

Transforming teacher professional practice through broadband technologies¹

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Abstract: The Advanced Broadband Enabled Learning (ABEL) project seeks to transform teacher professional practice through the use of broadband technology in schools in Canada. Underlying the project is a model that provides a multi-modal learning platform, a participant driven professional growth program, a supportive implementation strategy, and an on-going formative evaluation strategy. All components of the model inter-relate in a mutually supportive manner. The preliminary results from the first 18 months of the project have been encouraging. Teachers are now more willing to investigate, experiment, and collaborate in trying out new pedagogical approaches using the ABEL tools than they were initially. They have begun integrating broadband technologies into their practice in ways that are breaking through the bounds of traditional pedagogies, offering their students more authentic and engaging learning experiences.

Introduction

Significantly changing educational practice is a long, arduous process. Michael Fullan, who has extensively studied and written about educational change, estimates that an elementary school can be turned around from a poor performing school to a good or better one within three years, a high school can be reformed in six years, and a school district in about eight years (Fullan, 2001). Even at that, he adds, the number of examples of schools and school districts that have been transformed is discouragingly small given the intense efforts that have been devoted to educational reform over the last several decades. Moreover, reform efforts that have focused specifically on using information and communications technology (ICT) by and large have fared no better in producing fundamental changes in teaching and learning nor the productivity gains often promised by their leaders (Cuban, 2001).

The heart of this dilemma appears to be the lack of support for teachers (Fullan, 2001). Teachers, acting both as individuals and collectively with their colleagues, are absolutely vital in sustaining reform as school change clearly stands or falls depending on what teachers choose to do in the classroom (Elmore, Peterson, & McCarthy, 1996; Fullan, 2001; Owston, 2003). The challenge is exceedingly difficult, however, because teachers tend to “gravitate” toward approaches that are congruent with their past practices, focus on surface manifestations of reforms (*e.g.*, discrete activities or materials) rather than on deeper pedagogical principles, and tend to graft new approaches on top of existing practices without altering past routines or norms (Coburn, 2003). Collegiality, open communication in the school, trust, support, and high job satisfaction and morale among teachers are vital. Schools that focus on team learning foster a culture that values these attributes (Senge, 2000). A major part of team learning is teacher professional development—but not the traditional notion of professional development that permeates most schools, where one-shot workshops and outside authorities “deliver” professional development to teachers, as this kind of professional development offers very limited growth opportunities for teachers. Rather professional development that is long-term, school-based, collaborative, focuses on students’ learning, and linked to curricula tends to be most effective (Hiebert, Gallimore, & Stigler, 2002). Added to this ICT specific professional development should involve

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teacher hands-on technology use, a variety of learning experiences, ongoing technical assistance and support, and learning curriculum-specific software applications (NCREL, 2002).

The ABEL Project

With this understanding of the centrality of teachers in school reform as a starting point, we have embarked on a multi-year, pan-Canadian project aimed at transforming teacher professional practice. Called the Advanced Broadband Enabled Learning (ABEL) project, it seeks to engage teachers in a new culture of teaching and learning through the use of broadband networks. Since its beginning in the summer 2002, the project has created a community of over 300 individuals drawn from K-12 schools, post secondary institutions, and school boards in Ontario and Alberta, as well as from the public and private sectors. ABEL is comprised of four components, and from the interconnection of these components-in-use, a thriving learning community is emerging.

The first of these components is the “learning platform,” which mediates a variety of learning experiences that make use of IP-based videoconferencing via Canada’s Broadband Research Network (CA*Net) and regular high-speed networks to asynchronous discussion groups and instant messaging. Additionally, the multi-modal platform makes available to project participants a range of learning resources and tools for classroom use. Tools include the course management system WebCT (<http://www.webct.com>); IO (<http://www.myio.org/>), an online learning application that guides teachers through the process of creating and implementing inquiry-based learning projects; and Barrier Free Education, a web-based tool particularly suitable for the hearing and visually impaired that allows for the enhancement of multimedia artifacts with synchronized text and audio. Resources available to teachers include Heritage Minutes, a collection of dramatic 60-second “mini-movies” about significant events from Canada’s past (<http://www.histori.ca/minutes>); Insite (<http://www.magiclantern.ca>), a resource database of nearly 10,000 video learning objects aimed at the k-12 curriculum; E-STAT (<http://estat.statcan.ca>), an interactive database of Canadian socio-economic statistical information; TV Ontario’s Curriculum Resource Bank (CRB), a library of streamed video content that is linked to the Ontario curriculum expectations; and the Ontario Ministry of Education’s Learning Object Repository (LOR), that provides teachers with a data bank of re-useable digital learning objects and activities which are tagged to the provincial curriculum expectations.

ABEL’s second component is a professional growth program. The program is participant driven in its design, job-embedded, reflective, and includes a mentoring element. In the growth program, teachers assume responsibility for collaboratively developing innovative curriculum projects incorporating broadband technologies. Teachers participate in a combination of large group videoconference events that focus on key themes (e.g., use of ABEL tools, inquiry learning, effective videoconference techniques) and small group subject area-specific videoconferences to brainstorm, plan learning events, or coordinate curriculum. A key feature is that university faculty from two faculties of education collaborate with classroom teachers and student teachers who are placed in ABEL classrooms for their practicum experience. For teachers seeking formal accreditation, an online graduate degree credit course tailored for ABEL teachers was offered by the University of Alberta; teachers from Ontario can receive credit toward the Ontario College of Teachers Professional Learning Program requirement for certain approved clusters of ABEL professional activities.

Third is an implementation strategy that focuses attention on change management, motivating people to become change agents, and creating an environment that supports risk taking. The goal is to create an empowering culture that allows teachers to take responsibility for their own learning and professional growth. A key strategy to accomplish this is to overcome the major structural impediments to widespread and significant use of new technologies in education including:

1. inter-institutional barriers and inter-provincial barriers (e.g. access to research and collaborative delivery of teacher education);
2. pedagogical barriers (e.g., lack of educational models for the broadband environment that reflect changing student interaction and learning styles made possible by broadband);
3. professional barriers (e.g., differing professional development cultures and professional isolation of teachers); and
4. technological challenges (e.g., insufficient access, availability, easy use of tools).

The implementation strategy pays specific attention to an iterative quality management method of design, develop, deliver, and evaluate. Project staff responsible for each of the ABEL components—technology, learning, professional growth, and evaluation—employ this approach to guide their work. This strategy is directed at building a vibrant learning community that can overcome the challenges of jurisdictions and geographical distances.

The final component is a formative evaluative strategy that seeks to inform and shape the project as it evolves. A research team consisting of researchers from University of Alberta and York University has been an integral part of ABEL since its inception and is charged with this responsibility. The team has employed a variety of research methods throughout the project, such as detailed classroom case studies, teacher surveys, server log file analyses, document collection, interviews with key informants, and student focus group interviews and surveys. Two reports have been produced to date: a 2002-2003 interim report and a report on the summer 2003 ABEL professional development institute².

A project management team that consists of a project manager, a learning lead, a technical lead, and a research lead coordinates the four ABEL components. Overseeing the project is a board of directors that consists of representatives from the major stakeholders involved in the project.

Two Teacher Projects

Although it is beyond the scope of this paper to describe all professional growth activities that have taken place in ABEL, two projects are particularly illustrative of what ABEL achieved in its first eighteen months.

One is the “Energy Project” organized by two teachers at two different Ontario schools during the 2002-2003 school year. The focus of the project was for students to research and present issues surrounding energy production or energy resources, one representing the Grade 9 Ontario Science Curriculum Electricity Unit, the other the Grade 11 Ontario Science Curriculum Physics Energy Unit. The main aspects involved an online discussion about energy, a group proposal for the research topic through email, and a group research project presentation via videoconference. The two teachers set the project up through email and only met face-to-face after their arrival at the 2003 ABEL summer institute. Their objectives for the project included: (1) collaboration between teachers at different schools using videoconferencing, (2) integration between students in different schools and different grades, (3) students learning about how another class approaches the same project, and (4) the use of innovative broadband technologies to stimulate students’ interest and to encourage them to strive for excellence. Upon project completion, the two teachers engaged in a dialogue on what worked and what did not work, students’ feedback both positive and negative, and the technology problems encountered, then asked “Would they do this project again?” They answered “yes” to this question and began planning the project for the 2003-2004, but this time involving a teacher from Alberta. When the teachers reported on the project at the 2003 summer institute they emphasized how much they learned about broadband technology to stimulate student interest and how they learned to collaborate even though they had never met until then.

The second, called MC2, was a mathematics project involving a high school teacher from Ontario and one from Alberta, their students, faculty from two community colleges, and a faculty member from the University of Alberta. At the beginning of the MC2 project students were introduced to one another through an introductory multipoint videoconferencing event. After getting acquainted with one another and the ABEL resources, students researched mathematics problems which they could present as challenges to their remote peers. Students at each school then worked singly and in small groups to solve the problems presented to them by the remote class. Both the problems and their solutions were presented using two channels—online discussion groups and interclass videoconferences. Students could ask online “mentors” questions to help them along in their project. Technical difficulties were encountered during one videoconference that prevented students from exchanging problem solutions, but overall the teachers reported that students were highly motivated to participate in the project, and produced very high quality solution presentations. In later interviews the teachers commented on their own growth in ability to work collaboratively as a consequence of the project, and on their greater level of comfort using videoconferencing and related ICT tools.

² Copies of the reports may be obtained from the senior author.

Project Outcomes

Overall our results after the first year and a half of the project are promising. After a slow start in the months following the first summer institute that launched the project, a clear shift in the project's momentum occurred in the final quarter of the 2002-2003 school year. For a large proportion of teachers, a sense of vagueness about the project and what their involvement in it ought to be, along with a desire for a more prescriptive approach to project development, gradually gave way over the year to a greater willingness to investigate, experiment, and collaborate in trying out new teaching options using the ABEL tools. Part of this change has come about simply through teachers' increased knowledge of ABEL systems, which developed as they were exposed to new applications and tools through their participation in the large learning events, and especially the tools sessions. But both the survey and interview data, as well as observations of the different types of learning events, indicate that the key to understanding the rapid increase in project momentum lay in the efforts of the project team to actively seek out feedback from participants in their events, and then quickly move to change direction when that feedback indicated that obstacles were developing or needs were not being met.

By the time of the second summer, when teachers met face-to-face again, their transformation was significant. Teachers reported that had begun integrating broadband technologies into their practice in ways that were breaking through the bounds of traditional pedagogies, offering their students more authentic and engaging learning experiences. Furthermore, teachers found that the institute helped in building team skills, enjoined them to reflect critically on the previous year, gave them an opportunity to talk about pedagogy in ways that they otherwise would not have, and provided them with insights and ideas for future collaborations.

As ABEL moves into its second year many participating teachers are now focusing their efforts on developing longer term, multi-classroom collaborative projects employing interactive videoconferencing. Their goal is to embed ABEL activities into the larger pedagogical enterprise that leads students to co-construct knowledge through meaningful, active inquiry using a range of strategies.

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