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Multimodal Curriculum Delivery in Distance Education

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Abstract

This article focuses on the results from several evaluations of a pilot Realtime Writing Program as part of a CANARIE Learning project called BELLE (Broadband Enabled Lifelong Learning Environment). The program, the first of its kind in Canada, was offered to students across the province of Alberta using multiple delivery methods (face-to-face, videoconferencing, public Internet). On-line evaluations were administered to 23 students in two levels of the course to assess their experiences and satisfaction with the delivery methods. Students also participated in a focus group. The instructor was interviewed before and after the course to evaluate any pedagogical changes needed to teach successfully in a multimodal environment. The outcomes of these evaluations show that the program was effective and that students were satisfied. The archived lessons proved a valuable learning tool for students who had attended the classes in any of the modes, but were less effective when used as the sole learning format, and Internet participants wanted audio capabilities to converse with colleagues and the instructor.

Résumé

Cet article se centre sur les résultats de plusieurs évaluations d'un programme pilote d'écriture en temps réel faisant partie d'un projet d'apprentissage CANARIE dénommé BELLE (Broadband Enabled Life-Long Learning Environment / Environnement d'apprentissage à vie diffusé sur large bande). Ce programme, le premier en son genre au Canada, était offert aux étudiants de l'Alberta utilisant de multiples méthodes de diffusion (face à face, vidéoconférence, Internet public). Des évaluations en ligne ont été complétées par 23 étudiants à deux niveaux du cours pour évaluer leurs expériences et leur satisfaction avec la méthode de diffusion. Les étudiants ont aussi participé à un groupe de discussion (focus group). Le professeur a été interviewé avant et après le cours afin d'évaluer les changements pédagogiques nécessaires pour enseigner avec succès dans un environnement multimodal. Les résultats de ces évaluations montrent que le programme était efficace et que les étudiants étaient satisfaits. Les leçons archivées se sont prouvées être des outils d'apprentissage très utiles pour les étudiants qui ont déjà suivi les cours, peu importe le mode, mais elles ont été moins efficaces quand elles ont été utilisés en tant qu'unique mode d'apprentissage. Les participants par Internet

voulaient aussi pouvoir avoir accès à des moyens en audio pour converser avec leurs collègues et leur professeur.

Introduction

Postsecondary institutions in Alberta are continually striving to provide first-class educational opportunities, but with increasing costs and steadily decreasing budget envelopes in education the attempts to provide traditional quality education are more and more challenging. Institutions seeking innovative methods to combat the costs of traditional face-to-face teaching and learning are moving toward more flexible ways of providing educational opportunities (Archer, Garrison, & Anderson, 1999).

Computer-assisted teaching and learning have the potential to solve many problems related to both fiscal constraints and quality learning environments in the higher education sector (Franklin & Peat, 1998). With the integrated use of face-to-face teaching interactions and collaborative (online) learning environments, students and teachers can embrace and expand the scope of lifelong learning. The move toward alternative teaching and learning models can also address issues of student mobility and flexible learning (Franklin & Peat, 2001).

The BELLE (Broadband Enabled Lifelong Learning Environment, www.belle.ca) project is an attempt to enhance access to the effective education and training central to a learning society and a knowledge-based economy (CANARIE, 1999). In so doing, BELLE and its 10 national partners have set out to explore, prototype, and develop distance learning scenarios that will support the further development of collaborative learning environments and on-line curriculum repositories (BELLE, 2000).

Through the BELLE project, the Northern Alberta Institute of Technology (NAIT, www.nait.ab.ca) had the opportunity to pilot the multimodal delivery of a highly specialized Realtime Writing Program. Not to be confused with Real Player Video or live Webcasts, Realtime writing is the instantaneous verbatim translation of spoken words into text at speeds exceeding 225 words per minute with 98% accuracy (German, 2001). This instantaneous translation to text appears unedited on a screen for individuals to read and participate in the event. In Canada, Realtime writing has proven helpful for deaf and hard of hearing individuals both in and out of court settings (National Court Reporters Association, 2001). It is even helpful for hearing-enabled people in busy environments like conferences and meetings.

The pedagogical goals of the Realtime writing course are to provide students with the theoretical and practical knowledge to become certified in Realtime court reporting. Course objectives were at an advanced level and included medical terms, suffixes or prefixes, alphabets, math formulas and numbers, geographies, religions, and food. Realtime writing is a prac-

tical course in which students must develop and demonstrate proficiency during each class session. They use their stenographs and laptops during the class for practice and to increase both their typing skills and syntax databases.

The BELLE project provided an opportunity to test the multimodal delivery method of this Realtime Writing Program. In itself, this Realtime Writing Program is hands-on and technologically demanding. Adding a multimodal delivery method to the already challenging program made it intriguing to evaluate the effect of technology and distance delivery on the learning. By analyzing the participation and satisfaction of learners using all three delivery platforms (face-to-face, videoconferencing, live Webcasting), this pilot project helped to analyze both the positive and negative effects of technology-enabled learning.

Due to a lack of response from the local learning market, NAIT could not have offered this course if it was to be limited to the traditional face-to-face model. With only eight local students, instructor costs and related facility costs would not have covered their course registrations. The proposal to pilot a multimodal delivery system tripled the course registrations and provided an economically feasible solution for NAIT. The pilot also provided a real-life distance learning scenario to be evaluated as a prototype for the BELLE project.

Technology in Education

Combining face-to-face lecturing with videoconferencing and live Webcasting provides a unique and flexible solution to some distance education issues. Videoconferencing allows people separated by distance to talk, see, and work with each other in a collaborative environment (Reed & Woodruff, 1995). For those who do not have access to a videoconferencing facility, live Webcasting, that is, video streaming via a computer with an integrated text chat feature, allows remote students to participate in the class and interact with other students and the instructor. This has an advantage over e-mail because the interaction is synchronous, making it easier to build rapport with other students participating in class via other formats (Motteram, 2001). As well, the instructor can respond to questions and help provide immediate feedback. Local participants in the classroom can also interact with their on-line counterparts, creating a real sense of collaborative work and learning (Wright & Cordeaux, 1996).

Multimodal Technologies

This project used two video platforms for distance learning: the public Internet and a high-performance videoconferencing link, the Alberta Video Classroom Network. This Video Classroom Network is one component of Netera, an advanced research network in Alberta (Netera Al-

liance, 2001, www.netera.ca). The network, which spans the province of Alberta, connects 13 video classrooms in seven postsecondary institutions. These classrooms use MPEG2 videoconferencing technology, which provides broadcast-quality audio and video. For this particular course, the MPEG2 video classroom was used in a point-to-point mode, that is, between two locations.

In addition, the public Internet component of the multimodal delivery method employed live Webcasting and on-line text chat to enable students to interact with the instructor and students in the originating classroom as well as with the other students in the remote videoconference location. The instructor routinely checked the on-line forum during the class. To facilitate the archival capture and ensure awareness for all students, the instructor would repeat any incoming questions and then look for peer input from all participants before responding. Numerous questions were asked during the three-hour classes. Open discussion, peer consultation, and instructors' examples and scenarios provided responses to all students' questions.

The Webcast feature allows for live participation plus an archive of all three modes for later review by any student. A student attending the class in the originating classroom had the option of also accessing the stored archive on line via a password-protected Web site. In addition, students were free to choose non-active class participation and archive reviewing only.

Method

The Realtime Writing Program was offered in a series of three 10-lesson courses of ascending difficulty. The courses were offered on Wednesday evenings from 6:00 to 9:00 p.m. and employed three modes of delivery (face-to-face, videoconference, public Internet). Students in Edmonton and area were welcome to attend class at NAIT's main campus, the originating classroom. Students in Calgary and area were welcome to attend the Southern Alberta Institute of Technology (SAIT) and interact from SAIT's videoconference room. All students also had the choice of taking the class via the third mode of delivery: Webcasts over the public Internet with text chat capabilities either live or through the archive. In all, 23 students registered for the program.

Students in each of the course formats were asked to evaluate the technology, the teaching, and their learning achievements for the course. The Realtime Writing Instructor also voluntarily participated in pre-course and post-course interviews to evaluate the technology and its effect on pedagogical methods.

Design

Evaluation of the multiple distance education methods took place from April to December 2001. All responses and participation in these surveys, focus groups, and interviews were voluntary.

The survey questions were designed in collaboration with evaluation specialists from the Academic Technologies for Learning unit at the University of Alberta. Twenty-three questions were used in two separate survey instruments. One author designed the questions, which were then reviewed by a second author and the instructor for face validity. Questions were revised and clarified as a result. Response categories included demographics, pedagogy, instruction, technology, and instructional interactivity. Questions were scaled and open-ended.

All 23 students in the Realtime Writing course were asked to participate in on-line questionnaires on two separate occasions; each time approximately two thirds (15) of the students responded. Of the 15 students, six accessed the Realtime Writing course via the face-to-face mode, seven accessed the course via the Internet, and two used the videoconference mode.

In both surveys 13 of the 15 student respondents stated that the multimodal delivery method used in the class enhanced their learning experience, whereas one saw it as a distraction that detracted from his or her learning experience. Of the 15 respondents, 14 stated that they accessed the class archives as a supplement to their regular Wednesday night class participation. Four of the students who took the course via the Internet stated that they participated in a peer-to-peer exchange (text-chat interface) during class. In the first survey, the 15 student respondents agreed that having access to the class over the Internet was better than not having access at all.

Quantitative and qualitative data from both questionnaires indicate that the multimodal delivery was well received. Although some of the Internet respondents indicated that they would have liked to participate more in the class, all were pleased to be able to access the course via the Internet. All 15 student respondents stated that having access to the class archives over the Internet proved to be advantageous and a great aid in their learning experience. One student stated,

> I attended the class both in person and over the Internet, probably 50/50. Live attendance allowed me to glean extra information that was either not available (during breaks, etc.) or not audible on the Internet. One thing that I feel made the course so ideal is the archived broadcasts, which allowed me to review lessons and have a second kick at the cat. Let's face it: with so much new information coming at a person, it is very easy to miss important information. I think every course should have this wonderful benefit. I'm sure I learned as much from the archives as I did in the classroom setting,

> no doubt increasing my success. Being able to attend the class over the Internet was most definitely an addition to the quality of my life. (Realtime Writing Fall Evaluation, 2001)

Students also indicated that having alternative access points made for a more positive learning experience. As one student put it, "The ability to participate in this course via the Internet was valuable to me. To be able to see the instructor and hear other people's ideas and comments made me feel I was a part of the class as opposed to a conference call."

Focus Group

A one-hour voluntary focus group was held with students to discuss instructional methods, effects on learning, pedagogical issues, and general feedback on the multiple delivery methods used in the Realtime Writing Program. Five open-ended questions were used to guide the discussion, which enabled participants to take the discussion in several directions. Six students participated in the focus group. Three were from the face-to-face cohort, one had participated through videoconferencing, and two were from the Internet based group.

Results from the focus group indicate that the multiple instructional methods used to deliver the Realtime Writing Program were effective. Students appreciated being able to access the course in person as well as via the Internet and Web-based archives. Two students commented, "since the Realtime Writing Program progresses at such a hectic pace, it is a real bonus to be able to review the archives by reviewing an entire lesson once or twice and pick up on any missed parts."

Relative to the multimodal course delivery and its effect on learning, students pointed out the benefit of class archives and being able to attend lectures via the Web. Although most of the students said they would prefer to attend the class in person, all appreciated the flexibility of accessing the course via the Internet. Several distance students appreciated the opportunity to take the course from their home location. The Internet students would have preferred synchronous audio and video with the Internet feed, which they felt would have put them on a par with their student colleagues. Some focus group participants also alluded to the need to improve technological classroom environments by improving audio and video setups and allowing for the seamless participation of all three instructional cohorts.

Students also indicated that the multiple delivery methods would not have been as successful without the enthusiasm and ability of the instructor. One student said, "The instructor must have multitasking skills, be patient, and have a desire to use the new technology and become familiar with the use of the technology."

Instructor's Interview

The instructor of the Realtime Writing Program was interviewed before and after the delivery of the program to discuss pedagogy, course objectives, and technology. Based on transcript analysis of the audiotaped interviews, the Realtime writing instructor reported that she had never used the Web or Internet-based technology to teach in the past. Nonetheless, she was supportive and enthusiastic about using the multiple delivery method of face-to-face, videoconferencing, and the Internet for her Realtime Writing courses. She indicated that although she was unfamiliar with the technology, she was not intimidated by it. She also saw the delivery method as a wonderful opportunity for students to participate in courses that were normally unavailable to them. The instructor was intrigued by being able to offer Realtime Writing to students beyond the local audience.

Relative to instructional design and pedagogy, the instructor pointed out that she had not altered her teaching methods for this multimodal course. Although she said her teaching methods were unaltered, she reported that she had done more consistent class preparation given the distance learning formats.

The instructor also noted the need to focus on repeating questions for all audiences to hear. Because the Realtime Writing Program involved extensive active participation, the instructor said that continual verbal encouragement, positive reinforcement, the sharing of knowledge, and student interaction were critical to the success of the students. Her typical response to dozens of questions was to generate discussion, provide answers, and have interactive feedback.

In her post-course interview comments she indicated an increase in comfort levels in using the technology. The instructor also pointed out her increased consciousness of mannerisms and of enhanced accountability due to the recording and archiving of the classes.

Questions about the relationship between the ability or inability to learn and the method of delivery were also considered. Documentation showed that the students who did least well were those who did not attend the actual courses, whether in person, via videoconferencing, or on line. Students who did participate in weekly classes using one of the three instructional modes tended to perform better than those who accessed archived classes only and did lessons on their own. Five of the 23 students chose to participate in the course using the on-line class archives only, and these students performed less well than their peers (German, 2001).

Recommendations

Recommendations have been made to improve the layout of the class and the use of technology to make the Realtime Writing Program as seamless

as possible. Suggestions and recommendations for the multimodal delivery include:

- Minimum computer requirements for on-line participants (i.e., no slower than a Pentium III);
- Minimum Web-browser requirements (i.e., newest versions of Internet Explorer work best);
- Audio capabilities to enhance Internet students' participation (Internet students would like to have audio features to be able to converse with classmates and instructors);
- An audio signal to notify the instructor of questions from the on-line learning cohort (sometimes the instructor would not notice an on-line participant's question for a few minutes. With an audio signal or some sort of audible notification, the instructor could more efficiently respond to on-line participants);
- Maintain archived classes on the Web longer (students would prefer to have access to the course archives for a longer period or as an alternative have all the archives available to them on CD-ROM);
- The instructor indicated a need for an on-line monitoring system to verify Internet student participation and activities.

Conclusion

The multimodal delivery methods used in the Realtime Writing Program were effective. All participants were satisfied with the delivery methods and supported further instructional design in this area. As a result of their participation, both the students and the instructor became more familiar with innovative technologies and the flexibility of multimodal learning environments.

The Realtime Writing Program multimodal environment also proved to be an economically viable solution for NAIT. This solution can be integrated into other institutional programs and extended to other disciplines and specialized courses. Multimodal delivery does require technical and student support to achieve a positive learning environment, and therefore further developments and evaluations are required. As institutions and innovators continue to move forward with advanced technology and unique instructional delivery methods, there must also be the continued pursuit of quality education and teaching methods.

The challenge remains for all of us to examine possibilities for collaboration and educational enhancement. From a student's perspective, collaborative multimodal-based learning, as opposed to traditional face-to-face learning, allows for several levels of student participation and flexibility (Gornall, Pengelly, & Shearn, 1998). Hammond (1997) has

shown that multimodal learning can also establish an environment that encourages students to develop theories and ideas of their own, while working together and with the instructor as a collaborator. Encouraging learning through collaboration and flexibility fosters the sharing of knowledge and values. The continued pursuit and evaluation of multimodal and collaborative learning scenarios will help build a new era of lifelong learning environments. With the support and investigation of researchers and educators in the field, technologically enhanced learning environments can, now and in the future, provide all students with access to quality learning opportunities.

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