

# Who's taming who? Tensions between people and technologies in cyberspace communities

Terrie Lynn Thompson

Faculty of Education, University of Alberta, [terrie@ualberta.ca](mailto:terrie@ualberta.ca)

## Abstract

It would seem that for many people, spaces on the web have become an integral part of their lives. This may include seeking out learning opportunities in online communities. There is much said about how technology is changing our lives. Web2.0, which includes the much heralded social media, is creating the most recent buzz. How do people negotiate the materiality of screens and settings; discussion boards, RSS feeds and chat forums; passwords and Facebook profiles? This paper draws on conceptual and analytical tools from Actor Network Theory (ANT) to explore how the interactions between web-technologies and self-employed workers shape work-learning practices in an online community. Community can describe a gathering of people online that is self-managed, organic, driven by a shared interest, and highly social. These collectives form because someone is interested in a topic and searches for like-minded others. These online 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. The paper begins by examining the promises of web technologies, the importance of foregrounding objects in qualitative research studies, and the co-constitutive relationship between human and nonhuman actants. An overview of the way that I use ANT sensibilities in order to analyze my data is presented. Because ANT emphasizes the interactions between actors, things are always the effect of a network of relations between an array of heterogeneous entities (Singleton, 2005). Learners are therefore participants in networks of practices and learning emerges as an effect of the network. Thus, online communities are not *containers* for online activities but rather *networks* of relations in constant flux. Findings suggest that participating “in” an online community is a series of journeys and passages. The data also highlights how these passages, or moves, towards stabilizing tenuous actor-networks are countered by unpredictable disruptions, creating ongoing (dis)orderings that transform networks. As participants in this study attempt to “tame” the technology, the technologies-in-use are doing their part to tame other actants. However, these relationships do not reflect two separate camps of humans here and non-humans there, but rather, hybrids or socio-technical constructions—a blending. The paper concludes with questions about the politics of technology that emerge from uncertainties around delegation, invisible practices, and necessary literacies.

## Keywords

actor network theory, online communities, online networks, work-learning, informal learning, politics of technology

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 recent *State of the Blogosphere*, Technorati (2008) reports 900,000 blog posts made every 24 hours. There are more than 200 million active users 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). 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 research project focuses on the informal work-related learning practices of self-employed workers in these cyberspaces. Conceptual and analytical tools from Actor Network Theory (ANT) help to frame this research and forward 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 are treated analytically in the same way. ANT creates an opening for regarding “technology” as one actant entwined in relation with other actants—human or non-human.

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). However, 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). Indeed, technologies belong to the human world in modalities other than “instrumentality, efficiency or materiality” (Latour, 2002, 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)

In an effort to bring these web-technologies to critical inquiry, they are treated as key qualitative research participants in this study. This research therefore asks, “How do the inter-actions between web-technologies and self-employed workers shape work-learning practices in an online community?”

## Insights from the Literature

There is much said about how technology is changing our lives. *Web2.0*, which includes the much heralded social media, is creating the most recent buzz. 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. Others argue that Web2.0 is not just a set of technologies, but a set of new *practices* (Bonderup Dohn, 2008). Ryberg’s (2008) assertion is fitting: “It is not only a matter of adopting new technologies, but equally concerns the interaction between technological, pedagogical and organizational understandings of practice and knowledge” (p. 664). 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. One leading assertion is that ways of knowing are changing because of the shift in how people use and create knowledge. In the more “socially connected Web, people can contribute as much as they consume” (Anderson, 2007, p. 4). In this sense, knowledge becomes “decentred, multiple and less hierarchical” (Edwards & Usher, 2008, p. 120). As relationships between people and technologies change, we witness a change in our relationship with knowledge, what is meant by learning, and how learning progresses (Haythornthwaite, 2008).

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. Bryant (2005) explains that the 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, 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).

### **Overlooked but Not Forgotten**

Several issues become apparent when studying 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 into formal classrooms; and (c) technologies are often backgrounded or treated in an overly deterministic way. This paper addresses 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. It is clear that connectivity in cyberspace entails a mishmash of entanglements, alliances, resistances, and willing partnerships between technology objects and (non)human actants. 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. Objects are sidelined in many educational studies. Yet, web-technologies are significant, 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 offers a different way to examine work-learning practices in online communities.

### **Invitations-Refusals**

Pels et al. (2002) 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). However, human actants are not always receptive to the invitations and refusals extended by objects, such as web technologies, and visa versa. It is best, Latour (2002) argues, to speak about technologies “in the mode of the *detour*”. He adds that the mediation of technology experiments with *being-as-another* or *alterity*: without these technological detours the “properly human cannot exist” (p. 251). Another way of saying this is that technologies “fold into us as much we fold into them” (Introna, 2007, p. 14).

### **Exploring Actor-Networks**

The participants in this study include: postings; avatars; tool bars; emoticons; archives; community member profiles; the search term in Google 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 included: “newbies”, “wannabes”, colleagues, “big names”, celebrities, competitors, posers, lurkers, employment recruiters, clients, friends, strangers, 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. I developed several heuristics for “interviewing” objects.

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. 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. It is not only major breakdowns that are 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). Consequently, several anecdotes that simply described everyday online learning activities were also developed for analysis.

To examine how evolving inter-relationships between technologies and people shape work-learning practices, one of my first realizations was that participating “in” an online community is 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 (dis)orderings that transformed networks. I begin with these explorations. 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 do not reflect two separate camps but rather hybrid constructions of humans and non-humans. This paper concludes with an exploration of the political questions that these profound bonds provoke.

## Passages and Journeys

Actants move. Networks shift. Relations stretch and sometimes rupture. Work-learning in online communities is far from being a seamless 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 is searching for a workable configuration of technologies and people to keep them connected in the way they want. The sense of an ongoing journey suggests a “nomadic” actor-network. 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 interact in an online discussion forum, then the small core group moves back to e-mail, and now, a smaller shifting constellation draws on 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). 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 stays 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 (p. 99). Although each passage brings the possibility that the actor-network might break apart, there is something about the fluidity of the passages and objects in the network that keep the enactment of the most important relations and conduits intact for 12 years. Although each passage brings about a different enactment of online community, these *necessary* passages serve to maintain the connections and circulations that are most valued.

### **Stabilizations and Upsets**

Liz’s collective is looking for a home, trying out configurations and moving on until it feels right. 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 act 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 were evident in this study. 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). These tensions will be explored in this section.

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 lurk, 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.

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. At times, these networks are too porous. Entities are easily hijacked and moved into different configurations which create upsets. 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 flowed 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. 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. Lee resists this intrusion, and tries to prevent future incidents by making his Internet presence less ephemeral so he can better control it. Here is a passage about digital trails and online security. It is not an easy journey. Attending to online security and its related technologies (objects) has become a necessary passage. Ongoing negotiations to be protected, unexposed, and virus-free have become more onerous. The perception of connection to others with just a click of a key is a black box, knitting together all sorts of assumptions and alliances.

## Who's Taming Who?

Instability is inherent in stable relations between actants. The degree of stability that different actants are seeking remains uncertain. Some of these self-employed workers 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”. 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 actants' stories are rife with attempts to tame or discipline; attempts to order. As human actants attempt to tame the technology, 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. They enrol numerous objects 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. Digest versions of online conversations, are a delegation to technology to amalgamate and forward—daily or weekly—a compilation of all the contributions to the discussion forums.

## 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. 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. 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. Michael (2000) uses the example of the “couch potato”, a co(a)gent comprised of person, sofa, TV, and remote control, and argues 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). In a similar vein, one's digital trail includes text/images + the screen + hyperlinks + the person. As Lee discovered, 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 ethical and political questions.

## The Politics of Technology

Because online work-learning practices reflect a co-constitutive relationship between people and web-computer technologies, it is important to interrogate the ethico-political site of technology (Introna, 2007). In this section I explore three issues which are highlighted by the data and critical to work-learning practices in online communities.

### Delegation

Introna (2007) states that decisions and actions are often delegated to technology because it is convenient or necessary. However, he adds that we are often unaware of what we have delegated and always delegate more than we realize. While we can appreciate gains in usefulness, efficiency, or convenience, awareness of the subtle changes in our way of being emerges over longer periods of time. Chesher (2002) declares that when learning new software, “I have tied myself to an upgrade path. The tasks become habitual and I can no longer perform them without this software” (p. 7). Juxtaposed with web-computer technologies, our way of 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. There is much discussion around privacy, security, and ownership of online data (Oblinger, 2008). 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). 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.

### Invisible Work

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 was 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.

### Information and Media Literacies

Singleton (2005) maintains that when access and competence are unevenly distributed, different capacities to negotiate specific technologies become evident, thus creating a political issue. Despite the wide-open nature of the Web, there are differences in the way people are able to access and leverage learning opportunities. Configurations do not always successfully align to achieve the sense of community most conducive to these workers’ purposes. 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. 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).

## Conclusion

The networks explored in this study depict online communities as arrays of socio-material specificities. These complex actor-networks, labelled by some as online communities, are places constantly enacted through a process of 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 and ethical questions. 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. Web2.0 (and whatever comes next) offers fascinating and powerful ways to re-think how we experience learning, knowing, and connecting with others. To sort through the rhetoric, it becomes clear that the negotiations between different materialities and specificities are paramount in understanding the experience of work-learning online.

## References

- Alexander, B. (2006). Web 2.0: A new wave of innovation for teaching and learning? *EDUCAUSE Review*, 41(2), 33-44.
- Anderson, P. (2007). *What is Web 2.0? Ideas, technologies and implications for education* (JISC Technology and Standards Watch). Retrieved from JISC website:  
<http://www.jisc.ac.uk/media/documents/techwatch/tsw0701b.pdf>
- Antonelli, P. (2008). Design and the elastic mind. In L. Hruska & R. Roberts (Eds.), *Design and the elastic mind* (pp. 14-27). New York, NY: The Museum of Modern Art.
- Bonderup Dohn, N. (2008). Knowledge 2.0 – Tensions and challenges for education. *Proceedings of the 6th International Conference on Networked Learning* (pp. 650-657). Retrieved from  
<http://www.networkedlearningconference.org.uk/past/nlc2008/Info/confpapers.htm#Top>
- Boyd, D. (2006). *G/localization: When global information and local interaction collide*. Paper presented at the O'Reilly Emerging Technology Conference. Retrieved from <http://www.danad.org/papers.Etech2006.html>
- Bryant, L. (2005, January 6). Blogs are not the only fruit [Web log message]. Retrieved from  
<http://headshift.com/blog/2005/01/blogs-are-not-the-only-fruit.php>
- Chesher, C. (2002). Why the digital computer is dead. *CTheory*, a106. Retrieved from  
<http://www.ctheory.net/printer.aspx?id=334>
- Edwards, R., & Usher, R. (2008). *Globalisation and pedagogy: Space, place and identity* (2<sup>nd</sup> ed.). Milton Park, England: Routledge. doi:10.1080/158037042000225191
- Facebook. (2009). *Statistics*. Retrieved from <http://www.facebook.com/press/info.php?statistics>
- Haythornthwaite, C. (2008). Ubiquitous transformations. *Proceedings of the 6th International Conference on Networked Learning* (pp. 598-605). Retrieved from  
<http://www.networkedlearningconference.org.uk/past/nlc2008/Info/confpapers.htm#Top>
- Introna, L. (2007). Maintaining the reversibility of foldings: Making the ethics (politics) of information technology visible. *Ethics and Information Technology*, 9, 11–25. doi:10.1007/s10676-006-9133-z
- Latour, B. (1992). Where are the missing masses? A sociology of a few mundane artifacts. In W. E. Bijker & J. Law (Eds.), *Shaping technology/building society: Studies in sociotechnical change* (pp. 225-258). Cambridge, MA: MIT Press.
- Latour, B. (2002). Morality and technology: The ends of the means (C. Venn, Trans.). *Theory, Culture & Society*, 19(5/6), 247-260.
- Latour, B. (2005). *Reassembling the social: An introduction to actor-network theory*. Oxford, England: Oxford University Press.
- Law, J. (2002). Objects and spaces. *Theory, Culture & Society*, 19(5/6), 91-105.
- Massey, D. (2005). *For space*. London, England: Sage
- Michael, M. (2000). *Reconnecting culture, technology and nature: From society to heterogeneity*. London, England: Routledge.

- Michael, M. (2004). On making data social: Heterogeneity in sociological practice. *Qualitative Research*, 4(1), 5-23. doi:10.1177/1468794104041105
- Mol, A., & Law, J. (1994). Regions, networks and fluids: Anaemia and social topology. *Social Studies of Science*, 24(4), 642-671.
- Moser, I., & Law, J. (1999). Good passages, bad passages. In J. Law & J. Hassard (Eds.), *Actor network theory and after* (pp. 196-219). Oxford, England: Blackwell Publishers.
- Oblinger, D. G. (2008). Growing up with Google: What it means to education. In *Emerging technologies for learning* (Vol. 3, pp. 11-29). Retrieved from <http://www.becta.org.uk/research/reports/emergingtechnologies>
- Pels, D., Hetherington, K., & Vandenberghe, F. (2002). The status of the object: Performances, mediations, and techniques. *Theory, Culture & Society*, 19(5/6), 1-21.
- Ryberg, T. (2008). Challenges and potentials for institutional and technological infrastructures in adopting social media. *Proceedings of the 6th International Conference on Networked Learning* (pp. 658-665). Retrieved from <http://www.networkedlearningconference.org.uk/past/nlc2008/Info/confpapers.htm#Top>
- Singleton, V. (2005). The promise of public health: Vulnerable policy and lazy citizens. *Environment and Planning D: Space and Society*, 23(5), 771-786. doi:10.1068/d355t
- Star, S. L. (1991). Power, technology and the phenomenology of conventions: On being allergic to onions. In J. Law (Ed.), *A sociology of monsters: Essays on power, technology and domination* (pp. 26-56). New York, NY: Routledge.
- Suchman, L. A. (2007). *Human-machine reconfigurations: Plans and situated actions* (2<sup>nd</sup> ed.). Cambridge, England: Cambridge University Press.
- Technorati. (2008). *State of the blogosphere 2008*. Retrieved from <http://technorati.com/blogging/state-of-the-blogosphere/>
- Waltz, S. B. (2006). Nonhumans unbound: Actor-network theory and the reconsideration of “things” in educational foundations. *Educational Foundations*, 20(3/4), 51-68.
- Yahoo (2008, May 28). Think Big. Think Purple. [Web log message]. Retrieved from <http://www.ygroupsblog.com/blog>
- Young, N. (2006). Distance as a hybrid actor in rural economies. *Journal of Rural Studies*, 22(3), 253-266. doi:10.1016/j.jrurstud.2005.11.007