology allies battling information overload".

Philosophers of technology wrestle with the ethical dimensions of technology. For example, Benso (2000) pulls from Levinas's ethics and Heidegger's concept of things to formulate an ethics of things capable of celebrating their alterity. Although ANT does not explicitly engage with ethics, several philosophers of technology draw on Bruno Latour's writings to advance arguments related to the morality of technology. Verbeek (2005) develops his philosophy of technological artefacts by drawing on Latour as well as Idhe (a postphenomenologist) and Borgmann (a philosopher of technology). Introna (2007) draws on both phenomenology and Latour to put forward *disclosive ethics* as a way to make the morality of technology visible.

I am drawn to Latour's work on morality and technology (see Situating ANT chapter). In his well-known 2002 article, Latour strives to give technology and morality an ontological dignity. Requiring a "ceaseless circuit of concern" (p. 258), Latour sees morality as recalling the lost, trying to proliferate the greatest numbers of actants, and slowing down the too ready access to ends. Technology-morality is thus no longer in a relation of tool-intention but instead multiplies the entities that must be considered and reassembled. Introna's (2007) work on the ethico-political dimensions of technology draws on Latour to conceptualize technology as a moral actor and outlines the task of disclosive ethics as facilitating openness rather than closing: Latour's (2002) "reversibility of foldings". In other words, tracing the moral implications of closure and ensuring that matters of concern are not too quickly turned into matters of fact. Acknowledging that this is difficult to do with information technology, Introna describes disclosive ethics as attending to the "way in which seemingly pragmatic attempts at closing and enclosing connect together to deliver particular social orders that (ex)includes some and not others" (p. 16).

A theme in these writings is (in)visibility and the message seems to focus on making practices and socio-material entanglements more evident so they can be examined and interrogated. In Paper 5 I drew attention to how the complex work that goes into being engaged online is often unnoticed and unremarkable, despite the significant outlay of time, money, and effort expended by these self-employed workers. Different capacities to negotiate complex sociomaterial practices within the context of work and work-learning still need to be better understood. Digital objects are also often made invisible and othered. Worthy of further research is how one's online identity and data is translated into digital objects that are enmeshed and distributed over multiple databases, profiling programs, and surveillance technologies such as click stream data. I have become more interested in the social life of digital objects, such as a posting or one's digital trail. Questions this raises for me when considering a digital object are: How much control do I or you (i.e., the object) have in our interactions? Do I know where you have been? What is attached to you? What will my response to you trigger? Who will see these responses and who/what decides this? How transparent is this process? Given the importance of one's digital trail professionally, these are important considerations.

Within a work-learning context, the individual is not separate from sociomaterial systems of work or learning. I explored a few implications of the pervasive integration of web-technologies and their entourages of networks and alliances. This excursion into some political and ethical dimensions of technologies evident in this study provides a rich springboard for further research and debate.

Policy and Public Debate

Findings from this research project could be used to help inform policy and public debate in two areas. First, as online spaces become more complex and intertwined with political, social, and material implications it is important to acknowledge the critical information and media literacies required. Despite the wide-open nature of the Web, this study highlights differences in the way people are able to access and leverage online learning opportunities. In ANT parlance, "performances are difficult to put on unless they build on the networks that are already in place" (Law & Singleton, 2000, p. 4). In other words, networks cannot be plucked out of thin air. And so questions of access and competence are significant. Farrell and Holkner (2004) advocate that work-related education must help people "identify the social processes of technology in their own working lives, and develop the skills they need to shape these processes" (p. 142). The prevalence of web-based ways of working such as using the Internet for research, communicating via e-mail, conducting online meetings, socializing online, and professional networking (i.e., LinkedIn) keep these self-employed workers engaged online throughout the day: the "conduit" is already laid down. However, as these workers went about their (informal) work-learning, there were still numerous passages to be negotiated. A computer and Internet connection may not

be enough. I am reminded of Amy who sat in front of her computer with nowhere to go and no idea where to start looking for online groups.

Second, there is a pressing need to attend to issues around privacy, online identity, data security and ownership, and intellectual property protection. There are also concerns with how online groups are mined for commercial ends and the impact this has on learning possibilities. The recent announcement by Canada's federal privacy commissioner that introduced broad changes to the way Facebook stores and shares information about its users is very significant (see Denham, 2009). As Hartley (2009) reports, this decision will not only impact Facebook's 250 million users but also the "approximately one million application companies around the world crafting software for the site to collect and use" this kind of user information (para. 9). These stories are increasing in frequency and intensity.

Practice

It may be helpful for educators and worker-learners to get a better sense of how the presence or absence of certain actor-networks and different juxtapositions of actants play out in the enactment of richer or more impoverished work-learning practices. In Paper 2, participants shared reasons why an online space does not work as a learning space: discussions that are too broad or not focused on problem solving and more critical thinking, lack of questions that prompt sharing of experiences, too many non-learning related distractions in the space, not able to figure out who has expertise or information, too many non-participants, and the intimidation factor. Not an exhaustive list, it highlights many factors that may inhibit learning in these kinds of cyberspaces. Hemetsberger and Reinhardt (2006) found that online learning spaces should be a place for questions and ideas (instead of just answers and solutions) with a rich array of examples, analogies and metaphors in circulation.

Participants in my study would agree. They also offered several suggestions for changes that would make their online communities richer learning spaces:

- more efficient access to "tailored" just-in-time information;
- ability to quickly target specialists for specific questions;
- self-selection tools so people can more effectively filter messages by relevancy;
- more depth, not just breadth—it is not just about amassing people in one space but rather, those with relevance, ability, and willingness to make a contribution;
- more sharing of case studies that describe what someone did and how well it worked; and
- people who are invested in the online space, willing to contribute, and see it as a learning environment not just somewhere one pops in and out when an answer to a question is needed.

Despite the ups and downs of their online experiences, all the participants in this study recommended that other self-employed workers should turn to online communities for work-learning needs. As Brad shared:

> I think because the barriers to entry are so low it's, "Just do it". Just go out and try it. Enrol in online communities and see how they work for you. We're in such a neophyte stage in terms of this evolution there really are no formal standards so what works for one person will not work for another.

Online communities are increasingly believed to be important for learning and for new ways of working. In parallel, Web2.0 applications continue to foster new kinds of connectivity as well as new ways of knowing. Adult educators need to be able to cut through the rhetoric. Despite the way "digital technologies have come to dominate the domestic and commercial spaces of our everyday lives" (p. 7), Beer (2005) argues that they have become so embedded in our lives that they are often camouflaged and urges a more reflexive approach toward digitalization. Although the parade of new web-technologies seems endless, if adult educators can better understand how these collective cyberspaces work then they are better positioned to more critically evaluate new technologies and determine if and how they could be leveraged to create new and perhaps stronger forms of connectivity that will support learning efforts.

There is a growing interest in nurturing virtual communities for ongoing professional development and lifelong learning initiatives. Given the number of vacant spaces on the Internet it is clear that even state-of-the-art technology does not guarantee a successful online community (de Souza & Preece, 2004). How online community is imagined, conceptualized, supported and nurtured is complex. This study offers some insights by highlighting the difference between more "informal" online cyberspaces—the organic, commercial, and organizationally sponsored—and the formal spaces aligned with online courses. Even just conceptualizing online community as *fluid shifting configurations*, rather than a *container*, evokes a very different design and support orientation. A multitude of cyberspaces are utilized for work-learning and each will offer different possibilities for connection and learning, while at the same time demanding something different from the members, the collective, and the organization (if any) which may be "shepherding" the community.

Research

Networked architectures.

There is evidence that these self-employed workers were engaged in many different ways online, including multiple positionings across several online communities (which are not bound to cyberspace) and ways of participating that were peripheral, partial and part-time (but nevertheless still meaningful and productive). Participants made references to all kinds of online collectives and activities as well as offline and face-to-face entanglements. Most of the workers in

this study were moving toward more networked architectures of online participation. I sense that many will include communities in their online forays, despite the inherent tensions. As illustrated in this study, closeness and connection to others is important for some people. Schwier (2001) suggests that "many learning environments do not require a community of learners. … But there are cases where intimate engagement with others is important for rich learning to happen" (p. 8). Online communities provide a sense of place for these kinds of interactions. How these spaces will continue to change is open to debate. Future research could "follow the actors" as they engage in a multiplicity of networked spaces for work-learning. This would enable more in-depth probing of the politics of a wider range of Web2.0 technologies and configurations.

Spaces for work and work-learning.

This research project focused on the work-learning practices of own-account self-employed workers. I was able to catch glimpses into their work, work practices, and work spaces. Farrell and Holkner (2004) describe the contemporary workspace as a:

> complex and demanding environment, one that is globally distributed but heavily inflected by local histories and practices, technologically mediated but more reliant than ever on social relationships and sophisticated representations of self and identify, reliant on autonomous workers who are, nonetheless, increasingly regulated and controlled in unobtrusive ways. (p. 142)

The workspace they describe is incredibly complex and full of contradictions. More work is needed to unpack the role of technology actants in workspaces as one's workspace(s) is clearly not background to work or work-learning practices. Future research could include more in-depth analysis of hybrid workspaces. Exploration of workspaces that are global and local, physical and virtual, here and there, and the effect of endless negotiations between people and objects is exciting. In addition, future research could also address the intertwining of work and work-learning practices, particularly online. As Mulcahy (2005) writes, "far from being a simple distinction, 'work' and 'learning' are dependent on one another. Each carries the other's possibilities within itself. Essentialist accounts will not do because work and learning are endlessly recreated" (p. 9).

Global context.

Given the ostensibly globalizing influence of technology and the lifelong learning discourse, it makes sense to frame work-learning practices in an international context and explore them in a range of geo-political arenas. It is not merely a question of what Web2.0 technologies can do, it is more fundamentally about how workers in both the global south and north are creating information, using and reusing it, reworking it to create new ideas, and interacting with others about all of this. Although social well being and economic success—anywhere in the world—is increasingly linked with knowledge and more sophisticated use of technology, digital inclusion and avoiding amplification of digital inequities is a

pressing matter. It is important to probe how international adult education can respond to growing educational and social development pressures brought about by an interconnected, expansive, and intricate world system (Abdi & Kapoor, 2009). Alongside these questions are calls for informed global engagement, which move beyond simplistic notions of the digital divide (i.e., Potter, 2006), and explore how online spaces may create (or not) new locations of educational possibilities for workers in transitioning, and more established, economies. Kenny (2006) argues that the Internet is very young and its use in transitioning countries is even more recent. Are the workspaces of the non-standard workforce connected globally and if so, how do these inter-connections influence how different work-learning practices are enacted online and what knowledge making processes circulate and become legitimated?

ANT.

Attempting to study complex, mobile, and shifting work-learning practices requires appropriate conceptual and analytical tools. ANT has much to offer educational researchers. It is clear that connectivity in cyberspace entails a mishmash of entanglements, alliances, resistances, and willing partnerships between technology objects and (non)human actants. As Beer (2009) states, "the sinking of software into our mundane routines … means that these new vital and intelligent power systems are on the inside of our everyday lives" (p. 995). These entanglements raise questions which ANT is well-suited to explore by bringing technologies, and related objects, out of the background and into critical inquiry. Following the actors can lead to a surprising array of entities. Because ANT methodology does not pre-suppose which actants are important, further research into the online networked learning practices of the non-standard workforce may also unearth some unexpected black boxes.

These four avenues for future research are not mutually exclusive. What they have in common is a continued interest in untangling work and learning practices in an effort to better understand how people, things, ideas, and spaces become juxtaposed in the ways that they do.

> Dorothy will log in once she puts the coffee on and make a *posting* to encourage the newest daycare provider to stand up to the parents … Sophie will scan today's *digest*—chuckle over what Fred has said and *delete* the person who whittles on … Ben will check in every couple of hours to see how the *works-in-progress* posted by others are taking shape … Ryan will pull out his *BlackBerry* while waiting for a meeting and see what's happening … Amy might actually set up a *Facebook* account today … Ava will write something in her *blog* … Brad will make *an announcement* in Facebook that he is heading off to Thailand and ask if anyone has something he could be doing for them while he is there … Liz will send *an invitation* to three people to join her *LinkedIn* network and

> work on a piece she is writing for an e-learning group … Mia will *update* how she's doing on her goals in *43Things* … Yasmin will have *coffee* with a colleague (in real life). Just another work day in cyberspace.

For many workers, clicking their way into all kinds of online spaces is an everyday thing. It is an everyday thing for many objects too. This study set out to explore how web-based technologies are changing informal work-related learning practices. The web, and its associated technologies, encourages us to think about our entanglements with objects. This study questioned how people negotiate the materiality of screens and settings, passwords and Facebook profiles, postings and delete buttons in order to connect with others. The work-learning practices of the self-employed workers described in this study are a mishmash of fluid, distributed, and heterogeneous networks which include objects alongside people. It is not remarkable that people will continue to click their way through cyberspace for work, learning, and fun. What is remarkable are the complexities of where people-objects go, what they encounter, and how they connect bits and pieces together in these very sociomaterial experiences.

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Appendices

Appendix A: Ethics Approval

Appendix B: Information Letters to Pilot and New Participants

Appendix C: Consent Forms for Pilot and New Participants

Appendix D: Interview Guide

Appendix E: Acronyms

Appendix F: Glossary of Key ANT Terms

Appendix A: Ethics Approval

Terrie Lynn

FACULTIES OF EDUCATION, EXTENSION AND AUGUSTANA
RESEARCH ETHICS BOARD
(EEA REB)
I. Application for Ethics Review of Proposed Research
(revised June 25, 2007)

Principal Investigator - Terrie Lynn Thompson

Complete mailing address - 600 Butchart Wynd; Edmonton, AB T6R 1P9

Department/Faculty - **Educational Policy Studies / Faculty of Education**
E-mail - terrie@ualberta.ca
Supervisor's email (if applicable)
wallacej@ualberta.ca & haughey@ualberta.ca

Co-applicant(s) - n/a
Co-applicants *not* under the jurisdiction of the EEA REB are required to consult with their own REB.
Project title - Assembling online: Self-employed workers' experiences of informal learning in web-based communities
ANTICIPATED Data Collection Timelines
Start Date **(2007/08/01)**

End Date (end of data collection) **(2008/08/31)**

Status (if student) -
( ) Master's Project ( ) Master's Thesis (✓) Doctoral Dissertation ( ) other (specify)

Funding Source (if applicable) ____n/a_____

►Do you plan to gather data in University of Alberta units other than Education, Extension or Augustana? **n/a**
If yes, name the unit(s). It is the Applicant's responsibility to ensure that proper permission is sought. Please elaborate in Sections III and IV of this application.

►Is another post-secondary educational institution involved in this project? If yes, name the institution(s) and the nature of the involvement. It is the Applicant's responsibility to consult with the REB of all involved institutions to obtain ethical approval. See Section IV of this application. **n/a**

►I, the applicant, agree to notify the EEA REB in writing of any changes in research design, procedures, sample, etc. that arise after the EEA REB approval has been granted. A *Request for Change in Methodology* form must receive approval from EEA REB before the modified research can proceed.

►I also agree to notify the EEA REB *immediately* if any untoward or adverse event occurs during my research, and/or if data analysis or other review reveals undesirable outcomes for the participants.

►I have read the University of Alberta Standards for the Protection of Human Research Participants [GFC Policy Manual, Section 66 http://www.uofaweb.ualberta.ca/gfcpolicymanual/policymanualsection66.cfm] and agree to comply with these Standards in conducting my research.

Terrie Lynn Thompson — Signature of Applicant

June 29/07 — Date

►As the supervisor/instructor, I have read and approve submission of this application to the EEA REB, and ensure that the proposed project is compliant with the University of Alberta Standards for the Protection of Human Research Participants [GFC Policy Manual, Section 66 [http://www.uofaweb.ualberta.ca/gfcpolicymanual/policymanualsection66.cfm].

Janice Wallace — Printed name of Supervisor/Instructor

Janice Wallace. — Signature of Supervisor/Instructor

June 29, 2007 — Date

ETHICS REVIEW STATUS

☑ Application approved by EEA REB member ☐ Application approved by EEA REB ☐ Application not approved

J.R. Kelly
Signature of EEA REB Member or Chair

ETHICS APPROVAL HAS BEEN GRANTED FOR ONE YEAR FROM THIS DATE:

July 6th 2007
Date of Approval

Distribution of approval page: Original to EEA REB file; Copies to Applicant, Supervisor/Instructor (if applicable), Unit student file (if applicable)

Appendix B: Information Letter To Pilot Participants

Dear [NAME]:

As you know, I am currently working to complete the requirements of a Ph.D. degree in the Faculty of Education at the University of Alberta. In October/November 2006, you agreed to participate in an interview with me on the topic of online communities and learning as part of a course assignment I was doing in my graduate program. At that time you signed a consent form to indicate your decision to participate in this research project. Some of the questions we explored in our conversation included:

- What kinds of knowledge needs encourage you to reach out to others online?
- What's it like to participate in an online community?
- How does your engagement in this community help you build an understanding of yourself and your work?

The data I collected from our interview was integrated into a poster I created and presented in my course. I would now like to further analyze the rich data that come from our conversations and incorporate it into my Ph.D. research project. I am writing to ask if you would agree to allow me use the information you shared in our interview in this further scholarly endeavour. To ensure accuracy, I will transcribe our interview conversation and return this transcript to you for verification.

I would also like to invite you to participate in another telephone interview. The interview will be scheduled at your convenience and will be about 60 minutes in length. It will be audiotaped and transcribed. You will be given back the transcription of the interview and invited to make clarifications, revisions, and verify that this is what you want to say. After I study the interview notes I might ask you to clarify some points from our discussion. Shortly before or after our interview I may also invite you to do a small mapping activity, visually depicting the online communities to which you belong (both work and personal interest). You or I may do this drawing using pen and paper or by using software (such as Word or PowerPoint). We will use this drawing as a basis to explore the different types of online communities in which you participate and how they are (or are not) inter-related.

Your participation in this step of my research project is voluntary. If you consent to allow me to use the information gathered through our interview conversation, your anonymity, privacy and confidentiality will be maintained. I will continue to use a pseudonym to represent you in all work that is written about the topic. Your research data (interview tape, transcript, and e-mail clarifications) will be kept in a secure locked place in my office for a minimum of five years. Please note that you are free to withdraw from this study at any time. If you decide to withdraw, any data collected from you will be withdrawn and not included.

I do not foresee any harm resulting from this activity. Instead, people often find the opportunity to further reflect on their experiences to be beneficial. Given the interest in web-based communities, it is timely to examine how we are constructing our understandings of community and our expectations of online community as a pedagogical strategy. If you are interested then I will share excerpts of my dissertation with you as well as any papers or presentations I write on this topic.

If you have any further questions about this research project, please feel free to contact me at 780-433-6829 or tl2thompson@shaw.ca. You may also contact either of my Ph.D. supervisors: Dr. Janice Wallace at 780-492-3373 or wallacej@ualberta.ca OR Dr. Margaret Haughey at 780-492-7609 or margaret.haughey@ualberta.ca . Please complete and return the attached consent form to indicate your decision. Many thanks!

Yours sincerely,

Terrie Lynn Thompson

The plan for this study has been reviewed for its adherence to ethical guidelines and approved by the Faculties of Education, Extension and Augustana Research Ethics Board (EEA REB) at the University of Alberta. For questions regarding participant rights and ethical conduct of research, contact the Chair of the EEA REB at (780) 492-3751.

Appendix B: Information Letter To New Participants

Dear [NAME]:

I am writing to ask if you would be willing to participate in an interview with me on the topic of online communities and learning. I am currently working to complete the requirements of a Ph.D. degree in the Faculty of Education at the University of Alberta. This interview is part of the research portion of my Ph.D. degree.

If you are interested in participating, our interview will explore some of your experiences related to the research topic. Four sample interview questions are:

- What kinds of knowledge needs encourage you to reach out to others online?
- What's it like to participate in an online community?
- What kinds of online groups do you belong to?
- Think about the online interactions you have with people. How do you see these as forging a community (if they do)?

The interview will be scheduled at your convenience and will be about 60 minutes in length. If you do not live in Edmonton we will talk by telephone. The interview will be audiotaped and transcribed. You will be given back the transcription of the interview and invited to make clarifications, revisions, and verify that this is what you want to say. After I study the interview notes I might ask you to clarify some points from our discussion. Before or after our interview we may also do a short mapping activity, visually depicting the online communities to which you belong (both work and personal interest). You or I may do this drawing using pen and paper or in any software (i.e., Word or PowerPoint). We will use this drawing as a basis to explore the different types of online communities in which you participate and how they are (or are not) inter-related.

Your participation is voluntary. If you consent to be involved in this interview your anonymity will be maintained. You are free to withdraw at any time. If you decide to withdraw any data collected from you will be withdrawn. I will use a pseudonym to represent you in all work that is written about the topic and I will keep your interview tape and transcript locked in a secure place for a maximum of five years following completion of this research activity.

I do not foresee any harm resulting from this activity. Instead, people often find the opportunity to further reflect on their experiences to be beneficial. Given the interest in web-based communities, it is timely to examine how we are constructing our understandings of community and our expectations of online community as a pedagogical strategy. If you are interested then I will share excerpts from my dissertation with you as well as any papers or presentations I write on this topic.

If you have any further questions about the interview or this research project, please feel free to contact me at 780-433-6829 or tl2thompson@shaw.ca. You may also contact either of my Ph.D. supervisors: Dr. Janice Wallace at 780-492-3373 or wallacej@ualberta.ca OR Dr. Margaret Haughey at 780-492-7609 or margaret.haughey@ualberta.ca . Please complete and return the attached consent form to indicate your decision. Many thanks!

Yours sincerely,

Terrie Lynn Thompson

The plan for this study has been reviewed for its adherence to ethical guidelines and approved by the Faculties of Education, Extension and Augustana Research Ethics Board (EEA REB) at the University of Alberta. For questions regarding participant rights and ethical conduct of research, contact the Chair of the EEA REB at (780) 492-3751.

Appendix C: Consent Form For Pilot Participants

Investigator: Terrie Lynn Thompson

Research topic: Online Communities and Learning

_____ **No**, I do not allow you to use my interview data in your Ph.D. research project.

_____ **Yes**, I do allow you to use my interview data in your Ph.D. research project.

_____ **No**, I do not choose to participate in another interview.

_____ **Yes**, I agree to participate in another interview.

- I give my consent for my previous interview data about my participation in online communities and how this is related to my work-related learning to be integrated into Terrie Lynn's Ph.D. research project.
- I consent to a further interview about my participation in online communities and how this is related to my work-related knowing or learning more about myself. I understand that the interview will be recorded and transcribed.
- I understand that my identity will be kept private, confidential and anonymous. A pseudonym will be used in all references to me and text that includes information I have provided.
- I understand that the information I provide will be used in Terrie Lynn's Ph.D. research project and dissertation. I understand that Terrie Lynn's research may eventually be presented at a scholarly conference or submitted to a journal for publication.
- I understand that I am free to withdraw from the study at any time without prejudice or penalty. I understand that I have the right to request that any of the information I have provided be withdrawn from the data base and not included in the study. I understand that participation in any aspect of the study is voluntary.
- I understand that the researcher will endeavour to ensure that no harm will come to me through my participation in this project.

Name of participant:

Signature of participant: _____ Date: _____

Signature of researcher: _____ Date: _____

The plan for this study has been reviewed for its adherence to ethical guidelines and approved by the Faculties of Education, Extension and Augustana Research Ethics Board (EEA REB) at the University of Alberta. For questions regarding participant rights and ethical conduct of research, contact the Chair of the EEA REB at (780) 492-3751.

Appendix C: Consent Form For New Participants

Investigator: Terrie Lynn Thompson

Research topic: Online Communities and Learning

_____ **No**, I do not choose to participate in the interview.

_____ **Yes**, I agree to participate in the interview.

- I consent to be interviewed about my participation in online communities and how this is related to my work-related knowing or learning more about myself. I understand that the interview will be recorded and transcribed.

- I understand that my identity will be kept confidential and anonymous. A pseudonym will be used in all references to me and text that includes information I have provided.

- I understand that the information I provide will be used in Terrie Lynn's Ph.D. research project and dissertation. I understand that Terrie Lynn's research may eventually be presented at a scholarly conference or submitted to a journal for publication.

- I understand that I am free to withdraw from the study at any time, refuse to answer specific questions, and/or to withdraw my participation at any time without prejudice or penalty. I understand that I have the right to request that any of the information I have provided be withdrawn from the data base and not included in the study. I understand that participation in any aspect of the study is voluntary.

- I understand that the researcher will endeavour to ensure that no harm will come to me through my participation in this project.

Name of participant:

Signature of participant: _____ Date: _____

Signature of researcher: _____ Date: _____

The plan for this study has been reviewed for its adherence to ethical guidelines and approved by the Faculties of Education, Extension and Augustana Research Ethics Board (EEA REB) at the University of Alberta. For questions regarding participant rights and ethical conduct of research, contact the Chair of the EEA REB at (780) 492-3751.

Appendix D: Interview Guide

- Describe an experience of reaching out to either an individual or a group by using web-based technologies.
  - What happened?
  - What made this experience (un)helpful to you?
  - Was this a learning experience for you?
  - If so, what did you learn?
  - How did this experience impact the work you do or how you see yourself?
  - What happened to you and/or the group as a result of this experience?

- Think about the things you do in your work. When do you turn to other people online vs. F2F?
  - How has your participation in online groups changed since you joined your "very first" online group?

- What kinds of online groups do you belong to or have you "dipped" into? Let's focus on one group:
  - What prompted you to join?
  - How are you using this online community for learning?
  - Describe the sense of connection you feel to others in the group.
  - What do you contribute to this group?
  - Do you feel a sense of belonging? If so, when did you start to feel this?
  - Describe your role(s) in this group.
  - What would prompt you to leave this group or change the way you participate?
  - Do you belong to other online groups? If so, what is similar / different between this group and the one you just described?

- What does "online community" mean to you?
  - Have you ever been involved in an online exchange that was really valuable to you? If so, please describe.
  - Do you feel you belong to an online community?

- Tell me about a time when something in the online community didn't go as you expected.
  - Have you ever experienced or observed a breakdown or failure of an online community?
  - What has surprised you about your interactions / experiences in an online community?

- What do you expect or hope to learn through your online community interactions?
  - What has surprised you about what you are learning (or not learning)?
  - What would have to change for your engagement in XYZ online community to be a richer learning experience for you?

- Has the technology ever limited your ability to communicate or learn as you'd like with others in your online group(s)?

- What modes of technology do you use to participate in your online groups (discussion boards, e-mails, blogs, wikis, other social software)?

- Do you use any of the new social networking sites (i.e., Facebook)?

- What advice would you give to other self-employed workers trying to decide if and how they should be engaging in online communities, especially for informal learning?

- What do other people "see" when you are online? How do you shape these perceptions?

- Questions about being self-employed:
  - Tell me about the nature of your work.
  - How did you come to be self-employed?
  - Where do you work (home-based, office, client site)?
  - Do you feel isolated as a self-employed worker?
  - Describe the amount of computer usage in your work. How would you describe your computer literacy?

Appendix E: Acronyms

ANT	Actor Network Theory
CoP	Community of practice
F2F	Face-to-face
ICT	Information and communication technology
LPP	Legitimate peripheral participation
OASE	Own account self-employed
ROI	Return on investment
SL	Situated Learning
SSE	Survey of Self-Employment
STS	Science, Technology and Society studies

Appendix F: Glossary of Key ANT Terms

Actant

Harman (2007) explains that it is very important to Latour that "everything that exists must be regarded as an actant …. all entities are on the same footing"; an inherently democratic metaphysical perspective (p. 33). Actants are co-constituted in webs of relations. Once these become apparent, actants become known as actor-networks.

Actor-Network

Callon (1987) explains that "an actor-network is simultaneously an *actor* whose activity is networking heterogeneous elements and a *network* that is able to redefine and transform what it is made of " (p. 93 emphasis added).

Black Box

Latour (1987) explains that when many elements are made to act as one, a black box is created. By patiently tracing threads between human and non-humans actants that appear to be unified and/or foolproof, ANT researchers unpack networks of alliances, often reawakening controversies (Harman, 2009). The invisible is made momentarily visible. Un-black boxing shows how things are normalised and made inevitable (Singleton, 2005). Also referred to as punctualization by John Law.

Co(a)gents

Michael (2004) describes a *co(a)gent* as humans and non-humans operating together to produce patterns of connection.

(Im)mutable Mobile

Some objects in ANT accounts are described as *immutable mobiles*, an object which maintains its form as it travels (Latour, 1990). However, Law's (2009) conceptualization of *mutable* mobiles opens several new possibilities: objects that reconfigure themselves, different realities loosely rather than rigidly associated, and multiple actor networks.

Mediators and Intermediaries

Latour (2005) differentiates between mediator and intermediary actors. An intermediary transports meaning without changing it; outputs resemble the inputs. In contrast, mediators transform "the meaning or the elements they are supposed to carry" (p. 39).

Plasma

Latour (2005) introduces the notion of plasma to describe the unknown in between the meshes of the network circuitry.

Socio-technical Constructions

Michael (2000) suggests that rather than speaking of humans and objects as two distinct entities, perhaps both can be regarded as *socio-technical constructions*. Different terms are used to convey the notion of hybridity: Latour (1993) refers to *quasi-objects* and *quasi-subjects*. Michael (2000) refers to *co(a)gents*.

Translation

Translation is a concept which describes actions and alliances that bring two actants together. According to Callon (1986), translation is a "definition" and "distribution" of roles and the "delineation of a scenario" which "establishes more or less stable relationships between entities" (p. 26).