CSCL for teacher professional development

Bruno Poellhuber, Catherine Allen, Université de Montréal, C.P. 6128, succursale Centre-ville, Montréal, Québec, Canada H3C 3J7, bruno.poellhuber@umontreal.ca, catherine.allen@umontreal.ca
Martine Chomienne, Cégep@distance, C.P. 1000, succursale Rosemont, Montréal, Québec, Canada H1X 3M6, mchomienne@cegepadistance.ca

Abstract: Within the last fifteen years, many colleges of the province of Quebec in Canada have been faced with low admission rates in some less popular technical programs. The increased financial burden for these institutions and the enhanced task burden for teachers working with small groups of students threaten the quality of teaching and learning. In order to cope with this situation, computer-mediated collaboration (telecollaboration) was used to provide teachers with the opportunity to work with colleagues from other colleges who teach similar courses. In this short paper, the impacts of telecollaboration on resources diversity and teacher professional development are examined. After four semesters of experimentation, questionnaires and interviews suggest that teachers learned from their colleagues as they shared ideas and acquired pedagogical and technopedagogical knowledge and skills.

Introduction

Positive effects of collaborative and cooperative learning are well documented for students (Abrami, 1996; Johnson and Johnson, 1994). However, the same process is only marginally studied for teachers, especially regarding computer-mediated collaboration. In the province of Quebec (Canada), many college teachers work in remote regions and have only a limited number of students and colleagues. In order to provide more isolated teachers with opportunities to share pedagogical and disciplinary ideas, Quebec’s ministry of education implemented a project (the CEGEP network project) creating teams of teachers from different colleges. CSCL is used to foster professional development, and computer-supported telecollaboration is also used among their students.

Context and background

In Quebec, admission rates are diminishing in many technical programs, especially in remote regions (Inchauspé, 2004). Rural youths migrate in numbers to more urban areas (Gauthier, Molgat and Côté, 2001) and information on career opportunities related to less popular programs often fails to reach students. These programs are often important for regional economic development, because they train specialized workers for local enterprises. Maintaining these programs represents an increased financial burden on colleges in remote regions (Inchauspé 2004), and teachers working in these programs face increased workloads. Individuals are often responsible for all courses even though they are not necessarily experts in all subjects. Loneliness and work overloads are a threat for teachers and the lack of diversity of resources (teachers, other students, technical resources, etc.) available for learning may threaten the quality of the student learning experience. As the demographic decline continues, this situation is not expected to improve in the future.

Using telecollaboration to sustain teacher professional development and program vitality

In order to cope with this problematic situation (Inchauspé 2004), CEFRIÖ (Centre francophone d’informatisation des organisations or French-language organizational computerization centre) launched a project in which computer-mediated collaboration (telecollaboration) is used to foster professional development and resource diversity in both informal and formal ways. In the CEGEP network project, telecollaboration was used to pair up teachers working in similar programs in remote colleges to design learning activities for use in jointly run remote classes. In these activities, students were typically encouraged to work in teams even though they were physically separate. The CEGEP network project was designed to encourage teachers to share resources and expertise based on regional specificities. In this first phase of the project, we wanted to test the possibility of improving program vitality, defined as teacher professional development and the diversity of resources available to both teachers and students. The aim of the project is to find ways to help maintain these endangered programs in small colleges while maintaining or improving the programs’ vitality.

Even though teachers were free to decide how to collaborate with their students (choice of activities, pedagogical design and class interventions), the researchers and colleges supported the teachers in numerous ways. The colleges have ICT counselors who can help teachers deal with instructional design and effective use of ICT in class. The ICT counselors were trained by the researchers, and the ICT teams gave guidance to the
teacher teams. At each semester, meetings were held to train teachers and ICT counselors on the design of computer-supported collaborative learning and to reflect on best practices with teachers, administrators, researchers and counselors.

Literature review

Models of teacher professional development

In this research, program vitality is intrinsically linked to opportunities for teacher professional development. Professional development has traditionally been considered as a linear process. Teachers would participate in one-off workshops presenting new and more efficient ways of teaching. Afterwards, they would eventually incorporate these new strategies into their own teaching practices (Butler et al., 2004; Clarke and Hollingsworth, 2002). In these models, teachers act as technicians who individually apply external knowledge developed by researchers (Butler et al., 2004) and only formal training is recognized as a source of change in practices (Clarke and Hollingsworth, 2002).

Other researchers argue that professional development is similar to any other learning process and therefore use recent learning theories such as socio-constructivism (Knight, 2002) or self-regulation models (Butler et al., 2004) in their work. For them, professional development is a reflective and continuing process in which teachers construct their own instructional knowledge (Butler et al., 2004; Clarke and Hollingsworth, 2002). Informal opportunities to learn from colleagues or to reflect on teaching practices are examined by these researchers as well as formal training workshops (Uwamariya and Mukamurera, 2005). Communities of practice can also be part of the professional development process, providing space for reflection and common goals to meet (Triggs and John, 2004; Hamel, 2003). For these authors, professional development is not conceptualized as a top-down transmission of knowledge in this study. It is an individual and collective learning process fuelled by diverse opportunities for reflection and change, with changes in teaching practices and attitudes serving as indicators of learning (Clarke and Hollingsworth, 2002; Gusket and Sparks, 2002).

Characteristics of the change environment

In this study, even though different sessions of formal training took place, the project consisted mostly of the implementation of an environment promoting discussion, collaboration in the implementation of new teaching practices and reflection on these practices and their results. In Clarke and Hollingsworth’s interconnected model of professional growth (2002), the change environment and the external domains are particularly important for changing teachers’ beliefs and practices.

External learning opportunities can be formal or informal. Discussions with colleagues, instructional resources, counselor support (Triggs and John, 2004; Clarke and Hollingsworth, 2002; Clement and Vandenberghe, 2000) and formal training (Gusket and Sparks, 2002) can all fuel professional development. Nevertheless, the atmosphere in which the teachers work is crucial in order for reflection and change to happen. Departments with institutional policies and practices geared at professional development (Gusket and Sparks, 2002; Clark and Hollingsworth, 2002) or opportunities to experiment without being judged by colleagues or administrators provide such an atmosphere (Triggs and John, 2004). Can computer-mediated collaboration or telecollaboration create such an environment for teachers?

Research question

This short paper addresses the following question: To what extent can telecollaboration increase the vitality of technical programs with low admission rates? Two major dimensions of vitality were examined: resource diversity and professional development.

Methodology

Context

The CEGEP network project was implemented during the 2006 winter semester. To allow teachers and students to communicate together, three major tools were chosen before the project started. The first one is a videoconferencing program called Via (similar to Adobe Connect or Elluminate) which offers different collaborative tools such as a presentation area, an interactive white board, a chat system and document and application sharing. Teachers and students also used another videoconferencing tool (telepresence window) and a learning management system (DECClic) to communicate and share documents. During the first four semesters of the CEGEP network project, more than 30 teachers, 200 students, 25 administrators and 11 ICT counselors from 11 colleges in the province of Quebec participated. Data collection started during the second semester of implementation (fall 2006) and ended in December 2007.
Procedure

This study employs a design-based methodology with mixed methods. Each semester of the project represented an iteration, and data were collected each semester through general meetings with the participating teachers, ICT counselors and administrators to present successful and unsuccessful cases and reflect on best practices. While lessons learned on the design of computer-supported collaborative activities are not the focus of this paper, they were communicated to all participants at each iteration. The implementation of computer-supported learning activities for students was the focus of teacher collaboration, and data were collected from students in various ways, but the focus of the first phase of this study was the teachers. While the teachers were learning to implement successful learning activities, in the second phase of the project (ending in June 2009), the focus gradually shifted towards the students.

The researchers visited the colleges many times between 2006 and 2007 and witnessed discussions and changes in teacher practices through participant observation. Questionnaires on computer literacy, frequency of ICT use, professional development workshops and barriers to telecollaboration were distributed twice in 2007. In the middle of the winter semester, 53 teachers answered the questionnaire while only 24 did at the end of the fall semester. The results were analyzed using SPSS. For qualitative information, individual interviews were held with nine participant teachers, and notes were taken during four meetings of the coordination committee. All interviews were transcribed and coded using a code book developed by the research team. Atlas.ti was used to perform analyses on the transcripts and calculate code frequencies.

Results

Types of collaborative activities

Collaboration between teachers increased as they became more familiar with the technological tools. The teachers mostly used Via to plan learning activities because of its elaborate tools for collaborative work (for example the ability to comment documents and share applications was popular among teachers). Some of them also used SKYPE to communicate outside normal working hours or when they needed help from ICT counselors in another college. Statistics on videoconferencing use (Via) obtained through the software database show that the number of work sessions between teachers increased between 2006 and 2007 while training decreased (see figure 1). Indeed, at the end of 2007, teachers sometimes met every week to plan for future learning activities. These activities were also more numerous at the end of the experimentation period.

Changes in teaching practices

Teaching practices changed during the four trial semesters, which is a good indicator of professional development (Clack and Hollingsworth 2002). At first, lecture was often used by teams of teachers who combined all their students into a single virtual group. Teachers took turns lecturing in their own classroom while the students not physically present followed the lesson through a videoconferencing system. When teamwork was organized, the learning activities were short, lasting for only one or two classes. In contrast, in the fourth trial semester, the learning activities were more diversified. Some teachers asked students from different colleges to work in teams on a project for a few weeks or the whole semester. The teachers realized that the students lost interest quickly while listening to lectures in front of a computer, so they largely abandoned this particular teaching method in favor of more engaging ones. In brief, the researchers observed positive development in instructional design.
Effects on resource diversity

All nine teachers reported at least once in interviews that they benefited from the expertise of one or more colleagues in their discipline during the CEGEP network project experiment. Learning from a colleague who is not specialized in the same domain as the other teachers in the team is a positive impact of telecollaboration, according to the teachers. Sometimes, each teacher on the team taught lessons related to their own area of specialization and they were no longer required to lecture on notions topics outside of their expertise. This can eventually reduce individual workloads. Experienced teachers can also provide help on instructional design to those who have just started teaching. Thus, subject-matter and pedagogical resources are shared from one college to another.

Six out of seven teachers emphasized that their access to instructional and technological materials increased when they participated in the CEGEP network project. They shared their own teaching materials with teammates or used some of it to build telecollaborative learning activities. Telecollaboration tools are other resources that can benefit teachers from participating college in the future. Workshops and demonstrations were held in some colleges to show the potential of telecollaboration to all the members of the institution. Consequently, teachers benefited from more human and material resources with the implementation of the CEGEP network project.

Professional development

All teachers referred to professional development in the interviews (see table 1).

Table 1: Frequency of references to professional development in the interviews

<table>
<thead>
<tr>
<th>Professional development</th>
<th>Individual interviews (/9)</th>
<th>Coordination committee (/4)</th>
<th>Total # of references</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discussions and sharing</td>
<td>9</td>
<td>3</td>
<td>70</td>
</tr>
<tr>
<td>Knowledge and skills acquisition</td>
<td>6</td>
<td>3</td>
<td>63</td>
</tr>
<tr>
<td>Pedagogical</td>
<td>5</td>
<td>1</td>
<td>33</td>
</tr>
<tr>
<td>Technological pedagogical</td>
<td>3</td>
<td>2</td>
<td>19</td>
</tr>
<tr>
<td>Technological</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Content</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Others</td>
<td>2</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Feeling less isolated</td>
<td>4</td>
<td>0</td>
<td>16</td>
</tr>
</tbody>
</table>

“Discussions and sharing” was the category most unanimously and frequently mentioned in the corpus. The teachers all mentioned discussing different aspects of their work with colleagues. For example, they enjoyed learning about what was going on in other colleges. They also emphasized that they benefited from the expertise of one or more colleagues in their discipline during the CEGEP network project. Five out of seven teachers emphasized pedagogical discussions as a positive consequence of the project. Even though the teachers did not often precisely identify what kind of collaboration took place during the project, they all stated that telecollaboration made them talk and think about their own teaching practices.

The CEGEP network project provided opportunities for increased knowledge and skills, according to six teachers out of nine. Moreover, questionnaire results indicate that proficiency with Via increased significantly between the beginning and the end of 2007 (df = 1; f=11,999; p=0,001). It does not seem that other purely technological skills increased for participant teachers, but the small sample reduces the possibility for statistical analysis and the participants were already highly computer literate. Nevertheless, the teachers learned more than just using new technology.

In interviews, teachers identified two important skills that they acquired throughout the project. The first skill is the effective use of telecollaboration in the classroom. No model of telecollaboration between students of different colleges was available in theory. The teachers therefore collectively constructed knowledge from reflections on their best and worst practices. The second important skill was in instructional design. Some teachers realized that they faced similar challenges in both distance and traditional classes. They believe that they can apply what they learned in the CEGEP network project to improve their teaching practices and better motivate students in class. Telecollaboration with colleagues helped teachers reflect on teaching beyond the use of technology to foster collaboration between students.
Discussion

Results suggest that pedagogical resources and expertise increased during the four semesters of experimentation, providing opportunities for professional development (Triggs and John, 2004; Clement and Vandenberghe, 2000). The teachers also reported that they acquired technopedagogical and pedagogical knowledge, while the researchers witnessed changes in their practices throughout the experimentation. The teachers were able to use telecollaboration as an opportunity to construct their own knowledge on teaching and learning.

The quality of telecollaboration varied across teacher teams, however. Teachers often had to considerably modify their course outline because paired programs and courses were sometimes significantly different. When teaching styles differed too much within a team, disagreements over the design of telecollaborative learning activities made the learning experience less rewarding. Moreover, in some colleges, participating teachers had to quit their jobs for reasons of illness, retirement or lack of student registration. Collaboration could not continue with teachers in only one college in those teams.

As reported in other studies, some key elements for successful telecollaboration between teachers were identified: technological factors, teacher commitment and interest (related to time and financial allocations). But the quality of the collaboration experience also depended on socio-affective factors (professional climate and confidence), pedagogical factors (compatibility of teaching approaches and objectives), administrative factors and the teachers’ technopedagogical competencies (or TPK in Mishra and Koestler’s TPACK model). As suggested in the Butler et al. self-regulation model (2004), the most successful teacher teams devoted time to reflect on the activities and measure and discuss the learning outcomes.

Conclusion

After only four semesters of experimentation, telecollaboration experienced through the CEGEP network project seems promising as a means to foster teacher professional development. In this project, computer-mediated collaboration enabled teachers to share expertise, ideas and materials in programs with low admission rates. The degree of success varied across teacher teams, however, and different barriers to telecollaboration were identified by researchers and participants. Moreover, the impacts of telecollaboration on students need to be studied more closely in order to achieve program vitality. The small samples of participating teachers and students are another limit of this study because statistical analyses are difficult to perform with such low numbers. Nevertheless, teacher telecollaboration continues with the CEGEP network project. More precise measures of teacher and student learning will help us to understand how CSCL can foster learning at the workplace and at school in future research.

References


Inchauspé, P. (2004). Projet les cégeps en réseau. La mise en réseau de programmes techniques en difficulté peut-elle permettre leur consolidation? Montréal, Québec: CEFRIO


