

Telelearning: Distance and *telos*

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Abstract

This article presents telelearning as associated not only with the notion of being far off or distant, but also with the concept of *purpose*. Networked professional communities focused on the use of ICTs to serve their own purposes. The primary design experiment (Brown, 1992; Collins, 1999) was about bridging the distance between university and schools by creating a virtual community of support and communication. The goal of on-line activity for participants was twofold: learning about and learning with information and communication technologies (ICTs). The teleology and level of completion of this design experiment are investigated by tracing back through the learning artifacts of the communities its utility for participating members (school learners, preservice teachers, inservice teachers, teacher educators, and other professional educators). The materials and features of the TeleLearning-PDS (Professional Development School) are presented as evidence of understanding telelearning as distance and *telos*.

Résumé

Cet article présente le téléapprentissage comme étant associé non seulement à la notion d'être éloigné ou distant, mais aussi au concept de *but*. Les communautés de professionnels en réseau se sont concentrées sur l'utilisation des TIC pour servir à leurs propres objectifs. Les premiers designs expérimentaux (Brown, 1992; Collins, 1999) portaient sur la création d'un rapprochement entre l'université et les écoles en créant une communauté virtuelle de support et de communication. Le but des activités en ligne pour les participants était double: apprendre sur les technologies de l'information et des communications et apprendre par le biais de celles-ci. La téléologie et le niveau de complétion de ce design expérimental sont étudiés en retracant, à travers les artefacts d'apprentissage des communautés, son utilité pour les membres participants (apprenants, étudiants en formation des maîtres, professeurs en service, formateur de formateurs et d'autres éducateurs professionnels). Le matériel et les caractéristiques de l'École de développement professionnel du téléapprentissage (*TeleLearning-Professional Development School*) sont présentés comme des éléments de compréhension du téléapprentissage comme distance et *telos*.

academic interest in distance education. As with other spheres of activities (economical, political, media, social), new possibilities for educational renewal presented themselves to both individuals and organizations. The TeleLearning Network of Centres of Excellence (TL•NCE) was itself part of the unfolding phenomenon. For the Educating Educators R & D Team and partners, it meant exploring the many facets of connectivity, especially the Web, for teaching, learning, and knowledge-building purposes.

Some of us assigned to campus-based teacher education programs conceived of connectivity as movement *from the inside out*. Our challenge was to reach out to practitioners in the field to improve teacher education and professional development. The primary design experiment was about bridging the university-school distance by creating a virtual community of support and communication for preservice teachers: inclusive of inservice teachers, teacher educators, and other professional educators. Later, collaborative inquiry was included in the design. The intent of the experiment was also to create virtual bridges between culturally diverse local sites engaged in teacher education and professional development. The TeleLearning Professional Development School (TeleLearning-PDS) was envisaged as serving educators interested in thoughtful and effective uses of ICTs for collaborative learning and knowledge-building purposes.

The goal of on-line activity for participants (support, communication, and collaborative inquiry) was twofold: learning about and learning with information and communication technologies (ICTs). The derivation of the Greek term *telos* in telelearning is associated not only with the notion of being far off or distant, but also with the concept of *purpose*. At each participating site, already established or emerging networked professional communities were focusing on the use of ICTs to serve their own purposes.

Researchers engaged in design experiments (Brown, 1993; Collins, 1999). This approach needs to be distinguished from experimental design. As pointed by Kelly (2002), research as design “is directed at understanding learning and teaching processes when the researcher is active as an educator” (p. 3). Design-based research is “an emerging research paradigm for the study of learning in context through the systematic design and study of instructional strategies and tools” (Design-Based Research Collective, 2002, p. 5). In this article we investigate the teleology and level of completion of this design experiment. What was the virtual community designed to accomplish in the first place? How far has it come in meeting its purpose? Where does such a research and development (R & D) project end?

TeleLearning: A Polysemic Etymology

In the mid-1990s most educators did not include activities involving telelearning in their campus-based courses. It was a term that needed to be redefined to reflect a particular bias that we had chosen. The telelearning concept was not anchored deeply in our academic experience, but appeared as a new reality that exceeded the metaphor of the virtual and its ephemeral quality. However, when a new field develops, terms and concepts are often borrowed from known fields. It is in this sense that we rely on metaphors. For example, in data processing, the *menu*, initially borrowed from the restaurant context, was essential as a characteristic of the interface that all the users now know. The meaning of the term remained the same, but the interactive use of the menu developed in a way suitable for data processing. This kind of transfer, however, was more of an abstract nature in the case of use of the term *telelearning* and required tracing back the meaning of the prefix *tele*.

The last century and half witnessed a plethora of inventions related to electricity, electronics,

and communication. In themselves these technologies bring to our world a new culture. From the point of view of terminology, almost all these technologies borrowed the *tele* prefix to designate the distance between the source and the recipient (see Shannon's, 1948, diagram of communication and others that supplemented it). Everyone knows the telegraph, the telephone, and the television. With the same prefix, terms like *teleuniversity*, *telematics*, and *telelearning* were gradually adopted. However, Shannon's model of communication is not appropriate in education. Indeed, it is not enough in teaching that information be poured from a source into a channel and be received by one receiver or learner. When information is being channeled, stored, and found on the Internet, the data processing specialist and the engineer may have their work completed, but the work of the teacher is just beginning (Peirce, 1965; Vygotsky, 1978).

The etymological search for *tele* had led us to the Greek language and to *telos*, a term that indicates the ending point, the achievement of the goal. The adverb of the same root, *telosde*, means “until the end,” until the finish. “Until there is learning” is a beautiful etymology for telelearning. Rhéaume (1996) wrote:

The ancients thought less of the distance, than the inventors of this century; it was the goal and the course which interested them. One may have all the technologies, but must understand that learning involves more than *bits*; it is sense-making.

The Greek etymology was bringing to telelearning a teleological or purposeful dimension, one beyond media or means.

Educators began to give *networks* new meanings and developed new horizons, including those related to how learning communities can form and evolve (Harasim, 1993). The adoption of network technology and the Web was a new option, and the telelearning proposal to the National Centers of Excellence (NCE) Program targeted new pedagogies. The reorganization of the dominant teaching approach, that is, the transmission model, was envisaged as now more possible than before. The new pedagogies were to go beyond the recognition of distance between authors and their works. Art and printed texts had already accustomed us to this absence of the author (mediology) and to cultural artifacts. The magic of media, which makes it possible to move across centuries and to retain the most beautiful treasures and messages for us, was now offering new forms of social presence. *Tele* as distance could not provide all the meaning, and so it was relevant to talk about purpose or goals as suggested by the etymology of the term.

TeleLearning as Project

To explore the etymology of the term *project* was also instructive. Before the scientific and technological world developed, calculation and measurement existed only subjectively and existentially. The term *projectile* (the thing being projected with force) was used in this sense. In the absence of any technology of defense, distance from the projectile represented the zone of safety around a person, and the projectile was thrown in order to breach this zone. In the traditional classroom, the teacher has a project and throws it forth. The positioning of the teacher is important: Student teachers are told to speak loudly enough so that all students will hear and to place themselves well within the sight of all (the zone of learning). On the one hand, there can be a multitude of targets or teaching objectives set forth by the teacher, a multitude of small projects that fall under an overall vision. On the other hand, the term *project* may be used to designate what learners are aiming at, individually or collectively. It can happen in a classroom without computers and in a classroom with networked computers. In both cases it is the relationship between project, technology, and learning that makes the difference between a teacher-centered

or a learner-centered classroom. Whoever has a project (or projectile), whether he or she uses old or new technology and is or is not in a classroom, must have a clear idea of his or her target in order to take effective action: David, weak and small, defeated Goliath; immigrants crossed the Atlantic on rustic boats to fulfill their dream to live in America; lovers commute on planes so they can be together on weekends. School learners have computers, but do they have learning projects or intentional goals?

Telelearning was seen by the Educating Educators R & D Team (Theme 7) as an educational project encompassing a vision for those willing to question classical zones (traditional classrooms) and use new technologies to empower educational agents, including learners themselves. Several R & D projects were carried out ranging from the study of writers mentoring on-line school learners (Writers in Electronic Residence Project, Owen & Owston, 1998) to school learners gaining competence in information technology through servicing their own schools (ITM and Studio A Project, Willinsky, 1998). In general, telelearning tools extend capacity, and their purposeful use can transform roles and rules in the classroom (Lamon, Caswell, Scardamalia, & Chandra, 1997; Breuleux, Laferrière, & Bracewell, 1998; Laferrière et al., 2001; Bracewell, Breuleux, & Le Maistre, *in press*). Nonetheless, productivity, system integrity (classroom, school, district, university, state) in the adoption of telelearning tools and practices, and scalability are challenges yet to be turned into serious educational projects.

The TeleLearning-PDS Project

The professional development school (PDS) model has proven to be one of the most promising models for the education of educators (Holmes Group, 1990; Goodlad, 1990; Stoddard, 1993). The PDS's three basic dimensions were: preservice teacher education, professional development, and collaborative research. Our idea was to add a fourth dimension, telelearning, with the assumption that time and space boundaries could be spanned in order to create a critical mass of on-line activities, resources for the education of educators in the use of information and communication technologies, and learning and knowledge-building artifacts. To move forward, the Theme 7 design experiment relied on the collaboration of other TL•NCE researchers and partners. Theme 4 (K-12 sector) and Theme 5 (Postsecondary sector) research teams were critically important to the success of the TeleLearning-PDS Project. So were other major initiatives and organizations such as faculties of education, ministries of education, SchoolNet (Industry Canada) and the Office of Learning Technologies (Human Resources Development Canada). At each iteration of the design process, the project gained in clarity and complexity. Connectivity, ease of access, support, and co-constitutionality (the existence of a sociotechnical infrastructure) were the first design principles applied. Other principles were participatory design, authentic multimodal social interactions, interrelatedness, active collaborative learning, progressive distributed expertise, collaborative reflective teaching, and knowledge-building (Laferrière, 2000).

What began as a virtual community of support and communication for preservice teachers (phase one) soon reached inservice teachers, university colleagues, school principals, educational consultants, and policy-makers in order to engage in collaborative inquiry (phase two) for the renewal of school learning, teacher education, and professional development.

In the following section I present the chains of means and ends that contributed to the design of the TeleLearning-PDS (its teleology).

Methodology

The *Principia Cybernetica Web* (<http://pespmc1.vub.ac.be/>)

defines teleology as “the philosophical study of manifestations of design or purposes in natural processes or occurrences, under the belief that natural processes are not determined by a mechanism but rather by their utility in an overall natural design.” Therefore, investigating the teleology of the TeleLearning-PDS refers to tracing back through its learning artifacts its utility for participating members, be they school learners, preservice teachers, inservice teachers, teacher educators, or other professional educators. Utility refers to the usability of the means that were created by individuals and how well they served them and others who as members of learning and knowledge-building communities sought to understand how to use ICTs effectively in their teaching and learning.

The process was twofold. First, participants who created face-to-face and on-line teaching materials, on-line journals, multimedia presentations, case studies, and other learning artifacts were involved in descriptions of practice and reflective analysis of actions (iterative cycles of comparison between individual intents and results). Second, we sought interpretations of participants’ effectiveness in the use of ICTs through negotiation of meaning. Data collection strategies included seminars and interviews with incoming to graduating participants supported by on-line discourse (primarily, discussion forums), digital videos of specific activities, note-keeping of personal thoughts, tests and questionnaires administered to school learners, and other research materials).

The materials and features of the TeleLearning-PDS (what it is made of, what shape these materials have been given, and how these are assembled) are presented as evidence of our understanding of telelearning as distance and telos.

TeleLearning-PDS Artifacts

At the onset, building on innovative practices in teacher education and professional development, our aim was to design a virtual community of support and communication located at four teacher-education and professional development sites in Canada. “The [virtual] community will use various electronic linkages to connect the work and learning across schools and faculties of education” (TL•NCE 7.1 research project).

Internet connectivity may be viewed as a means to support the renewal of campus- and school-based practices in teacher education and professional development (the PDS Model), but first teachers must know how to access the Internet. Research teams, students, and partners had to make sense of these new tools quickly for learning and knowledge-building purposes. Support and communication took many forms as is demonstrated in the learning artifacts presented below.

Support

Support was key: governance or administrative support, technical support, and pedagogical or collegial support. Here are some early artifacts (instruments) that illustrate the research team’s attentiveness to support in the design of the TL-PDS:

- Vision of Learners in the 21st Century (Henchey, 1996): a visioning process initiated by the McGill site that led to a statement signed by a number of Canadian educators, later submitted to the School-Net Advisory Board;
- Studio A (Willinsky, see Deprés, 1996): a Web site developed at the University of British Columbia (UBC) in collaboration with Knowledge Architecture, a private partner, to support school learners from across the country who were helping teachers with new technology while earning information management or informatics credits;

- Télé-Apprentissage Communautaire et Transformatif (TACT): a Web site using Virtual-U VGroups and designed primarily to support early uses of ICTs (1996) in preservice teacher education and professional development activities in the Laval Network of Associated Schools (150 schools);
- Distance et projet (Rhéaume, 1996): an on-line document suggesting that telelearning/télé-apprentissage be a perspective with a big aim in mind, that of leading to the reorganization and restructuring of mass education. Another document was a documentary review on the contribution of ICTs to teaching and learning (Grégoire, Bracewell, & Laferrière, 1996).
- Canadian Education Research and Information System (CERIS): As Educating Educators' co-theme leader, I was part of the working group established in 1996 by the Canadian Education Association, the Council of Ministers Education Canada, and Industry Canada to design the system.

Support was a means, but each of the above was also an end in and of itself, that is, a specific project with its own resources.

Meanwhile, connectivity and other access challenges had been overcome on campuses and at associated schools and studies in networked classrooms—an elementary, secondary, or postsecondary class meeting face to face on a regular basis and having access to an intranet and the Internet—were underway. For example, Wideman, Shapson, and Owen (1998) evaluated the WIER (Writers in Electronic Residence) project. They stressed how school learners could write for an authentic audience and could also take a reflective stance to their work once an expert writer had provided feedback. The Computer Supported Intentional Learning Environments (CSILE) research team was using local area networks (LAN) and a client-server application for pursuing its groundbreaking work in the establishment of knowledge-building communities at the elementary school level (Scardamalia & Bereiter, 1996).

For pre- and inservice teachers, as well as for teacher educators engaged in making sense of the infusion of ICTs into teaching and learning, one of the key issues was the adoption of technology that supported their beliefs, knowledge, and values about how people learn and grow in school systems. Some were more constructivist than others, and some were highly preoccupied with control issues in classroom organization and management discussions. Project-based collaborative learning was one approach that made sense, combining a pedagogy going back to Dewey, Kilpatrick, Freinet, and Makarenko (Grégoire & Laferrière, 1998) with new technology.

The TeleLearning-PDS artifacts contain examples of sense-making activities related to the use of ICTs in teaching and learning in elementary, secondary, and postsecondary classrooms. Following are illustrations of the activities of teacher educators as well as preservice teachers.

- Publications: Works in progress and technical reports published on the Web or later turned into book chapters or articles by UBC research teams (Mayer-Smith, Pedretti, & Woodrow, 1998; Willinsky & Forssman, 2000).
- Graduate studies: A few teachers engaged in master's-level studies with a focus on understanding what ICTs could do for their teaching and student learning; one teacher engaged in and completed her doctorate in the domain entirely on-line.
- Case studies: Graduating student teachers (or teacher candidates) wrote self-reports and case studies on their use of ICTs in networked classrooms (classroom organization and management problems that confronted their own or other colleagues' value systems and knowledge); case studies were prepared by student teachers' engaged in the GrassRoots

projects (SchoolNet) at York University and Laval University; case studies were also developed on teachers' use of ICTs in the McGill TeLeLearning-PDS Net; and case studies were revisited each year as the technology and participants' pedagogy improved.

- Virtual visitations: Lamon, a researcher and teacher educator from OISE/UT, demonstrated (on the TeleLearning Teacher Portal) her use of Knowledge Forum in preservice teacher education. She highlighted the adequacy of the tool for knowledge-building purposes, the goal she pursues when working with teacher candidates.
- Virtual practica: Campus-based teacher candidates interacted with school learners in a Knowledge Forum database. Teacher candidates and graduate students presented to interested virtual visitors their own understanding of the potential of Knowledge Forum as a collaborative knowledge-building tool. Schoolteachers had Web sites so complete that preservice teachers from McGill or Laval University were able to get acquainted with and keep in touch with classroom activities.
- Reflective journals: Preservice teachers at Laval University debated on-line, among themselves and with others, the value of using ICTs. Electronic discussions designed for reflection on practice (1996-2002) are also clearly indicative of the preservice teachers' sense-making processes about the use of ICTs. They include arguments that reflect their motives, doubts, criticisms, and best practices. Over the duration of the project the doubts diminished, and the best practices examples multiplied.

The above artifacts indicate that connectivity to the Internet and Web-based learning materials provides new means of support and extends support beyond the usual boundaries of the face-to-face learning environment, be it a university classroom or a field placement. Such is the case when a regular classroom management course is linked to a practicum through an electronic discussion forum where student teachers support and help one another with the classroom management problems they face (Legault, 2000; see also Dutt-Doner & Powers, 2000). In another example, support through a summer institute on information and communication technologies is extended when participants continue to interact on-line during the fall term and agree to meet informally at specific times as in the case of the teachers of the McGill TL-PDS Net. The boundaries of a community of inquiry (an innovative model of preservice teacher education, Minnes Brandes & Erickson, 1998) are extended when its members address challenging issues with teachers from Australia using an electronic discussion forum as means of support (Meyer, Woodruff, Erickson, Yoon, & Haskell, 1998; Mitchell & Wakefield, 1999). A practicum's boundaries are extended when opportunities are provided for "virtual legitimate peripheral participation": legitimate peripheral participation, the key process in situated learning, refers to novices observing and being guided by more experienced mentors (a community of practice concept, Lave & Wenger, 1991). A final example is that of a student-teacher cohort with half of its members working in networked classrooms who agreed to open its on-line collaborative journal space to Spanish preservice teachers preparing to teach French as a second language who were interested in learning about how to integrate ICTs into teaching and learning. When journal excerpts, virtual practica, virtual visitations, case studies, works in progress, and reports become resources for real audiences, support takes on new shapes and forms and serves the purpose of renewing teacher education and professional development through such learning and knowledge-building artifacts.

Communication

With the collaboration of its provincial and territorial partners, SchoolNet was moving ahead

with the implementation of a plan to connect all schools in Canada. This strategy was seen as highly relevant to the quality of life in Canada. Teacher preparation and professional development (a provincial matter) became seen as increasingly important. The two key dimensions of the TeleLearning-PDS project, support and communication, became more and more focused on learning about and with ICTs as far as pedagogical communication was concerned. For example, at all sites discussion forums involving preservice teachers are learning artifacts that manifest a growing presence of networked computers in schools and classrooms and in their professional lives as future teachers.

Awareness of the network phenomenon was identified (Laferrière, 1997) as the first phase of a professional development model emphasizing ICTs. Other phases related to accessing networked computers and mastering the Internet and intranet resources, seeing new possibilities for learning and teaching, establishing new classroom organization and management routines, directing project-based learning, and cultivating knowledge-building communities. The content of the first four phases could be communicated in either a transmission or a constructive mode, and encourage the practice, with the support of most ICTs, of either.

One conceptual artifact, that is, the concept of the networked classroom (Laferrière et al., 2001), reflected both paradigms. Teaching and learning activities in networked classrooms and the workplace of an increasing number of teachers were the focus of on-line discussions. The *inside-out* of the classroom perspective was adopted, as exemplified by the networked learning community concept (Breuleux et al., 1998; see also Bielaczyc & Collins, 1999) and the knowledge-building community concept (Scardamalia & Bereiter, 1996). The networked learning concept was immediately more accessible to teachers, while the knowledge-building concept led to a higher degree of knowledge innovation with the support of digital tools such as Knowledge Forum, software designed for this purpose during the TL•NCE research program.

Bridging research and school cultures is a critical issue (Bereiter, 2002). School-university communication patterns have been given more attention with the spread in the United States of the PDS model (National Council for Accreditation of Teacher Education, 2001). The use of telelearning tools was meant to support more and better communications at all levels at specific Canadian sites. In the instances mentioned above, which were within the range of participating pre- and inservice teachers, graduate students, school principals, teacher educators and researchers, the use of telelearning tools provided this support. Electronic communications facilitated communications between campus-based and school-based participants, including in some cases school learners as well. ICT infusion projects brought focus to their collaboration. These activities relied on the willingness and commitment of interested individuals, and the TeleLearning-PDS artifacts reflect their technology skills, professional autonomy, and partnership-spirited R & D activities.

Collaborative Inquiry

Working in a networked classroom creates a momentum that goes well beyond the simple functioning of devices and software. Electronic discussions designed for reflection on practice during student teaching or a graduate practicum (Laval site, 1996-2002) are clearly indicative of a growing interest in inquiries into how to create learning opportunities that take advantage of ICTs. How much control should be given to school learners, and how much space should be left for the technology of the textbook were two driving questions that generated much collaborative reflection on practice at that site (in face-to-face and on-line dialogues). For example, an on-line book on the organization and management of the networked classroom as a learning community was revised three times by participating pre- and inservice teachers. Another set of learning

artifacts, including the domain name CollabU, related to a graduate course offered in collaboration by ICT researchers from five universities (Breuleux et al., 1999). Participants engaged in collaborative inquiry with colleagues from other universities in areas such as technology planning, virtual communities, teacher professional development, and project-based collaborative learning.

Collaboration also developed between Theme 1 (Learning models), Theme 4 (K-12), and Theme 7 (Educating Educators) researchers and partners. Teaching for understanding was the learning model suggested (Bereiter, 2002). This high-level teaching purpose inspired teachers who could devote some of the learning agenda of their networked classrooms to this purpose. Teacher educators were conscious, however, of obstacles pertaining either to connectivity or to technology and pedagogy skills that hindered computer-supported collaborative inquiry with school learners. In such a context, they were hesitant to make use of next-generation telelearning tools such as Knowledge Forum, a tool especially designed to support knowledge-building communities. Theme 7 researchers also had to take into account institutional choices regarding the use of on-line tools, for example, FirstClass and WebCT. These factors limited collaborative inquiry within and across sites.

There were shortcomings, but participants' interest in collaborative inquiry and knowledge-building grew as shown in the evidence provided here. As connectivity, technical and pedagogical support, and communication between networked classrooms expands, there are more "inside and outside" signs that computer-supported collaborative inquiry is an emerging practice: These include GrassRoots projects that reflect the metaphor of the school learner as a researcher and school learners who have become part of researchers' communities of practice (Dede, 2000).

Discussion

From the onset of the TeleLearning-PDS, specific ICT projects were presented by the "virtual community" of support and communication. Collaborative inquiries were favored, but school learners and pre- and inservice teachers engaged in projects of all sorts. Collaborative learning projects, collaborative knowledge-building projects, and collaborative research projects, whether Internet-enabled or not, require trust in the process (T), openness of communication (O), realness of goals (R), and interdependence (I). Completed projects as well as learning artifacts demonstrated the relevance of these processes (TORI model, Gibb & Gibb, 1967). More concretely, in instances where project goals became real for participants, interdependence developed and collaborative inquiry flourished. But when project goals did not become real for participants, especially in the case of inter-site projects, little could be achieved in terms of collaborative inquiry.

Researchers' specific domains of study, culture, and context were, however, also at play in these initiatives, influencing the conduct of projects within and across sites. Diversity was celebrated, but, not surprisingly, some research teams found more complicity and complementarity toward their goals, and others less. For example, two research teams' domain was the training of trainers, situating their research in the workplace, whereas others had university- or school-based locations. Although synergy developed between teacher education research teams as they advanced their respective designs (similarity of clienteles and activities), there was less opportunity for training-of-trainers research teams and teacher-education research teams to develop synergy because of their different clienteles and activities.

Moreover, in the scope of teacher education and professional development both locally and

provincially, only a few teachers and teacher educators were reached overall. The relevance of the concept was far from obvious to many actors, and for those interested in the concept there were numerous feasibility issues. Therefore, collegial and administrative support must be identified as another influential factor in all settings (school, district, and university). For example, signed agreements granting permission to involve local community members or to bypass a firewall, sufficient allocated resources, and political endorsement were critical to the success of specific TeleLearning-PDS design experiments.

Nevertheless, networked computers supported collaboration in ways we did not expect at the onset of our telelearning design experiment. We found that school learners participated in introducing university students and sometimes colleagues to some uses of ICTs. University students mentored school learners on-line, and graduating students produced learning artifacts that incoming students could take advantage of in preparing student teaching. Teachers presented and discussed their work in their local professional community and beyond, and graduate students and teacher educators at one university learned from their colleagues' work at another university. Our networked learning communities kept growing, and the results illustrated how ICTs can support university-school relationships in teacher education and professional development. The inventor of the Web, Berners-Lee (1999) and colleagues have provided professional educators with the means to move beyond the walls of their classroom when practicing telelearning and of outgrowing the assembly-line model that permeates the organization of their work (the isolated classroom, be it an elementary, a secondary, or a postsecondary classroom).

Referring to the first sense given to *telos* by Greek philosophers, that of distance, one may ask: Where does such a research and development project end? With the infusion of ICTs, we suggest that there is much rethinking to do about how organizations (departments and schools) operate. Telelearning challenges educational administrators to demonstrate administrative imagination and provide support, including financial support. Authorities' lack of proactive behavior reduces the distance (in French, *trajet*) that individual teachers can go with telelearning and consequently their zone of innovation. Creative and resourceful school administrators were instrumental in carrying a project beyond the reach of what was originally intended by innovative teachers and what they could accomplish by themselves.

Regarding the second sense given to *telos*, that is, whether the Tele-Learning-PDS project met its purpose, the sociotechnical design was embraced to the extent that it became possible for the R & D team to establish local alliances with colleagues who looked beyond their own specialty (educational technology, distance education, educational administration, educational psychology, and pedagogy) and could see the potential of the concept for their work as field supervisor, lecturer, coordinator, or dean. Such projects require ongoing administrative support. When new administrators arrive in office, new means are put into place that will compete with, replace, or ignore works in progress. Administrators also have to deal with the early adopters and other groups on the innovation curve. Such changes attenuate the work of initiatives such as the Tele-Learning PDS.

As an innovation the TeleLearning-PDS project evolved to serve educators interested in thoughtful and effective uses of ICTs for learning and knowledge-building purposes. It has been part of the capacity-building process through research and development at the local, regional, provincial, and pan-Canadian levels. Some of the learning artifacts that participants created are used more than others (case studies, reviews, virtual practica). Concepts like the networked classroom, network-enabled learning communities, and on-line communities of practice have

been favored by our R & D team, and their usage is reflected in our writing. Telelearning was given new meanings as we came to grasp the possibilities of ICTs for networked classrooms and schools. As networked computers become part of standard resources, productivity issues are arising. We suggest that visits, inquiries, and discussions conducted by learning communities and their members when going on-line are telelearning activities. In such activities, *telos* must precede and give meaning to distance. The fact of reaching out to distant resources (information or people) for on-campus learning purposes is a new reality for school- or campus-based classrooms.

Now that educators know more about what is possible with ICTs, future R & D projects will need to address issues of sustainability and scalability of network-based practices.

Conclusion

Innovation in a social context has a course of its own, which must merge with individuals' understanding of their roles and their own projects when it comes to improving teaching and learning. Educators have begun to explore how ICTs can make a difference for school learners and in their own learning. Educational research that relates to innovation has been redefined as design experiment. We engaged in such a process with our R & D initiative into the effective uses of ICTs for teaching and learning. Our consciousness of what networked computers can do for learning and knowledge-building developed, and we found ways to communicate with students, schoolteachers, colleagues, and administrators about themes and meanings that have persisted. Breadth and depth were qualities in tension in our design experiment.

Banathy (1996) observed that there was growing interest in redefining design in greater breadth and depth; this interest was instrumental in designing the TeleLearning-PDS. Later, Nelson and Stolterman (2000) made the case for "design as a guarantor of project success that expected outcomes would emerge serving the right place, at the right time, and in the right measure" (p. 30). They described the search for realness by opposing it to the search for the truth, and depict the real in terms of intention, multiple perspectives, practical judgment, production, interpretation, systems thinking, and patterns. Given the great number of teachers and students who meet face to face on a regular basis in classrooms all over Canada, the Educating Educators research team's contribution to the telelearning domain can be summed up as having been primarily a search for realness in the virtual world.

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