LEARNING SUPPORTED BY BROADBAND IN A CANADIAN CONTEXT: BENEFITS AND CHALLENGES

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Abstract

Geographic isolation, remoteness and population dispersion are characteristic of Canadian life. These characteristics pose challenges to the design and delivery of equal and quality learning opportunities. Reliance on high-speed, always-on, broadband connections presents solutions to the challenge of remoteness, isolation and population dispersion. Such connections provide support for collaboration and communication without spatial and temporal barriers as well as access to multimedia-rich interactions. However, use of broadband also presents challenges related to implementation time, asynchronous communication across time zones, and motivation for use. These and other benefits and challenges related to broadband-supported learning are presented and discussed in the context of a pioneering Canadian initiative to deliver music education across spatial, temporal and cultural zones.

Introduction

As of 2001, only 25% of Canadian communities had high-speed Internet access [1]. Nonetheless, support for broadband initiatives in the elementary and secondary school sectors in Canada has been noticeable. In the 2001 Speech from the Throne, the Canadian government announced that it would provide increased access to high-speed Internet service for schools [2]. Since that time, the Canadian government has introduced initiatives to provide broadband access to schools: An example of one of these initiatives is MusicGrid which pioneers large-scale broadband learning using Music as a vehicle. Begun in 2002, the project relies on broadband visual communication tools, including video-conference, video servers, and video repositories to enable geo-culturally and organizationally diverse collaboration and learning. MusicGrid participants collaborate around music for mentoring, coaching, performance, and auditions by playing, singing, composing, conducting and listening [3].

The project represents an illustrative example of the role that information and communication technologies (ICTs) in general and broadband in particular might play in teaching and learning and provides insight into the potential benefits and challenges related to broadband use in teaching and learning. The purpose of this paper is to highlight some of these benefits and challenges. Partial results of two formative evaluations are presented and discussed as are implications for research and practice.

Background: A pioneering initiative

MusicGrid features geo-culturally and organizationally diverse collaboration and learning among 20 partnering groups and associate partners from across Canada, from Finland, Australia and Russia and from different organizations. The project is described as a pioneering initiative designed to enable, expand and enrich Canadian music education programs in urban, rural and remote communities in order to address inequities of music education programs as well as access to experts, peers and professional development by music educators.

Activities include a violin program involving a violin teacher in an urban centre supported by a satellite connection teaching students in a remote village in Northern Quebec. Clinics, workshops, concerts,

collaborative performances, master classes and teacher professional development also represent activities featured in the project. MusicGrid supports the exchange of culturally diverse music experiences through the participation of Canadian Aboriginal (Inuit) students who share traditional drumming and throat-singing techniques and performances with project participants. Professional musicians, conductors, composers interact with students and teachers to provide technical and education-related expertise and mentoring.

Methodology

The partial results related to MusicGrid which are presented in this paper were derived from two formative project evaluations. The first of these evaluations reported on the project's first three months while the second evaluation reported on the subsequent three months. The perspective adopted for the first report was that of participants' perceptions of goals, challenges and solutions related to the project. Their perceptions were gathered through structured face-to-face group interviews. Interviews were conducted with nineteen of the project's thirty participants at the technical, pedagogical and administrative levels.

Data for the second report were collected by means of interviews with the six teachers participating in the project as well as by means of observation. The interviews were conducted by telephone, recorded on audio and subsequently transcribed in text format. In addition, six project events were observed synchronously either live or using the broadband technologies. Asynchronous observations of videos stored on the project's video server also provided insight into the project's activities.

Broadband-supported learning: Benefits and challenges

Interviews conducted with project participants as well as the observations provide insight into the actual and anticipated benefits resulting from learning

experiences supported by broadband technologies. They also provide insight into the challenges individuals can encounter in such contexts of technology use. This section of the paper describes some of the benefits derived and challenges anticipated and experienced by teachers participating in the MusicGrid project in relation to its first six months of operation.

In terms of benefits, teacher participants highlighted the value of the technology in facilitating access to peers. Peer interaction was described by one teacher as a means to promote cultural exchanges or to simply to have exposure to the experiences of others:

> ... to be able to use this technology on a weekly basis even to touch base, to have the teachers talking to the teachers, and the kids talking to each other...I think can go a long way to provide exposure on both ends. Whether it be like the culture exchange that we had, ... [with] the throat singing ... I think was absolutely fantastic. It was certainly worthwhile for the audience here watching that, but also at the other end too.

Cultural musical exchanges between peers were described by one participant as a value derived from broadband-supported learning.

> We have, particularly in this project such incredible diversity in the cultures just having an opportunity to be with people from different cultures, different parts of the world, different parts of the country and just to share musical experiences I think is a very good experience pedagogically.

The benefits of peer interaction were also described in terms of having opportunities to share and work with others who are engaged in the same types of learning activities and who can serve as both an audience and as a measure for comparison:

> I think just the exposure to listen to kids, say, from [the school], which is a school very similar to ours, I think is very much eye opening. ...just the other day we had a kid from [the school] playing the flute and I had a whole bunch of flute players down here watching her...she was quite exceptional ... [It was excellent] to have the ability to hear fine players and to work with them.

The value in broadband-supported music programs may also be derived by using technology for concerts in which students perform for virtual audiences of their peers:

> ...we've had anywhere between 50 to 80 people packed in a room watching the sessions take place. There's been a large interactive audience. I think you get to reference yourself, but you also get to see what is going on elsewhere. You can compare yourself, you can see where you are in regards to the relationship of your own musical performance.

Just as having virtual access to peers was described as important by participants, so too was synchronous and asynchronous access to experts identified as a value that can be associated with the technology:

> ...obviously, although I am trained to teach all instruments, I am not an expert and having an expert in my school will definitely help my students. My trumpet players, for example, will really benefit from watching video or having a live sectional lesson.

For new and inexperienced teachers living in remote and isolated communities, access to experts and mentors, although necessary from a professional perspective, may be difficult without access to technologies that allow exchanges across geographic barriers, as the following excerpt illustrates:

> I have only been teaching for two years. I often have questions and need help or advice and being the only trained music educator in my community leaves me with nobody first-hand to turn to and I have spent many hours on the phone trying to explain what is happening, when a short video clip of what's happening might tell my mentor, whoever that may be, exactly what the problem is. A lot of times, third party observation is what you need to gain the proper perspective on situations that you find yourself in as a new teacher and as a new music teacher.

in the following excerpt, a teacher describes interaction between students and a musical

expert and the value added by this experience:

> They're getting a session with a professional who can coach them in a way that might not necessarily otherwise be available as readily. It's instant feedback... I'm thinking of a quartet where four of them were working and they worked for about a half an hour and there was a lot of feedback ... just going back and forth. The questions were asked of them, by them and answers were there, so they got instant feedback on phrasing, on technical problems, on balance, all kinds of musical issues that would otherwise not be available as easily.

In some cases, access to experts may be defined simply in terms of having access to someone who can simply be a music teacher to students in cases where there is no trained music teacher on staff. In the following excerpt one teacher describes the situation in his school and what it has meant to have virtual access a music teacher:

> ...because we live in a remote community it's kind of hard to put aside funding to bring up a specialist such as a music teacher because the school board cannot afford to send a music teacher to each community, unlike the south where you usually have a circuit music teacher going to school to school. This was very important that we actually had a very solid music program set up and ran in the school. ...for some students, it showed that school is not all ...reading, writing, arithmetic, that school was a fun place to come.

Achievement of these benefits is not accomplished automatically. On the contrary, project participants including administrators, teachers and technicians identified a number of challenges overcome or needing to be addressed in order to take advantage of the potential value which broadband technologies can bring to a context of learning. Time, scheduling and motivation represented three challenges identified by participants. With regards to challenges related to time, as the following excerpt illustrates, teachers have to face a steep learning curve in order to master the technology and this task requires of them an investment of time:

> As a teacher in school you know if some time is not allocated to at least become somewhat familiar with the technology and how to turn the machine on and off, how to make the correct microphone settings, get the cameras adjusted, get a background up and all those kinds of things, it can be very, very frustrating.

Challenges related to time result as well from difficulties connecting people who, because of geography, find themselves in different time zones. As one participant commented: "[It] is always a great conflict when we are putting together a

communications network built in real time, but nobody is in the same time zones". Challenges related to working across time zones may be compounded with certain disciplines such as music:

> The big issue for us, again, depending on how we're set up across the country is if we're gonna be (sic) in real time. I really need a performance time slot where I can have kids who are actually in performance and not being pulled out of other areas. Now it can be recorded and shown at different times as well, but it's not the same.

Time and scheduling are related to other challenges such as motivation, as the following comment suggests: "[The] biggest challenge is the motivation of the teachers to make this part of their already-busy schedules". Motivation may also be adversely affected by negative experiences with using the tools:

> In the school, teachers are stressed enough as it is. They don't want to have to deal with broken-down computers and things that don't work. They have been burned before when they have tried to deal with technology and it failed them. They are not going to touch it anymore. Who can blame them? If it can't be trusted, it is not working. That is one of the challenges I see, making sure that the technology is stable enough for them to start trusting in it and taking risks, because it is only those few individual teachers who are willing to experiment with it.

Discussion

The potential value which broadband can add to a context of teaching and learning lies in the support it provides for highly interactive, asynchronous and synchronous transmission of audio and video files. Transmission of large amounts of data combined with simultaneous capacity for point-to-point and multipoint interaction makes possible forms of learning that privilege collaborating, sharing, mentoring and accessing expertise. These forms of learning go beyond benefits typically allowable by connections that support transmission of primarily text-based web pages with some still images. Such forms privilege interaction, not only with content, but with other learners and teachers. The interaction relies on peer-to-peer networking which represents as much a technical possibility as it does a way of learning. This peer-to-peer interaction

relies on a disintermediated, distributed network of individuals sharing and constructing expertise and knowledge. The result is new forms of learning made technically possible by a digital infrastructure that makes spatial considerations irrelevant by supporting virtual presence and interaction.

Challenges to these types of interaction were identified in relation to time, scheduling and motivation. Where interaction is in real time, scheduling can represent a barrier equivalent to that of a spatial barrier in non technology-supported learning contexts. However, where scheduling challenges cannot be overcome, reliance on asynchronous forms of interaction supported by a repository of private and professional video can represent an alternative means of interacting. The design of the MusicGrid project takes into account the need to overcome challenges to real-time collaboration and interaction through its private video server. Challenges related to time are accounted for in the project's design through the provision of technical support that aims to build a capacity among participants to manage the technology in such a way that integration can be easily achieved.

Challenges related to motivation are more elusive and evasive in terms of meeting with solutions. However, we can argue that use of broadband in a context of learning is motivated and driven by a realization of benefits of use of the technology, meaning that individuals must see a return on their investments of time, effort or money in order to want to exploit the technology. The perception of added value resulting from the support provided by broadband provides a justification for its use and for the investment of time needed to set up equipment, learn to use the tools, as well as an investment of efforts to schedule and organize interactions among geographically and organizationally dispersed individuals. Experiences with, recognition and communication of these benefits will assist in promoting motivation for use of and demand for the technology.

Conclusion

Projects such as MusicGrid provide a means to investigate the value and role of broadband- supported learning for remote and rural areas of Canada and

elsewhere in the world. The project also represents an opportunity to showcase the innovative types of learning and new forms of interaction that can be supported and made possible by these technologies. The initiative can also be considered a pioneering one because of the newness of these technologies, their state of current evolution and their as yet limited availability in most rural and remote communities in Canada and in many parts of the world. As recognition and communication of the benefits of broadband increase and as challenges to its use are overcome, we can anticipate that demand for its supply will increase in such a way that initiatives such as MusicGrid will represent only the first of many such projects that exploit the potential of emerging technologies to promote innovative and improved forms of learning.

References

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