Blended Learning Practices at COHERE Universities

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Executive Summary

The research questions explored the type of blended learning strategies and pedagogical approaches, how instructors and students viewed blended learning, how the blended learning experience compared to traditional formats, and what policy and support issues emerged from the use of blended learning in university courses.

This project consisted of case studies that examined blended learning practices at eight Canadian universities. The research questions explored the type of blended learning strategies and pedagogical approaches, how instructors and students viewed blended learning, how the blended learning experience compared to traditional formats, and what policy and support issues emerged from the use of blended learning in university courses.

We interviewed eight instructors by telephone, and asked each instructor to invite their students to complete an anonymous online survey. The overall survey response rate was 27%, but ranged from a low of 14% to a high of 100%. The interviews were recorded and transcribed, and this text along with the open-ended survey items was analyzed using qualitative methods.

We began the discussion with a description of how instructors at each university designed their course, and how students perceived the experience of studying in a blended learning format. Here is a list of the eight courses, and a brief description including the university's pseudonym:

- Albatross U's course was a third year nutrition course with approximately 120 students enrolled
- Eagle U's course was a large enrollment first year introduction to computers course that the instructor first developed as a fully online course, but has now reverted to a blended format
- Heron U's course was a very large enrollment first year chemistry course; students surveyed took the course in the previous semester.
- Kingfisher U's course was a large enrollment course that familiarized third year students with the main concepts, viewpoints, and research findings in the field of organizational communication
- U Nuthatch's course was an upper level class in contemporary feminist theories offered to about 16 students
- Oriole U's course was a small senior level course that examined current molecular techniques used to study plant development physiology

On average, 61% of students agreed they would take another blended learning course, 12% indicated they would not, and 27% said they were unsure.

- Redwing U's course introduced first year university students to foundational studies in teamwork and communications; the course has always been in the blended format since its inception about five years ago
- U Yellowlegs' course was a social work practicum delivered to about 18 students at remote locations

We compared the results among universities beginning with a description of the student's responses to background questions. There was considerable variation among courses on the gender mix of students, their employment status, their student status (full or part time), and students' access to computers. Another background survey question asked students if they would take another blended learning course, and on average, 61% of students agreed they would take another blended learning course, 12% indicated they would not, and 27% said they were unsure.

In most instances, students reported lower overall satisfaction with the larger enrollment courses, except in one case (Eagle); this finding was not surprising. There were statistically significant differences among universities for the Likert item that asked students if blended learning contributed to their success; however, 53% of all students combined did not agree with this statement. The survey statement that blended learning hindered my learning was a negatively worded Likert item, and the means ranged from a low of 4% agreement for Albatross to a high of 49% agreement for Kingfisher. Interestingly, Kingfisher students did not have face-to-face access to their professor during lectures.

Five of the eight universities used WebCT to support the e-learning components of their blended learning courses. Two instructors used traditional Web sites to house course outlines, syllabi, assignments, and other course materials and resources, in addition to the course management system. Seventy-five percent of all students disagreed that technology interfered with their learning. In general, technological problems did not disturb students very much, nor did any type of technology emerge as troublesome to students.

Online discussions were a primary part of the e-learning component for five of the blended learning courses. Most instructors awarded 20% of the course marks for online discussion activities; however, one instructor only awarded 5% for online discussions. In addition to the online discussions, one university had online labs, two universities had online quizzes, and another university had online thesis

proposals worth 50% of the students' course mark. Only one instructor did not award any marks for online activities, even though the lectures for that course were only available online (i.e., no face-to-face lecture).

Likert item comparisons among universities bring to light some interesting perceptions about online discussions. First, online student discussions can work in large classes. Students in a large enrollment course at Eagle U were more satisfied (72% agreed) than all other students were with student online interactions, and 54% more Eagle students than Kingfisher students agreed that online interaction with other students contributed to their understanding of course materials. Second, instructors do not necessarily have to grade individual online discussions for them to be valuable to students' learning. The Redwing instructors did not assign a mark to the individual student online contributions, yet they found a way to make the students' online discussions significant to their learning without directly marking the team conferences.

Encouraging higher order thinking skills among students was a pedagogical goal mentioned by six of the instructors. Both students and instructors saw the online components as a means to encouraging critical thinking. Students were especially happy with the ability to schedule course work when it was convenient for them, and in the case of courses with online lectures, students liked being able to "fast forward or rewind" the instructor. Moreover, students appreciated the traditional values (e.g., face-to-face discussions) that the blended format supported; for example, a student wrote, "I could work out the problems online, but if I had trouble there was always the face-to-face contact that could enhance my understanding."

Five instructors said that the online component of their course enabled them to get to know their students better than in a traditional face-to-face class, and they saw this as a major benefit of blended learning. However, there were also challenges for instructors with the blended learning format. For example, two instructors of large enrollment lecture courses believed there was no realistic way to incorporate online discussions, yet the amount and quality of interaction among students and with their instructors was a statistically significant factor in students' overall satisfaction with their courses. Lastly, 57% of all students agreed that the blended learning format required more time and effort than traditional on-campus courses.

In terms of university support, it seems evident that the variation reported among case studies was more likely due to individual instructors or course discipline rather than university policies or procedures. All of

In conclusion, instructors blended their courses to put together a more flexible, efficient, accessible, and varied learning experience for their students. Yet, student satisfaction seems highly dependent on the level of interaction with instructors and with other students.

the instructors had access to some type of technical and/or teaching support at their university for their blended learning courses. However, students felt that their blended learning course "receives hardly any attention or funding from the university."

In conclusion, instructors blended their courses to put together a more flexible, efficient, accessible, and varied learning experience for their students. Yet, student satisfaction seems highly dependent on the level of interaction with instructors and with other students. This strongly suggests that online interaction should be a core issue when designing blended learning courses; not only for student satisfaction but because both instructors and students saw online discussion as a means to encourage critical thinking and contribute to their understanding. This might also partially explain why some students viewed blended learning as requiring more time and effort. The sheer volume of work required to evaluate online discussions was an important objection by instructors of some large enrollment classes, yet one university motivated students to contribute to online discussions without formal individual evaluations. Finally, the success of online discussion in another large enrollment class suggests that student interaction can enhance large enrollment classes with appropriate design.

Introduction

COHERE institutions have begun to focus on blended learning and have taken the lead to understand the policy and practical implications of this approach and to promote its application.

Canadian universities realize that they are vulnerable to global competition for the best faculty and students. A group of Canadian research intensive universities known as COHERE[1] have recognized that communication and information technologies are a serious catalyst for change and the solution to the challenges facing them in order to be innovative and competitive. The COHERE institutions have begun to focus on blended learning and have taken the lead to understand the policy and practical implications of this approach and to promote its application. To this end COHERE sponsored two research initiatives. The first was a paper by McCracken and Dobson (2003) from Simon Fraser University on theoretical aspects of blended learning. This second report examines how blended learning is being implemented at COHERE institutions.

Our research questions for the study were as follows:

1. What are the various blended learning approaches in use at COHERE member institutions and what are their salient features?
2. What are faculty perceptions of teaching and learning in blended learning environments? What pedagogical strategies do faculty employ? What technologies do they use? What are the challenges they face?
3. How do students view online learning? How does the blended learning experience compare to traditional courses? Does the integration of technology contribute to or detract from learning? Does the quality of their interaction with peers and faculty change in blended learning courses?
4. What policy and support issues emerge from the use of blended learning in university courses?

To answer these questions we conducted case studies at each of the eight COHERE member institution.

[1] Collaboration for Online Higher Education and Research. See http://www.cohere.ca for details.

Research Methodology

With the help of contact persons at the COHERE universities, we selected one blended learning course at each university to study from a list of two to three courses that they nominated.

With the help of contact persons at the COHERE universities, we selected one blended learning course at each university to study from a list of two to three courses that they nominated. The criteria for nominating a course were (1) that online learning replaces some face-to-face time or classroom activities, and (2) that the instructor was willing to participate voluntarily. We made our final selection of the course to study from each institution by attempting to get a variety of academic disciplines represented in the national sample. We then interviewed all eight instructors by telephone using the questions in Appendix A as a guide. We taped and transcribed these interviews, and analyzed the transcripts using standard qualitative procedures. We developed about 20 codes for the textual analysis based on the research questions.

Additionally, we asked instructors to invite their students to complete an anonymous online survey. The survey consisted of 14 Likert items, 6 background questions, and 4 open-ended questions; the student survey is available at http://CTLSilhouette.wsu.edu/surveys/ZS24659. We obtained frequency counts for agree, disagree, and not applicable or missing answers, and used these results for the discussion below. In order to conduct an analysis of variance (ANOVA) on the Likert items on the survey, Strongly Agree and Agree responses were coded 1, and Disagree and Strongly Disagree were coded 0. The table in Appendix B shows the mean and frequency counts for each university for the Likert items, as well as the significance of a one-way ANOVA comparing means across universities.

We assigned each participating university a pseudonym to maintain confidentiality. The following table lists the pseudonyms used for each university, a brief description of each blended learning course, the number of survey responses, the number of students enrolled, and the student response rates for the online survey:

Table 1
Case Study Descriptions and Survey Response Rates

university	course description	number of responses	number of students enrolled	approximate survey response rate
Albatross	3rd year nutrition	26	120	21%
Eagle	1st year foundations of computers	169	241	70%
Heron	1st year chemistry	320	1,764	18%
Kingfisher	3rd year communications in organizations	128	159	66%
Nuthatch	3rd year gender studies	15	16	94%
Oriole	4th year plant biology	18	18	100%
Redwing	1st year communications and teamwork	55	380	14%
Yellowlegs	3rd year social work practicum	10	18	55%
Total		**741**	**2,714**	**27%**

We now discuss the findings of the study, beginning with a description of how instructors at each university designed their course and how students perceived the experience of studying in a blended learning format.

Findings

Results of Individual Course Analyses

Albatross U.

The blended learning class studied at Albatross U is a third year nutrition course with approximately 120 students enrolled. The content is

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at an advanced science level, and students in a variety of programs, such as, medicine, food science, pharmacy, and nursing enrolled in the course. The course consisted of traditional lectures twice a week, and a one-hour tutorial—classroom time did not change compared to a traditional format. The instructor posted the lecture notes online in PDF format before holding the class to encourage students to print them in advance. Besides three written assignments, a mid-term, and a final exam, students contributed to online discussions in WebCT. The online group discussions were worth five percent of the students' final grades; the exams made up 50% of the grade, and the written assignments accounted for the remaining 45%.

The response rate to the online survey was just 21% of students enrolled in the course; those who completed the survey were generally positive about the online discussions. Nearly 70% agreed that online interaction contributed to their understanding of course materials, and Albatross students agreed the least of all case studies with the statement that it was harder to relate to other students' viewpoints (Q08). One student wrote that the online interaction "helped because we were able to discuss in more detail how the things taught in class related to real world experiences." In addition, students recognized the contribution student-to-student interaction had on their learning, and wrote things like "two heads are better than one!" Furthermore, the benefits of online discussions for large classes was understood, and as one student explained "it was definitely good to get onto a personal level with my classmates through Web discussions; something that is not very conducive to a class of a hundred-something students during lecture period." However, even though Albatross students agreed the least that it was harder to relate to other students in this blended learning class, 62% of these students did not agree that the blended learning format contributed to their success in the course (Q05).

The instructor's perspective on online discussions was very similar to the students. For example, the instructor observed that in a large face-to-face class "you only get about five students that will actually talk to you . . . try to facilitate a discussion in a large classroom; it's always the same students talking to you." Yet, the instructor observed that the online discussions "allow dialogue and conversation in spite of it being a large class." In addition, the instructor saw the online discussions as a route to "applying and thinking about it [theories], and logically working through what this means to them." In other words, the online discussions promoted higher order thinking skills for students.

Even though the blended format proved more time consuming (65% of students agreed), the instructor would "definitely" teach in this format again.

There was some complaining by a few students about the low weight given to online discussions (5% of their mark), and the instructor recognized this problem. However, the instructor explained that participation in the online discussions was a prerequisite for one of the written assignments; therefore, students who did not join in the discussions would be at a disadvantage for an assignment worth 15%. Furthermore, the instructor expressed an interest in improving the online discussions by requiring more references in students' posts, which would encourage more library research on the part of students.

Besides the online discussions, WebCT was also a repository for course information, assignments, course calendar, grades, resources, and lecture notes. The instructor described using WebCT to support the course as very practical and handy; "if I forget to make an announcement in class, I can just post it on the Web site." In addition, the instructor created a Flash animated learning object housed on a separate server that enabled students to explore different aspects of glucose metabolism. The instructor created the learning object to address students' "inability to see the whole picture." Once again, the goal was to promote higher order thinking skills among students.

In conclusion, although online discussions only counted for five percent of a student's grade, both students and the instructor valued the online interaction. In addition, the instructor believed that online participation helped students "get it," and that they seemed "more excited to come to class" because of prior exposure to the issues in the online discussions. Even though the blended format proved more time consuming (65% of students agreed), the instructor would "definitely" teach in this format again.

Eagle U.

The instructor said "particularly in first year, some students do not adapt well to being truly online; they don't have the discipline in their study habits," and that was the reason for changing the course from fully online to a blended format.

This introduction to computers course is a large enrollment first year university course that the instructor first developed as a fully online course, but has now reverted to a blended format. Students could attend the weekly lectures in person, participate in the lecture real time over the Web, or watch the recorded lectures online for a limited time. Students can choose to take the course fully online, but the option to attend face-to-face lectures or talk to the instructor during office hours was also available to them. The instructor said "particularly in first year, some students do not adapt well to being truly online; they don't have the discipline in their study habits," and that was the reason for changing the course from fully online to a blended format. WebCT was the course

Eagle students agreed more than all other case studies that the blended learning format helped them succeed (Q05), and that online interaction with other students contributed to their understanding of course materials (Q14).

management system used to house assignments, announcements, discussion boards, quizzes, course syllabus, resources, and lecture/assignment presentations.

The instructor had considerable information technology skills, and thus made extensive use of technology tools in this course. Not only did the lectures have streamed audio and video in real time using HorizonLive©, but also the instructor recorded them for future playback. Students then had a week to listen to the recorded lecture online, and WebCT log file analysis tracked student *attendance* at the lecture. In addition, assignment tutorials were animated with screenshots and step-by-step audio instructions. Besides the lecture and assignment presentations, students had opportunities to test their knowledge by taking quizzes in WebCT. A pre-module quiz gave students who scored above 85% on their first attempt the option of skipping ahead to the next module in the course; students could take the collaborative quizzes repeatedly, and the final score was an average of all attempts. Finally, the students had the option of purchasing a textbook; this was another method used by the instructor to address different learning styles.

Even though this was a skills oriented course, the instructor encouraged student-student interaction and a sense of online community, and gave marks for participation in the online discussion boards. For example, students earned *service to society* marks for completing the online survey for this study, as well as participating in student government, and other volunteer activities that demonstrated good citizenship. The response rate to the online survey was 70%, which supports the effectiveness of the service to society marks. Eagle students agreed more than all other case studies that the blended learning format helped them succeed (Q05), and that online interaction with other students contributed to their understanding of course materials (Q14). As further evidence of the success of online student interactions, the following table shows the extraordinary amount of activity by these students within WebCT:

Table 2
WebCT Server Activity

WebCT log file analysis from January to April, 2004
241 students enrolled
603,437 total hits on the server for this course

WebCT log file analysis from January to April, 2004
6,184 postings submitted by students to the discussion board
211,543 postings read (507 postings median per student)
2,211 assignments posted
4,517 quizzes submitted

Students also recognized the "sense of community" that developed online, and how "everyone becomes a part of a team—a team which is dedicated to helping others do well."

Finally, the instructor developed another participation strategy that involved placing deliberate errors/typos in the text of announcements, assignments, or quiz items. Students who were the first to spot an error and report it to the discussion board earned bonus marks for doing so.

Some students complained about the volume of messages on the discussion boards—"congested with garbage," and another wrote, "online interaction detracted from my understanding because I prefer face-to-face interaction." However, positive comments about online interaction outnumbered negative responses by three to one (76 coded statements by students valued online interaction versus 25 coded statements that did not). For example, students recognized that the discussion board allowed them to "ask questions and benefit from the knowledge of everyone else." Students also got quick feedback in the online discussions; for example, a student wrote, "some one was always online no matter what time of day or night." In addition, another student observed, "there was a larger scope of students that I could ask for help than I normally would have in a face-to-face class." Students also recognized the "sense of community" that developed online, and how "everyone becomes a part of a team—a team which is dedicated to helping others do well."

The instructor employed so many unique strategies in this course it is difficult to report them all. For example, nearly everyday students would see a message in WebCT similar to this: "Today is brought to you by the letters RB, and the number 20." When students asked about this the instructor made them try to figure out the reason; eventually a student whose initials were RB would recognize the message referred to his 20th birthday. The instructor's fluency with technology made it easy to write a script that would capture students' birthdays and post these Sesame Street style messages. Another strategy enabled students to send the instructor an alternate marking scheme for the course within certain limits; students submitted their proposal as a spreadsheet exercise, which the instructor would inevitably accept if the student followed the guidelines. These strategies were also an attempt to promote higher order thinking skills among students.

the instructor said, "the number one benefit is that I have a better take on where my students are at . . . and particularly identify students who are lagging behind."

One of the major benefits of the blended learning format was that the instructor would get to know the students far better than in a face-to-face class. As the instructor said, "the number one benefit is that I have a better take on where my students are at . . . and particularly identify students who are lagging behind." The instructor also believed that the blended format improved the teacher's "capacity to deal with a lot more students." In addition to their satisfaction with the discussion tool, students benefited because "the archived lectures help by allowing students to refer back to the lecture if they do not understand a concept." As another student wrote, being able to listen to the lecture more than once "is such an important point for the international student." Finally, students enjoyed being "exposed to cool things," and appreciated that the blended format helped them "by applying their understanding of the technology."

Heron U.

The blended learning course for this case study was a very large enrollment first year chemistry course. The course studied ran during the fall semester so two different groups of students were surveyed in the winter term:

1. students who failed the course in the fall semester and were repeating it in the winter term; there were 34 respondents and a 20% response rate.
2. students who passed the course in the previous fall semester and were taking the next course taught by the same instructor; there were 283 respondents and an 18% response rate.

Students could attend face-to-face lectures in a 500-seat hall, and/or listen to e-lectures online. The e-lectures consisted of audio narration by the instructor and static screens with text and/or graphic formulas; the instructor recorded the e-lectures in a studio. Although face-to-face attendance was not required for lectures, five of the mandatory lab experiments, called *wet labs,* were face-to-face; three of the lab experiments were *dry labs* and completed online. In addition, the Chemistry Help Room was open to students three hours per day except Fridays, and the instructor was available for questions during office hours.

The course grading scheme was as follows: 20% for lab work (3 of 8 labs were done online), 10% for 5 online quizzes, 5% for a computer lab, 25% for a mid-term exam, and 40% for a final exam. Thus, students

The instructor believed that a recent drop in failure rates for this course was due to the online quizzes.

completed about 17.5% of the graded components online. WebCT was the platform used to house the course outline, announcements, course work (weekly work at a glance), quizzes (self-assessment, practice, and for credit), course resources (simulations, FAQs, links), grades, online lab work, and a discussion area for course related topics.

This was a difficult course, and Heron students agreed the least of all case studies that they learned key concepts (Q13). However, the instructor believed that a recent drop in failure rates for this course was due to the online quizzes. Besides the quizzes done for credit, students could take self-assessment and practice quizzes to help them learn the material. Self-assessment quizzes differed from practice quizzes because they gave students a hint if they chose a wrong answer. Building a self-assessment quiz was a lot of extra work, but the instructor said,

> I found that the students didn't use it [self-assessment quizzes] the way I wanted them to use it. What they did is they just kept clicking until they found the full solution and the right answer, or they'd print it out. So all this work and this nice design to have them try to learn something while they're doing it . . . .

In addition to the non-credit quizzes, students also had access to three animated simulations, as well as nearly 20 other online resources.

Differences in Likert item results between the students repeating the course, and students who were successful are evident (see Figure 3, especially Q03, Q05, Q07, Q09, Q13, and Q14). However, we cannot know whether their dissatisfaction was due to the blended learning format or they disliked the blended learning format because they failed. It seems reasonable that students who previously failed a course would be less enthusiastic about their learning experiences in that class; however, it is interesting to note that 25% more repeating students than non-repeating students believe the blended format hindered their learning.

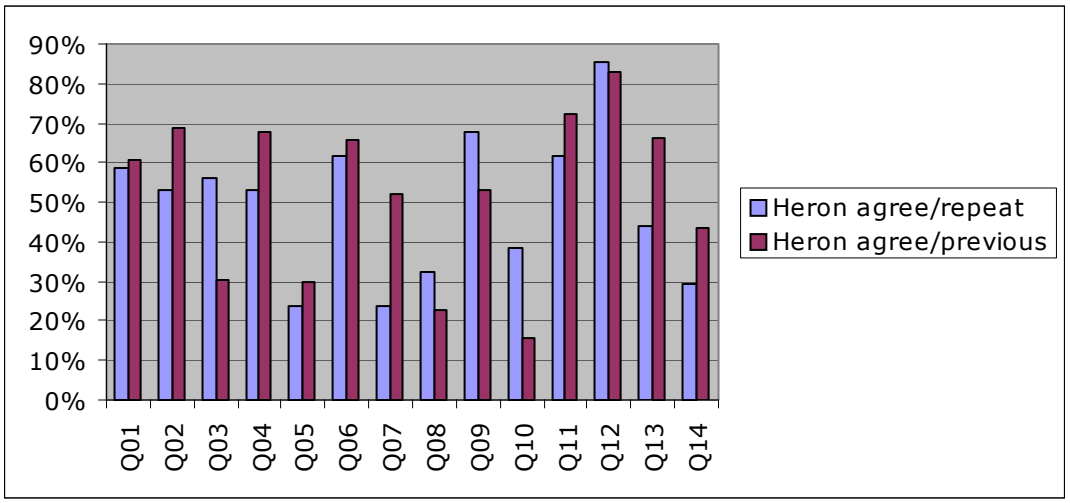

Figure 1. Comparison of Likert items for students repeating the course, and for students who passed the course previously.

The instructor enjoyed the challenge that the blended learning format presented, and gained "a new appreciation for what I could do with technology."

Of the written statements by students coded for student-to-student interaction, just under 40% did not value online interactions. There were 649 messages posted in the WebCT discussion area; the instructor posted 36 of these messages. Since the class originally had over 2,000 students enrolled, this does not represent much activity in the online discussions. In addition, it seems that a handful of roughly 20 students sent the bulk of the message postings. The instructor also noted that there was some incivility among students in the discussion area. Finally, the instructor did not think there would ever be enough resources (time, teaching assistants, etc.) in such a large class to give credit to students for online discussion postings.

The instructor believed "that the justification for that [blended learning] was it would make scheduling a little easier." Even though the instructor believed that the e-lectures "were just as effective as the [face-to-face] lecture," the instructor was disappointed that the institution would only offer the blended version as an option. The instructor observed that "the university did not want to face the fact of, perhaps, parents saying, 'I didn't send my kid to university so that they could sit in front of the computer. They should be in front of a real lecturer.'" In addition, the instructor said "in some ways I feel it [e-lectures] would probably be even more effective because the student actually is the participant." Finally, the instructor enjoyed the challenge that the blended learning format presented, and gained "a new appreciation for what I could do with technology."

By offering the pre-recorded lectures online, the instructor could offer the course every year rather than every other year.

Kingfisher U.

The purpose of this course was to familiarize third year students with the main concepts, viewpoints, and research findings in the field of organizational communication. This large enrollment course consisted of streamed audio and video lectures with accompanying slides using Mediasite Live®; the two hour lectures were also available online in plain text and in PowerPoint format. There were no face-to-face lectures, but there were weekly tutorials conducted by teaching assistants, where students reviewed course concepts in class discussions. The weekly lecture was available online for seven days, at which time it was removed and the following week's lecture was posted.

The marking scheme for the course included the following activities: two short papers 20%, a mid-term exam 15%, a term paper 25%, a final exam 25%, and tutorial participation 15%. Students submitted papers electronically in order to provide the markers with a date stamp, but students also handed in their reports in paper form. WebCT was the course management system used for the class, and contained the lecture links, a calendar, external course Web site link, mail messages, discussions, and grades. The course outline, marking scheme, instructor/TA contact information, assignments, readings, schedule, related links, and PowerPoint/text/audio links to the lectures were all on the external course Web site.

The instructor developed this method of blended delivery based on considerable positive experience with this particular technology and course format in his second year course, and because of departmental constraints. By offering the pre-recorded lectures online, the instructor could offer the course every year rather than every other year as previously contracted. This meant that the instructor was able to integrate the course content for both third and fourth year students. In other words, being the only content provider for this subject made it much easier for the instructor to manage the course material over the years, and avoid the pitfalls of having a different instructor prepare the students in the third year or having the course simply dropped from the schedule when he was on leave.

The instructor offered students a reward for completing the online survey, and the survey response rate was 66%; the students' incentive to complete the survey was access to the entire semester's online lectures one week before the final exam. Students were generally satisfied with the course overall, but they were not as supportive as all other students in the study that blended learning improved their understanding of concepts

(10% fewer agreed than all other students). Although most students agreed that the amount of face-to-face interaction with other students was appropriate, nearly half of the students did not agree with the amount of online interaction with the instructor. This result is confirmed in the open-ended questions; for example, a student observed, "not much contact with prof, i.e., to ask questions during the lectures," and another student wrote, "no interaction with the prof other than the online lecture."

One factor that may have contributed to the number of students concerned about a lack of online interaction with the instructor was an administratively required, last minute change in the structure of the course from one with a choice of live or streamed lectures to a purely online version. Despite a variety of means used to inform early registrants, this change appears to have come as a disappointing surprise to a number of students. In fact, 19.5% of the students spontaneously responded to an open-ended question in the instructor's own evaluation survey that they did not know it was a purely online course when they enrolled. As one student stated, "originally when I signed up for this course it wasn't an online course. I stuck with it because I really wanted to learn more about communication. However, I feel I personally would have benefited more had it been in class as originally planned."

In addition to the lack of interaction with the instructor, Kingfisher students agreed the least of all case studies that online student interaction contributed to their understanding of course materials (Q14). One student wrote, "I really missed the interaction with other students to discuss ideas and course concepts." Forty-three students commented in the open-ended questions about the lack of online student interaction. The instructor did create a discussion board for students in WebCT; however, many students seemed unaware of the online discussion area. In addition, less than ten students posted only 28 messages to the discussion forum; this was very little activity for 159 students in the class. One student wrote, "there was no online interaction with other students. Though, I believe if there was it would probably enhance my understanding of key topics."

To be involved in this experiment, the students were required to acquire WebCT accounts. The instructor created a WebCT front door to his established Web site, which directed students to the appropriate site locations in both WebCT and the regular Web site. Thus, despite the presence of two Web sites to support the course, which could be confusing, 96% of students agreed that the Web site was well organized and easy to navigate (Q12). Students enjoyed the intellectual challenges,

Students enjoyed the intellectual challenges, and one student wrote, "assignments allowed for suitable application of course material, rather than simple regurgitation of concepts."

and one student wrote, "assignments allowed for suitable application of course material, rather than simple regurgitation of concepts." In addition, 86% of the students agreed that the course helped them learn key concepts (Q13).

Although some students complained about the length of the two-hour lectures, they also appreciated the advantages of online access: "1) Ability to listen to lectures at my own discretion. 2) Ability to rewind and fast forward." Still, the younger generation's exposure to modern entertainment makes it difficult for a university lecturer to compete even if the instructor is a dynamic speaker with interesting graphics. As one student wrote, "the lectures are not boring, yet somehow I got bored."

One of the benefits for the lectures in the blended format was that it was "a focusing technique for me." The instructor explained, "my lecturing now is much more coherent; that is, it is a one hour piece. It's archived; it has to make sense." In addition, the instructor said, "I think it offers some choices to me professionally, but also to the department." However, the instructor recognized that "I actually made myself available to students without being in the classroom," and teaching a course without being there—by using pre-recorded lectures—was potentially controversial.

U Nuthatch.

The U Nuthatch course was an upper level class in contemporary feminist theories offered to about 16 students. The instructor omitted one face-to-face lecture as compensation for student participation in online discussions. Students prepared a one page critical response to an assigned reading that they posted in WebCT, and this activity was worth 20% of their course mark. Although the discussion postings were intended to promote dialogue among students, they had the option of submitting a response privately to the instructor if the subject was too personal.

The instructor used WebCT for discussion purposes only, and did not post any course documents or other course related material online. The instructor believed that giving students a paper copy of articles and course documents in a booklet was less likely to cause problems for students than putting course materials online. In addition, the instructor believed this strategy was less confusing for students, and there were no statements from students indicating they would have preferred to access the materials electronically.

The instructor said that the online discussion component "gave students more control over their own learning," increased student-to-

The instructor said that the online discussion component "gave students more control over their own learning," increased student-to-student interaction, and promoted learning that was more active.

student interaction, and promoted learning that was more active. Statements by students supporting the value of online interaction outnumbered statements that did not value online interaction by three to one. One student wrote that the online discussions "allowed us to think critically about what we read," and another student observed, "the process of reflecting and reading other people's takes [postings] helped me understand concepts." In addition, students also appreciated the integration of blended components, and Nuthatch students agreed more than all other case studies that the balance between face-to-face and e-learning components was about right (Q04); for example, one student wrote, "face-to-face class interactivity enhanced by Web-based class interactivity enhanced understanding of concepts." However, one student observed, "I enjoy face to face learning. I also have taken only on-line classes that I thought were good, but I do not get the need for the mixture."

Because the Nuthatch class is small, and there were only 15 respondents, we have less confidence in the Likert item results. Still there was strong support from Nuthatch students on their overall satisfaction (Q01), the balance between face-to-face and e-learning components (Q04), and the amount and type of interaction with both students and the instructor (Q06 and Q07).

On the other hand, 9 of the 15 students wrote about their lack of access to technology; more specifically, they put down things like "difficulty is created for students without computers at home," and "not having the Internet at home; it was very frustrating." In addition, one student wrote that the lack of computers "discouraged two Aboriginal women (who did not have computer skills) from taking the course, when their voices would have been extremely informative to hear."

Although this course was mostly face-to-face, the students and instructor supported the online components very much. Most students valued the online discussions, and the instructor believed that the blended approach "raised the bar, and was good pedagogy." The only notable limitation for students was their access to and familiarity with computers. For the instructor, the only negative was indifference to this mode from other instructors and administration. However, the advantage of increased student interaction, improved computer skills, and more freedom for both students and the teacher, justified the use of technology and continuing to teach in the blended mode.

Oriole U.

The instructor reported many benefits with the blended format, and said, "it's absolutely the most satisfying teaching I do."

This senior level course examined current molecular techniques used to study plant development physiology. Students attended two-hour lectures twice a week except for six lab assignments that replaced the lecture periods; teaching assistants managed the lab sessions. Students earned 50% of their course mark by completing a thesis proposal that they posted online. Groups of two to three students submitted the thesis proposal, and each student in turn commented on the other groups' proposals using an online form in Angel. Students were not able to view each other's critiques directly; however, the instructor posted feedback on each group's proposal, which included many quotations from individual critiques, and all students could read the instructor's feedback in Angel. A final exam was worth 35% of the course mark; the remaining 15% of the marks came from lab reports/performance, and in-class spot quizzes.

Two Web sites supported the course delivery; one was a commercial course management system (Angel) used to post critiques of the thesis proposals, and the second a basic Web site that hosted the remaining course materials. The instructor did not use the discussion board in Angel, and the basic Web site included a course schedule, contact information, learning objectives, assignment descriptions, animations, a sample final exam, links to relevant online resources, and links to the students' thesis proposals in a popular video format (*.mov). The instructor posted everything but the thesis proposal critiques and feedback on the basic Web site, and some parts of the Web site were password protected.

All students enrolled in this course completed the online survey (18 respondents). Even though this was a small sample, all but one student agreed that the blended format improved their understanding of key concepts, and all respondents agreed that they were satisfied with the course overall. However, only 44% of the students agreed that online interaction with other students contributed to their understanding (Q14); however, this was probably related to the fact that students did not really discuss issues online, but simply critiqued each other's proposals. In the open-ended questions, a student explained this approach to online interactions: "it wasn't a true student-student interaction; we were just able to download other students' proposals and critique them anonymously . . . . this was very good though!"

The instructor reported many benefits with the blended format, and said, "it's absolutely the most satisfying teaching I do." In addition,

the instructor observed, “it’s a real advantage [of the blended format] to get to know the students because I end up writing a lot of reference letters.” However, both the instructor and the students indicated the blended format took more time; Oriole students agreed more than all other case studies that this course required more time and effort (Q09). A student wrote, “filling out a critique for each group is difficult and time consuming.” Even the instructor acknowledged that answering the students’ critiques “took me ages.” Yet, the thesis proposal and critique was a “thinking assignment” according to the instructor, where students were “learning how to critique.” Finally, the instructor said, “I surveyed them this week . . . I asked them if it [the critique] was too much work . . . it was remarkable how many said well you can't take out too many or otherwise we wouldn't have gotten better at it.” Therefore, even though the thesis proposals and critiques were intellectually challenging and time-consuming, the instructor said students were “very proud of how well they can do that,” and all but one student agreed they learned key concepts.

Redwing U.

The instructor described the online environment as “quite an intimate environment because you really get to know the students really well and how they're interacting with one another because of what they're posting and how they're interacting.”

The course at Redwing U introduced first year university students to foundational studies in teamwork and communications; the course has always been in the blended format since its inception about five years ago. Four instructors taught eight different sections of this course (380 students). The instructor interviewed for this study taught three sections of approximately 150 students total, and was a primary developer of the course content.

A non-commercial course management system housed the online course materials for this course. Face-to-face classes alternated every other week with online conferencing, and students submitted assignments and quizzes online. Students could take the quizzes as often as they wanted to during the week the quiz was available. The instructor observed that it would be “tough to teach teamwork totally online,” but also that the course is “very writing intensive,” so, the online environment worked well for that. In addition, the instructor described the online environment as “quite an intimate environment because you really get to know the students really well and how they're interacting with one another because of what they're posting and how they're interacting.”

One unique approach to online conferencing was that these instructors no longer graded the student’s online contributions. When

The instructor reported many benefits with the blended format, such as, "flexibility of the blended learning model," and said, "I absolutely love this course . . . I feel like I'm always learning from students that are coming in."

asked if student participation decreased because of this, the instructor responded "no, and I thought they would . . . but I found that actually their participation has been better since we haven't been directly marking it." The instructor "made it clear [to students] that if you don't participate [in online conferences] it's going to affect your mid-term or final mark, but we didn't say specifically how." In addition, the instructor stressed that students who did not participate in the conferences would be letting their team mates down; the instructor felt this tactic motivated students to be more accountable and consistent in their online participation. Thus, this freer approach to marking online discussions was still effective in making the students' online contributions significant to their learning, and sidestepped assigning a certain percentage of students' marks to individual contributions.

The instructors offered the online survey to all 380 students, and the response rate was just 14%. Even though the students supported student-to-student online interaction in the Likert items, only a slight majority wrote favourably about online interactions in the open-ended questions. One student wrote, "1. Individuals are fake and superficial over the Internet. 2. Lack of social bonding;" however, another student observed this about online interactions: "the only time I "learn" anything is through the online portion where there is no instructor present." Finally, nearly 20% more students in this class agreed that the blended learning format hindered their learning than all other students in the study did (Q03).

The instructor reported many benefits with the blended format, such as, "flexibility of the blended learning model," and said, "I absolutely love this course . . . I feel like I'm always learning from students that are coming in." However, recent institutional changes, as well as only just offering the course to students in different programs may have had an impact on the range of responses from students. For example, technology students in previous years knew how to build a Web site before taking this course, but "now we have students coming in that are transferring to other programs that the only Internet experience that they've had is searching the Web or using e-mail, and they have no idea how to set up a Web site." Thus, the instructors were coming to grips with changes in student demographics, and the varying level of integration with other courses in the students' programs.

U Yellowlegs.

A student wrote, "online interaction with other students for me is very important. I feel that you learn best and have more time to share information online regarding course material."

A social work practicum seminar was the focus of this blended learning case study. About 18 students from three remote areas participated in both face-to-face and online discussions related to their field practice experiences in social work. Participation in the class discussions accounted for 40% of the course mark with 20% face-to-face and 20% online interaction using the Blackboard (Bb) course management system. The course was 36 hours in total with 12 hours devoted to online interaction, and 24 hours to face-to-face activities. In addition to online discussions, Bb also housed course documents, including PowerPoint presentations, the course outline, external links, and a syllabus. The blended learning format's main purpose was to enable students to interact with their peers at a distance, where previously they could only interact with peers in their own practicum locations.

Although only 50% of students agreed that the blend of face-to-face and e-learning components was about right (Q04), 70% agreed that online interaction with other students contributed to their understanding of course materials (Q14). However, only 20% of the students agreed that the blended format contributed to their success in the course (Q05). (Please note that the sample size is only 10 students for this case study.)

Open-ended comments in the student survey about online discussions were positive, except for one student who had concerns about maintaining client privacy in Bb. For example, a student wrote, "online interaction with other students for me is very important. I feel that you learn best and have more time to share information online regarding course material." Another student explained the advantage of online versus face-to-face discussions like this:

> Sometimes I would hear something in class about someone's practicum, and forget who said what or who was speaking as people do not usually announce their names when they speak, but online I can look each time and see what I am responding to, what others have said, and who says what.

In addition, another student explained that online interaction "has helped as it offers students a different perspective from their own. Allows for the opportunity of brainstorming and then coming back to an idea. It is available for students at any time, which offers more flexibility." Finally, this student felt that online discussions "help me step out of my comfort zone and learn something new."

Besides the advantage of increased opportunities for reflection, the instructor also saw the blended format as a way to monitor students' progress more closely

The instructor also saw the advantage of having students from different areas communicate online, and gave an example of a non-Aboriginal student who because of the blended format had new opportunities to discuss her Aboriginal clients with Aboriginal social work students. In addition to the time and place advantage of online interaction, the instructor also talked about reflection:

> Social work is really about reflective practice and students have opportunities to reflect on the materials . . . they can take that away and then they . . . had time to ponder that; they can add something to the Blackboard discussion that perhaps they thought of afterward or they can actually seek consultation with other students in a current issue that occurred between classes.

Thus, the social work practicum was particularly suited to the benefits of asynchronous online interaction.

Finally, the instructor recently adopted a less involved strategy within the online discussions because the students' interactions were "becoming more of a consultation with me, and so . . . I was leading more than I should have been." Staying out of the discussions also saved the instructor quite a bit of work compared to "the hours that it took last year with students expecting me to respond—was unbelievable. It was way too much." Perhaps some of the students' dissatisfaction with the blended format noted earlier stems from this decreased online interaction with the instructor; Yellowlegs students agreed the least of all case studies that the amount of online interaction with the instructor was appropriate (Q07). In addition, this result is probably even more pronounced because other teachers in the department were much more active in student discussions.

Besides the advantage of increased opportunities for reflection, the instructor also saw the blended format as a way to monitor students' progress more closely, and spoke about e-mailing students whose participation in the discussions was falling behind. In addition, the instructor used the blended format to orient students to computers because "some don't know how to use a computer—it's kind of scary." Furthermore, the instructor said "I feel that we owe this [computer training] to our students who are going out into a very technological work arena." Only two students had comments about technological problems, and only one agreed that technology interfered with her learning.

In conclusion, this blended learning course combined the advantages of distance learning for remote students with the benefits of reflection in asynchronous discussions for students who are beginning practitioners in social work. This case study was a particularly good marriage between face-to-face and online components, and is well suited to the social work discipline. However, although nearly 60% of the students completed the survey, the sample size is very small, making any conclusions somewhat less convincing.

University Comparisons

We now discuss how the universities compared to each other in terms of student background, student satisfaction and success, the technology used in the courses, the pedagogical choices, challenges the instructors' faced, and the impact of policy and support issues at the universities. For this part of the analysis, we draw on the results of the instructor interviews and student survey (see Appendix B for Likert item results).

As can be seen from Table 1 above, the sample sizes for each university were very different, and the response rates ranged from a low of 14% to a high of 100% of students enrolled in the course. However, even though there were only 10 responses from Yellowlegs, the response rate was higher than it was for Heron with 320 responses. Three instructors (Eagle, Yellowlegs, and Kingfisher) offered students rewards for completing the survey. All of these factors reduce the reliability of comparisons across universities so we interpret the results with caution.

Student background.

As might be expected, student backgrounds varied considerably across universities, and Table 3 describes differences in four of the background survey items.

It is also interesting to look at the profiles within a university; for example, 90% of Yellowlegs students indicated they attended university full-time, yet 40% of them also reported working full-time.

Table 3
Percentage Responses to Student Survey Background Questions

University	Gender		Employment status			Student status		Computer access		
	female	male	FT	PT	not employed	PT	FT	only home	only work or university	both
Albatross	96	4	0	62	38	0	100	42	4	54
Eagle	47	52	5	28	67	2	98	51	7	43
Heron	69	31	1	26	73	1	99	35	11	53
Kingfisher	82	18	4	67	29	5	93	58	14	27
Nuthatch	80	7	13	47	40	20	80	40	20	40
Oriole	50	44	0	22	67	0	100	28	6	67
Redwing	49	51	0	49	51	0	98	18	0	82
Yellowlegs	100	0	40	40	10	10	90	30	20	50

Note. Percentage totals that do not add up to 100% are due to missing responses from students.

As can be seen from Table 3, the profiles of students at each university are quite varied. For example, Yellowlegs was 100% female students while Eagle, Oriole, and Redwing classes had more evenly mixed gender profiles. In addition, 20% of Nuthatch and Yellowlegs students did not have access to a home computer, while only 4% of Albatross students and no Redwing students were in this situation. It is also interesting to look at the profiles within a university; for example, 90% of Yellowlegs students indicated they attended university full-time, yet 40% of them also reported working full-time. A fifth background question asked about grades; despite significant variation in the responses, all of the means were above the letter grade B.

Student satisfaction and success.

Students' overall satisfaction with their course was the first Likert item with statistically significant differences among universities (Q01). The means ranged from a high of 100% agreement for two small classes to a low of 65% for a very large enrollment course. The difference in class size probably explains this result. Although the question asking students if blended learning improved their understanding (Q02) had statistically significant differences, 23 students in some of the smallest classes (Nuthatch, Oriole, and Yellowlegs) did not answer the question, which probably affected this result. There were also significant differences

A background survey question asked students if they would take another blended learning course, and on average, 61% of students agreed they would take another blended learning course, 12% indicated they would not, and 27% said they were unsure.

among universities for Q05, which asked students if blended learning contributed to their success. Again, nearly 11% of all students did not complete the question or chose not applicable answers. Similarly, 14% of responses to the question about relating to other students' viewpoints (Q08), and 16% of responses to online interaction with other students (Q14) were not completed or answered not applicable.

Another background survey question asked students if they would take another blended learning course, and on average, 61% of students agreed they would take another blended learning course, 12% indicated they would not, and 27% said they were unsure. There were no statistically significant differences (p=.317) among universities on this question.

The statement that blended learning hindered my learning (Q03) was a negatively worded Likert item with statistically significant differences, and the means ranged from a low of 4% agreement for Albatross to a high of 49% agreement for Kingfisher. Interestingly, Kingfisher students did not have face-to-face access to their professor during lectures. Finally, Heron students agreed far less than those in other universities that they learned key concepts, and this probably contributed to the significant differences for Q13 (p=.000).

Technology used in courses.

Five of the eight universities used WebCT to support the e-learning components of their blended learning courses. One university used Blackboard, another used Angel, and one university developed an in-house course management system. Both Angel and Blackboard are competitive with WebCT, and all three are commercial products. Thus, all eight universities had some type of course management system. In addition to these systems, three instructors developed animated learning objects, and another instructor had online video demonstrations of the assignments. We did not ask instructors whether the blended format encouraged them to develop these multi-media online resources for their students, but it is interesting to consider the possibility.

Two instructors used traditional Web sites to house course outlines, syllabi, assignments, and other course materials and resources, in addition to the course management system. These instructors did this partly because they developed their Web sites before the university adopted a course management system, but also because the course management system did not provide the functionality they wanted. One technically skilled instructor used server log files to track attendance and participation, as well as to script announcements posted on the course

Seventy-five percent of all students disagreed that technology interfered with their learning.

home page. Finally, all but one instructor posted course materials and other resources online, although the technology used ranged from static document files to streamed high-end audio and video presentations. Thus, most instructors took advantage of the Internet's practical and convenient means of communicating with students over the Web.

Seventy-five percent of all students disagreed that technology interfered with their learning, and this survey question (Q10) had the least variation (p=.377, standard error=.016) among the universities in this study. In addition, 77% of all students agreed that their course made excellent use of Web resources (Q11). Thus, support from students for technology was strong despite the wide variation in tools used by instructors. Although there were a few open-ended comments by individual students about bandwidth, downtime, or incompatibilities, these comments made up less than 6% of all coded statements written by students. In general, technological problems did not trouble students very much, nor did any type of technology emerge as burdensome to students.

Online pedagogy.

Online discussions were a primary part of the e-learning component for five of the blended learning courses. Most instructors awarded 20% of the course marks for online discussion activities; however, one instructor only awarded 5% for online discussions. Five percent was probably not sufficient, and 42% of these students wrote that the online discussions were too much work for a small amount of credit given. Furthermore, one instructor did not grade the online discussions, but participation in them was a component of a team presentation mark worth 30%. In addition to the online discussions, one university had online labs, two universities had online quizzes, and another university had online thesis proposals worth 50% of the students' course mark. Only one instructor did not award any marks for online activities, even though the lectures for that course were only available online (i.e., no face-to-face lecture).

Likert item comparisons among universities bring to light some interesting perceptions about online discussions. First, online student discussions can work in large classes. Students at Eagle U were more satisfied (72% agreed) than all other students were with student online interactions, despite the large enrollment. As noted, the differences among universities for Q14 were statistically significant (p=.000), and a considerable 54% more Eagle students than Kingfisher students agreed that online interaction with other students contributed to their understanding of course materials. Thus, the approach used by this

Encouraging higher order thinking skills among students was a pedagogical goal mentioned by six of the instructors. Both students and instructors saw the online components as a means to encouraging critical thinking.

instructor, which gave marks for online community building activities (e.g., service to society marks), could provide a template for other instructors of large enrollment classes who wished to incorporate online student discussions.

Similarly, instructors do not necessarily have to grade individual online discussions for them to be valuable to students' learning. There was nearly 20% greater agreement by Redwing U students on Q14 than all other universities combined. The Redwing instructor did not assign a mark to the student online interactions; however, participation in online discussions was required for a good mark in a team project. The sheer volume of work required to evaluate online discussions was an important objection by instructors of other large enrollment classes. Yet, the Redwing U instructors found a way to make the students' online discussions significant to their learning without directly marking individual submissions to team conferences.

Encouraging higher order thinking skills among students was a pedagogical goal mentioned by six of the instructors. Both students and instructors saw the online components as a means to encouraging critical thinking. Flexibility and freedom were also important goals for both students and teachers. Students were especially happy with the ability to schedule course work when it was convenient for them, and in the case of courses with online lectures, students liked being able to "fast forward or rewind" the instructor. In addition, even though there was wide variation in the elements that were blended, 68% of all students agreed that the balance between face-to-face and e-learning components was about right, and there were no statistically significant differences across universities on the survey item asking this question (Q04, p=.116). Moreover, students appreciated the traditional values (e.g., face-to-face discussions) that the blended format supported; for example, a student wrote, "I could work out the problems online, but if I had trouble there was always the face-to-face contact that could enhance my understanding."

Five instructors said that the online component of their course enabled them to get to know their students better than in a traditional face-to-face class, and they saw this as a major benefit of blended learning.

Five instructors said that the online component of their course enabled them to get to know their students better than in a traditional face-to-face class, and they saw this as a major benefit of blended learning. For example, one instructor said, "I have a better appreciation of those who are falling behind, and the tools to be able to put a little note to them." In summary, the benefits of blended learning mentioned by instructors include being able to track students' progress more closely, having the opportunity to be creative, and a perception that students

The amount and quality of interaction among students and with their instructors was a statistically significant factor in students' overall satisfaction with their courses.

were learning more. In addition, all eight instructors enjoyed the blended format, and said they would teach in that format again.

Instructor challenges.

The challenges facing the instructors were often dependent on the size of the class. Two instructors of large enrollment lecture courses believed there was no realistic way to incorporate online discussions, yet another instructor of a large enrollment first year course did this quite successfully. A slight majority (55%) of all students disagreed on the survey that it was harder to relate to other students' viewpoints than in a traditional class (Q08). However, there were strong statistically significant differences (p=.000) in means across universities to the survey question which asked students if online interaction with other students contributed to their understanding of course materials (Q14). Interestingly, removing the two large enrollment courses (Kingfisher and Heron) with the least amount of online student-student interaction from the ANOVA calculations altered the results, and produced no significant differences among the means (p=.980). Approximately 72% of students in these remaining six universities agreed that online interaction with other students contributed to their understanding.

Thus, according to our survey, students who did not regularly see their professors (e.g., Kingfisher, Heron) and students whose instructors took a less active role in online discussions (e.g., Yellowlegs, Redwing) were significantly less likely to agree that the amount of online interaction with their instructor was appropriate. In other words, students were attentive to the amount and quality of interaction with their instructors as well as with their peers.

Finally, the correlation coefficients between students' general satisfaction with their course (Q01) and the amount of face-to-face interaction with other students (Q06) was significant at the .01 level (r=.313); in addition, the correlation between online interaction with other students (Q14) and general satisfaction (Q01) was also significant at the .01 level (r=.297). In other words, students who were more satisfied with the course overall were more likely to be satisfied with their interaction with other students. Thus, the amount and quality of interaction among students and with their instructors was a statistically significant factor in students' overall satisfaction with their courses.

Lastly, 57% of all students agreed that the blended learning format required more time and effort than traditional on-campus courses (Q09). However, there were statistically significant differences among the eight university's means (p=.007); for example, only 10% of students at

Five instructors observed that their peers were not supporting their efforts with blended learning; for example, when describing a recent technical problem, one instructor said "it's disheartening, and my colleagues who can't get motivated to do things [with blended learning] just look at me and say see?"

Yellowlegs agreed the course took more time and effort, while 94% of students at Oriole agreed with this statement. All instructors said the blended learning format took more time and effort on their part, but none objected to the extra work or indicated they would abandon the blended learning model.

Policy and support.

It seems evident that the variation reported among case studies was more likely due to individual instructors or course discipline rather than university policies or procedures. All of the instructors had access to some type of technical and/or teaching support at their university for their blended learning courses. Five of the eight instructors mentioned ways in which their support centre helped them with teaching and learning strategies in addition to the technical help. However, five instructors observed that their peers were not supporting their efforts with blended learning; for example, when describing a recent technical problem, one instructor said "it's disheartening, and my colleagues who can't get motivated to do things [with blended learning] just look at me and say see?" Even students wrote that their blended learning course "receives hardly any attention or funding from the university." Only three of the instructors were able to get some funding or release time to develop their blended learning courses. Such findings highlight the need for universities to continue to develop support policies.

Conclusions

Online interaction should be a core issue when designing blended learning courses; not only for student satisfaction but because both instructors and students saw online discussion as a means to encourage critical thinking and contribute to their understanding.

Instructors blended their courses to put together a more flexible, efficient, accessible, and varied learning experience for their students. However, student satisfaction seems highly dependent on the level of interaction with instructors and with other students. This is consistent with previous research (Swan, 2001). It strongly suggests that online interaction should be a core issue when designing blended learning courses; not only for student satisfaction but because both instructors and students saw online discussion as a means to encourage critical thinking and contribute to their understanding. This might also partially explain why some students viewed blended learning as requiring more time and effort. Finally, the success of online discussion in one large enrollment

class suggests that student interaction can enhance large enrollment classes with appropriate design.

From an institutional perspective, it is essential that there be clear policy, direction, and support of blended learning if the positive benefits are to be realized.

From an institutional perspective, it is essential that there be clear policy, direction, and support of blended learning if the positive benefits are to be realized. In addition, there must be incentives such as release time as well as recognition and rewards for creating innovative blended learning course designs. In other words, university reward structures need to recognize this work as a scholarly activity. More specifically, universities need to create an institutional action plan with the explicit and sustained commitment of senior administration and their academic policy bodies. The plan should ramp-up the redesign process by targeting a select few courses that will ensure success and provide the best exemplars and prototypes. Formal systematic and sustained design support is also a necessity. It is also essential to study and evaluate progress and outcomes to not only improve the design but to provide the information that will keep senior administration onside. A steering group of representatives across the institution may be essential to get buy-in and feedback in order to learn and adjust.

Blended learning offers a model for thoughtful redesign of courses consistent with the traditional values of a university as well as a means to positively address quality and diminishing resource issues.

Blended learning offers a model for thoughtful redesign of courses consistent with the traditional values of a university as well as a means to positively address quality and diminishing resource issues. In the context of the challenges facing universities from a funding, expectation, and technological perspective, there is a pressing need for change and leadership to reposition Canadian universities to remain competitive globally. Scholars must direct inquiry to teaching and learning as much as it is to research. The efforts reported here represent an exploration of new approaches and technologies to enhance the quality of the learning experience in Canadian universities and bring it into the 21st century. Such a thoughtful response will also be the sign of creative and bold leadership required to meet the educational challenges of a society in transformation.

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Appendix A

Instructor Blended Learning Telephone Interview Questions

1. To begin, please briefly describe your teaching background, how long you have been teaching, and if you've taught an online or blended learning course before.

2. What motivated you to try the blended learning format?

3. How much FTF & CMC instruction?

4. What is the nature of the mix (technologies used & strategies/methods being used)?

5. What was your rationale for deciding what topics/skill areas to cover online and what ones to cover face-to-face? What factors do you take into consideration when deciding when to develop an activity for either online or FTF contexts?

6. Are you satisfied with your decision about what to cover online and what to cover face-to-face? Please explain.

7. Is there anything unique about your academic discipline, course topic, or subject matter that lends it particularly well to teaching it in a blended format?

8. Compared to a traditional face-to-face course, how much time and effort did you put into *preparing* this course? Did you receive any technical assistance or inducements such as release time or a stipend for developing the course? How does the actual time you spend *teaching* the course compare?

9. Would you teach the course in this mode again? Are there any other aspects you would change if you offered the course again? Describe them.

10. What has been the reaction of students to your course in comparison to the regular face-to-face version of the course if you have taught it before in that mode. To what do you attribute the differences (if any) between the two course formats?

11. Are there any types of students (e.g., women, minorities, students who have full time jobs) who seem to benefit more from the blended learning format of your course than the traditional format?

12. What do you see are the advantages of teaching in a blended format? What are the limitations?

13. How do you integrate the learning activities in which students engage in both online and FTF activities into a coherent experience?

14. Do your students trust the technology; for example, are you finding they hand-in assignments more than once using different modes (e.g., e-mail, paper, digital drop box, etc.)?

15. What is unique and/or powerful about your approach to blended learning?

16. Where is blended learning most appropriate?

17. What goals are driving the decisions and strategies for determining the blend?

18. What are the problems and dilemmas you have faced as well as the solutions?

19. What returns or benefits are you experiencing from adopting a blended learning approach?

20. What in your mind are open issues (research/evaluation questions to be addressed) and next steps in blended learning?

21. Do you have any other comments about your course that you would like to offer?

Appendix B

Likert Item Means and Frequencies

Likert Number	Likert Item	University Mean *Percent agree (a) and disagree (d) in italics**								Overall Means *Percent agree (a) or disagree (d) in italics*	Significance of mean differences on ANOVA test
		Albatross	Eagle	Heron	Kingfisher	Nuthatch	Oriole	Redwing	Yellowlegs		
Q01	Overall, I am quite satisfied with this course so far.	**0.92** *a=92* *d=8*	**0.81** *a=80* *d=19*	**0.65** *a=61* *d=32*	**0.76** *a=74* *d=24*	**1.00** *a=100* *d=0*	**1.00** *a=100* *d=0*	**0.65** *a=64* *d=35*	**0.80** *a=80* *d=20*	**0.73** *a=70* *d=25*	.000
Q02	The use of blended learning in this course has improved my understanding of key concepts better than a traditional online course would have done.	**0.87** *a=81* *d=12*	**0.84** *a=79* *d=16*	**0.72** *a=67* *d=26*	**0.67** *a=61* *d-30*	**0.75** *a=60* *d=20*	**1.00** *a=94* *d=0*	**0.76** *a=71* *d=22*	**0.67** *a=60* *d=30*	**0.76** *a=70* *d=22*	.008
Q03	The blended learning format of this course has hindered my learning experience compared to a traditional on-campus course.	**0.04** *a=4* *d=92*	**0.40** *a=39* *d=57*	**0.37** *a=33* *d=57*	**0.49** *a=47* *d=50*	**0.14** *a=13* *d=80*	**0.33** *a=33* *d=67*	**0.57** *a=47* *d=36*	**0.14** *a=14* *d=86*	**0.39** *a=36* *d=57*	.000
Q04	The balance between the face-to-face and e-learning components in this course is about right.	**0.85** *a=85* *d=15*	**0.73** *a=71* *d=27*	**0.72** *a=66* *d=26*	**0.64** *a=61* *d=35*	**0.93** *a=93* *d=7*	**0.83** *a=83* *d=17*	**0.75** *a=71* *d=24*	**0.56** *a=50* *d=40*	**0.72** *a=68* *d=26*	.116
Q05	Without the blended learning format, I would not have been as successful in this course.	**0.20** a=15 d=62	**0.51** a=48 d=47	**0.34** a=29 d=56	**0.47** *a=44* *d=50*	**0.33** *a=27* *d=53*	**0.50** *a=44* *d=44*	**0.37** *a=33* *d=55*	**0.20** *a=20* *d=80*	**0.40** *a=36* *d=53*	.007

Likert Number	Likert Item	University Mean *Percent agree (a) and disagree (d) in italics**								Overall Means *Percent agree (a) or disagree (d) in italics*	Significance of mean differences on ANOVA test
		Albatross	Eagle	Heron	Kingfisher	Nuthatch	Oriole	Redwing	Yellowlegs		
Q06	The amount of face-to-face interaction with other students in this course is appropriate.	**0.80** a=77 d=19	**0.67** a=66 d=32	**0.73** a=65 d=24	**0.75** *a=75* *d=25*	**1.00** *a=100* *d=0*	**1.00** *a=100* *d=0*	**0.61** *a=60* *d=38*	**0.80** *a=80* *d=20*	**0.73** *a=69* *d=26*	.006
Q07	The amount of online interaction with the instructor is appropriate.	**0.83** a=77 d=15	**0.88** a=86 d=11	**0.57** a=49 d=36	**0.50** *a=48* *d=48*	**0.92** *a=80* *d=7*	**1.00** *a=94* *d=0*	**0.57** *a=56* *d=42*	**0.44** *a=40* *d=50*	**0.67** *a=61* *d=31*	.000
Q08	It is harder to relate to other students' viewpoints in this class than I would have if I took the course in the traditional on-campus format.	**0.24** a=19 d=62	**0.44** a=42 d=53	**0.31** a=24 d=52	**0.37** *a=36* *d=60*	**0.29** *a=27* *d=67*	**0.31** *a=28* *d=61*	**0.44** *a=40* *d=51*	**0.33** *a=30* *d=60*	**0.36** *a=31* *d=55*	.165
Q09	This course required more time and effort than other more traditional courses at this level.	**0.65** a=65 d=35	**0.62** a=60 d=36	**0.60** a=55 d=37	**0.61** *a=59* *d=39*	**0.64** *a=60* *d=33*	**0.94** *a=94* *d=6*	**0.54** *a=47* *d=40*	**0.11** *a=10* *d=80*	**0.61** *a=57* *d=37*	.007
Q10	The technology used in this course interferes with my learning.	**0.08** a=8 d=92	**0.21** a=20 d=75	**0.20** a=18 d=71	**0.22** *a=21* *d=76*	**0.13** *a=13* *d=87*	**0.06** *a=6* *d=94*	**0.26** *a=26* *d=71*	**0.10** *a=10* *d-90*	**0.20** *a=19* *d=75*	.377
Q11	The course makes excellent use of Web resources.	**0.95** a=81 d=4	**0.85** a=83 d=14	**0.78** a=71 d=20	**0.89** *a=82* *d=10*	**0.83** *a=67* *d=13*	**0.87** *a=78* *d=11*	**0.85** *a=80* *d=15*	**0.78** *a=70* *d=20*	**0.83** *a=77* *d=16*	.162
Q12	The course Web site is well organized and easy to navigate.	**0.92** a=92 d=8	**0.82** a=79 d=17	**0.86** a=83 d=13	**0.96** *a=96* *d=4*	**0.92** *a=73* *d=7*	**0.83** *a=83* *d=17*	**0.88** *a=84* *d=11*	**1.00** *a=100* *d=0*	**0.87** *a=84* *d=12*	.040

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		Albatross	Eagle	Heron	Kingfisher	Nuthatch	Oriole	Redwing	Yellowlegs		
Q13	This course has helped me to understand key concepts.	**0.88** a=88 d=12	**0.90** a=87 d=10	**0.68** a=64 d=30	**0.87** *a=86* *d=13*	**0.80** *a=80* *d=20*	**0.94** *a=94* *d=6*	**0.76** *a=67* *d=22*	**0.78** *a=70* *d=20*	**0.78** *a=75* *d=21*	.000
Q14	The online interaction with other students in this course contributed to my understanding of the course materials.	**0.69** a=69 d=31	**0.76** a=72 d=23	**0.52** a=42 d=39	**0.26** *a=18* *d=52*	**0.71** *a=67* *d=27*	**0.73** *a=44* *d=17*	**0.75** *a=71* *d=24*	**0.70** *a=70* *d=30*	**0.59** *a=50* *d=35*	.000

**Note.* Agree and disagree totals do not always add up to 100% because missing or not applicable answers are omitted in the frequency counts.