Teaching Teachers to Teach Together Between High Schools

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The proliferation of Internet-based networks linking small schools in rural communities in some countries challenges the appropriateness of teaching exclusively in the closed environments of traditional classrooms. The development of Internet-based school networks, facilitating the creation of virtual classes, has implications for the professional education of teachers who will, it is argued in this article, increasingly teach both face-to-face and on-line, or virtually and actually. Internet-based networks of schools provide opportunities for teachers to collaborate with their colleagues in the open learning spaces between sites that are academically and administratively linked. This paper outlines four ways in which pre-service Canadian teachers are encouraged to collaborate in preparation for teaching together across dispersed sites.

Key Words: Cybercells, Rural, Triads, Virtual, Teaching Teachers, High Schools

INTRODUCTION

Teachers have traditionally had their own classrooms in the schools to which they are appointed, in which they have been expected to teach students assigned to them. This way of organizing teaching and learning has a long history and wide acceptance, but with increasing use of the Internet, the interactive possibilities of Web 2.0 and an expanding range of educational software, collaboration between both teachers and those they teach has become increasingly possible. Instead of teaching exclusively in classrooms in traditional schools, teachers now have increasing opportunities to teach together across multiple sites. This way of organizing teaching and learning is particularly appropriate in societies that have significant populations to be educated in small communities located beyond major centres of population. The potential of collaborative teaching between high schools for such people has been realized in a growing number of developed countries.

Collaborative teaching has been used in a variety of educational contexts and is known also as team teaching (Anderson, et.al.,1998; Leavitt, 2006; Wentworth & Davis, 2002), peer-teaching (Bullough et.al. 2002, 2003; Hasbrouck, 1997; Morgan, et.al.; Neubert & McAllister, 1993; Pierce & Miller, 1994; Wynn & Kromrey, 2000) and co-teaching (Eick et.al., 2003; Tobin & Roth, 2005). Collaborative teaching is central to the formation of learning communities (Cochran-Smith & Lytle, 1999; Ertl & Plante,

2004; Hu, et.al. 2011; Roth & Tobin 2005) in encouraging teachers to work together and critically assess one another's teaching (Dunne, et.al., 2000). Collaborative teaching, peer teaching, co-teaching and team teaching all describe recent developments in Internet-linked networks of high schools spanning dispersed rural communities, between which teachers are increasingly able to work together (Griffin & Sherrod, 2005; Stevens, 2012).

THE EMERGENCE OF COLLABORATIVE TEACHING IN HIGH SCHOOL INTRANETS

Some of the first collaborative networks of schools or intranets, pre-dating the introduction of the Internet, were developed on opposite sides of the world, in Iceland, Finland and in New Zealand. Since 1989 Iceland has had the Icelandic Educational Network that links all schools in that country (Stefansdottir, 1993), while in Finland schools in Helsinki have been linked with selected small, rural counterparts in Lapland, in the far north of that country (Kynaslahti & Wager, 1999; Stevens, Kynaslahti & Salminen, 1996).

The Cantatech network began in the early nineteen nineties in the South Island of New Zealand as an attempt to halt the decline in rural school enrolments in the Canterbury region (Stevens & Moffatt, 2003) In the Cantatech network teachers of specialized subjects such as agriculture, economics and Japanese in small rural Canterbury schools were able to provide instruction to students who were linked to them from other schools using dedicated telephone lines attached to electronic whiteboards. This pre-Internet form of distance learning, known as audiographic instruction, was made possible via speakerphone and electronic tablet in which teachers and students could hear one another and together follow written material on the tablet, opened a new way of providing instruction by linking classrooms in real, or synchronous, time. Teachers in one school in the Cantatech network were able to teach to as many as eight sites simultaneously. This enabled curriculum options to be enhanced for students who lived in small communities located beyond major centres of population. Although video conferencing (Roberts, 2009) and other contemporary technologies are now used in the network (Craig & Stevens, 2011) the pre-Internet linking of classrooms across dispersed rural sites is perhaps Cantatech's most significant contribution to the education of rural students in providing a new way of enabling teachers and learners to collaborate two decades ago.

While New Zealand, Iceland and Finland were experimenting with telephone-based communication technologies two decades ago, initiatives were under way in Russia to provide instruction in science from Moscow State University to selected small schools in Siberia (Sandalov et.al., 1999). Later in the decade, experimental work in small schools in the Canadian province of Newfoundland and Labrador began to re-organize the provision of learning opportunities as teachers began teaching from one school into selected others. A feature of education in the Canadian province of Newfoundland and Labrador is the proliferation of Internet-based networks linking its many small schools in rural communities (Stevens, 2011). Within these networks virtual classes have been developed for teaching an expanding range of subjects between schools at high school

level. The development of Internet-based rural school networks, facilitating the creation of virtual classes, has implications for the professional education of teachers who will, increasingly, be teaching both face-to-face and on-line, or virtually and actually. The professional preparation of high school teachers has, accordingly, had to make provision for this new teaching and learning environment.

A Collaborative Network in Newfoundland and Labrador

The Canadian province of Newfoundland and Labrador has a population of approximately 500,000 people, of whom less than 30,000 live in Labrador. In Newfoundland, the island portion of the province, almost all of the population lives in coastal settlements, including the capital, St John's. Approximately two thirds of schools in the province are located in rural communities. With continuing out-migration most small schools in Newfoundland and Labrador are decreasing in size and during the last decade many have closed and local students have had to travel to larger centres to continue their education. Since 1998 there has been consolidation of school boards in Newfoundland and Labrador from ten to four reflecting the reduction in both the size and number of schools in the province. The changes that have taken place in the organization and administration of education in rural Newfoundland and Labrador have influenced classroom structures and processes.

In 1998 the first intranet was established in Newfoundland and Labrador in which eight schools in the same rural district were academically and administratively integrated through the local school board, so that teaching and learning could be shared between the dispersed rural sites. The eight participating schools had to coordinate senior classes in those areas of the curriculum that were taught across multiple sites. Some schools received instruction for senior classes from teachers located on other sites (schools) within the network. Collaboration between schools, teachers and students in the initial teaching and learning network was essential. Classrooms that had previously been closed to one another began to open to classes located in other parts of the district network for both teaching and learning. The autonomy of teachers within their own classrooms as well as their isolation from other members of the profession was challenged by this initiative. Students struggled with the concept of discussing their work with peers they did not know who participated in shared lessons taught from other locations. The traditional closed, or autonomous, model of the school was challenged by an increasingly open teaching and learning environment.

The initial intranet initiative challenged the notion that senior students in small schools have to leave home to complete their education at larger schools in urban areas. By participating in open classes in real (synchronous) time, combined with a measure of independent (asynchronous) learning, senior students were able to interact with one another through audio, video and electronic whiteboards. The initial electronic linking of eight sites within a school district to collaborate in the teaching of Advanced Placement (AP) Biology, Chemistry, Mathematics and Physics initiated a series of open classes in rural Newfoundland and Labrador. (Advanced Placement courses enable senior students in Canada and the United States to gain credit towards undergraduate degrees from high school depending on the grades specified by the university of their

choice). The creation of the first intranet was an attempt to use information and communication technologies to provide geographically-isolated students with extended educational and, indirectly, vocational opportunities (Stevens, 2003). The development of the first intranet within a single school district involved the introduction of an open teaching and learning structure to a closed one. Accordingly, adjustments had to be made in each participating site so that administratively and academically, AP classes could be taught. While technological and administrative changes supported this initiative, adjustments were needed in the professional education of teachers.

The structural changes that have taken place in Newfoundland and Labrador since the inception of the first intranet, within which initial AP courses were developed and taught, has advanced to become a system that provides online instruction to almost all schools in the province. The provincial government, after a ministerial inquiry (Government of Newfoundland and Labrador, 2000) expanded the linking of schools through the creation of the Centre for Distance Learning and Innovation (CDLI) within the Newfoundland and Labrador Department of Education. CDLI develops and administers online learning that complements traditional classes in schools throughout the province. Awareness of what was taking place in the delivery of education in the province had to be introduced to pre-service as well as practicing teachers who have traditionally been prepared to teach in autonomous, or closed, teaching and learning environments known as classrooms. While many members of the profession will continue to provide instruction in traditional closed environments, an increasing number will teach in open, collaborative, Internet-based learning spaces.

TEACHING TEACHERS TO TEACH TOGETHER

Teachers have been prepared for positions in collaborative networks in four ways: (i) by raising awareness of the changes in schools that have taken place based on open teaching and learning environments in networked schools; (ii) an experiment with a triad approach to classroom practice in traditional classrooms; (iii) the introduction of learning circles and Professional Associates; and (iv) the creation of cybercells.

(i) Development of Awareness of Collaborative Teaching and Learning Structures

The first step in the introduction of pre-service high school teachers in Newfoundland and Labrador to the idea of networked classes is the development of awareness of recent changes in school organization in the province, particularly in the majority of schools that are located in rural communities. Pre-service teachers have traditionally been prepared to teach in Newfoundland and Labrador schools in which they could expect to have their own classrooms and their own students on a single site. It is likely that many teachers will not now teach exclusively in classrooms but also in the spaces between schools, such as intranets, as classes are academically and administratively integrated for at least part of the school day. Teachers in rural Newfoundland and Labrador will, to an increasing extent, teach on site as well as online, in virtual as well as in actual classes. This change requires a different way of thinking about teaching and the organization of learning. Future teachers in the province's high schools will require collaborative skills that their predecessors of a decade ago did not need. In Memorial University of Newfoundland's secondary teacher program in the Faculty of Education

students have been introduced to the concept of learning circles (see below) within which they can collaborate by sharing ideas and experiences about their initial observation visits to local schools and, in particular, their semester-long internships. Not all students return from the intern experience to the university aware of the changes that are taking place in the delivery of education in the province, particularly if they spent their time in urban schools. However, it is accepted that learning circles provide a collaborative process that complements the structural changes that have been introduced in the organization of schools over the last decade in Newfoundland and Labrador.

(ii) Triads and Traditional Classrooms

Traditional thinking about teacher education has been based on a model in which theory is introduced to pre-service teachers through university-based courses followed by a dyadic internship in schools. In the dyadic relationship pre-service teachers are paired with practicing teachers who supervise, advise and mentor them as interns. This dyadic model, in which a pre-service teacher works alongside an experienced teacher, is widely used in Faculties of Education. The preparation of teachers to teach classes that are networked with teachers and learners on multiple other sites requires a conceptual shift from traditional classroom teaching in which teachers are encouraged to collaborate with one another. A recent experiment based on four case studies of face-to-face teaching in Canadian schools, suggests that a triad model provides a context for pre-service teachers to give one another intensive feedback, share insights and support each other as they engage in peer-teaching and co-teaching (Goodnough et. al., 2009). In a triad, two pre-service teachers are placed in the same classroom as the cooperating teachers, rather than the traditional one pre-service teacher working alongside a cooperating teacher. The outcomes of the Canadian study suggest that a triad model has some positive outcomes for pre-service teachers, such as a decrease in feelings of loneliness, higher levels of collaboration, greater risk-taking, the development of more varied lessons and a change in the power structure within classrooms between cooperating and pre-service teachers. The triad model challenges the traditional dyadic approach to pre-service teacher education and has implications for how teacher preparation is conceptualized at a time when schools are increasingly networked, facilitating teacher collaboration between classrooms located in diverse locations. At the end of the triad experiment teachers reported a range of advantages and disadvantages in working with a colleague in the same classroom. One reported "there was a lot of collaboration and a lot of communication and we brought a lot of creative ideas into the classroom." The synergy of two teachers teaching together was confirmed by another intern who noted "If I was to do it (the internship) alone, I would not be able to put as much time in to develop it. I am creative and (the other intern) is creative but has different experiences so we really complemented each other." This was supported by another intern: "The collaboration was excellent. (The other intern) would come up with an excellent idea I had not thought of and we'd discuss it and bounce ideas off one another. As well, we team-taught. While she was teaching I could observe how the students were understanding and listening to what she was teaching and I would do a little assessment of my own on how well they were grasping the topic." One of the

potential disadvantages of the triad model was working styles. It was pointed out by one intern that "you have to make sure that your partner – I mean the other intern – has the same working style as you or you can clash. If you are working on a unit together and you are planning it and putting in a lot of effort and the other person is not putting in as much, it can clash and get sticky." The triad experiment was summed up by the intern who said of her partner, "we balanced one another."

One intern pointed out that while there were disadvantages in the triad approach, they were "a lot less than the advantages." She pointed out "I suppose you can't be yourself all the time….you're not as quick to react because you are contemplating what the others would think or do in that situation."

The teachers who accepted two interns rather than the traditional one in their classrooms were asked to comment on the experiment. One teacher's perception of triads was that "the biggest advantage is the collaboration, the sharing and the support and the dual… you could call it a mentorship. I'm not sure that between the two of them there is mentorship all the time, but it is there." Another teacher thought that "Possibly the lessons that would be presented to the children would've been better because there were three teachers often involved in the planning and coming up with ideas. Maybe one of the teachers would come up with an idea to do an art lesson one way and the other would say 'how about this?' and then I'd say we can also do it this way."

(iii) Learning Circles and Professional Associates

In the final semester of their professional education program, following internships in schools, pre-service teachers were organized into learning circles that were heterogeneous in that they comprised many different curriculum teaching areas. Mathematics, language, social science, visual art, science and physical education teachers were encouraged to discuss common issues in teaching and learning within learning circles. Pre-service teachers were encouraged to project themselves from their university learning circles into the near future when they would be appointed to schools across Newfoundland and Labrador (most of which are located in rural communities) or in other Canadian provinces, with a view to continuing to work collaboratively across disciplines by sharing common educational problems. The purpose of working in heterogeneous learning circles was to encourage the development of awareness in pre-service teachers that members of their profession have traditionally been isolated from one another in their classrooms but that this is not always appropriate in an Internet-based network of schools. Teachers may be physically isolated from other teachers within intranets spanning schools in rural communities, but they do not need to be professionally isolated in ways they organize teaching and learning if collaboration is fostered.

Each learning circle was encouraged to engage with practicing teachers who had volunteered to become Professional Associates of the Faculty of Education and thereby provide practical insights to complement learning circle discussions based on recent classroom experience and academic reading. Professional Associates of the Faculty of Education were practicing teachers and former students in the university program. By

engaging with Professional Associates who were practicing teachers in schools, pre-service teachers were introduced to the potential of collaboration between actual (face to face) and virtual instruction between the university and classrooms in schools, thereby developing awareness of the opening of traditional on-site classrooms to other classes for part of the school day. By opening university seminar spaces to include Professional Associates who were teachers in schools, collaboration between pre-service and practicing teachers was facilitated.

(iv) Cybercells

The introduction of Professional Associates to Learning Circles facilitated the creation of cybercells. Cybercells are face-to-face groups whose members extend their discussions to include virtual visitors (Stevens and Stewart, 2005). In a cybercell students can be provided with ways of integrating e-learning and traditional face-to-face instruction, thereby challenging educational isolation and promoting social inclusion.

A challenge for teacher educators seeking to engage new members of the profession is linking the practice of teaching and learning in schools to educational theory. In learning circles students are asked to bring to their discussions appropriate reading from academic journals and books that complement their discussions about recent teaching practice as interns. How can the literature support (or refute) ideas that are under discussion, drawn from recent classroom experience? Learning circles, schools, intranets and the provincial educational system are all social structures. Students are encouraged to consider the sociological implications of classroom issues they encountered and, if possible, to locate them within an appropriate theoretical perspective. Discourse about shared experience between students and between teachers facilitates the creation of new realities as participants discover common perceptions, experiences and problems. The development of shared realities through cybercells challenges teacher and student isolation in a way that is similar to how intranets challenged the physical isolation of rural schools in Newfoundland and Labrador over the last decade. In a cybercell teachers who collaborate on an actual site (or school) can share their discussions with virtual colleagues from other sites located within their Internet-based network and beyond. Cybercells enable shared realities to be created both on site, for example, in a particular school, as well as virtually, by enabling participants at a distance to engage in discourse with those in a given, physical location.

TEACHING TOGETHER – CONCEPTUAL, ORGANIZATIONAL AND PEDAGOGICAL CHANGE

The changes outlined above involved conceptual, organizational and pedagogical changes in the preparation of teachers for schools. The first change was conceptual. Collaboration between teachers enables them to move from the closed learning spaces of traditional classrooms and take advantage of the open learning environments based on the integration of virtual and traditional classes. Working together in the spaces between high schools over dispersed sites involves new ways of thinking about schools and classes. A significant conceptual change in the provision of education in rural Newfoundland and Labrador was teaching from one school to another which meant

collaborating with other teachers. Classrooms, accordingly, became open rather than closed teaching and learning environments. The notion of a school as a closed and autonomous institution with its own teachers and its own students and even its own culture was challenged by the developments that followed the introduction of the Internet to teaching and learning. A fundamental conceptual change was that teachers could teach from one school to another and that students could collaborate with their peers across multiple sites in the course of a lesson. These changes challenged traditional notions of the school, of a "small" school, of the composition of a school class and the significance of location, particularly rurality, as an educational consideration.

In organizational terms, the Internet has had profound implications for teaching, learning (Cavanaugh, 2001) and the organization of schools. At a personal level, the advent of the Internet enabled teachers and learners to engage with one another in real or delayed time (synchronously or asynchronously) using websites and a variety of technologies. With the emergence of Web 2.0, interactivity has been enhanced as have the possibilities for collaboration. Facebook, blogs, the sharing of flies, video and text messages and an increasing range of social networking possibilities facilitate teacher collaboration across dispersed sites.

Teaching in collaboration with other teachers is a new pedagogy for many teachers, particularly those who are not employed in networked schools serving rural communities. In the open learning space of networked environments teaching is a much more public undertaking than it is in the traditional closed space of traditional classrooms. The increased exposure of teaching in open environments may not be welcomed by some teachers, but the triad experiment outlined above, indicates that collaborating teachers can support one another as well as enhancing instruction. In the networks of small schools that have developed in New Zealand, Canada, Finland, Iceland and elsewhere, teacher collaboration can provide instruction in specialized areas of the curriculum such as foreign languages, economics and science to students in small communities in remote areas where it would otherwise be inaccessible. In Newfoundland and Labrador specialized e-teachers, often providing instruction from a non-local site, are supported by in-school mediating teachers, locally known as m-teachers (Barbour & Mulcahy, 2005; Coffin, 2002). Collaboration in the delivery of the curriculum by e-teachers and m-teachers across dispersed sites provides students with access to specialist instructors as well as familiar on-site teachers.

CONCLUSION

Teachers have traditionally been prepared for what have been, in effect, closed, autonomous classrooms in physical schools. The emergence of networks of schools and, with them, open learning environments, are being acknowledged by teacher educators. Collaborative approaches to teaching, including triads for interns, learning circles and cybercells, complement the advent of networked virtual environments. Students preparing to become teachers in rural Canada and in other countries with rural populations, will, to an increasing extent, be expected to contribute instruction to open, networked, virtual learning environments from the schools to which they are appointed.

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