Networked Inquiry and Performative Knowledge

Approaching the Process of Finding Problems in Learning Networks

Magdalena Day (National University of Cuyo)

Abstract: The purpose of this paper is to offer a framework for the analysis of knowledge production in networks of students. The theoretical approach includes sociological developments related to networks (Castells, 2005) combined with the pedagogy of philosophy with children and young people (López, 2009), which we apply to educational research. To begin with, we consider inquiry as the starting point of the learning process. This process occurs in a context denominated the "community of inquiry" (Lipman, 2003), which includes technology-enabled interactions that go beyond classrooms. Because of this connectedness, this community is viewed as a network that constitutes itself around the practice of problematization. In this regard, the question is not how a certain device, platform, software, or app could change the interaction between students and already defined educational contents, but rather, how students can find problems to answer creating a different type of knowledge.

Networks, Technology, and Education

The idea of networks is present in every activity of our contemporary life (Galloway & Thacker, 2007).[1] In education, it is common to talk about networks of knowledge, for instance, or networks of learning, to name a few. This is due to the permeability of new technologies, such as the Internet and social networks, in our societies (Castells, 2005). The interconnectivity provided by these technologies has led authors such as Manuel Castells to talk about networks as the "variable geometry" (Castells, 2000, p. 9) of social relations.

For Castells, "technology is embodied in technical relations, relations socially conditioned, for in itself is not an independent, nonhuman, dimension" (2004, p. 4). Therefore, technology is not viewed as an exogenous variable—what the category Information and Communication Technologies (ICTs) accounts for—but rather as a layer of social structure (Castells, 2000) that enables interconnection.

The networking logic, meaning multiple relations between a networks' nodes, would be the features by default in our societies and of most relevant social practices, including education.

Nevertheless, we understand that what we are dealing with in terms of knowledge production and learning in networks is not just the flow of information,[2] but rather the connected practice of inquiry.

On the other hand, we take it that any device, platforms such as smartphones, virtual classrooms,[3] and even apps could be conceived of as part of the networks in which students participate. Consequently, the connection among students, technology enabled, would be part of any educational experience.

---

1. "Even beyond the fields of technology and philosophy, the concept of the network has infected broad swaths of contemporary life" (Galloway & Thacker, 2007, p. 25). We take Castells's basic definition of network as a "set of interconnected nodes" (Castells, 2005, p. 550).

2. Information is one of the key elements for diverse network theorizations. We choose to work with Castells's, in which subjectivity, socialization, and shared meaning are at stake. For some basic definitions in this matter see Barabási (2009) or Watts (2013).

3. In sessions with teachers the term *virtual classroom* came up as the equivalent of online platforms in which they shared materials for students, or discussion groups for certain subjects. They also called it *extended classroom*.

Furthermore, the examination of networks from a sociological perspective that we present here sets us free from the dichotomy between a *normal* educational experience, and one that involves, or *includes*, technology.

As a result, in terms of educational research, the question could be raised: "But how would we know when are we talking about technology in education if we do not use the term '*ICTs*'?" Our answer is: by using the concept of network.

If we take virtual-digital-technological developments of any kind as part of the networks of students,[4] there is no need whatsoever to use the ICTs category. The network concept involves all of the above (students, apps, platforms, social networks, etc.).

Moreover, the idea is not to assess what a particular technology introduced ex post to a classroom can do, but rather to understand to what extent the technologies and platforms that students and teachers already use (Latour, 2008) are part of a network's practice of inquiry.

Our selection of authors and theories looks for a way in which any technological experience can involve the production of knowledge, not only its diffusion. In this regard, we understand networks as the framework for most relevant social practices, such as education and as the way in which students relate to each other.

Hence, our conception of education is far from the one that equates it with the "acquisition of information" (Lipman, 2003, p. 3). Rather, this conception is closer to Matthew Lipman's model of critical thinking, for which the learning process is situated in a context or framework that this author called the "community of inquiry" (2003, p. 20).[5]

Therefore, it is key to comprehend the nature of this new community of inquiry, conceived as a network.[6]

Networks as Communities of Inquiry

Our "blended approach" (Castells, 2010) includes sociological theory related to networks and a philosophical tradition regarding learning called *philosophy with children and young people* (PWC from now on). This tradition, mainly in its version from Argentina and Brazil, is an adaptation of Matthew Lipman's philosophy for children (also denominated as P4C) that originated in the United States.

Lipman's method was inspired by the thought of pragmatist philosophers such as John Dewey and C. S Peirce, who saw experience as a source of meaning and knowledge (López, 2009, p. 18).

The PWC philosophical tradition embraces Lipman's view, adding conceptualizations of Michel Foucault and Gilles Deleuze to rephrase this "art" (López, 2009), focusing on children's experiences not through pedagogical novels, but rather through problematization.

---

4. We will not differentiate among the three concepts as we think that each of them will be considered as a node or as part of the network.

5. "To use Professor Dewey's phrase, instruction should be an interchanged experience in which the child brings his experience to be interpreted by the parent or the teacher" (Lipman, 2003, p. 85).

6. Latour's (2011) actor-network theory (ANT) might be considered as a microsociological approach, while Castells's network society would be a macrosociological one. Castells considers networks as the "social morphology" that predominates over action (Castells, 2005), and he states that networks are the "variable geometry" (Castells, 2000) of social relations in the information age. According to Latour, there is no difference between the micro- and the macrosocial levels. It is by following the actors' (people, computers, microbes) association with others that a network is found. But they both share the perspective of taking technology into account of human networks (Latour, 2008).

Indeed, problematization is the key activity in the classroom, with the teacher as a coordinator rather than a storyteller. There is also a close relation between experience, meaning, and creating space for the unexpected (López, 2009) to come up in this philosophical practice.

After this theoretical confession has been made, we need to explore the nature of the community of inquiry, following Matthew Lipman's (2003) consideration of this key concept for our reasoning.[7] "Lipman wants to make little communities of inquiry out of classrooms to reproduce in them the form of deliberation typical of scientific community" (López, 2009, p. 21).

This deliberation is the one that Thomas Kuhn refers to when he says that "effective research scarcely begins before a scientific community thinks it has acquired firm answers to questions" (Kuhn, 2012, p. 5).

Although he makes reference to physicists and natural sciences practitioners, there is a social element, a consensual one in his argument, that could easily be replicated in any other discipline regarding the process of knowledge production that we see as transforming itself (Day, 2017).

And in the case of learning networks, we can translate Kuhn's thinking into the way in which a community decides in which problems to work, which would be the same as saying what kind of knowledge this networks aims to create. This is the type of deliberation involved in the community of inquiry and in its problematization process.

As Lipman (2003) examines:

> How is inquiry guided? … I find Dewey's answer a compelling one. Inquiry takes place in situations—in contextual wholes or fields. A situation is a whole by virtue of its "immediately pervasive quality." This quality is not only what binds all constituents in the situation into the whole but is also unique and indivisible. No two situations have the same permeating quality. (p. 85)

What occurs in networks is a collective interchange, a "communal dialogue" (Lipman, 2003, p. 139) that produces "the phenomenon of distributed thinking, in which each participant contributes to the single thinking process."

In this way, it is not fanciful to think of the network not only as a new dynamic for communities of inquiry, but of network as inquiry (Latour, 2011), meaning inquiry in association with others.

Hence, we can think of networks of inquiry, in which students learn to problematize together. Interconnection would be the nature of the process of asking questions, learning from each other's experience, and so forth.

In this way, both problematization and learning from other students (indirectly by distributed thinking as a form of "movement" of inquiry within the network) would be part of the process of knowledge production in the network.

Regarding this reflection on knowledge production in communities of inquiry, Lipman (2003) adds that

> the epistemology of that community will be that of the reflective equilibrium. This equilibrium should be

7. *From Philosophy With Children and Youth. The Community of Inquiry From the Concepts of Event and Tragic Experience,* by M. Lopez, 2009, Buenos Aires, Argentina: Noveduc.

understood in the fallibilistic sense that, in the classroom of the community of inquiry, the aim is not to find an absolute foundation of knowledge, like a bedrock. Instead, there is a constant remaking, improving, revising of all its parts in order to maintain the equilibrium. (p. 197)

This author adds that "what the community of inquiry 'produces'" is "a process that aims at producing a product" (p. 83) and that this process "is not merely conversation or discussion; it is dialogical. This means it has a structure … its procedural rules, which are largely logical in nature" (Lipman, 2003, p. 83).

For the PWC tradition the community of inquiry is the deliberative space of the philosophical and dialogical practice, but the product of this practice is problematization (López, 2009).

We believe that today, networks are the new configuration of the community of inquiry. And it is in this deliberative space, which is both virtual and physical, that also "the possibility of asynchronous interaction in chosen time, at distance" (Castells, 2013, p. 34) is possible.

This new practice is not only "enabled" but entirely transformed by the communication and information exchanges that constitute the basis of social practice. Furthermore, there is no "ex post" interaction related to technology in the classroom (or in the community of inquiry), but a new and emergent space with a dual nature and a flexible consideration of the time needed for dialogue.

Ultimately, even when we consider networks as the structure and dynamic (Watts, 2013) of social interactions, we ought to develop a model that is closer to philosophy, or to social theory, than it is to network theories.[8]

---

8. Though there might be a network science (Watts, 2013), we argue that it would be hard to sustain that there is a network theory (or even a general one to use for education). What both Castells (2005) and Latour (2008) give us is the possibility to think of agency in networks even when their frameworks are different.
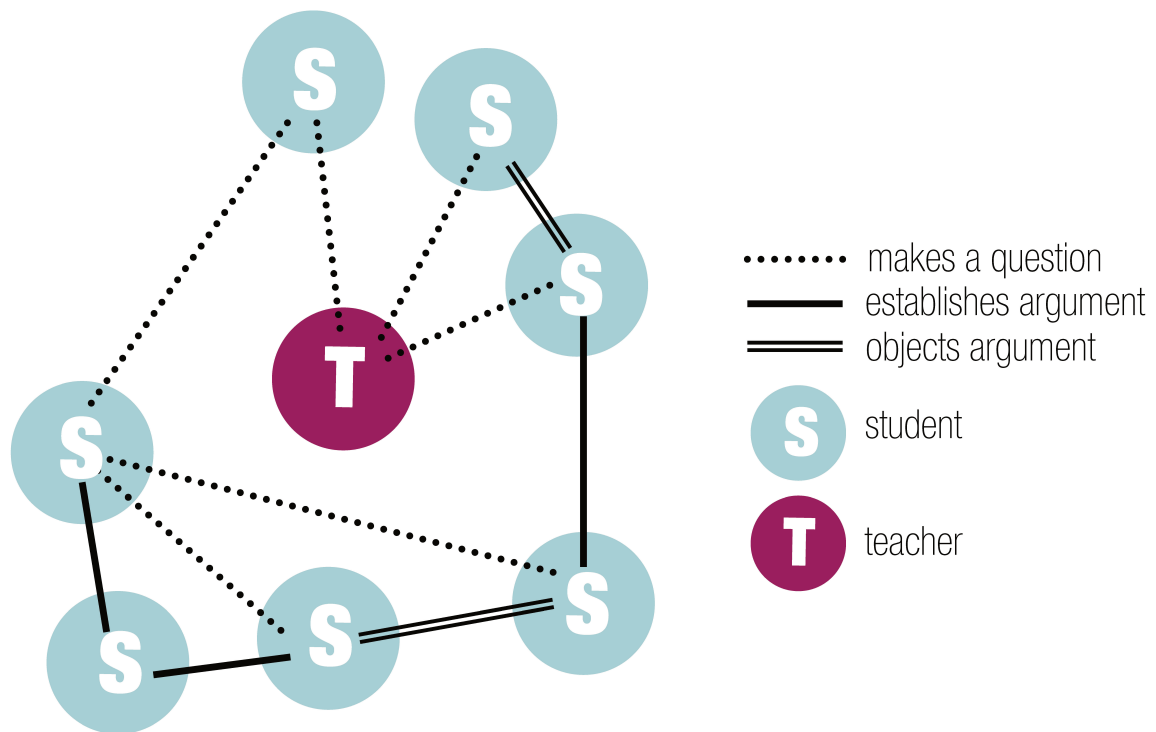
Figure 1. Networked inquiry model.

Following that question is that we have developed a first model for our purposes that includes students and teacher as part of the network, and for which technologies, virtual platforms, digital contents, and so forth are embodied in practices.

For practice we understand: inquiry as making questions, establishing an argument (an idea, hypothesis, etc.), objecting to that argument (as being opposed to and bringing up another one to which the networks' inquiry movement could change), searching for different words or ways to present it, and so on.

Problematizing and Learning in Networks

As we stated earlier, the reason for the use of technology in the classroom could be thought of as being the facilitation of knowledge "absorption" by the students (e.g., student interacting with multimedia contents, searching for new information, etc.)

However, by applying the PWC pedagogy to an educational experience that considers its space of practice (the classroom, students) as a network, the process of learning changes, as learning goes beyond absorbing contents introduced by teachers, software, or an app, and becomes the process of problematizating about students' ideas and experiences on any subject.

As a result, students learn not by answering to situations already defined, but by being part of the

problems that they help to define (López, 2009) in a network, with the tools and thought processes developed by themselves.

> Pedagogy has already discovered the importance of problems and tried to involve students in its constituency. However, it is important to perceive that problems are not provisory nor contingent, and that they are not condemned to disappear through the production of knowledge. The problem is not the opposite of knowledge, it is not its double neutralized. … Problems are not difficulties to be overcome but thinking in itself, the constituent act that establishes thought. (López, 2009, p. 73)

The challenge is to think which type of networks and which dynamics can lead students to the "problem finding" process as a first step for knowledge production, with a form of inquiry that emerges.

In this regard, Paul Rabinow argues that the key of problematization "is not to intervene**,** but to understand and to make a diagnoses … in order to see a situation not only as something given, but also as equally a question" (2003, p. 6).

A strong intervention of teachers (also called "coordinators") and guided inquiry are not compatible with PWC. Problematization is thought to be the practice of a whole group, or different *nodes*, in networks terminology. There is a minimum level of guidance in this pedagogy, but it mostly relies on students' interventions and leading roles while in the dialogue.

Making problems the center of an activity is also a common practice in disciplines such as mathematics. In this field, it is not so much the answer but the proof, the technique, and the validity of the developed answer (Ernst, Hodge, & Yoshinobu, 2017) that matter. Also, it implies collaboration in the development of the problems. For instance, the inquiry-based learning (IBL) method is "a form of active learning," with "two principles, the 'twin pillars' that education research has shown to be at the core of most implementations of IBL: 1. Deep engagement in rich mathematics. 2. Opportunities to collaborate (in some form)" (Ernst et al., 2017, p. 571).

In our view of learning, knowledge production is tied to a network problematization. Therefore, what is knowledge could be defined in relation to the product of a specific problematization, or outcome, that helps the network in its goal of getting its own answers.

To make this case stronger, we quote Richard Sennet (2008), a sociologist from the pragmatic tradition, who states that "there is in learning skills, the intimate, fluid join between problem solving and problem finding." Even though the author refers to skills useful to the labor market, we use it as an inspiration to affirm that today, learning starts with finding problems to solve.

And the process—or procedure—of problematization has different moments that we adapt to our consideration of the community of inquiry as a network:

- The constitution of the network of inquiry into what we denominate "one moment of thought": This would mean bringing together both virtual and physical stages. In the traditional PWC practice, it usually starts in a circle of chairs integrated by students and teachers, but in our proposal this would mean joining what happens in the classroom and what takes place in the flows of digital/virtual space.

- Presentation/"pretext" by teacher of the subject that will open the dialogue/deliberation: It can be a question, an idea, or material as a trigger.

- Open agenda of questions to problematize about.

- Statement of the problem.

- Reframing the problem and finalization of the experience.

As we stated in 1. there are two moments to consider, so this practice of problematization could be initiated virtually and continued in the classroom, or vice versa, it could start at school and have its development virtually.

Whatever the option chosen, the idea is not to think of one space as a complement of the other, but rather, as a single one, and to use this pedagogy to create new knowledge and redefine the many contents and programs that are being used by teachers or schools.

Networked Performative Knowledge

The inherent epistemological assumption of these pages is that students are subjects of knowledge, and that they are at the center of the process of inquiry. Thus, they do not receive education, meaning only those contents given by teachers in a defined program, even when that could be critical or reflective. Rather, they create problems and take part in the development of the knowledge production involved in its solution.

In addition, this knowledge-production process is always situated in a context, the community of inquiry. As that community is understood as a network, the validation is given by the network.

We agree with the statement that "much of our collective knowledge is generated by groups" (Zollman, 2012, p. 2). However, if we pay attention only to the communication among the members of the network, those interactions might effectively be reduced to the analysis of information flows.

And we believe that neither is a behavioral perspective an adequate one for understanding how the process of thinking and learning in a network unfolds, nor is it sufficient with applying actor-network theory (ANT) to analyze each node's practice/association within the network.

This is why we think that the question is not how a certain technology helps in the diffusion of information, skills, or knowledge, but rather how the network functions when problem finding and solving are involved. For instance, massive open online courses (MOOCs), social networks, virtual classrooms, online mobile apps, or even blockchains as decentralized networks could always be thought of as the technologies behind networks. But new technologies might even appear to consider in the future.

Considering that meaning "can only be understood in the context of the social relationships in which information and communication are processed" (Castells, 2013, p. 54), we ought to understand the network of inquiry as such context. Even though, as Castells argues, "communication is the sharing of meaning through the exchange of information," (2013, p. 54) we differentiate between the flow of information and inquiry. "The child does not become social by learning. He must be social in order to learn"[9] (Lipman, 2003, p. 84)**.**

In the network understood as a space for learning and for knowledge production, there would be a

9. Lipman is originally quoting G. H. Mead's "The Psychology of Social Consciousness Implied in Instruction."

"shared" (Castells, 2013, p. 137) "emergent meaning" (Wegerif, 2007, p. 160) to be interpreted by the teacher at the moment of applying the PWC pedagogy and for the research of such practices.

Therefore, both nodes' inquiry (student/teacher) as a practice and the network's inquiry practice as a whole are key to understanding that emergent meaning each time that a network problematization takes place.

For this theoretical approach to be useful for teachers, learners, and practitioners, we should ask which situations in the network we can include for the analysis. Also, how students engage in diverse networks' problematizations is key to the different knowledge-production processes in which they are participating.

Furthermore, we could rethink how schools and classrooms function in the networks of inquiry that they enable or are part of, with students simultaneously integrating different networks at the same time.
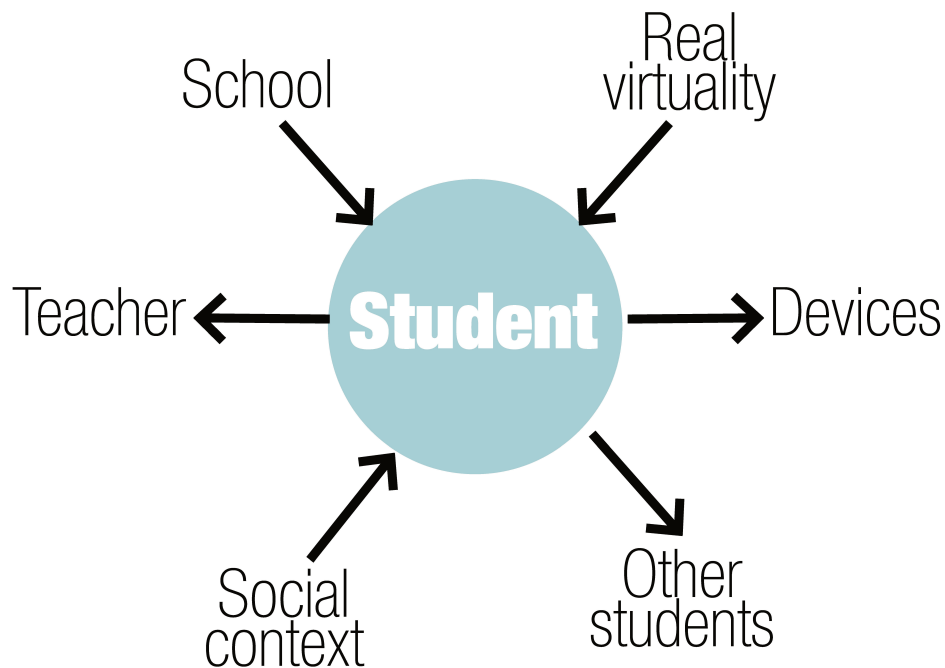

Figure 2. This image aims at showing how students form and are part of several networks at the same time. "Real virtuality" is Manuel Castells's concept to describe the digital/virtual place in which socialization and subjectivity take place.

In this regard, the idea of knowledge being "performed" (Terranova, 2006, p. 287) through networks also raises the question of whether those networks are the equivalent of classrooms, or even schools.[10]

10. "Lyotard identified information with a shift in the status of knowledge as such, where the latter is increasingly wrested away from its status of grand explanation or narrative and bent towards the technical requirements of performativity. For Lyotard, information refers to a mode of knowledge that is no longer reflective or contemplative but performative and pragmatic (Lyotard, 1989)." From "The Concept of Information," by T. Terranova, 2006, *Theory, Culture and Society, 23,* 286–288. We include this use

Furthermore, it turns networks as "contingent" (Rorty, 2009) frameworks, meaning performative communities of inquiry in which the nature of schooling could be redefined.

Finally, performativity in the network of inquiry could also have two lectures: one that has to do with knowledge, specifically the way in which a problem is found and its answers proposed, which is "to bring something new into the world" through words that enact it (Butler, 2015, p. 205).[11] On the other hand, it can be related with the two spaces or situations mentioned earlier: the virtual and the physical. Consequently, understanding this performative knowledge is not only about words or communicative action, but also about bodies and the "organic" (Butler) conditions of thought.

Conclusions

Our aim is to rethink the community of inquiry as a pedagogy, and as a model for educational research, from the perspective of its sociomateriality and its specific nature.

Our purpose is to elucidate how knowledge production and validation occur in networks. The question that remains is how problem finding, and the knowledge required for problem solving, works out in the network, independently of the technology behind it.

We argue that this process of finding problems to solve as a way of learning collaboratively starts with inquiry in a specific network. We find that the network has an internal dynamic, which can be understood as "network as inquiry" (Latour, 2011, p. 5), in which each node constitutes a practice to be traced, but also, a dynamic of the network as a whole, with the network as a structure in which meaning making is emergent and complex as it merges from both micro- and macrolevels of inquiry.

Finally, we suggest to go from thinking in inquiry-based learning (Ernst et al., 2017) to networked inquiry learning.[12] Given that the main reason behind these pages is in which way networks may alter the answer to the question "How do we know?" a first hint would be: in a networked and performative manner.

References

Barabási, A.-L. (2009). Scale-free networks: A decade and beyond. *Science Magazine, 325,* 412–413. Retrieved from http://barabasi.com/f/303.pdf

Boll, J. (2017). Is knowledge performative? *Interdisciplinary Science Reviews, 42*(3), 282–295. Retrieved from https://www.tandfonline.com/doi/abs/10.1080/03080188.2017.1345069

Butler, J. (2015). *Notes toward a performative theory of assembly.* Cambridge, MA: Harvard University Press.

Castells, M. (2000). Materials for an exploratory theory of the network society. *British Journal of Sociology, 51*(1), 5–24). Retrieved from http://red.pucp.edu.pe/ridei/files/2011/08/33.pdf

of *performative* as it involves information and knowledge and cybercultures. We acknowledge the existence of similar uses (Boll, 2017), but we do not consider them related to the virtuality in question.

11. Even though we acknowledge the use of performativity in learning by authors such as Butler-Kisber (2010) and Escudero Nahón (2018), we apply the term exclusively to the PWC pedagogy.

12. IBL is used in the world of mathematics, but we suggest that we take it into consideration for developing an educational model related to networks.

Castells, M. (2005). *La sociedad red. La era de la información* (Vol. 1) [*The network society. The Information Age: Economy, Society and Culture Series* (Vol. 1)]. México: Siglo XXI.

Castells, M. (2010). *The power of identity* (2nd ed.). *The Information Age: Economy, Society and Culture Series* (Vol. 2). Chichester, England: Wiley Blackwell.

Castells, M. (2013). *Communication power* (2nd ed.). Oxford, England: Oxford University Press.

Day, M. (2017). Manuel Castells, a classic? *REVIISE, 10*(10). Retrieved from http://www.ojs.unsj.edu.ar/index.php/reviise/article/view/116/0

Ernst, D., Hodge, A., & Yoshinobu, S. (2017). What is inquiry based learning? *Doceamus, 64*(6). Retrieved from http://www.ams.org/journals/notices/201706/rnoti-p570.pdf

Galloway, A., & Thacker, E. (2007). *The exploit. A theory of networks.* Retrieved from http://dss-edit.com/plu/Galloway-Thacker_The_Exploit_2007.pdf

Kuhn, T. (2012). *The structure of scientific revolutions.* Chicago, IL: The University of Chicago Press.

Latour, B. (2008). Reassembling the social [Reensamblar lo social]. In *An introduction to actor-network theory* (pp. 13–35). Buenos Aires, Argentina: Manantial.

Latour, B. (2011). Networks, societies, spheres: Reflections of an actor-network theorist. *International Journal of Communication, 5,* 796–810. Retrieved from http://ijoc.org/index.php/ijoc/article/view/1094/558

Lipman, M. (2003). *Thinking in education.* New York, NY: Cambridge University Press.

López, M. (2009). *Filosofía con niños y jóvenes. La comunidad de indagación a partir de los conceptos de acontecimiento y experiencia trágica* [Philosophy with children and youth. The community of inquiry from the concepts of event and tragic experience]. Buenos Aires, Argentina: Noveduc.

Rabinow P. (2003). En medio de los problemas de la Antropología [In the midst of the problems of Anthropology]. *Journals of Social Anthropology,* 18, 15–34.

Rorty, R. (2009). *Contingency, irony and solidarity.* New York, NY: Cambridge University Press.

Sennet, R. (2008). *The craftsman.* New Haven, CT: Yale University Press.

Terranova, T. (2006). The concept of information. *Theory, Culture and Society, 23,* 286–288. Retrieved from http://raley.english.ucsb.edu/wp-content/Engl800/Terranova-information.pdf

Watts, D. J. (2013). *Six degrees. The science of a connected age.* New York, NY: W. W. Norton & Company.

Wegerif, R. (2007). *Dialogic education and technology: Expanding the space of learning.* Retrieved from https://www.researchgate.net/profile/Rupert_Wegerif

Zollman, K. (2012). *Network epistemology: Communication in epistemic communities.* Retrieved from http://www.kevinzollman.com/uploads/5/0/3/6/50361245/netepist.pdf

Acknowledgments