Assessing the Costs and Benefits of Telelearning:

A Case Study from the Ontario Institute for Studies in Education of The University of Toronto

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Acknowledgments

Summary and Major Findings

This project, "Applying a Cost-Benefit Model for Assessing Telelearning" is funded by the Canadian Federal Government and is part of a $13 million Telelearning Networks of Centers of Excellence project, NCE-Telelearning, headed by Dr. Linda Harasim at Simon Fraser University. The NCE-Telelearning project involves universities, colleges, schools, public organizations and private organizations across Canada and involves projects that study the effects of modern telecommunications on both learning and teaching.

The methodology used in this study is based on Bates (1995) ACTIONS model for assessing the strengths and weaknesses of learning technologies. Based on this model, the following cost and benefit factors are examined:

Cost measures assessed include: 1) capital and recurrent costs, 2) production and delivery costs, and 3) fixed and variable costs. Benefit measures include: 1) performance driven benefits, 2) value driven benefits, and 3) societal or "value added" benefits. Data was collected through quantitative and qualitative research techniques and include student, faculty/staff, and campus planner/administrator perspectives.

The Ontario Institute for Studies in Education/University of Toronto (OISE/UT) is one of six case studies assessed in this project. The course described in this report is "CTL 1692: Research Methods in Education". This course is part of OISE/UT's Distance Education Master's degree program in the Department of Curriculum Teaching and Learning, currently the first degree program at OISE/UT available entirely online.

Summaries of the main findings are presented below:

Summary of Student Characteristics (based on questionnaire responses from 14 of 20 students)

Characteristic	General Results
Gender	86% female; 14% male
Age	Average age is around 37 years
Grade point average last year	Mean GPA is approximately 82%
Highest level of education	2/3 at the Bachelor's level; 1/3 at the graduate level
Number of courses enrolled in	Average one course this term; 3 courses this year
Student Status	All part time students
Employment	All but 1 employed
Work hours/week	Range from 12-60 hours/week; mean approximately 43 hours/week
Caregiver status	Half were the primary caregiver
Computer use for this course	Mostly at home; some at the office
Reasons for taking the course	Most significant - to obtain qualification/credit; least significant - to socialize with others
Most preferred delivery method	A mix of technologies
Least preferred delivery method	No response

Main Cost Findings

Findings
• The use of WebCSILE software rather than Parti software decreased tutorial and student support time by half.
• As this course was revised from an existing online course, course development costs were minimal.
• There were no software costs as WebCSILE was developed at OISE/UT.
• Overhead costs are unknown as no system of keeping track of these costs is currently in place. Future policy and plans around funding for online courses are currently being developed.
• Based on the researched costs, revenue, and student enrollment, annual profit obtained for this course is $1,962.
• Annual break-even enrollment for this course, based on the projected costs, revenues, and student enrollment over 5 years is 5.31 students. (This would increase with the inclusion on the unknown overhead costs).
• Students thought the course was worth the money it cost them.
• The costing methodology developed provided an accurate means of measuring the full direct costs of online courses in a real context.

Benefits and limitations of the remaining data have been divided into those that are specific to the analyzed course and those that may potentially apply more globally to other online courses/programs.

Benefits and Limitations Specific to the Research Methods Course

Benefits	Limitations
Access and Flexibility	
• Access to an OISE/UT degree was increased.	
Teaching and Learning Functions	
• Course objectives were meaningful and there was a "good fit" between objectives, content, and assignments. • Course materials were relevant and well organized. • Students had access to the combined experience of two instructors. • Students thought the course was worth the time demands involved.	• Increased organization in course discussions would be helpful to the learning process – i.e. organization and inclusion of all relevant discussion topics. • Additional resources beyond the textbook would be beneficial.
Interaction and User Friendliness	
• Interaction with the instructors and students was relevant to the students' learning experience. • Instructors were quick to respond to student comments/questions. • Instructor feedback was useful and individualized.	• Several students required more feedback at regular intervals.
Organization	
• One of the instructors created a "guide to the technology" for this course which students found useful. • OISE/UT's electronic library system worked well although the majority of students still preferred to do their own leg work in a local library. • The bookstore handled distance orders well.	
Speed	
• WebCSILE is a lot faster than Parti (software previously used for this course).	• The speed of WebCSILE could be improved. • There was a delay with the old technology of print – the textbook was delayed due to the publisher not being well known.

Benefits and Limitations Identified in this Case Study that may Potentially Apply to Other Online Courses/Programs

Benefits	Limitations
Access and Flexibility	
• There was access to diverse students. • The online format fits a flexible work schedule in terms of time and place.	• Technological problems can interrupt the learning process.
Teaching and Learning Functions	
• Students learned important computer skills in addition to the course material. • Written work produced is of higher quality than in face to face courses.	• Students <u>perceived</u> the time commitment for this course to be more than that of a traditional course although time estimates revealed this to not be the case.
Interaction and User Friendliness	
• Student confidentiality was maintained through the use of private e-mail. • WebCSILE was easy to use.	• Several students felt the lack of face to face contact was a limitation. • Increased time and effort is needed to interact online. • The online delivery can be intimidating for students. • Not everyone is suited to this type of learning/teaching – appropriate skills are needed (e.g. independence, technological skills). • WebCSILE does not have an area for synchronous interaction.
Organization	
• Through their own experiences the faculty hope to inspire/mentor others trying online delivery.	• Additional resources for technological support are required such as guidelines in the form of web sites, CD ROM's, and newsletters. • Online registration is more convenient for distance students and needs to be made available. • Telephone support proved to be expensive although students revealed a need for telephone support services for students. • There is a growing need for entire graduate programs to be available at a distance.

Novelty	
• The course contributed to professional development – first hand experience will be used in the workplace.	• There are potential health problems due to increased computer use.
Speed	
• Time savings are possible with the reduced need to travel. • Electronic articles can be shared/used quickly.	• Responding online takes more time than face to face. • Students can develop unreal expectations as to how soon they will get a response to their inquiry.

      The final decision as to whether a course or program's benefits have outweighed its costs will depend on the perspective of the reader. The values and goals of an institution/organization will influence which factors are the most important to consider in the assessment.

Table of Contents

List of Tables

Background and Context

Section A: The NCE Project

The "Applying a Cost-Benefit Model for Assessing Telelearning" project is funded by the Canadian Federal Government and is part of a $13 million Telelearning Networks of Centers of Excellence project, NCE-Telelearning, headed by Dr. Linda Harasim at Simon Fraser University. The NCE-Telelearning project involves universities, colleges, schools, public organizations and private organizations across Canada and involves projects that study the effects of modern telecommunications on both learning and teaching.

Case Studies

There are six case studies involved in this NCE project. These include seven institutions/organizations and seven types of software used in course development. Generally, 1-2 courses from each case study are examined in this project. Table 1 lists the institutions/organizations, corresponding software used in course development, and courses assessed in this study.

Table 1

NCE Telelearning Cost-Benefit Case Studies, Corresponding Software used in Course Development, and Assessed Courses

Institution / Organization	Software	Courses
University of British Columbia	HyperNews	Educational Studies 565f
Simon Fraser University	Virtual - U	Statistics 101; Business 343
Ontario Institute for Studies in Education/University of Toronto	WebCSILE	CTL 1692 - Research Methods in Education
Kwantlen Community College	Lotus Notes	Creative Writing 1100; Creative Writing 1110
Kitimat Community Skills Center working with Southern Alberta Institute of Technology	NetMeeting and LearnLink-I-Net	Math 235/285; CADD 211
LICEF/Télé-université	undetermined[1]	unavailable[2]

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[1]   At the time of writing the technology used was a prototype and therefore did not have a proper name associated with it.

[2] Course titles were unavailable at the time of writing.

Methodology

The methodology developed for this study is based on Bates (1995) ACTIONS model for assessing the strengths and weaknesses of learning technologies:

A Access: how accessible is a particular technology for learners? How flexible is it for a particular target group?

C Costs: what is the cost structure of each technology? What is the unit cost per learner?

T Teaching and learning: what kinds of learning are needed? What instructional approaches will best meet these needs? What are the best technologies for supporting this teaching and learning?

I   Interactivity and user-friendliness: what kind of interaction does this technology enable? How easy is it to use?

O Organizational issues: what are the organizational requirements, and the barriers to be removed, before this technology can be used successfully? What changes in organization need to be made?

N Novelty: how new is this technology?

S Speed: how quickly can courses be mounted with this technology? How quickly can materials be changed? (Bates, 1995, pp. 1-2, emphasis added)

As part of this project, Cukier (1997) reviewed existing cost-benefit methodologies which have been used to assess educational technologies and suggested an approach to be used for this NCE-Telelearning project. Based on this approach, the following cost and benefit factors are examined:

Costs. Cost measures assessed in this study include:

- capital and recurrent costs,
- production and delivery costs, and
- fixed and variable costs.

Capital costs are the expenses associated with the purchase of equipment and materials. Recurrent or operating costs are expenses that occur on a regular basis (e.g. yearly) in order to run a program. An example would be computer support costs involved in the delivery of a course. As their names suggest, production and delivery costs are the costs associated with the development and delivery of a particular course/program. In traditional, face to face instruction, these costs are usually combined as the instructor both prepares and delivers lectures. These costs are unlikely to change significantly from year to year. For distance education courses however, these costs must be analyzed separately as there can be large differences in these costs from year to year. Generally, the initial production costs are high but then tend to be quite low in subsequent years (when revisions are minimal). Delivery costs can, however, stay at the same level each year (or course offering). Fixed costs are costs that do not change with output (the number of students taking the course), while variable costs do. This distinction between fixed and variable costs is important when comparing technologies or in determining the number of students necessary to justify the use of a particular technology as different technologies have different proportions of fixed to variable costs (see Bates, 1995 for further explanation).

Benefits. Benefits assessed in this study include:

- performance driven benefits,
- value driven benefits, and
- societal or "value added" benefits.

Performance driven benefits include aspects such as learning outcomes, student/instructor satisfaction, and return on investment. Value driven benefits include increased access, flexibility, and ease of use. Finally, societal or "value added" benefits include aspects such as reduced traffic and pollution, unemployment, and the potential for new markets. These benefits are assessed from student, faculty/staff, and campus planner/administrator perspectives. These benefits may be either positive or negative depending on the perspective taken.

Both quantitative and qualitative research techniques were used to determine these cost and benefit factors. Quantitative data was obtained through a student survey. Students were asked to complete a survey developed to evaluate the courses studied for this project. This survey can be found at: http://research.cstudies.ubc.ca/nce/survey.html. For this course, "CTL 1692: Research Methods in Education", students were asked on three separate occasions to complete the survey - the first time half way through the course and then two additional times after three week intervals. Request for participation was made through the mail and online within the course database. Students had a choice of responding by mail or online. The student response rate was 70% - 14 / 20 students completed the questionnaire.

Qualitative data was obtained through interviews. The case study research partner posted online the request for interview participation on behalf of the project research associate. Students were asked to reply to the research associate by phone or e-mail if they were willing to participate in an interview. The research associate then contacted the students to set a time. Student interviews were conducted by phone. Faculty and staff involved in the development and delivery of the course were contacted by the case study research partner for interviews. These interviews were conducted in person. Overall, there were 2 formal faculty interviews and two student interviews for the OISE/UT course. The student interviews were conducted by phone. Other staff were informally asked questions to aid in the data collection process.

Section B: Course Description

"CTL 1692: Research Methods in Education" (hereafter referred to as Research Methods) is part of OISE/UT's Distance Education Master's degree program in the Department of Curriculum Teaching and Learning, currently the first degree program at OISE/UT available entirely online. This course was revised (from an older version of the course that used Parti[3] software by using WebCSILE software. Basic concepts, methods, and problems in educational research were considered: discovering the periodicals in one's field, examining steps in the research process, developing research questions, designing instruments, reviewing methods of data collection and analysis, interpreting

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[3] Parti, or Participate was a UNIX-based mail and conferencing software used at OISE prior to WebCSILE. It was developed by Participation Systems Inc, Winchester, Massachusetts.

results, and writing research reports. Two instructors co-taught this course. The following aspects of the course are described below: the course in brief, conference software, computer requirements, registration, resources, and assessment.

The Course in Brief

The objective was for students to learn to design research that is practical, feasible and that answers worthwhile research questions. To that end, students were expected to read the textbook and participate in the online discussions such as: framing the research question and pursuing it via case studies, surveys, experiments, questionnaires and the like. Both qualitative and quantitative approaches were studied and discussed. Each student was to choose a research question, design a study, write up, and hand in to the instructors a full research proposal, including a literature review. A first draft of the proposal was collected about half-way through the course so that the instructors could provide feedback. The course content was comprised primarily of online discussions. Students received a reading package as well as some web resources. Then issues and questions were raised by the instructors and students as work on the students' proposals progressed.

Conference Software

The conference software used in this course was WebKnowledgeForum, a second generation version of CSILE (Computer Supported Intentional Learning Environment) (the particular version in use at that time was called WebCSILE). A detailed description of WebCSILE is located in Appendix A, including general notes on functions, notes on theoretical framework and ascribed benefits, software and hardware requirements, and considerations on use. A significant teaching feature of WebCSILE used in this course was the software's ability to reference across topics or Views within a single note, thus allowing connections to be made laterally as well as linearly through building on replies as is customary in other threaded conference software.

Computer Requirements

Students were given the following guidelines for computer requirements needed for this course: "A reasonably fast computer (80 Mhz or better), either Mac or Windows, with at least Netscape 3.0 or equivalent. If you link via modem, you'll need at least 14.4 speed."

Registration

Students were required to pre-enroll via the Registrar's Office of OISE/UT, either by telephone or by mail. After pre-enrollment, they were asked to complete the form at http://www.oise.utoronto.ca/courseconnect to receive login instructions from the instructors by e-mail.

Resources

Students were provided with an introduction to WebKnowledgeForum and an online manual at http://www.oise.utoronto.ca/~lmclean/beginguide.html, as well as the online help

available on each page of the conference. In addition, there was one required text for the course:

Robson, Colin (1993) *Real World Research: A Resource for Social Scientists and Practitioner-Researchers*. Cambridge, MA: Blackwell Publishers.

Assessment

Participation in online discussions was required and was considered as Pass/Fail. If anyone was perceived as failing, one of the instructors would contact the student to privately discuss and help if possible. Given adequate participation, the final mark was based on the instructors' evaluation of the final version of the research proposal. A draft of the proposal was due approximately half way through the course (October 27, 1997) for feedback with the final version due at the end of the course (December 15, 1997).

Findings

Section A: Student Characteristics

Students were asked to respond to a number of questions regarding their personal characteristics, work commitments, computer use, goals, and response to various course delivery methods. Regarding personal characteristics, students were asked to respond to the following four questions: 1. "Gender", 2. "Year of birth", 3. "Highest level of education", and 4. "Grade point average for last term". Response categories for level of education include: "some high school", "high school completed", "some post secondary credit", "certificate", "diploma", "Bachelor's degree", "Master's degree", and "Doctorate". Table 2 provides the results of these items.

Table 2

Student Characteristics

Item	Number of Students Responding	Mean	Standard Deviation
Gender			
• male (14%)	2	n/a	n/a
• female (86%)	12	n/a	n/a
Age (range 24-48 years)	14	37.36	6.16
Highest level of education			
• bachelor's degree	9	n/a	n/a
• master's degree	3	n/a	n/a
• doctorate (medical)	2	n/a	n/a
Grade point average last term			
• percent (range 77-85%)	11	81.86	2.55
• did not take courses last term	3	n/a	n/a

As can be seen in Table 2 almost all of the students in this course (that responded to the questionnaire) are female, and females comprised 62% of the class group. The age of the students ranged from 24-48 years old with the average age around 37. Three of the students did not take courses in the previous term. Of the 11 who did, their grade point average ranged from 77-85% with a mean of 81.86%. Most of the students had completed a Bachelor's degree (9) with three having completed a Master's degree. Two of the students were medical doctors.

Students were also asked to respond to the following six questions regarding work commitments (these include educational, paid employment, and family commitments): 1. "How many courses are you currently enrolled in?", 2. "How many courses have you taken in the past twelve months, including those in which you are currently enrolled?", 3. "What is your student status?", 4. "Are you currently employed (paid work)?", 5. "If yes, on average, how many hours a week do you work for pay?", and 6. "Are you the primary caregiver in your family?". Table 3 illustrates the results of these items.

Table 3

Student Work Commitments

Item	Number of Students Respond- ing	Mean	Standard Deviation
Course load			
• # currently enrolled in (range 0-1)	14	0.79	0.43
• # taken in last 12 months (range 1-5)	14	2.57	1.22
Student status			
• part time	14	n/a	n/a
• full time	0	n/a	n/a
• non-credit (adult learner)	0	n/a	n/a
Employment status - employed (paid work)			
• yes	13	n/a	n/a
• no	1	n/a	n/a
• hours/week work for pay (range 12-60 hrs/week)	13	43.04	12.65
Primary caregiver in the family			
• yes	7	n/a	n/a
• no	6	n/a	n/a

Generally, students, at the time of completing the questionnaire, were currently enrolled in one course. In the last year, courses taken ranged from 1-5 courses with three courses being the average. All of the students were part time learners. Almost all of the students were employed (13 of 14). Work hours ranged from 12-60 hours/week with the average work week around 43 hours. Approximately half of the students that responded were also the primary caregiver in their family.

Students were then asked to respond to a series of questions regarding their computer and technology use: 1. "Please check the location(s) where you use a computer for this course." (Response categories include: 'at home', 'workplace/work office', 'on campus', 'community', and 'other' and are rated 1. 'Never', 2. 'Sometimes', and 3. 'Mainly'); 2. "At home, I can use the following for study purposes: 'a computer', 'e-mail', 'the world wide web', 'a VCR', and 'an audio cassette player'";   and 3. "There is somewhere in my community where I can go to use the following for study purposes: 'a computer', 'e-mail', 'the world wide web', 'a VCR', and 'an audio cassette player' (Response categories for the latter two questions are: 1. 'Yes, and convenient', 2. 'Yes, but not convenient', 3. 'Definitely not', and 4. 'Not that I know of'). Table 4 provides the results of these items.

Table 4

Student Computer and Technology Use.

Item	Response Distribution			Number of Students Respond-ing
	Never	**Sometimes**	**Mainly**	
Locations where computer is used for this course				
• home	2	2	10	14
• workplace/work office	7	3	4	14
• on campus	11	0	0	11
• community	11	0	0	11
	Conven-ient	**Not Conven-ient**	**No**	**Not Sure**	
Technology available at home for study purposes					
• a computer	7	1	5	1	14
• e-mail	4	1	4	4	13
• the world wide web	5	2	4	3	14
• a VCR	4	1	8	1	14
• an audio cassette player	4	1	8	1	14
Technology available in the community for study purposes					
• a computer	3	6	0	4	13
• e-mail	4	4	1	4	13
• the world wide web	4	6	0	3	13
• a VCR	3	5	0	5	13
• an audio cassette player	3	5	0	5	13

The majority of the students worked on this course at home. Workplace/work office computer use was also used but to a much lesser degree. No one used campus computers or computers available to them in the community to work on this course. Not all of the students had all of the technology listed conveniently available to them in their homes (a computer, e-mail, the WWW, a VCR, and an audio cassette player). Students reported this same technology was even less conveniently available to use for study purposes in the community. Approximately one third of the students were not sure about its availability in the community for their use.

Potential reasons for students to take this course were listed. These include: "to obtain the qualification or credit", "interest in the subject/content for its own sake",

"contact with distinguished instructors", "content is relevant to the work I do/will do", "to socialize with others", "personal growth/broaden perspective", "to show myself I can do it", "to get high grades", and "other". Students were asked to rate the importance of these statements (1 = least important, 5 = most important). Table 5 provides the results:

Table 5

<u>Student Goals</u>

Item	Response Distribution					Number of Students Respond-ing	Mean	Stan-dard Devi-ation
	Least				Most			
			Important					
Importance of the following goals:								
• to obtain the qualification/credit	0	0	0	6	8	14	4.57	0.51
• interest in the subject/content for its own sake	0	0	0	7	7	14	4.50	0.52
• contact with distinguished instructors	1	2	5	6	0	14	3.14	0.95
• content is relevant to the work I do/will do	0	0	0	7	7	14	4.50	0.52
• socialize with others	3	1	5	5	0	14	2.86	1.17
• personal growth/broaden perspective	0	0	1	6	7	14	4.43	0.65
• show myself I can do it	1	2	2	8	1	14	3.43	1.09
• get high grades	0	1	6	6	1	14	3.50	0.76

The most significant reason students took this course was "to obtain the qualification/credit" followed by "interest in the subject/content for its own sake" and " the content is relevant to the work I do/will do". The least significant reasons students took this course were "to socialize with others" and "contact with distinguished instructors". One student indicated an additional goal of gaining knowledge/skills to act as a resource person and leader in their job.

Finally, students were asked three questions with regards to course delivery methods. First they were asked if they had limited experience with the course delivery methods listed. They were then asked to mark the delivery methods that they most and least preferred. Response categories included: "face to face", "print based distance (may include video/audio cassettes)", "print based distance with online, CD-ROM, teleconferencing, or videoconferencing", "teleconferencing, or video conferencing as main delivery method", or "a mix of technologies". Table 6 shows the results of these items.

Table 6

Student Response to Delivery Methods

Item	Number of Students Responding
Limited experience with various course delivery methods:	
• yes	10
• no	4
Preferred delivery method(s):	
• face to face	3
• print based distance (may include video/audio cassettes)	1
• print based distance with online, CD-ROM, teleconferencing, or videoconferencing	1
• online, CD-ROM, teleconferencing, or video conferencing as main delivery method	2
• a mix of technologies	4
Delivery method(s) not preferred:	
• face to face	0
• print based distance (may include video/audio cassettes)	1
• print based distance with online, CD-ROM, teleconferencing, or videoconferencing	0
• online, CD-ROM, teleconferencing, or video conferencing as main delivery method	0
• a mix of technologies	0

Four of the fourteen students that responded to the questionnaire felt they had limited experience with the various course delivery methods. Therefore, two thirds of the students were able to make experienced judgments as to their preferred delivery method. The most preferred delivery method was "a mix of technologies" followed by "face to face". It is important to note however that very few of the students responded to this question. Students did not respond to the question on delivery methods they do not prefer.

The instructors were asked to describe, what they believed was the student diversity in the class. Because they had access to student biographies, the instructors thought they had a good sense of their students:

> We asked everybody to provide a little biography of themselves. We probably had a couple of fairly young teachers and then otherwise they were older ... I would say in their thirties, forties and fifties. (instructor 2)

You should see the diversity in this course. We had eight medical doctors, practicing medical doctors who are in a special program in Ottawa, three nurses and the rest were a full range of a graduate students ... I think it was 60% female and 40% male. (instructor 1)

Table 7 below provides a summary of the main student characteristics (based on the 14 of 20 students who responded to the questionnaire):

Table 7

<u>Summary of Student Characteristics</u>

Characteristic	**General Results**
Gender	86% female; 14% male
Age	Average age is around 37 years
Grade point average last year	Mean GPA is approximately 82%
Highest level of education	2/3 at the Bachelor's level; 1/3 at the graduate level
Number of courses enrolled in	Average one course this term; 3 courses this year
Student Status	All part time students
Employment	All but 1 employed
Work hours/week	Range from 12-60 hours/week; mean approximately 43 hours/week
Caregiver status	Half were the primary caregiver
Computer use for this course	Mostly at home; some at the office
Reasons for taking the course	Most significant - to obtain qualification/credit; least significant - to socialize with others
Most preferred delivery method	A mix of technologies
Least preferred delivery method	No response

SECTION B: Costs

The following categories will be described in this section: revenue, researched costs, projected costs, and student costs.

Revenue. The Research Methods course is one of five courses required for the completion of a Master's degree. The Master's degree costs $3,700 in tuition fees. Therefore, tuition fees for this course was $740 per student. Twenty students enrolled in the September 1997 offering of this course. Therefore, the total revenue obtained from tuition fees was $14,800.

In addition, the provincial government assigns funding to graduate programs on the basis of "Basic Income Units" (BIU's). These are calculated based on the number of Full Time

Equivalent enrollments (FTE's) within a particular program. Master of Arts programs generate two BIU's per year, Doctorate programs generate four BIU's. One BIU equals approximately $5,000. FTE's are calculated by adding the number of people enrolled in all courses in a program and dividing by five (the full time course load). Therefore, additional students in a particular course would not immediately generate more government funding because there is a 'corridor' of fluctuation, before a renegotiation for an increase can occur. Therefore, an estimate of government funding for this course is $400 [[($5,000 x 2 x 2 years)/ 10 courses in the Master's program]/ 5 (the full time course load as all students were part time students)]. Table 8 summarizes the revenue for this course.

Table 8

Research Methods - Winter Session 1997 Revenue

Source of Revenue	Amount
Tuition (20 students)	$740/student
Government funding	$400/student
Total Revenue	**$22,800**

Researched Costs. Researched cost data was obtained in a number of ways. Where possible those involved with the project were asked to estimate the time they spent on specific elements of the course design, development, and delivery. Other data was obtained by looking at expense accounts. Table 9 provides a detailed breakdown of the researched costs of the Research Methods course (winter session 1997). Please note, this course was first offered online in 1995 using Parti software. The costs provided below are ongoing development/maintenance costs and are not initial start up costs. All costs are in Canadian dollars (at the time of writing: C$1 = U.S. $0.66).

Table 9

Research Methods - Winter Session 1997 Researched Costs

Source of Cost	Amount
Fixed Costs:	
Design and Development (staff time ~28 hrs)	$1,600
Assessment techniques (2 hrs)	150
Overhead	Unknown
Total Fixed Costs	$1,750
Variable Costs:	
Tutorial/training (210 hrs)	12,000
Marking (120 hrs)	6,528
Long distance calls	200
Materials/fax costs	400
Library services	500
Technical support (20 hrs)	500
Total Variable Costs	$20,128
Total Costs	**$21,878**

As indicated above, personnel working on the design, development, and delivery of this course were asked to estimate the time they spent working on this course. Thus, costs for course design and development, assessment techniques, tutorial/training, marking, and technical support are based on the time each faculty/staff member spent working on the course multiplied by their daily rate based on salaries and benefits. Faculty costs are being estimated on a senior faculty salary of $100,000. Library support costs and computer support costs are being estimated using a $50,000 salary.

The tutorial/training and marking make up the largest portion of the costs for this course. This was due to the fact that the research proposal drafts were long and detailed and each required a lot of intensive review (similar to thesis proposals). If this course was taught face to face, the tutoring time may be less because feedback could be given face to face, rather than being written. The marking time however, would be much the same. The course structure is limited largely be the nature of the content. Students must take the ideas and rework them in the context of their own proposal development. Learning in this way takes time.

Development of the course took substantially less time as this course was already online using Parti software and only needed to be revised to use the WebCSILE software capabilities. Switching to WebCSILE saved the instructors approximately half their time in student support and tutorial/training as Parti was more difficult to use and was harder to access. Initial costs of getting this course developed (using Parti software in 1995) are unknown. However, due to the nature of the course content (primarily discussion), the initial course development cost is assumed to be minimal.

Delivery of the course was through WebCSILE, developed at OISE/UT so there was no costs attached to using the software. Course development was part of the normal faculty teaching load.

Overhead costs are unknown as these costs were not readily tracked. Course development/delivery has been taken on largely by individual faculty members guided by their own technological interests and expertise, rather than being directed by specific funding policies. As part of the recent merger between OISE and the University of Toronto, however, the role of online learning in the new OISE/UT is under discussion and future policy and plans around funding are being developed. Recently, there have been new initiatives from the Education Commons, such as the delivery of short courses on online teaching and learning, as well as increased personnel and technical support for faculty considering the use of technology within teaching. Developments like these will help build institutional capacity to move in new directions.

Projected Costs. This course is expected to run for five years with minor updates each year. The costs and revenues generated by this course are projected in Table 10 below. The fixed costs are estimated to decrease substantially with each successive year as fewer large changes will be required with each successive year. The variable costs remain the same as the course enrollment is estimated to stay the same over the five years.

Table 10

Research Methods - Projected Costs and Projected Revenues

Source of Cost	1997 (year 3)	1998 (year 4)	1999 (year 5)	2000 (year 6)	2001 (year 7)	Total
Fixed Costs:						
Design	$1,600	$800	$400	$200	$100	$3,100
Assessment Techniques	150	75	75	75	75	450
Overheads	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Total Fixed Costs	$1,750	$875	$475	$275	$175	$3550
Variable costs:						
Tutoring/training	$12,000	$12,000	$12,000	$12,000	$12,000	$60,000
Marking	6,528	6,528	6,528	6,528	6,528	32,640
Long distance calls	200	200	200	200	200	1,000
Materials/fax costs	400	400	400	400	400	2,000
Library services	500	500	500	500	500	2,500
Technical support	500	500	500	500	500	2,500
Total Variable Costs	$20,128	$20,128	$20,128	$20,128	$20,128	$100,640
Total Costs	**$21,878**	**$21,003**	**$20,603**	**$20,403**	**$20,303**	**$104,190**
Projected Revenue :						
Graduate Fees @740/student	$14,800	$14,800	$14,800	$14,800	$14,800	$74,000
Government Funding[4] @ $400/student	$8,000	$8,000	$8,000	$8,000	$8,000	$40,000
(Student enrollment)	(20)	(20)	(20)	(20)	(20)	(100)
Total Revenue	**$22,800**	**$22,800**	**$22,800**	**$22,800**	**$22,800**	**$114,000**
Total Profit[5]	**$922**	**$1,797**	**$2,197**	**$2,397**	**$2,497**	**$9,810**

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[4] Assuming the allocation of government funding for 4 FTE's per year towards this course.
[5] Minus unknown overhead costs.

As can be seen in Table 10 over the life of the program (5 years) total revenues are $114,000 while total costs are $104,190. Therefore, there appears to be a profit of $9,810. However, overhead costs were unknown and thus not included in this analysis. If they were, the course would probably just break-even or be slightly under with the inclusion of these costs.

Annual total costs can be determined as follows:

Total fixed costs ($3,550) averaged over five years are $710 per year. This is the average annual fixed cost (plus any earlier development and overhead costs that are unknown). The average fixed costs per student per year is $710/20 = **$35.50**

Total variable costs per student can be determined by taking the total variable costs ($100,640) and dividing by the total number of projected students (100). The total variable cost per student are therefore **$1,006.40**.

- *Total Fixed Costs/5 years = $3,550/5 = $710 average annual fixed cost (or $35.50 per student)*

- *Total Variable Costs = $100,640 / 100 (total enrollment) = $1,006.40/student*

therefore, Total Annual Cost per Student = $35.50 + $1,006.40/student = 1041.9 per student

Total revenue per student can be determined by taking the total revenue ($114,000) and dividing by the total enrollment (100).

Total Revenue = $114,000/100 (total enrollment) = $1,140/student

With a few calculations we can determine that for these projections, the break-even annual enrollment must be 19 students.

Total Costs (5 years) = $104,190
Average Cost Per Year = $20,838
Average Revenue Per Student = $740 (tuition) + $400 (government grant) =$1,140

Since breakeven (number of students) = Average Cost Per Year/ Average Revenue Per Student,

Break-even = $20,838/$1,140 = 18.28 students

The average annual enrollment for this course based on the above projections is 20. Therefore, total annual **revenue** at 20 students is $22,800 while total annual **costs** at 20 students is $20,838. Therefore, the annual net profit obtained from this course is $1,962 (minus the unknown annual overhead costs).

Total Annual Revenue = 20 x $1,140 = $22,800

Total Annual Cost = (20 x $1006.40) + $710 = $20,838
Annual Net Profit = $22,800 - $20,838 = $1,962

Again, if overheads were known and included, costs would be higher and hence greater enrollments would be needed.

   Student Costs. On the questionnaire, students were asked to estimate the expenses associated with their taking this course. The response categories included: "course/registration fee", "travel", "accommodation", "per diem", "long distance telephone charges", "postage/courier", "textbooks", "software", "Internet/online costs", "parking", and "other (please specify)". Of the 20 OISE/UT students who took the course, 14 responded to the questionnaire. Table 11 illustrates students response to expenses associated with this course.

Table 11

Student Expenses Associated with the Research Methods Course

Type of Cost	Number of Students Responding to Question	Mean Costs ($)	Standard Deviation	Range ($)
Tuition[6]	12	859.83	268.14	700-1700
Travel	n/a	n/a	n/a	n/a
Accommodation	n/a	n/a	n/a	n/a
Per diem	1	3200.00	n/a	n/a
Long distance	5	74.00	126.41	10-300
Postage/Courier	7	28.29	27.18	3-75
Textbooks	10	55.50	23.62	10-100
Software	2	125.00	106.07	50-200
Internet/Online costs	8	78.75	92.30	10-300
Parking	1	20.00	n/a	n/a
Other[7]	3	685.00	1138.83	25-2000

   Because of the relatively low student responses to this question and wide variation of responses it is difficult to interpret the data in this table. Appendix B provides response distributions for each of the student expenses. There was some discrepancy in the cost reported for course/registration fee by students. The actual fee for the course, as mentioned above, was $740. Although no explanation was given from the students, students who reported significantly lower costs than the course fees may have been reporting the portion that they themselves had to cover (employer paying the rest). Also, students reporting costs above the actual course fees may have included the cost of the readings package and/or other university fees included in registration such as graduate

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[6] Since the tuition fee is known to be $740, statistics calculated without including the person who estimated their tuition to be $1700 are as follows: mean 783.46, standard deviation 45.68 and range $700 - $875.
[7] Computer upgrade ($2000), photocopies ($30), library materials ($25)

student society fees. Similarly, the range of costs reported for the textbook may have resulted from some students including library expenses in this category and/or some students not buying the textbook.

Table 12 is provided for comparative purposes and indicates what the minimum student expense would be if students only paid for tuition, and the textbook. As shown, the OISE graduate students are required to pay a minimum of $790.00.

Table 12

Minimum Student Expenses

Type of Cost	Amount
Tuition	$740.00
Textbooks	$50.00
Minimum Cost[8]	**$790.00**

Students were also asked "Who pays for the above costs?" and were asked to estimate the amount that is paid by the following: "myself (or a family member)", "employer", "institution offering the course", and "other (please specify)". Table 13 illustrates the results of this item.

Table 13

Distribution of Who Pays for the Research Methods Course

Who Pays	Number of Students	Mean Costs ($)	Standard Deviation	Range ($)
Myself	10	784.63	457.10	82-1375
Employer	4	780.33	36.69	738-803
Institution	n/a	n/a	n/a	n/a
Other (grant: $2000)	1	n/a	n/a	n/a

Ten of the fourteen students paid for their own costs. Amounts ranged from $82 - $1375. These statistics are calculated without the inclusion of one individual who expensed $3200 for per diem and another person who paid $2000 for a computer upgrade. Only four students reported that their employer paid for this course. Amounts ranged from $738 - $803. These statistics were computed with the exclusion of one individual who reported paying $1700 for tuition.

Two additional questions were asked of students regarding costs: 1. "Taking this course in this delivery method costs less than other methods of delivery." and 2. "This course is not worth the money it costs." These items were rated on a 5 point Likert type scale with 1 = strongly disagree and 5 = strongly agree. Table 14 illustrates the student response to these questions.

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[8] Assuming the purchase of the textbook.

Table 14

Student Response to the Costs of the Research Methods Course

Statement	Response Distribution					Number of Students Respond-ing	Mean	Standard Devi-ation
	SD				SA			
Delivery method costs less than other methods	1	3	4	2	3	13	3.23	1.30
Course is not worth its cost	11	0	2	0	0	13	1.31	0.75

SD = strongly disagree; **SA** =strongly agree

Students indicated an almost neutral response to the question of whether online delivery costs less than other delivery methods. They did however, indicate the cost of the course was worth the money it cost them to take it.

In addition, one student indicated they saved money by not having to drive to class:

I decreased the wear and tear on my car and so on as well. You know that's something you have to think about [as well as] the price of gas today. (student B)

Table 15 provides a summary of the main cost findings.

Table 15

Main Cost Findings

Findings
• The use of WebCSILE software rather than Parti software decreased tutorial and student support time by half.
• As this course was revised from an existing online course, course development costs were minimal.
• There were no software costs as WebCSILE was developed at OISE/UT.
• Overhead costs are unknown as no system of keeping track of these costs is currently in place. Future policy and plans around funding for online courses are currently being developed.
• Based on the researched costs, revenue, and student enrollment, annual profit obtained for this course is $1,962.
• Annual break-even enrollment for this course, based on the projected costs, revenues, and student enrollment over 5 years is 5.31 students. (This would increase with the inclusion on the unknown overhead costs).
• Students thought the course was worth the money it cost them.
• The costing methodology developed provided an accurate means of measuring the full direct costs of online courses in a real context.

Section C: Benefits and Limitations

Benefits and limitations found for this course will be presented according to Bates (1995) ACTIONS model, (C=Costs, which have already been discussed). Results are based on both quantitative and qualitative data.

Access

Students were asked two questions regarding access to and flexibility of this course: 1. "If this course was not offered in this delivery method, I would be unable to complete it", and 2. "I like this delivery method because it gives me flexibility in my studies (e.g. time, place, location)". Responses are based on a five point Likert type scale (1 = strongly disagree, 5 = strongly agree) and are shown in Table 16.

Table 16

Student Response to Access and Flexibility of the Research Methods Course

Statement	**Response Distributions**					**Number of Students Responding**	**Mean**	**Standard Deviation**
	SD				**SA**			
Unable to complete the course without online delivery	0	2	1	2	9	14	4.29	1.14
Flexibility	1	0	0	3	10	14	4.50	1.09

Students strongly indicated that the online format increased their access to this type of course as well as gave them greater flexibility in their studies.

Several important issues related to access and flexibility came out of the student and instructor interviews as well as the student questionnaires. Access to a University of Toronto degree, access to diverse students, flexibility, and technological limitations will be discussed below.

Access to an OISE/UT Degree. One important benefit of having this course delivered online was the opportunity it gave students to earn credit toward a Ontario Institute for Studies in Education/University of Toronto degree:

> *The most important benefit is being able to take this course offered by the University of Toronto, and hopefully one day achieve a U of T degree, even though I live in Winnipeg. The drawbacks will occur down the road a bit when I am confronted with completing the degree requirements of a "residence requirement".* (student 7)

> *I wanted that U of T degree so I started looking into what opportunities were there and I found that much more existed now then existed back then [seven years ago] and that it would actually be possible not to get the degree [Doctorate in Education] by distance, but to make some progress toward it.* (student A)

> *It was OISE that I really wanted to go to. I don't know it was just one of these things that I had in the past always wanted to take courses through OISE. I knew that they were very progressive. I just like the concepts that they use and the big reason that I went with them was they were bringing it off campus and they brought it to Kitchener. Which is about an hours drive for me, and for me to go into Toronto is unrealistic. It's at least an hour and half if not two hours drive from home and that's on a good day and not looking at the bad weather and everything else. Because I am working full-time and I live in the country I am half hour out, I have a family and no social life. But that's okay.* (student B)

> *The most important benefit is that I have an opportunity to further my education.* (student 1)

> *This allows me to continue my degree as I live in a remote area of Ontario and otherwise would not be able to complete courses.* (student 3)

> *I live 900 km North of Toronto.* (student 12)

Access to diverse students. A few students also mentioned the benefit of having diverse students in the class to work with and learn from:

> *I think the other thing that was positive was the diverse background of people.* (student B)

I can do my course work outside my work hours (employed full time) and [the online delivery] allows distance education and links to students far away. (student 9)

Flexibility. Another benefit of the online delivery method was the increased flexibility it offered in terms of location and time.

Flexibility in location. A few of the students as well as one of the instructors indicated they had more flexibility to choose the location from which to work on this course:

I can study towards my Master's while living in Europe. This would not be possible without the computer and the Internet. (student 2)

I was able to take the course despite the fact that I don't live in Toronto. (student 5)

I have now set myself up at home so I could work online, work on the net. I bought a reasonably nice notebook and fax modem and got it going. (instructor 1)

Flexibility in time. The students and instructors also liked the fact that they were able to work according to their own schedule, when it was most convenient for them:

[I was] able to plan my own schedule, work from home. (student 3)

I could do it during lunch hours at work from my work computer ... but sometimes I could just do it during the day while I was here [at work] and that was a huge bonus for me. (student A)

[A benefit is being able to] manage my own time to learn - especially asynchronously. This suits my learning style, which is very reflective prior to being underline. (student 11)

[I liked the] flexibility of schedule and the fact that I could access the course from a distance. (student 8)

[I liked the] limited interference with my work responsibilities. (student 6)

My daughter is 10 and with school and everything else she needs to be in bed. So I could do this from ten o'clock at night until two in the morning and last night it was almost that. And that way I know that she is in bed and she has got her homework done. She's settled in and she knows that I am downstairs. And so it's just really working out well for me. (student B)

I have always been a full-time student prior to this. So this was quite different in the sense of I had to really squeeze this in and you know an hour here an hour there which is not the way I have ever studied before. I usually like to spend my day in the library doing research and then

*writing. This was a whole different experience. This is probably more
being a part-time student experience then an online student [experience].*
(student A)

*I can [teach] at any time of the day and given the other things that I have
to do, it's a huge bonus and a huge plus for me.* (instructor 2)

*I work around my schedule, so if I want to log on on a Sunday or a Friday
or whatever time of day or even during the middle of the day when I
happen to have an hour [I can].* (instructor 2)

    Technological limitations. One of the drawbacks to the online delivery method is
that it is dependent on technology, which can be prone to difficulties. If the technology
does not work properly, learning is interrupted; A few students did report some trouble
with the technology:

*A couple of times I was not able to get access online. At times the server
was a little slow. However, this in no way compares to the inconvenience
I would have had to travel to Toronto to take the course.* (student 6)

*At times I was unable to access the site - at others I was thrown off. I
reported these problems to the professor.* (student 5)

*[There were] some problems - system crashing just when I had to use it,
and my own technical 'handicaps' - difficulties uploading.* (student 8)

*Oh, sure once or twice the server was down, but that was rare thank
goodness and I did not have any problem, but some of the students did.
For the most part I was coming in from inside the building by the Ethernet
and but students who were coming in from service providers outside and
even one or two I think were dialing in, they had trouble.* (instructor 1)

    Solutions used to get beyond the technological difficulties included the
development of a beginner's start-up guide and using tech support that was available at a
students worksite:

*I found quite a few of the students having basic troubles not so much with
WebCSILE, but actually some of them just getting connected as they
nearly always do and that's when I produced the beginning users start-up
guide.* (instructor 1)

*I did get the tech guys in a couple of times because I am very new at this.
So I was able to access support. I think I would have had some difficulty
had I been doing this on my own at home.* (student A)

    In summary, several benefits and limitations of access and flexibility of this
online course have been mentioned. These are included in table 17:

Table 17

<u>Benefits and Limitations of Access and Flexibility</u>

Benefits	**Limitations**
• There was increased access to an OISE/UT degree. • There was access to diverse students. • The online format fits a flexible work schedule in terms of time and place.	• Technological problems can interrupt the learning process.

Teaching and Learning Functions

This section will cover the following topics related to teaching and learning functions: course design and content, course objectives, course materials, time demands, and delivery method.

Course Design and Content. Although this course had already run twice in the online format using Parti software, with the introduction of WebCSILE as the new course software, there were still a few issues that arose in terms of course design and content:

> *We did [this course] twice on Parti and this was the first time we had done it on WebCSILE. So having done it twice before, we had a sense of what did and didn't work. We did different things each time to try and engage the students in interaction.* (instructor 2)

One of the design issues that a few students had difficulty with was having all of the students documents posted online as part of the course content. Although it was intended to be a means of learning from each others work, not all of the documents were relevant to all students:

> *[I was] unable to be spontaneous as I plowed though the pages of written material. Having all of everyone's documents was not helpful.* (student 8)

One of the students felt it would be more helpful to post only parts of each students' work. Particularly parts of their work that would generate useful discussion for the entire class:

> *Discussions have to be more clearly directed. Information that is posted should not just be a total document, perhaps, just relevant parts to discuss.*
> (student 8)

Another issue of concern was the level of structure provided in the course. There appeared to be adequate structure in terms of deadlines for work to be completed:

We gave them deadlines like we want a set of ideas from you or a set of questions from you by this date. We want a first draft by this date. We will give you feedback so it's very structured in terms of when they have to give successfully improved drafts of the proposal. (instructor 2)

Specific time lines help — due dates, and when readings need to be completed. (student 1)

There was, however, a need for more structure in the discussion topics identified in the course:

In the feedback from the students, more than one mentioned that they would have liked a more structured approach to the textbook because they found that it was good, but we didn't take as structured [an approach] and we [told them to] start at the beginning and read through taking up the topics as they go. Well you can imagine people started raising all kinds of questions and jumping around and that meant we did not attend systematically to some of the general topics about research methods and so **** and I are going to talk about that and come up with what we hope will be a little more structure but not very much more. When you get fifteen people doing all kinds of different things and they are themselves at different levels you can't have a rigid structure. (instructor 1)

I'm a post grad neophyte. I have a degree (M.D.) but was spoon fed and find the openness of the course anxiety provoking. I would like a bit more structure, but I think that this just reflects my fledgling status in the Arts at the Master's level. (student 9)

One way to achieve more structure in the discussion topics is to carefully organize topic discussion threads:

Once again, part of the learning curve for the instructors is how most usefully to set-up the topics and then sub-divide them or make new topics or to be able to reorganize and combine topics and that's all possible, but it isn't all that easy. (instructor 1)

Instructors should be a little more attentive to setting-up topics and sub-topics so that no topic gets too huge. (instructor 1)

An additional concern due in part to the open structure of the course was whether or not all the appropriate questions get covered during the course and whether the questions get answered correctly. A benefit to the online format is the ability of students to learn from one another as well as from the instructor. However, incorrect information can just as easily and quickly be learned as correct information is indicated in the quote below:

I guess I worry that the right questions do get asked, because to some extent you rely on that happening and you don't have any control over it. If you don't log on for three or four days and somebody has raised an issue and they keep going at it, like in this particular kind of area of ethics, research ethics, [it can become problematic]...[For example], one

particular student raised a question and other students responded and gave advice and it was really actually pretty terrible advice. And by the time I got to it or **** got to it, it was a matter of oh wow, we have got to undo some of the stuff that's here. So the threat that there is sometimes inappropriate advice or people's positions can be problematic.
(instructor 2)

The level of difficulty of the course content was appropriate as indicated by the students in Table 18.

Table 18

Student Response to the Level of Difficulty of the Research Methods Course

Statement	Response Distributions					Number of Students Responding	Mean	Standard Deviation
	SD				SA			
Course content is the right level of difficulty	0	1	1	5	7	14	4.29	0.91

Of the 14 students who responded, the majority of the students were very happy with the level of the course content.

Course Objectives. Students were asked to respond to two statements with regard to course objectives. Responses were based on a five point Likert type scale (1 = strongly disagree, 5= strongly agree): 1. "The course objectives are specific and meaningful." and 2. "The course objectives, content, and assessments are consistent." Table 19 depicts these results:

Table 19

Student Response to Course Objectives for the Research Methods Course

Statement	Response Distributions					Number of Students Responding	Mean	Standard Deviation
	SD				SA			
Course objectives are specific and meaningful	1	3	0	3	7	14	3.86	1.46
Course objectives, content, and assessments are consistent	0	2	2	3	7	14	4.07	1.14

Generally, the students thought the course objectives were meaningful and felt there was a 'good fit' between the course objectives, content, and assignments.

Course Materials. Three questions on the questionnaire related to course materials. Students were asked to rate the following two statements using a five point Likert type scale (1 = strongly disagree, 5 = strongly agree): 1. "The course materials are well-organized."; and 2. "The course materials are relevant to my personal or professional needs." The third statement asked: "How do you rate the course materials?" Students responded to the following categories: "poor", "fair", "average", "good", and "excellent". Table 20 provides the results.

Table 20

Student Response to Course Materials for the Research Methods Course

Statement	Response Distributions					Number of Students Respond-ing	Mean	Stan-dard Devi-ation
	SD				**SA**			
Course materials are well organized	1	3	0	6	3	13	3.54	1.33
Course materials are relevant	0	2	0	5	7	14	4.21	1.05
	Poor	**Fair**	**Aver-age**	**Good**	**Excell-ent**			
Course material rating	0	2	4	4	4	14	n/a	n/a

Students thought the course materials were both relevant and well organized. The majority of the students responding to the questionnaire rated the materials "average", "good", and "excellent".

> *Course materials from WebCSILE [are] always relevant — students [were] encouraged to develop their own adaptations and implementation of the materials.* (student 8)

> *The textbook used was excellent. [It was] helpful to have access to it at the start of the course. The introductory session with the professor was useful but not essential.* (student 6)

The text was practical and realistic. (student 8)

A few students however, felt that more then one textbook should be used especially in a Master's level course:

Reliance on one text kind of says it all, doesn't it? (student 11)

Printed material beyond the textbook would've been useful — with examples of applied research methods. (student 13)

However, unlike most traditional face to face courses, this course had the combined expertise of two instructors — each with expertise in different areas — rather than just one instructor:

****'s background is way more statistical and he knows more about direct research methodologies and more quantitative stuff, so that if there was a question about statistics [for example] "what population size do I need?". I'll tend to say well **** will answer that and I want to focus on this. So I tend to look more at the relationship of the questions to the theories and things like that. And so we actually bring different backgrounds to this and what the students get is actually twice as much value. (instructor 2)

Time Demands. Six questions on the questionnaire address the time demands of this course. Students were asked: 1. "On average, how many hours per week do you spend working on this course?", 2. "Is this more or less time than the average amount of time you spend working on courses in a traditional classroom setting?", 3. "Is this more or less time than you expected to spend?", 4. "If you have to travel to take this course, how much time do you spend traveling?", 5. students were asked to respond to the following statements: "This course is not worth the time it takes to complete" and 6. "I come to campus less often because of the technology used in the course." The last two items were rated on a 5 point Likert type scale, 1 = strongly disagree, 5 = strongly agree. Table 21 provides the results:

Table 21

Time Demands of the Research Methods Course

Statement	Response Distributions					Number of Students Respond- ing	Mean	Stand- ard Devi- ation
	More	Less	Same	N/A	DK			
Hrs/week spent working on the course (Range 4-20 hrs)	n/a	n/a	n/a	n/a	n/a	14	9.29	5.78
Course took more/less time than a traditional course	7	0	4	0	2	13	n/a	n/a
Course took more/less time than expected	5	0	7	0	2	4	n/a	n/a
Amount of time spent traveling (3 hrs, 9 hrs)	n/a	n/a	n/a	n/a	n/a	2	6.00	4.24
Course not worth the time spent	11	1	2	0	0	14	1.36	0.75

Time students spent working on the course ranges from 4 to 20 hours per week with the mean of 9.29 hours. Of the 13 students who responded, 7 said the course took more time than a face to face course, 4 said it took the same time and 2 did not know. Similarly, of the 4 students who responded, 5 students indicated the course took more time than they expected, 7 said it took approximately the same time as they expected, and 2 did not know. It is interesting to note that although most students spent what would be considered an appropriate amount of time to spend on a Master's level course and roughly the same amount of time as they would be expected to spend in a face to face course, half of those who responded (7 of 13) thought the course took more time than a traditional course and one third (5 of 14) said the course took more time than anticipated. One possible explanation for this discrepancy is the difference between perceived and real time commitments. The course may seem to take more time than a face to face course due to the more intense nature of reading and discussions that make up the bulk of this course. These activities may appear to take longer than attending face to face classes as the quotes below suggest:

> *[There was] a lot of reading and typing as the number of participants in the course increased. Enrollment should be limited to prevent this from getting out of hand.* (student 6)

> *You really have to be self-directed. You have to be really time oriented. I am finding with this course that I am spending more time on it than I do*

on a course that I go to class. But that's on the course time itself, but if I take into account my travel time and everything else ... (student B)

At least one student could not participate fully in the course due to their time constraints:

I noticed that some people seem to be able to commit a vast amount of time to responding and questioning and communicating with others in the class online and it was all I could do to keep up with the reading. I just didn't have time. I barely found that I had time to get into my own work and my research and contribute what I thought minimally. There were some people who seemed just to be able to comment on everyone's work and I was doing my best to read what they had written and write my own. Again, I am not sure if that is an online issue or if that's just a part-time student with a full-time job [issue]... I did not participate online as much as I might have in class. I didn't because of the time. The time to write a thoughtful response would have started to push more than I was preparing to give to the course ... I had felt that there were areas that I would have really liked to have explored further but I limited my topic. I just set a practical goal of completing the course. I took it not so much as a researcher but as a student. My main objective was completing the course. That was just my own attempt to be practical. (student A)

Technical troubles did pose a time constraint for a few students, especially during the first week of the course. Fortunately, as indicated by the quotes below, those interruptions were not too long or too often:

Technical trouble yes - the assistance group had been notified of my various but not recurring troubles...The impact has been lost time on course work, and lost work and editorials. It's very frustrating when it happens. (student 14)

Technical difficulties - A week in the beginning, it was probably two or three hours a week in total, but then that of course fell off to nothing at the end because someone would post a question and somebody else in the class would answer it before I got to it. (instructor 1)

Only two students reported traveling to campus for this course, one 3 hours per week, the other 9 hours per week. Since the course itself is entirely online, one could speculate that the travel was to conduct research in the library to use towards their proposal development. Eight of 9 students responding indicated that they came to campus less often due to the technology used in this course. In addition, students generally believed the value of the course outweighed the time demands associated with completing it.

Delivery Method. Students were asked to comment on three statements about how the delivery method (online) related to their learning experience: 1. "Using technology in this course helps me learn with greater depth of understanding.", 2. "Using technology in this course helps me learn more relevant information.", and 3. "I can learn better using print materials than by working on a computer." Table 22 provides these results:

Table 22

Student Response to the Delivery Method's Effect on Learning Experience

Item	Response Distribution					Number of Students Responding	Mean	Stan-dard Devi-ation
	SD				SA			
The technology helped me learn with greater understanding	1	3	4	5	1	14	3.14	1.10
The technology helps me learn more relevant information	1	3	5	4	1	14	3.07	1.07
I learn better using print materials than by working on a computer	2	4	5	1	1	13	2.62	1.12

Students' response to these items was neutral. In other words they did not think the technology helped or hindered their learning experience.

Student and instructor interviews, however, provided examples of how the online delivery format of the course enhanced the quality of student learning. First, students indicate that in addition to the course content, they learn important computer skills:

I learned how to make better use of my computer. (student 6)

At the start [the instructor] encouraged people to ask questions about problems that they had using the software and he would address that as we would go, it was almost like a two things were happening learning to use the software and the technology, as well as, learning the course itself. (student A)

In addition, an instructor indicates that the quality of work both in online discussions and assignments is of a higher quality:

Over several years now I have observed people contributing what I consider to be higher quality work than what I have seen before. All these courses I have taught before and [the students] write better than they wrote before. Even the quick response questions, which of course are written, are just a higher quality and so I contribute that to the technology. (instructor 1)

I find that for a course which is focused on common readings and where the objective is to have discussion of ideas and then the production of

something in writing, we would get far better discussion in the online mode and I contribute that to the requirement that people think through what they are going to say. Even if they are typing it in real time, it requires more thought and so I'm totally convinced that it is an excellent way to have a discussion seminar type course now that we are getting HTML capability. I think there is no reason that it's not appropriate for any type of course. Now, the mathematical symbol is still a barrier to doing full statistics courses. It's not that the symbols don't exist, but it's yet another area of learning highly technical stuff and it's not easy, it's not simple or straight forward. But never mind. Even our statistics courses are not highly mathematical courses here. There are far more words than there are symbols in our applied work. It used to be that the barrier was graphs, but now that's not a barrier at all. I can do an example in SPSS and export the picture. I can export the graph as an object and bang it goes right into the system and so I think it has great benefits and so much so that next year I am teaching all three courses online. (instructor 1)

Students were also asked to respond to the following two statements: 1. "The technology increases my motivation to work on the course." and 2. This course requires taking more personal responsibility for completion than does a face to face course." Responses were based on a five point Likert type scale where 1 = strongly disagree and 5 = strongly agree. Table 23 depicts these results:

Table 23

Student Response Regarding Motivation/Personal Responsibility

Item	Response Distribution					Number of Students Responding	Mean	Standard Deviation
	SD				SA			
The technology increases my motivation to work on this course	0	4	2	5	3	14	3,50	1.16
The course requires more personal responsibility than a face to face course	1	4	3	1	5	14	3.36	1.45

Once again students were neutral as to whether the technology increases their motivation to work on this course and whether this course requires more personal responsibility.

One of the instructors and at least one of the students did indicate the course requires more personal responsibility:

I think the students have to be more self-sufficient and take charge of their learning much more. (instructor 2)

WEBCSILE was very easy to use. (student 7)
*The text was excellent. Students required a high degree of self-discipline
and self-motivation.* (student 7)

One student was very satisfied with the course overall:

*I was very satisfied with the course. It really did exceed my expectations.
I was nervous going in and you know quickly felt comfortable and you
know enjoyed it. I looked forward everyday to logging in and seeing who
had written what and you know yeah. It was very good.* (student A)

Several benefits and limitations related to teaching and learning functions have been discussed. Table 24 provides a summary of the benefits and limitations.

Table 24

Benefits and Limitations of Teaching and Learning Functions

Benefits	**Limitations**
• Course objectives were meaningful and there was a "good fit" between objectives, content and assignments. • Course materials were relevant and well organized. • Students had access to the combined experienced of two instructors in this course. • Students thought the course was worth the time it took them to complete it. • Students learned important computer skills in addition to the course material. • The written work produced was of a higher quality than that of face to face courses.	• more structure in course discussions would be useful to the learning process, such as organization and inclusion of all relevant discussion topics. • Additional resources beyond the textbook would be beneficial. • Students <u>perceived</u> the time commitments of this course to be more than that of a traditional course although time estimates revealed this to not be the case.

Interaction and User Friendliness

This section will cover the following topics related to interaction and user friendliness: interaction, feedback delivery method, and software.

Interaction. Students were asked four questions on the questionnaire related to interaction: 1. "In this course, I am able to interact (communicate and exchange ideas) with the instructor as much as I want.", 2. "In this course, I am able to interact (communicate and exchange ideas) with other students as much as I want.", 3. "In this course, the interaction with the instructor is relevant to my learning.", 4. "In this course, the interaction with other students is relevant to my learning.". Responses were based on a five point Likert type scale where 1 = strongly disagree and 5 = strongly agree. Table 25 provides these results:

Table 25

Response to Interaction in the Research Methods Course

Statement	Response Distribution					Number of Students Respond-ing	Mean	Stan-dard Devi-ation
	SD				SA			
Adequate amount of interaction - Instructor	0	3	3	3	3	12	3.50	1.17
Adequate amount of interaction - Student	0	3	3	3	5	14	3.71	1.20
Instructor interaction relevant	1	0	1	6	6	14	4.14	1.10
Student interaction relevant	0	2	1	6	5	14	4.00	1.04

Students were neutral as to whether there was enough interaction with the instructors and with the other students. They did think that the interaction with both instructors and students was relevant to their learning experience.

Students indicated that the instructors made a positive effort to be available to the students through the use of e-mail, web pages, and humor:

The instructors made themselves available by e-mail individually by phone. (student A)

[The instructors] set-up a cafe and one of the instructor's had a home page and they actually worked very hard to inject their own personalities by using humor and just kind of being chatty to the extent that that's

possible. And I felt that that was really nice. It didn't seem so cold. You felt that there really was a person there. You know I actually feel like I do know them even though I have never met them. ... I had a weird experience of going to the institutional research conference last Fall in Toronto and realizing that one of the instructors was there also giving a paper and I couldn't find her. I had no idea who I was looking for. (student A)

The instructors facilitated the interaction process by responding quickly to discussion messages received:

I think I responded to nearly every [comment], especially in the beginning. I found this is very important that when people contribute something they get an answer back right away so that they know the instructor is reading it and thinking about it and that gets [discussion] going very fast. (instructor 1)

I responded to [discussion messages] where I felt that I could add something to the knowledge. If it was a general comment or if I felt that another student had responded in an appropriate way I would ignore it. If I felt that this was an issue where there needed to be some further debate or I could point them to other information, then I would respond to it. Often times though ... I would try to respond to the whole package. (instructor 2)

The responses were very quick. They were very conscientious about turning around quick comments. (student A)

Several students still preferred the face to face course delivery format in order to connect with their classmates and to clearly discuss course topics:

Face to face, that's still my preferred way [to learn]. You know I really enjoy being in a classroom and having that type of interaction. I mean it is a little bit of a lonely experience sitting here with my computer. I do a lot of that during the day anyway ... the relationship is primarily with the subject matter I guess not so much with the individuals you know. (student A)

I still needed face to face sessions to feel connected and helpful to the group ... My own need for face to face learning ... clear discussion of ideas was hampered for me. (student 8)

There are times that I would like to communicate with others on a one-to-one [basis] but at this time in the program my comfort is not there to even know which person to connect with. (student 10)

[A limitation is the] lack of personal contact. (student 4)

Limited interaction with other students is a drawback. (student 3)

One of the students was pleasantly surprised at the extent to which he/she could get to know fellow classmates but still preferred the face to face format for social reasons:

I was quite surprised actually the extent to which you get to know your fellow students. But if I wanted [to take this course] for the social aspect I would much prefer to be sitting in a classroom and get to know the people. (student A)

A limitation is the increased time and effort needed in order to interact online.

A weaknesses is just the amount of writing one has to do to get across a thought that you know you can say in twenty seconds and the fact that you are online and it's public, you can't just write anything. It has to be, basically grammatically correct and thoughtful and I am not suggesting that a verbal comment wouldn't be thoughtful, but it doesn't sit there in print for the duration of the course. So I think you take a lot fewer, well I, I took a lot fewer risks in what I was writing and commenting and to me that inhibited dialog. (student A)

Feedback. Students were asked to respond to two statements regarding grading with response categories based on a five point Likert type scale (1 = strongly disagree, 5 = strongly agree): 1. "The grading criteria are clear." and 2. "The marking is fair.". The results are provided in Table 26.

Table 26

Student Response to Course Grading

Item	Response Distribution					Number of Students Responding	Mean	Standard Deviation
	SD				SA			
Grading criteria are clear	2	1	3	3	5	14	3.57	1.45
Marking is fair	0	1	3	1	1	6	3.33	1.03

Students were neutral to both of these statements. This is probably due in large part to the fact that when the students were completing the questionnaires and interviews for this research they were only approximately half way through the course. Many students would not have yet received very much feedback on the project proposals and would not have received a grade. [The course had only one assignment - to complete a research proposal. Feedback was given on early versions of the proposal but no grade.]

Three questions were asked of students regarding feedback: 1. "The tutor/instructor provides useful feedback.", 2. "The feedback I receive is individualized.", and 3. "I do not receive feedback in a timely manner." Table 27 depicts these results.

Table 27

Student Response to Course Feedback

Item	Response Distribution					Number of Students Respond-ing	Mean	Stan-dard Devi-ation
	SD				SA			
Instructor feedback is useful	1	2	0	7	4	14	3.79	1.25
Feedback is individualized	0	1	0	8	5	14	4.21	0.80
Feedback is not timely	4	3	2	4	1	14	2.64	1.39

Students thought the instructor feedback is both useful and individualized. they were neutral as to whether the feedback was timely. Once again this is largely due to the design of the course where most of the feedback is given in the later part of the course when drafts of proposals are being reviewed.

A few of the students indicated they required more feedback at regular intervals which was personalized:

Daily/weekly assignments/input/interaction are needed. (student 5)

I'd like to have more feedback from my instructor - more regular and personalized feedback. (student 14)

I would have liked to probe some of the answers to my questions to a get better understanding of the advise being given. (student 6)

Despite the online and communal format of the course, the instructors maintained student confidentiality when they felt it was necessary through the use of private e-mail and telephone:

> *I've got a couple of telephone calls from students who were worried about something and they didn't want to put that in front of everybody. I got some e-mail. So people dealt with [confidentiality] quite well I thought.* (instructor 1)

> *When I was telling people that they weren't participating enough that all went in private e-mail.* (instructor 1)

> *If I wanted to send anything that only went to one student I would just do it by e-mail. It wasn't done in the system at all. That's fine as long as you have e-mail accounts for everyone then you can do it on a one-to-one basis.* (instructor 2)

> *You have to be so careful how you provide feedback to students especially when you are giving critical feedback on proposals. People get devastated by it. So [the challenge is] finding a way that you can do that in a public forum without everybody seeing it.* (instructor 2)

Delivery Method. Students were asked to respond to three statements regarding comfort with the delivery method: 1. " When I began this course, I was worried about the delivery method", 2. "At this point in the course I am comfortable with the delivery method" and 3. "I was not provided with enough training in the use of the technology at the start of the course." Responses were based on a five point Likert type scale (1 = strongly disagree, 5 = strongly agree). Table 28 depicts these results:

Table 28
Comfort with the Online Delivery Method for the Research Methods Course

Statement	Response Distribution					Number of Students Responding	Mean	Standard Deviation
	SD				**SA**			
Began worried	2	1	2	4	5	14	3.64	1.15
Now comfortable	0	1	3	2	8	14	4.21	1.05
Not given enough training on the use of the technology	4	2	2	4	0	12	2.50	1.31

These results indicate that initially students were neither worried nor completely comfortable with the online delivery method. After six weeks into the course (the time when the first batch of questionnaires were completed), the students became comfortable with the delivery method.

Students were then asked to respond to the following statement regarding training: "I was not provided with enough training in the use of the technology at the start of the course." Responses were based on the same five categories; 1 = strongly disagree, 5 = strongly agree. Twelve of 20 students responded to this item. The mean was 2.50, sd. 1.31 indicating a rather neutral response to this statement.

An instructor indicated that one of the benefits to the online delivery is that students are provided with a medium in which they can interact freely with one another and hence develop support systems more quickly:

> *I think [the online delivery method] engages the students in interaction with one another. Throughout the entire course all of them have to interact. And I think that I found more critiquing and support comes from one student to another when it's done that way than when it's done face to face. And that support, those support systems spring-up almost right away. Whereas in a regular class it may be by the end of the year that they start giving each other helpful advice, but otherwise they don't. They come in. They take their course and they leave.* (instructor 2)

One student, however, found this delivery method to be intimidating:

> *[Limitations include the] inability to pick up on nuances that occur during normal discourse. The need to carefully formulate questions before "writing" them is probably good for discipline, but inhibiting at the same time.* (student 13)

Not everyone is suited to this type of instruction and/or learning. Instructors and students must have the appropriate skills in order for the course to be a success:

> *I think the very needy students who need constant reassurance, need constant direction ... I don't think it's a waste for them to do [an online course] ... but if they pose a question and you don't get to it for three days they are just oh my God she didn't answer my question. I need this information right away. And it's like come on calm down if you were in a face to face class you wouldn't get to see me again until next week. But don't think oh God if you don't get a response within twenty four hours that there is a problem here. They are very needy and I don't know that this is the optimal way for them to learn. I think it's the independent folks*

*who can manage on their own and who have got a lot of self confidence to
do this [that will benefit from this delivery method].* (instructor 2)

*A drawback [to this delivery method is that]: instructor quality (skills of
the instructor in this medium) has a <u>HUGE</u> impact on [computer
mediated] courses.* (student 11)

  Software. Students were asked to respond to three statements about the software
used in this course (WebCSILE): 1. "Using the computer software for this course is
boring." 2. "Using the computer software for this course is easy." and 3. "I am not
satisfied with the software used for this course." Responses were based on a five point
Likert type scale where 1 = strongly disagree, 5 = strongly agree. Table 29 provides the
results:

Table 29

<u>Student Response to the Software Used in the Research Methods Course</u>

Statement	Response Distribution					Number of Students Responding	Mean	Standard Deviation
	SD				**SA**			
Software - Boring	6	5	3	0	0	14	1.79	0.80
Software - Easy	0	1	2	8	3	14	3.93	0.83
Not satisfied with the software	6	6	0	2	0	14	1.86	1.03

The students who responded to these questions did not find the software boring, thought
it was easy to use, and were satisfied with it.

  Both students and instructors thought the software was easy to use:

*WebCSILE - it's just ever so much smoother and easier and faster both to
set-up and to conduct.* (instructor 1)

I liked WebCSILE. I thought it was really quite easy to use. (student A)

  One student however did not find WebCSILE easy to use:

WebCSILE is not user friendly! (student 9)

  Instructors needed a way to delete or remove old and error messages from the
course database. It appears that this was a new feature of the software as one instructor
knew the software allowed instructors to do this while the other instructor was unaware it
was a possibility:

*There is something I wanted that has already been done. I made a request
a long time ago that people be able to delete up-loaded images from the*

common area. You heard about the incident that triggered that didn't
you? One of the students up-loaded a picture from the computer and got
the wrong one and didn't know that the picture was on his computer, at
least that's the story. It was a wonderful picture of a women in the lotus
position, starring straight out of the screen, it was a serene expression,
arms folded you know the thing, but completely naked, stark naked, it was
a beautiful picture, but the person was embarrassed, and we had to get
**** to delete it. The other thing is, quite apart from this amusing episode,
there are times when you just make a mistake and you need to correct it.
(instructor 1)

There has to be a way as an instructor [to remove old messages so] that I
could think, all right I have seen all this stuff and I don't want to see it
again. Even if I could compress it and put it in a folder or put it
somewhere so that it's not still there. Then I could just keep individual
notes the ones that I know are very important. (instructor 2)

Two additional suggestions from students for improvements in the software are to
have a guide to the use of the software at the beginning of the course and to have an area
where synchronous interaction can occur:

I think what could have been improved is to have a better guide to the
software right up front. And I know it was new software that they were
using for the first time, but that would have helped. As it was, it worked
out fine sort of to be guided as we went. (student A)

[There needs to be] some opportunity for simultaneous interaction
(telephone? chat room?) so that everyone is on the same wavelength.
(student 5)

Several benefits and limitations of interaction and user friendliness have been
discussed. Table 30 provides a summary of the benefits and limitations:

Table 30

Benefits and Limitations of Interaction and User Friendliness

Benefits	Limitations
• interaction with the instructors and students was relevant to the students' learning experience. • Instructors were quick to respond to student comments/questions. • instructor feedback was useful and individualized. • student confidentiality was maintained through the use of private e-mail. • WebCSILE was easy to use.	• several students felt the lack of face to face contact was a limitation. • increased time and effort is needed to interact online. • several students required more feedback at regular intervals. • the online delivery can be intimidating for students. • not everyone is suited to this type of learning/instructing - appropriate skills are needed (e.g. independence, technological skills) • WebCSILE does not have an area for synchronous interaction.

Organization

Several organizational issues are discussed in this section. These include issues regarding: technological support, registration, library operations, bookstore operations, telephone services, faculty development and availability of adequate distance programs. Information on these issues was obtained through student surveys and interviews and faculty interviews.

Students were asked to respond to the following statement regarding support services: "Support services for this course are unsatisfactory." Responses are based on a 5 point Likert type scale where 1 = strongly disagree and 5 = strongly agree. Table 31 indicates the results of this item:

Table 31
Student Response to Support Services Offered for the Research Methods Course

Item	Response Distribution					Number of Students Respond-ing	Mean	Stan-dard Devi-ation
	SD				SA			
Support services are unsatisfactory	4	3	2	1	1	11	2.27	1.35

Students were generally neutral about their thoughts on the quality of support services provided.

Students and faculty were asked to describe how the existing support services could be improved, what additional support services should be made available, as well as to describe what services are working well.

Technological Support. Many of the students were very happy with the level of technological support provided to them through OISE/UT for this course. Some others were not satisfied as can be seen in the quotes below:

I don't see how [support services] can be improved. They do a very good job at present and since I'm in another country, the potential to improve the service is minimal. (student 14)

Support was available throughout the course and responses were prompt. (student 1)

I needed some more help with the technology itself. (student 8)

I had some trouble finding personnel to "walk/talk" me through the initial kinks. (student 12)

Students were however very vocal, providing ideas for better support services. All of their suggestions involve providing them with resources to solve their own technological problems without the need to speak to the course instructor. These include guidelines in the form of web sites, CD ROMS, and newsletters:

[To improve technological support] have an individual or individual site identified that [students] are able to communicate with when perceiving problems with the process. I do not tend to want to contact the professor as this may be a negative reflection on me and my learning process. (student 10)

Put info/support docs, procedures, ref. manuals ... ONLINE. (student 11)

Have more services geared to off-site students. A video or CD guide to OISE facility/staff/services and orientation. (student 9)

Other support should be available - Newsletters/bulletins sent regularly by mail to remote students. (student 3)

Some of the non-credit courses designed to introduce the use of the internet format should be offered over a single week instead of spread over weeks. This would allow out of town full time workers to attend. (student 9)

As one student mentions below, one of the course instructors created such a guide for his/her students which the students found helpful:

One of the things that the instructor did was develop an instructional manual or sheet of instructions for using WebCSILE. And it was quite user friendly. This was the first time for me so I was quite nervous about how I was going to do this [course] and found it easy. (student A)

Registration. Registration for this course was done through the mail, not online as is the case with many other OISE/UT courses. Because there was a mail strike during the fall of 1997 this caused some confusion for students at a distance who had to register by mail:

There is limited to nil use in communicating problems and actual registering for the program. When the mail strike was on it did seem ridiculous to say the least to be taking programs in this mode and yet not be able to register. If I had not paid my total tuition in September and communicated with my January professor early I am not sure what would have happened. (student 10)

Allow students to enroll online as with all other OISE courses. The 'offline' OISE method is both inefficient and error prone. (student 11)

Library Operations. Students registered for this course had access to OISE/UT's library through their electronic library system. As is indicated from the comments below, this system worked well for the students in this class. The majority of students however still felt more comfortable in doing their own library searches and therefore distance students used a library in their own neighborhood rather than OISE/UT's library electronically.

I only used library assistants and I found them to be helpful and prompt. (student 5)

Getting books, getting resources, copies of journal articles, and even doing a search, a literature search ... most people were able to get to a library. Most of the students were able to get to a library not too far from them and do that work themselves, but a couple of them needed some help

and they called **** and sent her e-mail and she responded. I don't know how many [students]. (instructor 1)

I guess maybe, maybe I am just a little bit old school in the sense that I don't have entire faith in the electronic library system, because I think that they are very dependent on someone else's categorization. So I still like some of the tried and true back-up methods and unless you have a really good research library it is kind of hard to do that kind of leg-work. Those are just my worries and they may be unfounded. (student A)

> ***Telephone Services.*** One student suggested that help over the phone in the form of Teaching Assistants would have been helpful:

There should be T.A.s available over the phone to help when needed with technical problems - i.e. a pager system or something similar. (student 9)

Phone help would have been useful for learning to upload files. (student 9)

Another student mentioned that OISE/UT had, in the past, provided a toll free number for their distance students but that it was no longer in operation:

As a remote student, at one time a toll free number was provided by OISE. For the past couple of months, it has been out of operation without explanation. This makes it very difficult for me to contact OISE. (In my residential area, we use a private phone company and long distance charges are not affordable at peak hours). E-mail messages sent, especially to the registrars office are very slow to respond or no response at all is received. (student 3)

However, online help was available from the instructors and help desk. In addition, a help line was available. The instructors also responded to student queries by phone. In the example described below though, this proved to be time consuming and expensive:

On long distance calls we did have problems with one student from Egypt. And she had a lot of problems trying to cope with this. I think it's because it was one of the first courses that she had ever taken but it was the wrong course for her to be taking. She insisted that she wanted to do something via computer conferencing. And it was wrong. She shouldn't have been doing that course at this point in her program and she was a techno whatever, a techno-nerd, but also trying to do it from Egypt. On her I would have spent a minimum of I would think a day and half or two days

trying to deal with her problems and then she would call us and she'd call the Registrar's Office. So she called everyone. (instructor 2)

Faculty Development. As one of the instructors indicated, their use of new learning technologies can inspire other faculty members to try it and expand access to their courses to distance students:

I think it is really important that people like me use these technologies, because I want to encourage more faculty members around here to do this, [teaching online courses] sure makes a difference when I can say that I do it. (instructor 2)

Availability of Graduate Distance Programs. Two of the students describe a frustration of many adult learners - graduate programs are not available entirely at a distance. Although there is a move toward more online courses at the Master's level, most universities still require that students fulfill a "residency requirement" where they must take courses on campus for a select period of time - usually one-two years. This becomes problematic for students who must work to support themselves and/or their families and pay tuition fees. For many potential graduate students, the residency requirement deters them from pursuing a graduate degree. Doctoral programs are even less likely to be offered entirely at a distance:

The only recommendation is that I wish that they would do [the online format] with more programs. Somebody that just applied to a Master's program in nursing is going to have to try to juggle her home life and everything like I am as well as travel and hours to do her courses and she did get accepted but she is trying to think now do I really want to do this. And if it was on computer it would just be so much easier... I think gone is the time of the mentality that some of the people and faculties have that you have to go onto campus because you have to experience the whole thing. I am thinking give your head a shake. ... It is just adding more, I don't know, more challenges to the individual, which puts them into reality for the real system today but still on the other hand I think that as adult learners we've got to take a look at that. That was one of the things that they told me when I was looking at this at curriculum or at adult education or whatever, that they still have you go onto campus for some of them, because they feel that you need to experience that. I am thinking "Oh come on" ... You can't afford not to work, but you also can't afford to give up your position because if you do who knows what's going on behind your back. (student B)

I don't know that other institutions have addressed this particular issue. I mean as far as I know there aren't that many doctoral programs in

Education that are available online. I think OISE is probably ahead of the game for most and even that ... the selections are limited. That's understandable. The requirements still require people to move there. And the residence requirement is two consecutive terms not summer and fall, but fall and spring. So what that will mean for me, is that somewhere down the road when I've done as much as I can do online is that I will have to move to Toronto or figure out some kind of way of commuting between Winnipeg and Toronto. Which is hugely expensive. It's an accessibility [issue]. (student A)

In summary, several benefits and limitations related to organization have been described. Table 32 summarizes these findings:

Table 32

Benefits and Limitations of Organization

Benefits	Limitations
• One of the instructors created a technological resource guide for this course. • OISE/UT's electronic library system worked well although the majority of students still prefer to do their own leg work in a local library. • The bookstore handled distance orders well. • Through their own experiences the faculty hope to inspire/mentor others trying online delivery.	• Additional resources for technological support are required such as guidelines in the form of web sties, CD ROM's and newsletters. • Online registration would be more convenient for students. • There is a need for telephone support services for students - the existing toll free line was not operational. • Telephone support proved to be expensive for this course. • There is a growing need for entire graduate programs to be available at a distance.

Novelty

Two aspects, novelty of the delivery method and professional development will be addressed in this section.

Novelty of the Delivery Method. Online courses, especially those with an interactive component are still relatively new. As increasing numbers of courses are offered in this delivery method and increasing numbers of students access their education in this way it is important to fully explore the outcomes of learning in this way not just in terms of learning outcomes but associated benefits and limitations. A limitation not yet addressed in this paper is the potential health problems that may occur as one student suggests:

Drawbacks [to this delivery method] are health problems that occur as a result of overuse of the computer (e.g. back, eyesight). (student 3)

On the questionnaires, students were asked to respond to the following statement: "I would not take another course using this delivery method". Responses are based on a 5 point Likert type scale (1 = strongly disagree, 5 = strongly agree). Table 33 provides the results of this item:

Table 33

Student Response to Using the Online Delivery Method

Item	Response Distribution					Number of Students Respon- ding	Mean	Standard Deviation
	SD				**SA**			
I would not take another course using online delivery method.	10	1	1	1	1	14	1.71	1.33

As can be seen, the majority of the students would take another course offered in the online delivery format.

Professional Development. Another important benefit of this delivery method are the contributions made to professional development. As one student suggests, having experienced an online course first hand will give her invaluable insight in the workplace:

The value for me taking this course online is that it really has given me some insight into the aspects of the work that I do here. Like as I had mentioned to you, we're now reviewing this initiative at our college, the laptop computer initiative, where students are learning online in a number of different courses. So, as the person who is responsible for setting up the review of this initiative, I understand much more, since I have my own experience. That has been a huge value to me and because I also work in Program and Curriculum Development and I know that there will be more programs that will be looking at this type of learning delivery, it has given me insight. (student A)

In summary several benefits related to novelty were addressed. These are summarized in table 34:

Table 34

Benefits and Limitations of Novelty

Benefits	Limitations
• Contributions to professional development - first hand experience to be used in the workplace.	• Potential health problems due to increased computer use.

Speed

        According to Bates' (1995) ACTIONS model, speed is the final aspect that should be considered when assessing educational technology. Time considerations, technology, and course materials will be discussed in relation to speed.

        Time Considerations. One of the potential benefits to online learning is that it can save the student time. Time spent traveling can be spent on the course:

> *I work full time, have a family, commute 30 minutes to and from work and the university site is 60 minutes from home on a good driving day. Gas etc. keeps increasing and so does job related responsibilities...I have to be practical in what I can reasonably accomplish without considering additional circumstances of illness in the family...or other needs.* (student 10)

> *The benefits are many to me personally - my motivation and interest in the technology, the time convenience, etc.* (student 14)

However, the online format does pose its own potential time constraints.   First, responding by message takes longer than verbally due to the time needed to type out a response and the more formal nature of the discourse - responses are generally well thought out:

> *At times messages can take too long due to the amount of time to think about a response.* (student 4)

Second, getting used to having people potentially available to respond to your questions right away can breed unreal expectations and frustration when responses are not prompt:

> *Sometimes [there was] a delay from the time I asked a question until I received a response. If I had to clarify the answer, took that much longer*

*again. (However, if I were asking questions in class I would likely still
wait up to a week for the next class)* (student 6)

Technology. Technological limitations can also affect speed of course delivery.
As both students and instructors indicate the speed of WebCSILE could be improved:

*If the speed of the system could be improved, it would reduce frustration of
sitting and waiting in front of the computer.* (student 6)

Speed it up - i.e. faster moves between notes. (student 12)

*Sometimes there were technical problems - i.e. being able to move quickly
between the different "pages" or "chat groups" within the classroom.*
(student 13)

*By the end of the course when there were so many entries on there it just
took so long to go through them. We had I think two hundred on one
learned topic. And it took forever to read one and then get the next one.
And either I wasn't doing it properly ... it's just the length of time it took to
go back and to move them around. That was the only thing that I found - a
problem was the speed towards the end. And not being able to get rid of
stuff. Like there were these notes in there that I just didn't want to see any
more. I didn't know how to delete them.* (instructor 2)

However, it is important to remember that WebCSILE is a lot faster and easier to use
than Parti, the software used previously for this course:

It's just easier and it's faster using WebCSILE than it was using Parti.
(instructor 2)

Course Materials. Another benefit of the online delivery format is the speed at
which electronic articles can be shared and used in an educational context:

*The technology is taking quite a bit of time, but I can show the students
anywhere an article without photocopying and mailing it out and
furthermore and I can annotate it and people can refer to it and people
can look at parts of it. So we are of course just learning how to exploit the
technology, but I think we are.* (instructor 1)

With this course a limitation in speed occurred with the old technology of print. The
textbook was difficult to obtain as the publisher was not well known. Delays in receiving
the textbook inhibited learning:

Very slow to receive textbook at start of course. (student 9)

At the outset it was a little difficult to know when the course actually started. People were chatting. It wasn't clear to me whether we were actually started or not. There's a difficulty in getting the text book and I think that delayed the actual instruction because so much of it was based on reading the textbook and then applying it to the discussion or to the development of a research statement in the project. (student A)

In summary, there were several benefits and limitations of speed for this online course. These are summarized in table 35:

Table 35

<u>Benefits and Limitations of Speed</u>

Benefits	Limitations
• Time savings are possible with the reduced need to travel. • WebCSILE is a lot faster than Parti software (previously used). • Electronics articles can be shared/used quickly.	• Responding online takes more time then face to face. People can develop unreal expectations as to how soon they will get a response to their inquiry. • The speed of WebCSILE could be improved. • There was a delay with the old technology of print - textbook was delayed due to publisher being not well known.

Conclusion

Several findings of interest came out of this case study. Based on projected costs, revenues, and student numbers, OISE/UT will make a small 'notional' profit of $1,962 per year for the life of the course (which is expected to run 5 years). Similarly, based on the current course fee of $740 per Master's level course, 19 students are needed to break-even. It is important however, to keep in mind that the costs assessed did not include overhead costs as these were unknown. The inclusion of these overhead costs would decrease the profit margin and/or increase the student numbers required to break-even. A more realistic assessment then, based on the current level of 20 students would perhaps be to say that the course will have recovered all its direct costs. Also, the actual direct costs are probably higher than indicated because initial development time was not known and therefore not included. This analysis shows that it is however, possible to develop highly cost-effective online courses within a niche market, at relatively moderate cost to learners.

The issue of unknown overheads is interesting in its own right. We know for instance that at the University of British Columbia (UBC), direct costs constitute 47% of all face to face teaching costs. This was a project where indirect expenses were not known however, as OISE/UT has not done this analysis. Increased interest in and development of online courses and programs and the desire to compare costs with those of face to face teaching, make it increasingly important to take account of overhead costs.

Furthermore, despite the change in software from Parti to WebCSILE (which was said to be twice as fast), the largest 'cost' of this course was tutoring and marking time spent by the instructors. This was due to the nature of the course as the course content was largely made up of online discussions where questions and issues were raised and student work was evaluated. These costs could be decreased by changing the format of the course to include exams rather than discussions but then the students would be deprived of the hands on experience gained by 'actually' writing a research proposal rather than simply studying how to write one. Constructivist learning however, takes time as students must process the information and then manipulate it to fit their own project. Interestingly, the students and instructors reported that additional skills to the course content were learned, such as computer and writing skills. This course was an example of low cost front end development but high delivery cost as compared to the UBC case study (available at: http://research.cstudies.ubc.ca/nce/reports.html) which had high development and moderate delivery costs.

Another important finding is that students enrolled in this course have expressed a strong need for entire graduate programs to be available at a distance. The 'residency requirement' of most graduate degrees limits the accessibility of graduate education to many individuals. Increasingly families are 'dual-income' out of necessity rather than choice and the only way for these individuals to upgrade their skills is through combining

education with their careers. As the availability of online courses increases, higher education institutions will need to identify what cannot be done at a distance to justify attendance on campus.

It is somewhat surprising that the technology itself, while not without problems, was a relatively minor issue. This can be attributed partially to the innovation of one of the instructors who created a 'guide to the WebCSILE technology' which was added to the course database. This guide answered many student questions regarding the use of the technology for the course and provided solutions to possible technical problems. Students did however, still request additional resources for technological support, such as links to websites, a CD ROM and/or newsletters.

Interestingly, one of the support services offered, the electronic library system, was not highly used by students in the Research Methods course. Although the service was efficient and in good working order, students preferred to do their own leg work when it came to researching for their own projects and thus would use their own local libraries. This may be a finding specific to this particular course but may be worth researching as library services are currently in the process of gearing up for online programs.

When developing online courses/programs, it is important to keep in mind that not all students are suited to this mode of learning. Working online requires independence, as well as technical and time management skills. The graduate nature of this course may have contributed to its success. Undergraduate students, especially in their first year may need more direct contact with the instructor and fellow students to keep motivated and succeed.

Overall, the cost-benefit methodology has allowed us to take a detailed evaluative look at a substantive telelearning project. It has provided a costing methodology that should be easy to adapt and apply to other telelearning contexts.

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Appendix A: Technology Background: WebCSILE
Madeleine Butscheler

General Notes on CSILE & WebSCILE Functions

This section includes: descriptions of functions, developer, and pedagogical foundations; historical background; pedagogical evolutions; and ascribed benefits.

Descriptions of Functions, Developer, & Pedagogical Foundations. CSILE software provides a communal database for asynchronous student and teacher exchanges. Various "note" formats and supports are designed to enhance the potential of this communal database for collaborative knowledge-building.

Use of the software commonly takes the form of teachers creating topics, themes, or principles with students. These are entered into the database as the starting point for a collaborative research project. Students can then create a new note, add to an entry, build on, or start a new discussion. The software accommodates both text and graphics. On the network, students using search and browse facilities are able to read and comment on each other's ideas. Authors are notified when comments have been made. They also receive notification of changes to the database.

The software developers have identified the concept of creating, "Knowledge-Building Communities", as pivotal to developing and enhancing the software. They emphasize the significance of a non-competitive research model that creates an environment in which groups both contribute their knowledge to a communal database and pursue lines of inquiry through discussion notes or messages. The intention to create a knowledge building community is reflected in the organization of notes. In addition to being linked to a topic or theme, the student labels the note in terms of, "Thinking Type", which includes several choices such as, "New Information", "Problem, I Need To Understand", "My Theory", "What We Have Learned", and "Comments".

The software has been enhanced to allow for branching. This means students can attach subdiscussions to "I Need to Understand" points in a main discussion. The enhancement is intended to encourage follow ups to problems, questions, or elements, which may have been raised, but not considered. For ease in reading and drafting purposes, in addition to the full screen display, the user can opt for the "split screen" view. This divides the screen in half with the reader being able to opt to view the notes in the upper or lower screens.

Viewers can also opt to see the notes by "Thread", "Author", or "Date" and can retrieve them by specifying the name of an author, a note topic, a note keyword, a thinking type and several other variables. There are also security features that may be attached requiring authorization to view entries.

A "Knowledge Map" utility has recently been created to allow teachers and students to assess what research has been gathered, where there are gaps, and what contributions the groups have made to their Knowledge-Building community. This utility displays all the notes, allowing students to adjust the position of their notes and thereby consider the relationship of information as the Map is being built. The software authors have introduced a range of shapes to represent different kinds of notes and colored lines to depict differing relationships among notes. This utility also permits highlighting groups of notes for pattern identification and to keep up to date.

Finally, an instrument for assessment measures has been created to compute: the number of notes in the database, the percentage of notes that are co-authored, and the percentage of other people's notes students have read.

Historical Background. Begun in 1986, CSILE (Computer Supported Intentional Learning Environment) brought together cognitive scientists and computer scientists working with teachers and students at school sites to develop a collaborative, problem-solving centered educational model making use of characteristics unique to computers. During its early years the software was piloted in a number of mid range grades mainly 5-6 classrooms. While grounded in that experience it is now being used in regular educational programs ranging from primary grades to graduate school. It appears to be one of the most intensively researched in the classroom setting during its core developmental stages.

Being created in the schoolroom context, the software was developed for a MAC platform and has been undergoing conversion to make it available on a PC platform. In 1996, WebCSILE was generated which allows users to remotely log into CSILE databases using Netscape or Microsoft Explorer browsers. Other relatively recent functions created from ongoing research include the branching function previously described.

Pedagogical support has been created in 2 forms. The Progressive Curriculum Network(PCN) emerged from the CSILE project in 1995. Modeling its pedagogical roots, the Network's aim was to make possible sustained collaborative knowledge-building activity via the Internet among CSILE teachers and researchers towards progressively developing curriculum designs and materials. The CSILE database for this group's collaborations is titled, the Knowledge Forum. It represents the latest reincarnation of CSILE, a commercial version. Creation of WebCSILE, the browser that allows access from a PC platform was directly linked with growth of this Network. The Knowledge Society Network (KSN), part of the Telelearning Research Network extends the knowledge building community to art galleries, science Centers, and some health care professionals as well as the educational community.

Pedagogical Evolutions. "The real distinctiveness of CSILE lies in a harmonious integration of research-based software and teaching methods that have grown up together, each influencing the other and resulting in a powerful combination." (*Overview of CSILE, http://csile.oise.on.ca/intro.html.*) It was developed with teachers using techniques such as, the Jigsaw and Reciprocal Teaching. For example, using a Jigsaw exercise, students formed groups to research a certain piece of a larger question. They recorded their work on the computer using the database. Then groups were reformulated so that each person in the new group had a "missing piece" to contribute to the overall picture for the new group.

Over time, however, in the research papers the focus appears to have shifted away from developing other techniques to adapting the database to make it the primary environment for knowledge building, hence the following description: CSILE is a problem-centered, collaborative, knowledge-medium designed to encourage cognitive skill development among school children (Scardamalia et al., 1989, *Student Use Of Branching In A Computer-Supported Discussion. Jim Hewitt, Jim Webb, & Peter Rowley, p1.)*

Another transition seems to be occurring in research papers associated with CSILE. Questions about concepts of "cognition" have surfaced. Changing ideas related to those questions are influencing the articulated pedagogy associated with CSILE research development. Earlier papers were concerned with "intentional learning" described as "cognitive processes that have learning as a goal rather than an incidental outcome (Bereiter and Scardamalia, (1989), p. 363, *Intentional Learning As A Goal of Instruction*, in *Knowledge, Learning and Instruction.)*

One of the most recent papers, *Design Principles for the Support of Distributed Processes,* by Jim Hewitt and Marlene Scardamalia refer to "cognition as distributed over both individuals and their surroundings" (p.1). Those holding a "distributed cognition perspective" believe that cognition is fundamentally distributed, "the tools, rules, values and actors in a classroom constitute a highly complex, interacting system". This conception forms the basis for asking pragmatic questions about "what kinds of distributions are educationally effective?"

A recent paper, *Situative Design Issues for Interactive Learning Environments: The Problem of Group Coherence*, by Jim Hewitt and Marlene Scardamalia, refers to "situative perspective". Those who espouse this theory believe that "the relationship between mind and environment is so complex and so interdependent, that it is an oversimplification to consider them separately" (p. 2). According to the authors, cognitivist theory tends to consider cases one at a time. Eschewing the mind-world dualism of cognitivists, a situative perspective brings new meaning to the concept of "knowing something" — "it is no longer a matter of storing ideas in your head that can be applied to different situations. Rather, 'knowing' is tied to context, distributed across the individual, situational affordances and other people. Similarly 'learning' 's not the personal acquisition of knowledge, but is instead understood as participation in an active system." (Paraphrased from, *Situative Design Issues for Interactive Learning Environments: The Problem of Group Coherence, by Hewitt and Scardamalia, p.3.)*

For this holistic view to researching, the paper describes a model by Engestrom (1990) in *Learning, Working and Imagining*. He: "views human activity as an interdependent system involving the individual (or subject), tools, a problem space (or object), the community of people who are similarly concerned with the problem, the division of labor between community members, and the conventions (rules) regarding actions. (Paraphrased from, *Situative Design Issues for Interactive Learning Environments: The Problem of Group Coherence, Hewitt and Scardamalia, p.4*.)

Ascribed Benefits. Claims are made by CSILE developers and researchers that it provides a crucible for creating a Knowledge-Building Community through several means:

- *Student's Ideas as Objects of Inquiry*: Student-created knowledge artifacts are available to the entire community and serve as a foundation for creating other more advanced artifacts.
- *Knowledge of the Collective as Primary*: The goal is to continually extend the knowledge of the collective. Individual understanding is driven forward by the dual need to be familiar with the knowledge of the collective, and the desire to advance that knowledge.
- *Responsibility Transferred to Students*: Each student shares some responsibility for planning, organization, posing question and summarizing.

(Paraphrased from*, Design Principles for the Support of Distributed Processes, by Jim Hewitt and Marlene Scardamalia, p. 2*).
- Students can see their theories evolving because the discussion notes make the knowledge-building process more visible.
- Through the serial nature of the discussion, students experience a depth oriented bias to a learning activity.
- Students can observe and practice cognitive skills by recording a discourse chronologically.
- Through the process of engaging students in a common discourse, they have opportunity to experience peer modeling and peer guidance activities.
(Paraphrased from, *Students use of Branching in a Computer-Supported Discussion Environment, by Jim Hewitt, Jim Webb, and Peter Rowley, p.3.*)
- Unlike face to face conversation, CSILE provides a permanent record of the interactions.
- This eliminates the need for turn-taking, allowing all students to work simultaneously.
(*Paraphrased from Schools for Thought: Transforming Classrooms into Learning Communities by Jim Hewitt, Clare Brett, and Marlene Scardamalia. p.1*)

Software & Hardware Requirements[9]

This section will include server, client, hardware and installation recommendations.

Server.

No. of Clients	Server	Hardware
5-10	Ilfx	40MHz 68030 or any 68040 or PowerPC processor
10-20	Quadra 900	any 68040 or PowerPC processor

Minimum requirements:
- Ethernet, 8Mb of RAM, a hard disk of 160Mb, an external backup device (a SyQuest 105Mb drive + 3 cartridges or a DAT tape drive and tapes, **or**
- [(Not as good) an external 160Mb hard disk)], and a 14.4K baud modem (e.g. Practical Peripherals 14400FXMT, USR Sportster 14.4) with high-speed Macintosh serial cable (i.e. that supports hardware handshaking).
- Monitor (e.g. 12" monochrome) suffices.
- Will run on PowerPC Macintosh systems.

Extra software for the server:
- Disk checking software, e.g. Public Utilities by Fifth Generation Software or Norton Utilities for the Macintosh by Symantec
- Backup software - specifically Retrospect 2.0 by Dantz Software
- AppleTalk Remote Access 1.0 or 2.0 (preferred) can be used with the modem to allow remote access to the CSILE databases, e.g. from a home PowerBook

Client. An LC II or, preferably, any currently available Mac with a 13" or 14" Apple RGB monitor, extra VRAM that may be needed to drive the monitor with 8 bit color, at

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[9] Excerpted from the CSILE web-site at: http//csile.oise.on.ca/tech_ref.html. Please note: some of the hardware appears to be quite dated.

least 4Mb of RAM (6-10Mb if other programs will be used along with CSILE), at least a 40Mb disk (80Mb or more if QuickTime movies might be stored on the local disk which will eventually be supported in MacCSILE), and an Ethernet interface.

Software recommendations for all clients:
- *At Ease* (version 2 Apple software).
- *Typing Tutor* (Kriya Systems, Inc.)

Hardware & Installation Recommendations

- One client machine for the teacher and one for every three or four students.
- A printer per class, preferably a LaserWriter for direct attachment to the Ethernet, **or,**
- A LocalTalk-based printer is possible with a printer bridge (e.g. EtherPrint from Dayna) or an internet router to connect it to the Ethernet network.
- The Macs can be installed by someone with a basic knowledge of the machines. The network should be professionally installed by someone who can be an ongoing provider of network troubleshooting. Use high quality Ethernet cables and connectors making sure they are not vulnerable to attack.

The software authors have indicated a willingness to review specific equipment lists.

Considerations On Use:[10]

This section will include pedagogical links, ease of use, accessibility, security features, and availability of technical support.

Pedagogical Links: This section will include suitability for a variety of presentational requirements, suitability for creating appropriate learning environments, and availability of pedagogical support.

- <u>*Suitability for a variety of presentational requirements of the subject.*</u> Based on presentations describing the software use, it would appear to have been successfully introduced in various subjects including science and writing. The software's early use was exclusively with students in mid-range K-12 programs. In recent years its use has been extended to include both undergraduate and graduate students at the university level. In these contexts the software has been used by some as a basic database without focusing on the pedagogy of collaborative research and it has also been used closely with the pedagogy.

- <u>*Suitability for creating appropriate learning environments.*</u> This is a "pedagogy-driven" software. The intention is to foster a particular kind of learning environment --a collaborative approach to research thereby forming a knowledge building community. Both learning the content and concurrently understanding their research process are intended goals for students. The tools provided to foster this learning

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[10] Elements for *Considerations on Use of Software* are drawn from several sources including:
- Kelly McCollum's article, Colleges Sort Through Vast Store of Tools for Designing Web Course, The *Chronicle of Higher Education* http://chronicle.com/data/internet.dir/itdata/1997/10t97102101.htm,
- Bruce Landon's comparative research, *Online Educational Delivery Applications: A Web Tool for Comparative Analysis,* c1998 C2T2, http://www.ctt.bc.ca/landonline/, and
- Tony Bates' ACTIONS model for measuring the costs and benefits of teaching technologies in, *Technology, Open Learning and Distance Education* (1995).
-

environment include providing a structure for identifying the kind of notes (e.g. I Need To Know, My Theory), the relationship among notes (branching), and the process of note creation (Mapping and indication of authorship/contribution). This framework is purposefully the primary form of interactivity. Those looking for flexibility through several means of interactivity, such as chat rooms or places where students experience private exchanges, can expect to seek other tools.

- *Availability of pedagogical support.* Two support groups exist which provide opportunity for literally modeling the collaborative research approach. The Progressive Curriculum Network(PCN), which affords a forum for CSILE teachers and researchers to exchange ideas on curriculum design and software as well as to consider problems encountered. The Knowledge Society Network (KSN) provides a similar forum extended to community art galleries, science Centers, some health care professionals as well as the educational community.

Ease of use.

This section will include installation, maintenance, and repair.

- *Installation.* The authors have indicated that the basic software can be installed with little computer background. However, for installation of the more sophisticated and fragile network hardware and software, they candidly recommend an individual with expertise in this area that can also offer trouble-shooting support over time.

- *Maintenance & repairs (including robustness).* Based only on access to the CSILE web-site, two key questions come from users — speed of the software, and server "expiry dates".

Accessibility. Using Netscape or Microsoft's Explorer browsers, the WebCSILE browser now permits users to remotely log into CSILE databases. However, those on a PC platform will experience limits in a few areas of access. At this point, most located reports on the software describe its use in classroom settings where students all attend. However, the networks for teachers and researchers demonstrate its application for distance education or "distributed learning".

Security features. The authors have created versions of the software which allow for limited access as exemplified by the demo on the WebCSILE Mini-Manual web-page. However, since the pedagogy framing the software encourages sharing, private cafes for students and other such measures requiring security features are not invoked.

Availability of technical support. At their web-site the software authors have indicated that they are prepared to review prepared checklists of hardware and software. Also available is a "WebCSILE Mini-Manual at the following URL: http://webforum.oise.utoronto.ca/WebCSILE/help.html. A demo can also be found at that location.

Table 36

Response Distribution of Course/Registration Fee (N=12)

Value ($)	Frequency
700	1
743	1
750	2
800	6
875	1
1700	1

Table 37

Response Distribution of Long Distance Charges (N=5)

Value ($)	Frequency
10	1
20	3
300	1

Table 38

Response Distribution of Postage/Courier Fees (N=7)

Value ($)	Frequency
3	1
10	3
40	1
50	1
75	1

Table 39

Response Distribution of Textbooks (N=10)

Value ($)	Frequency
10	1
40	1
50	4
60	1
70	1
75	1
100	1

Table 40

Response Distribution of Software (N=2)

Value ($)	Frequency
50	1
200	1

Table 41

Response Distribution of Internet/Online Costs (N=8)

Value ($)	Frequency
10	1
20	1
50	3
75	2
300	1