LearnCanada in Context

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Introduction

LearnCanada accomplished its mission to develop a broadband-enabled learning community for Canadian K-12 educator professional development. Students also became engaged in broadband activities, because the professional development focus was project based learning. The teachers and students in LearnCanada, together with associated programs at CRC, NRC, and NAC, comprise the world's largest and most advanced broadband learning community.

LearnCanada was a driver for significant migration and evolution of broadband tools and behaviours supporting learning. Continuation of progress made in LearnCanada can contribute to fulfillment of broadband's potential to greatly benefit Canadian society. This document describes LearnCanada's background assumptions, the observed migration and evolution, and recommendations for building on this momentum.

Background

LearnCanada's intent was to create new possibilities for learning and performance enhancement. LearnCanada focused on higher-order learning – analysis, reflection, creation of content and understanding. Therefore, LearnCanada utilized broadband visual communication tools appropriate for sharing knowledge and experience, including multi-site videoconference and a novel video server.

Our expectation is that broadband's primary long-term impact will be societal, at a level of significance comparable to today's Internet and the World Wide Web. Therefore, to gain insight into human behaviour and technical requirements, it was essential that LearnCanada support an authentic learning community. LearnCanada brought network and software expertise into the teachers' world, so that broadband visual communication research could proceed through cycles of rapid prototyping and teacher evaluation.

Broadband Learning Experience

The visualization on the next page summarizes broadband learning sessions in LearnCanada and associated projects, entailing more than one hundred videoconferences involving teachers, students and researchers.

Migration & Evolution

Broadband tools, and human behaviour around these tools, underwent significant migration and evolution within LearnCanada. "Migration" addresses issues of access; "evolution" implies new forms of interaction and content.

LearnCanada comprised three principal migrations regarding broadband videoconference, teacher professional development and project based learning.

- Broadband videoconference over CA*net 3 migrated from the laboratory to the school. Operation and usage migrated from scheduled, centrally supplied services to on-demand sessions using only school capabilities. Technical training and troubleshooting migrated from one-on-one, to experts simultaneously addressing multiple locations, to teacher-led training.
- Professional development migrated from being one-day separate-from-school workshops to being at school, ongoing throughout the school year. Teacher peer groups were expanded to a geographically distributed, diverse, virtual peer community. Mentors simultaneously addressed multiple sites.
- Teachers drew on their virtual community to find like-minded peers with whom they collaborated on project design. The resulting student project work migrated from a single school to collaboration across schools. Student presentations migrated from the school assembly to a multi-site virtual festival.

LearnCanada evolved broadband interaction and content, including multi-site videoconference session design, rich media content, and asynchronous tools.

- Multi-site videoconference evolved from expert-directed lectures to teacher-led highly interactive sessions. Groups at as many as nine simultaneously connected sites facilitated every individual's engagement by working together in combinations of plenary and breakout groups, the latter in both single- and multi-site formats.
- Broadband brings people together to create and analyze rich media content. In LearnCanada, this content evolved through creation of teacher/student evaluation rubrics, instructional video provided by one site, live video of a teacher working in his classroom, student/teacher-produced videos of classroom activities provided by several sites, to all sites contributing to a live virtual arts festival.
- Videoconference spans distance, but requires scheduling - a difficulty that increases with the number of sites and participants. Consequently, LearnCanada evolved video server content and functionality, allowing teachers to asynchronously share and discuss behaviours captured in videos of themselves and their class. The LearnCanada "Private Video Server" entails the notions that video is captured and produced at near-zero cost, and is viewed only by trusted colleagues and mentors, and incorporates functionality for dynamically attaching annotation to the video, streamlining communication regarding the content.

Recommendations

Further migration and evolution of broadband infrastructure, tools, behaviours and virtual community will be critical for the path forward towards the future, where a modest investment provides an organization with ubiquitous access to a global learning community. LearnCanada experience suggests the following thrusts will be significant; they are reflected in LearnCanada's two follow-on projects, ABEL and MusicGrid :

Migration:

- More schools need access to broadband backbones providing at least 10Mb to the workstation. Financial and technical support is essential. LearnCanada schools experienced difficulty obtaining appropriate services from ISPs, and the combined cost of local loop, backhaul, and ORAN/CA*net access was substantial .
- Broadband services need to migrate into school networks. LearnCanada used dedicated workstations outside the LAN/WAN; if this were sustained, the result would be poor return on the cost of broadband connectivity. Broadband services must be available throughout the organization, without compromising security or performance.
- Broadband tools need to move into the classrooms and offices of the people using them. In LearnCanada, broadband tools were in the school, but not always in the appropriate classroom; those that were in the classroom were the most used.
- Broadband services could extend from the school to students' homes and community centers, so that learning becomes a responsibility shared between school, parents, teachers and community. A possible business model is to place gigapops at schools, providing school-ISP partnerships the opportunity to offer services. Schools can become the focus of local broadband capacity building.

Evolution:

- Asynchronous broadband visual communication tools need further research and development. Virtual communities cannot scale without them, due to scheduling and time zone constraints. Private Video supports reflection, collaboration, performance enhancement via expert feedback, and binding of virtual community.
- Scalable models for virtual community governance and management are needed. Grid and peer-to-peer models may be a suitable starting point.
- Organizations need affordable, ethical and scientifically valid methods for evaluation of broadband-enabled learning. LearnCanada evaluation experience initiated research into multi-factor multi-stakeholder methods.
- Broadband's video streaming capability supports communication of tacit how-to knowledge requiring movement and nuance. Beyond this, there is a need for tools that allow virtual community members to jointly create complex artifacts. NRC and CRC have recently initiated research on digital tables at which remote groups work together.

Conclusion

Further migration and evolution of broadband infrastructure, tools, behaviours and virtual community will result from multidisciplinary research in partnership with authentic users; this will play a critical role in building demand sufficient to spark exponential growth of broadband services. Focus on school, post-secondary, professional and lifelong learning can make Canada the country to which the world looks for advances in education.