

Elizabeth Murphy
Memorial University of Newfoundland

and

Thérèse Laferrière
Université Laval

Virtual Communities for Professional Development: Helping Teachers Map the Territory in Landscapes Without Bearings

This article illustrates how through participation in virtual communities, teachers can progress in making sense of their practice of working with online technologies. These communities are described as reflective of a creative-interpretive and socio-constructivist approach to teachers' professional development. The article reports on a study in which teachers came together as a community to engage in collaborative, reflective practice through participation in an online discussion. Excerpts from the discussion highlight how teachers make sense of their practices by viewing problems from multiple perspectives and contexts and by adapting and reorganizing existing conceptions of their practices in the light of new experiences.

Cet article démontre comment la participation des enseignants aux communautés virtuelles peut les aider à comprendre l'emploi qu'ils font des technologies informatiques. On y décrit les communautés virtuelles comme reflétant une approche créative, interprétative et socio-constructiviste au développement professionnel des enseignants. L'article décrit une étude qui a rassemblé des enseignants pour créer une communauté engagée dans une pratique réfléchie et collaborative par le biais d'une discussion en ligne. Des extraits de la discussion expliquent la façon dont les enseignants en viennent à comprendre leur pratique en envisageant des problèmes à partir d'une multitude de perspectives et de contextes et en adaptant et réorganisant leurs idées à la lumière de nouvelles expériences.

The classroom is a place where order prevails. The infusion of information and communication technologies (ICTs) creates a zone of uncertainty for both teachers and learners, engaging them in a process of risk and exploration for some time to come. (Bracewell, Breuleux, Laferrière, Benoit, & Abdous, 1998)

De Kerckhove (1997) argues that the Internet constitutes the most comprehensive, innovative, and complex communication medium in existence, representing the mega-convergence of hypertext, multimedia, virtual reality, neural networks, digital agents, and even artificial life. The ecology of such a network

Elizabeth Murphy is an assistant professor of educational technology and second-language education in the Faculty of Education. Her research interests lie in the use of online discussions in the context of workplace learning and in the design of online learning experiences that reflect a socio-constructivist perspective.

Thérèse Laferrière is a professor and teaches classroom organization and management in regular and networked classrooms. Her theoretical perspectives are grounded in group psychology and socio-constructivism.

can be characterized by three essential elements: interactivity, hypertextuality, and connectedness. The Internet is the ultimate decentralizing force that suppresses all distances and all delays. The lack of horizon on the Internet leaves its users without a clear sense of boundaries. The notion of personhood is challenged by extending the body's reach and range and through use of hypertext that "turns everybody's memory into everybody else's" (p. 79).

Internet communication is most often asynchronous, which results in the element of time playing a less important role than in non-Internet communication. As Newhagen and Rafaeli (1996) observed in relation to time, "The Net stretches the edges of the synchronicity continuum. Communication on the Net travels at unprecedented speed. It can also be consumed at unprecedented delays" (p. 2). The Internet can also be characterized as unorganized, uncensored, decentralized, and unordered. It provides for nonlinear presentation and communication as well as sensory vastness (Newhagen & Rafaeli). Another important feature of the Internet is its openness. "On the Net, due to historical reasons perpetuated by the discovery of other functions, the organizing principle is to have no organization, or deliberate, orderly anarchy. The message keeps its own gate, carries its own homing device. The net treats censorship as noise and is designed to work around it" (p. 2).

When it comes to using the environment of the Internet for purposes of teaching and learning, the landscape contrasts starkly with that of the physical classroom. Its vastness as well as the lack of constraints related to time and distance are only some of the characteristics that serve to distinguish this environment from that where teachers traditionally conduct their practice. This article is premised on the assumption that to work effectively in this environment, teachers must be able to make sense of it, and they must do so in relation to their existing practice. This process of sense-making is analogous to Kagan's (1992) mapmaking in landscapes without bearings.

A significant characteristic of classroom teaching is its many uncertainties. A teacher cannot continue to orchestrate instruction and maintain control in the highly unpredictable environment of the classroom without knowing whether things are going well; a teacher must be able to identify, label, solve, and evaluate the solutions to problems. Because there are no indisputable external guidelines, teachers create their own, in the form of a personal cohesive pedagogical system that they can support without reservation. In a landscape without bearings, teachers create and internalize their own maps. (p. 80)

The landscape without bearings described by Kagan becomes even more indeterminate, uncertain, and unfamiliar when the focus of understanding is no longer the traditional physical classroom, but instead a virtual classroom. This process of becoming familiar with the unfamiliar territory or environment of the Internet involves rethinking interpretations, transforming meanings, and inquiring into the unknown. Teachers can be assisted in this process by professional development opportunities designed to help them master the problematic situation, find bearings, define new maps, and make sense of the new environment. To be effective, these opportunities will ideally be highly teacher-as-learner-centered and will promote both individual and collaborative reflection and discussion in order for teachers to share their experiences of working in this new environment. These opportunities should also assist teach-

ers in identifying and finding solutions to the new problems that arise as a result of working in this unfamiliar environment.

The purpose of this article is to describe and illustrate an approach to professional development that is advocated as a means of helping teachers make sense of this unfamiliar environment or landscape without bearings. It is an approach that is advocated as being well suited to assisting teachers in the process of working in the online environment of the Internet, which is unfamiliar and different from the environment in which they traditionally conduct their practice. This approach is founded in a perspective on professional practice and development that is described in the next section of this article. Following this section is a description of a study presented as an example of this approach. The study is illustrative of a professional development experience supported by use of the Internet to facilitate collaborative reflection in order to help teachers make sense of their practice of teaching with the Internet.

Conceptual Framework

Lester (1994, 1995) distinguishes between two perspectives or models of professional practice: Model A, the technical-rational model and Model B, the creative-interpretive model. Both models represent epistemologies of practice. Model A privileges expert, received knowledge, which precedes and guides action and is conceived as existing outside the practitioner and within the authority of the profession. Model B privileges personal, contextualized knowledge that informs action, is generated by it, and that is situated in the context of the individual's practice. According to Model A, problems in the professional world are conceived as solvable, can be analyzed, and are capable of yielding to logic and the application of knowledge. Thus professional practice can be seen as a mechanism that involves objectively "applying a body of expert knowledge to known situations in order to produce rational solutions to problems" (1994, p. 1). In Model B, problems are conceived as messy and interconnected and as products of complex, dynamic systems. So defined, these problems defy technical solution and must, therefore, first be constructed and identified.

Lester's (1994, 1995) perspective echoes that of Schön (1987), who described technical rationality as instrumental problem-solving or the application of technical means to practical purposes. According to this model, the practitioner applies "theory and technique derived from systematic, preferably scientific knowledge" (p. 4). Schön describes the problems in this model as "well formed instrumental problems" contrasting them with "the problems of real-world practice," which do not even present themselves to practitioners as problems, but as "messy, indeterminate situations." Schön also provides a perspective on dealing with unique cases of problems or those that do not "fall inside the realm of existing theory or technique." He notes that with these cases the practitioner cannot apply rules from a "store of professional knowledge," but can only deal with them "by a kind of improvisation, inventing and testing." Schön groups unique cases along with problematic situations that are uncertain and those that present a situation of conflict among values into what he refers to as "indeterminate zones of practice" (p. 6). He argues in favor of a model of professional practice hinged on competence versus knowledge for dealing with these zones.

We should start not by asking how to make better use of research-based knowledge but by asking what we can learn from a careful examination of artistry, that is the competence by which practitioners actually handle indeterminate zones of practice—however that competence may relate to technical rationality. (p. 13)

Schön's (1987) perspective is useful in terms of understanding the practice of teachers who are using the Internet for teaching and learning. We can think of such practice as constituting unique cases and as belonging in an indeterminate zone of practice. The situations in which teachers find themselves when teaching with the Internet do not fall inside the realm of existing theory or technique. Thus professional development experiences designed to assist teachers adapt their practice to the new online environment will ideally privilege reliance, not on a store of professional or expert knowledge, but on teachers' own artistry and competence, which they can share with each other. Such experiences will be based on the assumption that teachers actively construct their knowledge of the world of the classroom by fitting their existing perceptions, interpretations, and understanding with knowledge gleaned through new experiences. This construction occurs largely through a process of collaborating and of sharing and negotiating interpretations, experience, and understanding with others.

Collaboration plays a pivotal role in learning and affords opportunities to view multiple perspectives, test alternate and contrary ideas, and appreciate new insights (Duffy & Cunningham, 1996; Riel, 1993). As Brown, Collins, and Duguid (1989) argue, learning is most effective when it takes place as a collaborative rather than an isolated activity and when it takes place in a context relevant to the learner. The multiple perspectives afforded by a collaborative approach can promote reconstruction and reorganization of teachers' existing knowledge and conceptions as a result of being exposed to new interpretations. Helping learners hear other arguments, see other perspectives, and reflect on choices made in the light of that information enables them to make better decisions (Harrington & Quinn-Leering, 1995). Bereiter (1994) argues that meaning-making and new conceptual structures arise through a dialectic process in which members of a learning community negotiate contradictions and begin to synthesize opposing viewpoints.

Exposure to opposing or multiple viewpoints, sharing and negotiating interpretations, group reflection: these processes and activities require that the pattern of interaction be not one-to-many, but rather many-to-many. Many-to-many interaction is what might be promoted in opportunities for dialogue, conversation, or discussion. Dialogue has long been valued as an educative experience (Burbules, 1993). Cervero (1988) advocates the use of discussion groups to facilitate an exchange of ideas, practices, and solutions to common problems. Brown et al. (1989) describe how through conversation and narratives ideas can be exchanged and modified and how belief systems can be developed. For this reason, dialogue, conversation, and discussion are well suited to supporting the approaches to professional development advocated in this article.

The dialogue and discussion must provide opportunities to promote social interaction, sharing knowledge, and group problem-solving. Furthermore, it should provide opportunities to view multiple perspectives and to foster col-

laborative reflection. The particular characteristics and benefits of online discussions suggest that they may be well-suited to supporting these types of activities and interactions. Harasim (1990) and Blumenfeld, Marx, Soloway, and Krajcik (1996) explain that online learning tools and environments present unique opportunities for supporting and organizing collaborative human conversation, group interaction, and for creating communities of learners. Harrington and Hathaway (1994) argue in favor of computer conferencing as a means of fostering reflection through dialogue because it offers a means to allow participants to discuss issues with their peers in a nondominating, non-threatening way. Holt, Kleiber, Swenson, Rees, and Milton (1998) suggest that "participant reflection may be greater in a Web conference because of the ability to reread an entire sequence of postings while composing a response" (p. 47). Anderson (1996) argues that online forums can support collaboration and reflection. Similarly, Berge (1995, 1997) observed that the written communication and the time lag in computer conferencing allow opportunities for reflection, consideration of responses, and deeper cognitive processing.

The opportunities for collaborative reflection highlight the advantages provided by the time-independence of the online discussion. However, its place-independence also affords many possibilities, the most important of which is the opportunity for collaboration and the development of communities between individuals in different geographic areas. Online discussions afford opportunities for teachers to form virtual learning communities in order to work with others with the common goal of interpreting and understanding their practice. They represent logical and appropriate ways of situating and organizing professional development experiences for those teachers who are experimenting with and trying to make sense of the use of the Internet in their practice. The following sections illustrate how some teachers came together online to participate in a virtual community and to benefit from an opportunity to make sense of their practice of working in landscapes without bearings.

Methodology

From September 1998 to June 1999, 64 teachers from around the world showed interest in forming a community, the common goal of which was to make sense of their practice of teaching French as a second language using the Internet. The experience formed part of a study centered on teachers' beliefs about teaching and learning French as a second language in online learning environments (Murphy, 2000). Data collection techniques relied on a discussion list in English called CREDO and another in French called CREO. All participants in the discussion volunteered after having seen the invitation or announcement sent out to other lists on the Internet. Participants included teachers from grades kindergarten to 12, with some participation from the postsecondary sector. Although most participants were from Canada and the United States, participants also came from Australia, Europe, South America, and Africa.

Because the discussion operated in a virtual context, participation was not constrained by geography, and it was, therefore, possible to include in the experience individuals from various social, economic, and geographic communities. More important, participants came from varying local communities of practice. In spite of these differences, participants shared an interest in discussing their practice and in sharing their experiences and interpretations of

these experiences in a delocalized or distributed context. This interest arose out of a common purpose, which was to advance their knowledge and inform their practice related to teaching and learning with the Internet. It is in this sense that their participation in the discussion list allowed them to become part of a virtual community. Rheingold (1993) defines virtual communities as "social aggregations that emerge from the Net when enough people carry on those public discussions long enough, with sufficient human feeling, to form webs of personal relationships in cyberspace" (p. 2 of online version). The virtual community of the study did not involve physical or temporal co-presence. Instead it relied only on asynchronous communication between a group of teacher-learners with the common purpose and goal of making better sense of the relationship between use of the Internet and their existing practice.

In the case of the present study, the community represented a potential membership of 64. At the onset this size allowed for diversity of experience and a broad range of geographical and pedagogical representation that facilitated a multiplicity of experience, contexts, and perspectives. In this sense the size of the group offered members the possibility of participation in a broad, distributed community of practice. At the same time, a community as large and as diverse as that involved in this study presents certain challenges or limitations, particularly in relation to participation. Participation in the discussion was not only irregular, but also uneven. An average of four to five messages were posted per week over a period of approximately 40 weeks. The total number of messages, excluding those of the participant-observer, was 193 for the duration of the study. The English-speaking community was more active than the French-speaking, which had fewer members and represented an even more geographically dispersed and diverse range of individuals. In general, although the size of the community assured a certain degree of interaction, it did not guarantee that each teacher-learner would participate. In fact, of the 64 participants, 24 participants posted only once, 30 participants posted 2-5 times, 8 participants posted 6-10 times and 2 participants posted 11-20 times. Such levels of participation or lack thereof present challenges to the integrity of the community. At the same time, participation in the community did not have to be restricted to or characterized only by actively posting messages. Participation also occurs as members of the community read the postings of others. How much of this passive participation the members were involved in was not documented in the study and cannot therefore be reported. However, we can assume that the peripheral participation of the 24 who posted only once nonetheless contributed to the dynamic of the community as a whole.

In addition to the postings by participants, the researcher as moderator and a teacher of French as a second language herself also made 101 postings to the discussion. Her intervention pertained to the tasks and roles described by Berge (1995), who categorizes the role of the online moderator or facilitator as pedagogical, social, managerial, and technical. As a moderator or facilitator, she was actively involved in focusing the discussion, developing group cohesiveness, questioning, summarizing, probing, responding to questions, encouraging participation, unifying threads, and providing feedback (see Meloth & Deering's, 1994, "means of assistance" categories). Therefore, the researcher's participation in the community was active and reflected a variety

of interventions, each designed with a different aim in mind. In addition to the interventions outlined above, the researcher played a pivotal role in orienting the discussion, keeping it on track, providing support, maintaining participation, and assisting participants in their efforts to begin to make sense of the new online environments for learning.

Results

The data collection process yielded in excess of 300 pages of communication and discussion. From the data analysis, which involved keyword coding, emerged two main categories of advantages and challenges or problems with regard to the use of the Internet in the teaching of French as second language. In the category of advantages, six subcategories were identified: resources and information, communication and collaboration, real-world learning, motivation, learning, and teaching. In the category of challenges were the subcategories of curriculum, roles and responsibilities, materials and information, control and monitoring, training and access, and equipment. The scope of this article does not allow for consideration of all of these subcategories. The focus of this article is on how teachers can make sense of their practice of teaching with the Internet through collaborative reflection in virtual communities. For this reason, the results presented in this section are those that illustrate most vividly how teachers collaboratively reflected on specific problems that arose for them in the context of using the Internet for the teaching of French. Thus results from the subcategory of control and monitoring are presented in this regard. Following a presentation of the results related to control and monitoring are excerpts that originate from a variety of the subcategories that provide insight into how for members of this virtual community, making sense of one's practice involved not only problem-solving, but also comparing and contrasting past or traditional practices with the new practices that arose as a result of teaching with the Internet.

Collaborative Reflection on the Problem of Control and Monitoring

The issue of control and monitoring provides an example of how members of a virtual community socially and collaboratively negotiated meaning and how they made sense of the Internet to teach French. The problem also illustrates how varied contexts and multiple perspectives contributed to the process of sense-making. Various teachers in various settings approached the problem, identified it, named it, and subsequently responded to it from multiple perspectives. For some teachers, control and monitoring represented a problem related to content, that is, the grammar structures and vocabulary to which students are exposed while working online: "I try to help my students learn how to find the answers. With the Internet I don't have control over what vocabulary is used or the complexity of the grammar structures." Another teacher identified the problem of control as being related to evaluation and assessment: "The most difficult part is the control. It is wonderful to let a student go and discover what she or he may and watch the excitement. But how do you grade that?" For another teacher, the problem was identified as one that related to time on task:

I just had them surf on 3 sites and I thought they would enjoy them and they did, but only for about 5 mins each. It was impossible for me to keep them on track after they had fulfilled their part of the bargain and investigated the sites.

Teachers also recounted specific anecdotes as illustrative examples of how the problem of control manifests itself for them.

One other problem is, of course, the inappropriateness (to put it mildly) of many sites—sites that kids can stumble upon quite innocently. I was doing a search on Paris attractions recently and in no time at all found myself at the Folies Bergère, and you can imagine what that page had to offer!

Another teacher explained the problem as one that related to a need to provide more guidance to students when they are working online.

I would not have the students do a general search without guidance! I saw what that could lead to in a music class, where, the music teacher was doing an activity in the computer lab with my class. Ten minutes before the end of the class, she decided to let them do a search for the "Spice Girls," which the students had been requesting. The results of that search certainly were not appropriate!

The issue of control in the second-language classroom was also identified as problematic in terms of the need to monitor students to ensure that they are working in and with the French language as opposed to with their mother tongue. From the perspective of some teachers, monitoring becomes even more essential on the Internet where so much material is available in English: "For elementary core French, I must preview sites in order to find visually rich pages with child-level language; otherwise, kids will go to English sites and translate later."

The responses to the problems were often as varied and as multifaceted as how teachers named or identified the problems. The following excerpt illustrates what Schön (1987) described as a means of dealing with problems by a kind of improvisation, inventing, and testing.

I do not conduct many classes in the computer lab that require random browsing. Usually the students must do a guided search or I have pre-selected the sites that they must visit to find out certain information. During a 40-minute class it would be impossible to have much constructive on-task work completed if students were permitted to randomly browse sites.

These responses to problems are interesting and useful because they are contextualized in specific situations. Their responses are as contextualized and as situation-specific as how they named the problems. They are not simply applying a body of expert knowledge, but knowledge based on their interpretation of their experiences. The following excerpt provides an example of a situation-specific response to a problem.

I most often preview the site I want a pair of students focusing on—I also rove around constantly, and found one day last year a student who had quickly reverted to his Metallica home page—I hollered and told him he was off navigating (my chosen site) for at least a week. The fact that he had to keep his fingers still and go back to the "old way" of learning a FL scared the heck out of him, and it never came up again.

Collaborative Reflection Through Comparing Old Practices With New

Participants in the study were also looking at alternative ways of defining problems and of responding to them. At the same time, they were presented with conceptions and meanings that sometimes challenged, confirmed, or conflicted with their own interpretations, meanings, and knowledge. It is in this way that participation in the community also provided an opportunity to challenge the familiar practices of the physical classroom as part of a process of making more familiar this world of the virtual classroom. As part of this process of making sense of the practices related to working online, teachers compared the familiar with the unfamiliar and the old with the new. To do this, they fitted existing perceptions, interpretations, and understanding with knowledge gleaned through new experiences. They compared ways of thinking and of knowing associated with teaching without the *nouvelles technologies* or new technologies. In the process of making the unfamiliar familiar, members of the community had to identify the conflict between existing models of their practice and the new possibilities presented by working on the Internet.

These conflicts became evident in some of the comparisons that involved criticizing existing systemic practices. The following excerpt illustrates how one teacher makes the comparison between the old and the new or the familiar and the unfamiliar.

Our educational system works against these very valuable but time-eating learning projects. There's the "curriculum to cover"—always more than is ever possible even without the extra projects. Why do just two themes when we can do six? And what's wrong with a system that has kids and teachers running from one subject (sometimes even one room) to the next, with no time to reflect, to process, to—gasp!—relax? It drives me crazy. And as long as teachers are willing to play by those antiquated rules, the *nouvelles technologies* will remain just that.

At times this criticism and questioning of existing practices focused less on systemic factors and more on teachers themselves. This teacher's interpretation of working with the Internet involved questioning the habits of colleagues and of attempting to reconcile existing practices with those that, for this teacher, come into play when teaching and learning with the Internet.

I am considered a nut, albeit a nice friendly one, by my colleagues. Nose in the computer, out of touch with "reality" and so on and so forth. For years, I tried to convert them, with absolutely no success, but occasionally with some backlash.... But they are convinced that the only way to do this effectively is for the teacher to be the almost-only source of input of knowledge.... There is an unspoken, perhaps unconscious, distrust of the ability of students to learn on their own ... they must be carefully led to knowledge and that knowledge structured according to the priorities of the teacher.

Questioning existing practices also involved making sense of the new ways of knowing in relation to old ways of knowing. In the following excerpt, one teacher argues in favor of adopting practices that privilege real-world, authentic learning.

We have to think Internet as opposed to book learning when we use the Internet. The linear model of learn, answer questions, test, is based on what is manageable for the book and paper form of learning. Actual real-life learning on the job takes place much more diversely and has an actual real application. Therefore why not

get students to do more projects based on their real questions about the world, find info., talk to real experts on-line and find their own answers?

Arguments in favor of changing one's way of thinking about "book learning" represent how members of the community took advantage of the discussion to challenge existing ways of conceptualizing their practice. In this regard, some comments were explicit in their rejection of existing practices and urged teachers to explore new approaches to teaching.

Many of the old-school teachers will stick religiously to the text book and they believe they are on the cutting edge and providing enrichment by showing a pertinent video in class—to me, that kind of stand-up delivery classroom is like using a film-strip or a reel-to-reel tape. It has merit, and information will certainly be transmitted to the students, but how much more could be done in that room in the allotted time by using the advances and tools that are now available to most of us in our schools.

The new approaches advocated by some of the members highlighted not only a need to rethink familiar ways of knowing and teaching, but also advocated a new perception of the role of the teacher. In the following excerpt, the use of terms such as *rut*, *dry*, and *boring* underlie a criticism of the traditional role of the teacher.

I get to vary my teaching style, it pushes me to keep changing—it is so easy to get into a comfortable rut! I get to offer the students worlds by visual aid of the computer that I could have never dreamed of by "normal" teaching methods. I guess it is making me a better teacher and I am more proud of the product I am delivering—it is now multi-dimensional rather than dry and boring.

Similarly, in the following excerpt, one teacher's reference to "a breath of new life" describes a reconceptualization of practices that favors not only a change in the role of the teacher, but also a change in the role of the student.

The Internet has changed my practice of teaching, by allowing the student more control and therefore encouraging more active learning in the class. As long as a teacher is willing to give up the "sage on the stage" concept, and become a "guide on the side"—the technology becomes an asset and not a liability. We needed a breath of new life, teaching had become stagnant, and now we are on the right track, in my humble opinion. I look forward to surfing the net, to make the language current and pertinent.

Discussion

The excerpts presented above illustrate some of the ways membership in the virtual community provided teachers with a means to recount and reflect on their experiences and to share their interpretations of problems and situations in order to understand them better and make sense of them in relation to their practice. The excerpts provide some insight into the process of sense-making and reveal that participating teachers engage in constructing, deconstructing, and reconstructing meaning, beliefs, interpretations, experiences, problems, attitudes, and understandings.

Excerpts from the category of control and monitoring are indicative of how problems faced by teachers can come into focus, be contextualized, and related to particular situations. These problems represent unique cases that belong to a zone of indeterminate practice, as well as a complex situation that manifests

itself in many different ways. As such, this problem illustrates Lester's (1994, 1995) notion of problems being messy, interconnected, and products of complex dynamic systems. Participation in the virtual community provided opportunities to view problems in multiple contexts and to see the different ways they might be identified, named, and potentially solved. The collaborative virtual space presents occasions to consider alternate perspectives, contrary ideas, and new insights that might sometimes confirm existing conceptions and ideas, and other times challenge them.

Besides identifying and naming problems, participants also discussed how they responded to their problems. Their responses did not involve applying a body of theory or expert knowledge, because such knowledge was not likely to be applicable or useful in terms of providing a response to identifying the multiple ways a problem manifests itself. The dynamics of the discussion, however, did allow for alternative and tested responses to the situation. The discussion provided teachers with an opportunity to make explicit their otherwise tacit knowledge and to share their interpretations of how best to respond to the reality of using online environments. Teachers were able to bring their knowledge to a public level where it could be shared with others, who if they found it applicable to their own situation could choose to respond to the situation in a similar way.

Teachers' reflection on the challenge of control and monitoring also illustrates not only how teachers identify, name, and respond to problems, but how they make sense of the realities of teaching and learning with the Internet. We can see how such discussions can help them build knowledge that is new and that is therefore suited to helping them identify and respond to the problems faced in their practice. These responses may remain tentative and may require further testing, invention, and improvisation, but they nonetheless provide teachers with a multiplicity of perspectives from which to begin to interpret their own situation and tailor responses to it.

Although we cannot know or measure how sharing these experiences might have influenced the practice of participating teachers, we can observe from some of these excerpts that teachers took advantage of their participation in the community to reflect on and share with others what working with the Internet meant for their practice. We can remark from these comments how the process of sense-making is referential, where to understand the new, comparisons are made with the old. We can also observe how the sense-making process involves adapting and reorganizing existing conceptions of one's practices in the light of new experiences. In this regard we can observe how in order to make new maps to guide them in the unknown territory, teachers may first have to question existing maps or existing interpretations of their practice. Above all, this study contributes to the understanding of the early results of a new form of professional development for reflective teachers willing to devote time to think about their practice along with others.

Conclusion

Korzybski (1933) reminds us that a map is not the territory that it represents. In this regard the sense that teachers make of their practice in the new landscape of the Internet is highly personal. It is contextualized in the individual activity, personal knowledge, and particular circumstances of each teacher's experience

and subsequent interpretation of that experience. At the same time membership in the virtual community affords an opportunity to become aware of the structure of the maps of others and thus provides a reference point against which individuals can better interpret and compare their experiences and the sense they have made of their new practices.

The sense teachers make of their experiences or the maps that they begin to define to help them navigate through the uncertainty of the new landscapes for teaching and learning are their own. Thus the process of sense-making does not involve locating or becoming more aware of some existing or true maps to which they must refer in order to find their way. In this regard we are reminded of the complexity of the process of sense-making and of how highly contextualized and individual the process is. We are reminded that the map is not the territory, but an interpretation or representation.

We can conjecture as well that teachers' own maps will change as the territory changes and as they accumulate additional experiences. Most important, their maps will change as they provide themselves or are provided with opportunities to participate in experiences where they can begin to articulate their interpretations and to be exposed to the interpretations of others. Through membership in virtual professional communities, teachers can engage in collaborative activities of making sense of their practice in the new online environment for learning. An important role of professional development is to provide opportunities for teachers to engage systematically and formally in this very process.

References

- Anderson, T. (1996). The virtual conference: Extending professional education in cyberspace. *International Journal of Educational Telecommunications*, 2(2/3), 121-135.
- Bereiter, C. (1994). Implications of postmodernism for science, or, science as progressive discourse. *Educational Psychologist*, 29(1), 3-12.
- Berge, Z. (1995). Facilitating computer conferencing: Recommendations from the field. *Educational Technology*, 35(1) 22-30.
- Berge, Z. (1997). Computer conferencing and the on-line classroom. *International Journal of Educational Telecommunications*, 3(1), 3-21.
- Blumenfeld, P., Marx, R., Soloway, E., & Krajcik, J. (1996). Learning with peers. From small group cooperation to collaborative communities. *Educational Researcher*, 25(8), 43-46.
- Bracewell, R., Breuleux, A., Laferrière, T. Benoit, J., & Abdous, M. (1998). *The emerging contribution of online resources and tools to classroom learning and teaching*. Report submitted to SchoolNet/Rescol by TeleLearning Network Inc.
<http://www.tact.fse.ulaval.ca/ang/html/review98.html>
- Brown, J.S., Collins, A., & Duguid, P. (1989). Situated cognition and the culture of learning. *Educational Research*, 18(1), 32-42.
- Burbules, N. (1993). *Dialogue in teaching: Theory and practice*. New York: Teachers College Press.
- Cervero, R. (1988). *Effective continuing education for professionals*. San Francisco, CA: Jossey-Bass.
- De Kerckhove, D. (1997). *Connected intelligence: The arrival of the Web society*. Toronto, ON: Somerville House.
- Duffy, T., & Cunningham, D. (1996). Constructivism: Implications for the design and delivery of instruction. In D. Jonassen (Ed.), *Handbook of research on educational communications and technology* (pp. 170-198). New York: Scholastic.
- Harasim, L. (1990). Online education: An environment for collaboration and intellectual amplification. In L. Harasim (Ed.), *Online education: Perspectives on a new environment* (pp. 39-64). New York: Praeger.
- Harrington, H., & Hathaway, R.S. (1994). Computer conferencing, critical reflection, and teacher development. *Teaching and Teacher Education*, 10, 543-554.

- Harrington, H., & Quinn-Leering, K. (1995, April). *Reflection, dialogue, and computer conferencing*. Paper presented at the Annual Meeting of the American Educational Research Association, San Francisco.
- Holt, M., Kleiber, P., Swenson, J.D., Rees, E.F., & Milton, J. (1998). Facilitating group learning on the Internet. In B. Cahoon (Ed.), *Adult learning and the Internet* (pp. 43-53). San Francisco, CA: Jossey-Bass.
- Kagan, D. (1992). Implications of research on teacher belief. *Educational Psychologist*, 27(1), 65-90.
- Korzybski, A. (1933). *Science and sanity: An introduction to non-Aristotelian systems and general semantics*. Lakeville, CT: International Non-Aristotelian Library.
- Lester, S. (1994). *On professionalism and professionalism*. [Online]. Available: <http://www.devmts.demon.co.uk/protnal.htm>
- Lester, S. (1995). Beyond knowledge and competence: Towards a framework for professional education. *Capability* 1(3), 44-55. [Online]. Available: <http://www.devmts.demon.co.uk/beyond.htm>
- Meloth, M., & Deering, P. (1994). Task talk and task awareness under different co-operative learning conditions. *American Educational Research Journal*, 31, 138-165.
- Murphy, E. (2000). *Strangers in a strange land: Teachers' beliefs about teaching and learning French as a second language in online learning environments*. Unpublished doctoral dissertation, Université Laval. [Online]. Available: <http://www.uclm.ca/~emurphy/strangers/toc.html>
- Newhagen, J., & Rafaeli, S. (1996). Why communication researchers should study the Internet: A dialogue. *Journal of Computer-Mediated Communication*, 1(4). [Online]. Available: <http://jcmc.huji.ac.il/vol1/issue4/rafaeli.html>
- Rheingold, H. (1993). *The virtual community: Homesteading on the electronic frontier*. Reading, MA: Addison-Wesley. [Online]. Available: <http://www.well.com/www/hlr/vcbook/vcbookintro.html>
- Riel, M. (1993). Global education through learning circles. In L. Harasim (Ed.), *Global networks* (pp. 221-236). Cambridge, MA: MIT Press.
- Schön, D. (1987). *Educating the reflective practitioner*. London: Jossey-Bass.