Assessing the Costs and Benefits of Telelearning:

A Case Study from the University of British Columbia

SILVIA BARTOLIC-ZLOMISLIC & A.W. (TONY) BATES

For project information contact:

Silvia Bartolic-Zlomislic	Dr. Tony Bates
Research Associate,	Director,
Distance Education & Technology	Distance Education & Technology
The University of British Columbia	The University of British Columbia
1170-2329 West Mall	1170-2329 West Mall
Vancouver, BC	Vancouver, BC
Canada V6T 1Z4	Canada V6T 1Z4
(604) 822-8964	(604) 822-1646
e-mail: silvia.bartolic@ubc.ca	e-mail: tony.bates@ubc.ca

project web page: http://det.cstudies.ubc.ca/detsite/framewhat-index.html

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Summary and Major Findings

This project, "Developing and 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 which 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 University of British Columbia (UBC) is one of six case studies assessed in this project. The course described in this report is 'Educational Studies 565f: Developing, Designing, and Delivering Technology-Based Distributed Learning' (EDST 565f). This course was developed in partnership with the Monterrey Institute of Technology (ITESM) and is the first of five courses to be developed toward a post graduate certificate in technology-based distributed learning. This report focuses on the UBC side only.

Summaries of the main findings are presented over:

Summary of Student Characteristics

Characteristic	General Results
Gender	50% Male/50% Female
Age	Average approximately 40 years
Grade point average last year	Mean approximately 88%
Highest level of education	Majority – Master's level
Number of courses enrolled in	Average - 1 course this term/3 courses last year
Student Status	Majority part-time/adult learners
Employment	Almost all employed
Work hours/week	Average approximately 36 hours/week
Caregiver status	Approximately half were primary caregivers
Computer use	Majority use computers at home and work and have a lot of computer experience
Reasons for taking the course	Most significant reason: Content is relevant to their work/Least significant reason: to get high grades
Most preferred delivery method	A mix of technologies
Least preferred delivery method	Print based distance

Main Cost Findings

Findings
• The partnership with ITESM was a major factor in making this course cost effective to the DE&T unit (ITESM paid for half the course development costs) and to students (the ITESM payment subsidized their tuition fee).
• Start up costs were higher than anticipated.
• In spite of the increased start up costs, over the life of the course, a profit will be made.
• A substantially higher profit will be made over the entire program of five courses. Therefore, on-line courses can be cost effective, especially when marketed internationally.
• Annual break-even enrollment for this course, based on projected costs, revenues, and student enrollment over four years is 44 students.
• Students thought the course was worth the money it cost them to take it.
• The costing methodology developed provided an accurate means of measuring the full direct costs of on-line 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 on-line courses/programs.

Benefits and Limitations Specific to the Educational Studies 565f Course

Benefits	Limitations
Access and Flexibility	
	• Timing of the discussion forum was not as flexible as desired.
Teaching and Learning Functions	
• Course material was rated 'good' by students. • Assignments were useful learning tools. • Feedback was useful and timely. • Course tutors were very satisfied with the learning that took place. • Tutors felt the teaching was more individualized than would be possible in a face-to-face course.	• Some students would have liked a more applied focus to the course. • One textbook was not as useful as expected. • Initially, organization of the discussion groups was lacking - it was too large. • Discussion groups needed more moderation and summarization. • Although time demands fell within the suggested range, many students thought the course was too much work. • Some students didn't find the guest tutors useful.
Interaction and User Friendliness	
• The course web site was user friendly.	• HyperNews was slow to use and not entirely user friendly. • Some features of the web-site needed improvement.

Organization	
• Existing policy is being reviewed while new organizational processes have been developed to accommodate student needs such as a 'one stop shopping' approach for international students. • Partnerships with ITESM and the Faculty of Education at UBC have resulted in the success of this program.	• Student confidentiality is a sensitive issue and places restrictions on marketing and evaluation activities. • UBC's telephone registration system does not allow students to register for distance education credit courses at a graduate level, and an on-line registration system had to be developed for the non-credit students. • The UBC bookstore did not have a system in place to handle orders from distance students in terms of payment and shipping procedures. • Increased administrative support was required to handle new procedures for international students.
Novelty	
• The on-line delivery method was the most appropriate delivery method for the course content. • This course fills a gap in the Faculty of Education course offerings in Distance/Distributed Education. • Development of the certificate program, of which this course was a part, provided professional development, publication opportunities, and job interest to course developers.	• Even for an experienced on-line teaching team, there was a steep learning curve, not just with regards to new technology but also with regard to on-line teaching methods.
Speed	
• This course was developed and opened within 10 weeks of the contract being signed between UBC and ITESM.	• Printed materials were received late by students due to delays in delivering textbooks by publishers and copyright clearance for custom course material.

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

Benefits	Limitations
Access and Flexibility	
• There was access to international experts. • Students and instructors could access from a distance. • The on-line format fits a flexible work schedule.	• Access is limited to those with the necessary technology. • Technological problems can interrupt the learning process.
Teaching and Learning Functions	
• Collaborative assignments were possible allowing students to share ideas globally. • There was the opportunity to improve writing and self management skills in addition to learning the course material.	• Discussion on-line takes more time than face-to-face and was found to be less preferable by students who were on campus. • Some students were concerned about the permanency of their on-line postings.
Interaction and User Friendliness	
• There was the ability to interact freely with the instructor and other students. • There is the potential for more interaction than in a face-to-face setting.	• It is difficult to know if 'quiet' students are having problems. • There is the potential for miscommunication over e-mail.
Organization	
• Specifying computer pre-requisites prior to registration alleviated most student technological problems.	
Novelty	
• The on-line delivery method is a novel way for students to learn.	• With novelty comes the need for more time to learn and to make mistakes.

Speed	
• There is the potential to develop courses very quickly. (This resulted in solidifying a partnership with ITESM). • Revisions can be made while the course is in progress to take account of student feedback and the latest developments in subject matter. • Time and money can be saved by reducing printing processes during the development stage.	• There is the potential for work to be left to the last minute as a result of knowing changes can be made quickly. • Courses are expected to be up-to-date. Therefore, time for revisions must be allocated on an ongoing basis.

The final decision as to whether a course or program's benefits have outweighed its costs will depend on the perspective of those making the judgement. The values and goals of the teaching institution will also influence the assessment.

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<center>**Background and Context**</center>

Section A: The NCE Project

The "Developing and 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 which 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, and courses assessed in this study.

Table 1 <u>NCE Telelearning Cost-Benefit Case Studies, Corresponding Software used in Course Development, and Assessed Courses</u>

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; AutoCADD 211
LICEF/Tele-universite	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.

ITESM registered 80 students for Educational Studies 565f: "Developing, Designing, and Delivering, Technology Based Distributed Learning", and UBC registered 40 students, of whom 11 were on-campus Masters students, 18 were certificate students studying at a distance, and another 11 distance students who audited the course (i.e. paid full fee but did not wish to be assessed or receive a certificate). This report will focus only on the 40 UBC students. For a full description of this program, see Bates and Escamilla, 1997.

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://itesm.cstudies.ubc.ca/survey.html[3] .

For this course, Educational Studies 565f: "Developing, Designing, and Delivering Technology-Based Distributed Learning", 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 on-line within the course database. Students had a choice of responding by mail or on-line. The UBC student response rate was 50% - 20/40 students completed the questionnaire.

Qualitative data was obtained through interviews. One of the tutors posted on-line the request for interview participation on behalf of the project researcher. Students were asked to reply to the researcher by phone or e-mail if they were willing to participate in the interview. The researcher then contacted the students and set a time for the interview. Interviews were conducted in person, over the phone, or by e-mail. Students chose the interview method that suited them best. The researcher also contacted faculty and staff involved in the development and delivery of the course for interviews. These interviews were conducted in person. Overall, there were 10 faculty/staff interviews and four student interviews for the Educational Studies 565f course. Of the four student interviews, one was in person, one by phone, and two were by e-mail.

This study takes account of subsequent changes and developments made by the course team after the first offering of the course and after the first analysis of data. Many of the findings have been incorporated into the design of the second offering of the course, which ended in December, 1998. We intend to collect and analyze data from the second offering of this course, if the project is funded for a second phase, but the course team reported that the second offering went much more smoothly and had less criticism from students than the first offering. This is an important point, because the first offering of highly innovative courses is more likely to have higher costs and more problems than course offerings in subsequent years.

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[3] This survey is longer than the survey used for the remaining case studies. The Director of UBC's Distance Education & Technology unit requested the addition of questions 37-62 for a more in depth analysis specific to this particular course as this course was the first of five courses to be developed on-line towards a post graduate certificate in technology-based distributed learning.

Section B: Course Description

Educational Studies 565f: "Developing, Designing & Delivering Technology-Based Distributed Learning" (EDST565f) is an on-line course created by the Department of Distance Education & Technology at the University of British Columbia (UBC) in partnership with the Monterrey Institute of Technology (ITESM) located in Mexico. This course was the first of five courses to be developed toward a post graduate certificate in technology based distributed learning. Course designers at UBC developed EDST565f by "rolling their own HTML" with the addition of using HyperNews for the computer conferencing component.

Committees

Six teams and committees were established for the development and delivery of these five courses. These committees included:
1. the Core Course Team (10 members),
2. the Associated Course Team (7 members),
3. the Marketing and Registration Team (6 members),
4. the Tutoring Team (5 members),
5. a Certificate Program Advisory Committee (5 members), and
6. an Academic Review Committee (4 members).

A total of 21 people, were involved in the development of this program.

The Core Course Team developed the course content and made all necessary arrangements to have the course up and running properly. The Associated Course Team consisted of members who had an interest in the ITESM/UBC partnership/project (for example, this research). The Marketing and Registration Team was responsible for all the details of course marketing and registration. The Tutoring Team team-tutored the class and dealt with student tutoring issues. The Certificate Advisory Committee worked to get the series of courses set up as a certificate program offered by UBC. Finally, since these courses were also available as electives to students taking UBC's Masters in Education, the Faculty of Education established an Academic Review Committee to ensure the courses met the requirements for a masters level program. See Appendix A for a list of members and their respective positions.

Course Home Page

The course home page consisted of links to the various sections of the course and was used as a notice board for important course announcements. Examples of these announcements include: announcements of assignment due dates, marking weights, and links to video conference slides.

Resources

Course resources included:
- directories,
- guidelines,
- required texts, and
- library resources.

Directories. The directories link included a student directory, a tutor directory, and a biographies link. The student directory was split into UBC registered students and students registered with ITESM The student directory contained student biographies where students provided background information about themselves to the class.

The tutor directory gave biographies of each of the tutors: Dr. Tony Bates, Dr. Mark Bullen, Dr. Jose Escamilla de los Santos, Diane Janes, and Jose Octaviano Morales Wade. Similarly, the biographies link gave the biographies of the core course team: Dr. Tony Bates, Dr. Mark Bullen, Dr. Jose Escamilla de los Santos, Diane Janes, Dana McFarland (librarian) and Jo-Anne Naslund (librarian).

Guidelines. The guidelines link included an on-line code of conduct and an on-line discussion guideline message. Appendix B details UBC's on-line code of conduct. The on-line discussion guideline provided the students with a schedule of discussion topics and discussion expectations. For example, students were asked to respond to the tutors' questions within 72 hours. The grading criteria for the discussion component was also explained. Students' postings were to add to the discussion, incorporate readings and other academic sources, incorporate students' own experiences, and respect the point of view of others.

Required Texts. There were two required texts for the course. These included:

Collis, B. (1996). *Tele-learning in a Digital World: The Future of Distance Learning*, London: International Thomson Computer Press; and

Moore, M. & Kearsley, G. (1996). *Distance Education a Systems View*, Belmont: Wadsworth.

A specially collected printed pack of 40 articles and book chapters in the area of distributed learning was also required for this course and was available for purchase through the UBC bookstore.

Library Resources. The library resource link included links to a bookmark database, UBC's extension library, research resources, and on-line journals.

Content Blocks

The course content was divided into 6 blocks:
1. Introduction
2. Theoretical Influences
3. The Remote Classroom Approach
4. The Systems Approach
5. The Networked Multimedia Model; and
6. Integrating the Course: Developing a Plan for the Design of a Distributed Learning Course.

Appendix C displays the 1997 breakdown of the content blocks for this course.

Block one provided learning objectives[4] for the course, links to three discussion forums, a description of the course, and five introduction activities for students to complete.

Block two focused on the psychological theories of behaviorism and cognitivism and the epistemologies of objectivism and constructivism. Five perspectives on teaching were also examined. The block also provided links to four discussion groups and had two activities for the students to complete.

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[4] The five main learning objectives for this course:
1. Compare and contrast 3 major approaches to distributed learning: the remote classroom, the systems-based independent study, and the networked multimedia model.
2. Identify and question the values and underlying theoretical influences underpinning each of these 3 models of distributed learning.
3. Develop a detailed blueprint for the design, development, and delivery of a distributed learning course, including the rationale for and a critique of the decisions taken.
4. Use the internet to access and analyze research on distributed learning and find appropriate on-line databases in this area.
5. Compare views on and experiences of distributed learning with other graduate students and with international experts from around the world.

Block three covered the key characteristics of the remote classroom approach as well as its strengths and weaknesses. This block contained links to four discussion groups, had three activities for the students to complete as well as guidelines for the first course assignment.

Block four described the key characteristics of the systems approach, its strengths and weaknesses, and historical context. Once again there were links to four discussion groups, two activities, and guidelines for the second assignment.

Block five focused on the key characteristics of networked multimedia and its strengths and weaknesses. This block had links to three discussion groups and guidelines for the third assignment.

There was no new text for block six. This block was essentially the completion of the final assignment. No new discussion forums were set up for this block. The survey used for this research was posted in this block as well as advertising for the next course developed in this series: "Educational Studies 561g: Selecting and Using Technology for Distributed Learning".

Discussion Forums

Three discussion forums ran throughout the course: introductions, international cafe, and general questions. The introductions forum was a place where UBC students could introduce themselves to other UBC students. The international cafe was a forum where UBC and ITESM students could exchange messages to one another. Generally these messages contained "hello" messages and general comments on the course. The general questions forum was where students could ask questions about the course, assignments, and software.

In blocks 2-5 additional forums were created where students were to respond to specific questions posed in relation to the course content covered in the individual blocks. For example, in block 2, two additional discussion forums were created. The first was a forum on epistemological traditions where students were to discuss objectivist versus contructivist views. The second new forum was an analysis of the implicit epistemology of blocks 1 and 2 of this course.

The course began with all students participating in the same discussion forum. That meant 40 UBC students and 80 ITESM students all responding in the same discussion forum. Due to the large number of messages posted each day by such a large discussion group and the corresponding workload involved in reading all the messages, the discussion groups were split into four with approximately 20 students per group. This significantly decreased the workload

involved in reading messages to a manageable size. This change was made as the course progressed, at the start of block 4.

Guest Tutors

The following guest tutors were part of this course:
- Dr. Gary Miller, Director of the Center for Distance Education, Penn State University, USA.
- Dr. Greg Kearsley, George Washington University, USA. (Dr. Kearsley is the author of one of the course text books).
- Dr. Betty Collis, University of Twente, Netherlands. (Dr. Collis is the author of the second course text book).

The guest tutors interacted with both UBC and ITESM students on-line for a period of one week each.

Video Conferences

There were four videoconferences involving student participation associated with this course. These videoconferences were for the ITESM students and were not a part of the UBC course offering. Costs were paid for by ITESM and therefore will not be reflected in the cost analysis described below. The purpose of the videoconferences was for the ITESM students to meet their UBC tutors, to meet some of the UBC students, and to discuss with the course designers any difficulties they were having with the course. UBC students were invited to attend the videoconferences located at UBC. The videoconferences were held on August 28th, September 11th, October 23rd, and November 28th, 1997.

Assessment

At the outset of the course, students were assigned four assignments. Three of the assignments were critiques of each of the three models presented in the course. Each of these assignments was worth 15% of their grade. The fourth and final assignment was to prepare a detailed plan for the design of a distributed learning course. This assignment was worth 40%. Finally, participation in the discussion forums was worth 15% of the students' grades. However, as the course progressed, it became evident that the workload for this course was too high. Therefore, the course assessment changed slightly. Students were required to do only three of the four assignments, each given equal weight (~28%). (Participation remained as 15% of the final grade). If a student wanted to complete all 4 assignments, marks for the best three assignments were used to calculate the final grade.

Technology

As indicated above, this course was developed by simple HTML coding and the use of HyperNews for the discussion forums. Appendix D provides a detailed description of HyperNews, including general notes on functions, software and hardware requirements, and considerations on use.

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 (50%)	10	n/a	n/a
• female (50%)	10	n/a	n/a
Age: (range 24-56 years)	20	40.45	9.25
Highest level of education:			
• Bachelor's degree	3	n/a	n/a
• Master's degree	13	n/a	n/a
• Doctorate	4	n/a	n/a
Grade point average last term:			
• percent	12	87.79	5.59
• did not take courses last term	6	n/a	n/a

As can be seen in Table 2 there was an equal number of males and females that took this course. The age of the students ranged from 24-56 years old with the average age around 40. Six of the students did not take courses in the previous term. Of the 12 who did, their grade point average ranged from 80-100% with a mean of 87.79%. Most of the students had completed a Master's degree (13) with four having completed a Doctorate and three having completed a Bachelor's degree. The post graduate nature of the sample may account for the high grade point average.

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	Stan-dard Devi-ation
Course load:			
• # currently enrolled in (range 0-4)	20	1.25	1.16
• # taken in last 12 months (range 1-12)	20	3.40	3.41
Student status:			
• part time	9	n/a	n/a
• full time	5	n/a	n/a
• non-credit (adult learner)	3	n/a	n/a
Employment status - employed (paid work):			
• yes	18	n/a	n/a
• no	2	n/a	n/a
• hours/week work for pay (range 6-60 hrs/week)	18	36.31	14.40
Primary caregiver in the family:			
• yes	10	n/a	n/a
• no	8	n/a	n/a

Students, at the time of completing the questionnaire, were currently enrolled in 0-4 courses with one being the average. In the last year, courses taken ranged from 1-12 courses with three courses being the average. It seems that the majority of students take courses one at a time throughout the year. The majority of the students were part time or adult learners. Almost all of the students were employed (18 of 20). Work hours ranged from 6-60 hours/week with the average work week around 36 hours. Ten of the 18 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 are: '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'";

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');

4: "How long have you been using your current computing platform (computing platform referring to the operating system-Windows, Mac, Unix, etc... and not the physical machine)?";

5. "What is the average length of time you use your computer each week (for any purpose, including viewing the EDST course web site)?";

6. "On average, how often do you use a WWW browser (for any purpose, including viewing the EDST course web site)?";

7. "On average, how often do you view the EDST course web site?";

8. "How (on average) are you connecting to the EDST course web site?";

9. "Do you often use the Bookmark feature of your browser when viewing the EDST course web site?";

10. "Do you save or print documents from the EDST course web site?".

Table 4 provides the results of these items.

Table 4 Student Computer and Technology Use

Item	Response Distribution			Number of Students Responding
	Never	**Sometimes**	**Mainly**	
Locations where computer is used for this course:				
• home	3	8	12	20
• workplace/work office	2	10	7	19
• on campus	9	1	4	14
• community	14	0	0	14
Technology available at home for study purposes:	**Conven-ient**	**Not Conven-ient**	**No**	**Not Sure**	
• a computer	18	0	1	0	19
• e-mail	17	1	1	0	19
• the world wide web	17	1	1	0	19
• a VCR	18	0	0	0	18
• an audio cassette player	17	0	1	0	18
Technology available in the community for study purposes:	**Conven-ient**	**Not Conven-ient**	**No**	**Not Sure**	
• a computer	6	6	0	3	15
• e-mail	4	6	0	6	16
• the world wide web	5	6	0	4	15
• a VCR	5	4	2	5	16
• an audio cassette player	5	5	2	4	16

Table 4 continued Student Computer and Technology Use

Item	Response Distribution	Number of Students Respond-ing
Length of time using current computing platform:		
• less than 1 year	n/a	2
• 1-2 years	n/a	1
• 2-5 years	n/a	7
• over 5 years	n/a	10
Length of time computer is used/week:		
• 1-4 hours/week	n/a	0
• 5-10 hours/week	n/a	1
• 11-20 hours/week	n/a	9
• more than 21 hrs/week	n/a	10
Number of times Web browser is used:		
• once a month	n/a	0
• once a week	n/a	0
• 2-4 times/week	n/a	2
• 1-4 times/day	n/a	15
• 5-8 times/day	n/a	2
• more than 9 times/day	n/a	1
How often EDST 565f course Web site is viewed:		
• once a month	n/a	1
• once a week	n/a	0
• 2-4 times/week	n/a	9
• 1-4 times/day	n/a	10
• 5-8 times/day	n/a	0
• more than 9 times/day	n/a	0

Table 4 continued Student Computer and Technology Use

Item	Response Distribution	Number of Students Responding
How students connect to the EDST course web site:		
• high speed connection on campus/at work (Ethernet, T1)	n/a	8
• high speed connection at home (cable modem)	n/a	1
• 36K modem	n/a	5
• 28K modem	n/a	2
• 14K modem		2
Bookmark feature used:		
• yes	n/a	13
• no	n/a	7
Save or print documents from the course web-site:		
• yes	n/a	20
• no	n/a	0

The majority of the students used a computer to work on this course both at home and at their workplace/work office. A few students used campus computers and no one used computers made available to them in the community. Students had all of the listed technology conveniently available to them in their homes (a computer, e-mail, the WWW, a VCR, and an audio cassette player). This same technology was also available in the community for study purposes although there was less agreement as to its convenience. In addition, approximately one third of the students were not sure if this technology was available in the community for their use.

The majority of the students had used their current computing platform for more than two years. Nine of the students used their computer for 11-20 hrs/week while 10 students used it over 21 hrs/week. These results indicate that most of the students had significant experience using computers.

The majority of the students used their web browser 1-4 times a day. Approximately half the students viewed the course web site 2-4 times a week while the other half viewed it 1-4 times a day. Eight of the students had Ethernet or a T1 connection available to them at work or on campus, while five students had a 36K modem. Overall, the majority of the students had fairly fast connections available to them. Two thirds of the students used the bookmark feature on their web browser and all of the students saved or printed documents from the course web site.

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		Important		Most			
Importance of the following goals:								
• to obtain the qualification/credit	3	1	5	7	3	19	3.32	1.29
• interest in the subject/content for its own sake	0	0	0	8	12	20	4.60	0.50
• contact with distinguished instructors	1	2	3	12	2	20	3.60	1.00
• content is relevant to the work I do/will do	0	0	0	3	17	20	4.85	0.37
• socialize with others	5	2	5	7	1	20	2.85	1.31
• personal growth/broaden perspective	0	1	2	6	11	20	4.35	0.88
• show myself I can do it	7	4	0	4	5	20	2.80	1.70
• get high grades	6	3	7	3	1	20	2.50	1.24

The most significant reason the students took this course was that the "content was relevant to the work they do/will do", followed by "interest in the subject/content for its own sake" and "personal growth/broaden perspective". The least significant reasons students took this course were "to get high grades", "to show myself I can do it", and "to socialize with others".

Table 6 Student Response to Delivery Methods

Item	Number of Students Responding
Limited experience with various course delivery methods:	
• yes	3
• no	16
Preferred delivery method(s):	
• face-to-face	9
• print based distance (may include video/audio cassettes)	2
• print based distance with on-line, CD-ROM, teleconferencing, or videoconferencing	3
• on-line, CD-Rom, teleconferencing, or video conferencing as main delivery method	7
• a mix of technologies	16
Delivery method(s) not preferred:	
• face-to-face	3
• print based distance (may include video/audio cassettes)	11
• print based distance with on-line, CD-ROM, teleconferencing, or videoconferencing	2
• on-line, CD-Rom, teleconferencing, or video conferencing as main delivery method	4
• a mix of technologies	1

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 on-line, CD-Rom, teleconferencing, or videoconferencing", "teleconferencing, or video conferencing as main delivery method", or "a mix of technologies". Table 6 (above) shows the results of these items.

Only three of the 19 students that responded felt they had limited experience with the various technologies. Therefore, the majority of the students were able to make experienced judgments as to their preferred delivery method. The top preferred delivery method was "a mix of technologies" followed by "face-to-face" and "on-line, CD-Rom, teleconferencing, or video conferencing as the main delivery method". The least preferred delivery method was "print based distance".

During the interviews, the course tutors were asked about the student diversity in the class. The following two quotes show how the course tutors perceived the students:

> *This is not systematic research but I would say that the big differences were not between the Mexican students and Canadian students but between the UBC graduate students and the rest. The UBC grad students came with a very set, strong view mainly based on the philosophy of the department they are in [UBC's Department of Education] which emphasizes adult learning principles about constructivist approaches of learning. They were less tolerant of other approaches than the other students. They tended to take automatically a more critical stance, which is not necessarily a bad thing but also what was really interesting is that some of the students were much more negative to the distance form of learning (because they were on-campus students) than the other students who were all distance students and could not have accessed the course any other way.* (Course tutor 1)[5]

> *It's a mixture. I mean we have graduate students, who are really on campus students taking this course. I haven't actually checked the numbers. My sense is that they're relatively young, mid 20s to 30s maybe, and then the other major group would be the certificate students who are working professionals and they tend to be older. They're working in the field so their motivation is slightly different I think than the graduate students. And we found that showed up in their concern about grades. The graduates were much more concerned about what their grade was going to be and what the criteria for the assignments and exactly what the directions for the assignments were. The professional students were a little more laid back and relaxed about it. They just felt that as long as*

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[5] Quotes from the course tutors will be identified by a number code (e.g. course tutor 1). Quotes from the student interviews will be identified by a letter (e.g. student A) while quotes from the student surveys will be identified by number (e.g. student 1). We were unable to match student interviews with survey data. Where it is known, students will be distinguished as international students.

they did something that was relevant to their work, that was all that mattered. (Course tutor 2)

Table 7 below provides a summary of the main student characteristics:

Table 7 Summary of Student Characteristics

Characteristic	General Results
Gender	50% Male/50% Female
Age	Average approximately 40 years
Grade point average last year	Mean approximately 88%
Highest level of education	Majority – Master's level
Number of courses enrolled in	Average - 1 course this term/3 courses last year
Student Status	Majority part-time/adult learners
Employment	Almost all employed
Work hours/week	Average approximately 36 hours/week
Caregiver status	Approximately half were primary caregivers
Computer use	Majority use computers at home and work and have a lot of computer experience
Reasons for taking the course	Most significant reason: Content is relevant to their work/Least significant reason: to get high grades
Most preferred delivery method	A mix of technologies
Least preferred delivery method	Print based distance

Section B: Costs

The program of which this course is a part was established as a full cost-recovery program. Thus, a budget was designed to reflect all costs, which facilitated the costing methodology for this study. However, it should still be possible in principle to assess the costs of government subsidized courses in a similar way. Collecting cost data though, for such courses, may be more difficult if accounting procedures do not reflect this form of analysis.

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

Revenue. ITESM paid UBC's Distance Education & Technology Department half of the estimated development costs, in this case $15,000.00, towards the development of this course. This gave ITESM the rights to offer the course in Latin America. UBC retained the rights for the rest of the world.

As per the partnership agreement, each institution received tuition fees from their own students. The UBC enrollment was 40. These included Faculty of Education graduate students (11), certificate (18), and audit[6] students (11).

Tuition fees were $465 for graduate students and $695 for certificate and audit students. Graduate students pay a lump sum graduate fee to the Faculty of Graduate Studies. Graduate Studies then transfers the appropriate proportion of funds to Distance Education & Technology for this course (~$465).

The fee of $695 for certificate and audit students was based on what UBC charges on campus certificate students enrolled in Continuing Studies courses. This was the external standard used to set the fee level.

Distance Education & Technology did not differentiate between international and Canadian students, in order to keep the fees competitive with similar programs offered internationally. This is different from the UBC policy for on-campus students where international students pay a higher fee. The total tuition received was $25,270.00. Table 8 summarizes the revenue for this course.

Table 8 Educational Studies 565f - Winter Session 1997 Revenue

Source of Revenue	Amount
Tuition (40 students):	
Graduate students (11 x $465)	$5115.00
Certificate/audit students (29 x $695)	$20,155.00
ITESM Rights Payment	$15,000.00
Total Revenue	**$40,270.00**

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[6] A student taking a course as an *auditor* is a student registered in a course who does not have to write assignments or examinations for that course. They are expected to keep up to date on course readings as would a regular student, but they do not receive 'credit' for the course.

Budgeted Costs. The budget for the Educational Studies 565f course was developed by Dr. Tony Bates, Director of the Distance Education & Technology unit at UBC, based on his extensive experience in course development. Costs were divided into fixed and variable costs. Fixed costs are not effected by the number of students while variable costs are. The budgeted costs are listed in Table 9. All costs are in Canadian dollars (at the time of writing: C$1 = US$0.66).

Table 9 Educational Studies 565f - Winter Session 1997 Budgeted Costs

Source of Cost	Amount
Fixed Costs:	
Subject Experts: (30 days @ $400/day)	$12,000.00
Internet Specialist: (7 days @ $300/day)	2,100.00
Graphics/Interface Design: (4 days @ $300/day)	1,200.00
Copyright Clearance	700.00
DE&T Overheads	4,000.00
Library	1,000.00
Server Costs	300.00
International Tutors: (3 @ $1,000)	3,000.00
Faculty of Education Academic Approval	4,000.00
Total Fixed Costs	$28,300.00
Variable Costs:	
Tutoring: (40 students @ $220/student)	$8,800.00
Delivery Costs:	
Non-credit Registration: ($14.00 x 29)	406.00
Student Administration: ($28.86 x 40)	1,115.00
Printed Materials: ($37.50 x 40)	1,500.00
Total Variable Costs	$11,821.00
Total Costs	**$40,121.00**

Personnel costs (subject experts, internet specialist, graphics/interface design) are based on 200 working days per year (to account for weekends and holidays) and includes benefits. The time allocated is higher than usual because the development of this course involved new curriculum development rather than adapting an existing curriculum. This course is unusual in that the subject experts were also instructional designers by training. In most Distance Education & Technology courses, there would have been an instructional designer as well as the subject experts.

Copyright clearance was required for the printing of the custom course materials (package of readings) that accompanied the course.

Distance Education & Technology overheads are calculated as 25% of the cost of personnel time allocated for this course. Overheads cover the indirect costs of the Continuing Studies Division's support of the Distance Education & Technology unit, such as a contribution towards the salaries and benefits, etc. of an Associate Vice-President and Director of Administration in addition to a number of continuing studies services such as marketing, accounting, and computer and network services. Furthermore, there are costs for telephone service, heating and lighting, etc..

The UBC library was paid $1,000 for staff help in locating relevant articles for the course as well as providing a service to UBC students where students could order journal articles/books on-line and receive them by mail/fax.

UBC's Distance Education & Technology unit has two servers (one as a backup) at a cost of $9,000. Costs for the server are amortized over three years (average life of a computer) and based on the development of 10 new courses a year ($9000/10x3 = $300).

Three international tutors were invited to moderate the discussion groups for a week each. Each tutor was paid $1,000 for their involvement in this course.

The Faculty of Education charged $4,000 in order to give this course academic approval to ensure the course content was appropriate for a Master's level course and to clear its inclusion within the Master's program as an elective course.

Tutoring costs were estimated at $220/student, based on an average tutoring cost of $4,400 for a class of 20 students. Tutors were expected to moderate on-line discussions as well as mark assignments for this course. The course had 3 tutors. Therefore, the tutor/student ratio was 1:13. However, 11 of the students were 'auditing' the course and therefore not submitting assignments for grading. This was an unusually low tutor/student ratio for this program. Most subsequent courses have a 1:15/20 ratio.

Delivery costs included costs for registration of non-credit students. (UBC Master's students are registered through UBC's Telereg system. Because Master's students pay a flat fee for a Master's program, this cost was considered pre-paid. Distance Education & Technology pays overheads to UBC's central administration on all credit course registration, which covers registration costs

for distance education credit courses). There were also administration costs and costs for the printing and mailing of the course reading package.

Researched Costs. Researched cost data was obtained in a number of ways. Where possible those involved with the project were asked to keep track of the time they spent on specific elements of the course design, development, and delivery. Other data was obtained by looking at expense accounts. Table 10 provides a detailed breakdown of the researched costs of the first offering of the first course in the series of educational studies courses in technology-based distributed learning.

Table 10 Educational Studies 565f - Winter Session 1997 Researched Costs

Source of Cost	Amount	Budgeted
Fixed Costs:		
Course Planning: (staff time = 33.2 hours)	$1,641.68	0
Development: (337 hours)	15,993.37	15,300
Marketing: (122.5 hours)	3,709.80	0
Copyright Clearance	700.00	700
Overhead (potential)	12,295.32	4,000
Library	1,000.00	1,000
Server Costs	300.00	300
International Tutors	3,000.00	3,000
Faculty of Education (Academic Approval)	2014.00	4,000
2nd phone hook up and fees: (6 months)	225.90	0
Miscellaneous	305.94	0
Total Fixed Costs	$40,716.51	$28,300
Variable Costs:		
Instructional Time: (382 hours)	$16, 344.28	8,800
Administration/Registration: (400 hours)	12,365.08	1,521
Printed Materials	1,500.00	1,500
Total Variable Costs	$30,209.36	$11,821
Total Costs	**$70,925.87**	**$40,121.00**

As indicated above, personnel working on the design, development and delivery of this course were asked to keep track of the time they spent. Thus, costs for course planning, development, and marketing as well as instructional time and administration/registration are based on the time each staff member

spent working on the course multiplied by their daily rate based on salaries and benefits.

The overhead costs are also based on 25% of the personnel time invested in this course. The overheads are substantially higher than what was budgeted due to the increased amount of time spent by staff, especially in the areas of marketing, instruction, and administration/registration. However, a lot of this time was worked 'extra' by the personnel without pay (in other words, their work load did not decrease as a result of the extra time spent) and therefore, such a high overhead would not actually be paid by the Distance Education & Technology unit (as is reflected below in the adjusted costs in Table 11).

The Faculty of Education originally requested UBC's Distance Education & Technology unit to pay $4000 per course for the costs of the time Faculty of Education staff spent on academic approval of these courses. However, it was later agreed that the Faculty of Education should receive 5% of the gross revenues from all the courses as part of a general agreement between DE&T and the Faculty of Education for profit sharing where the bulk of the teaching is done by DE&T staff. Therefore, the more 'accurate' cost is $2,014 for this first offering, based on 5% revenues.

A second phone was required to handle the registration of non-credit students.

Adjusted Costs. Costs for this first course were higher than budgeted. This was because being a new program, a range of unanticipated issues arose. The major one was the need to introduce new administrative procedures for international on-line students, although course development and tutoring time were also higher than anticipated. Because these problems were resolved primarily on this course offering, but benefited all subsequent course offerings, the Director of Distance Education & Technology developed an adjusted budget that took into account these issues, and which averaged 'one-off' costs over the whole program. Based on the above researched costs, Table 11 provides the adjusted costs for the first offering of this course (1997) and projects costs for the next three offerings. In addition, the actual revenue for the 1997 offering and the projected revenue for the next three offerings is depicted, indicating that over the life of the course a profit will be made. Keeping in mind that this is the first of five courses to be developed under this partnership, the additional four courses will have a higher profit since most of the 'bugs' will have been worked out through the development of this course.

Table 11 Educational Studies 565f - Adjusted Costs and Projected Revenues

Source of Cost	1997	1998	1999	2000	Total
Fixed Costs:					
Subject Experts	$12,000	$4,000	$4,000	$4,000	$24,000
Internet Specialist	2,100	1,500	1,500	1,500	6,600
Design	1,200	300			1,500
New Procedures	6,000				6,000
Marketing	3,000	3,000	3,000	3,000	12,000
Server	300				300
DE&T Overheads	6,150	2,200	2,125	2,125	12,600
Library	1,000				1,000
Copyright Clearances	700	700	700	700	2,800
International Tutors	3,000	3,000	3,000	3,000	12,000
Total Fixed Costs	$35,450	$14,700	$14,325	$14,325	$78,800
Variable costs:					
Tutoring: DE&T	8,800	8,200	8,200	7,040	32,240
Tutoring: Others		5,000	5,000		10,000
Delivery	3,021	4,822	4,822	2,572	15,237
Faculty of Education: 5% of gross	2,014	2,247	2,247	1,320	7,828
Total Variable Costs	$13,835	$20,269	$20,269	$10,932	$65,305
Total Costs	**$49,285**	**$34,969**	**$34,594**	**$25,257**	**$144,105**
Projected Revenue :					
UBC Graduate Fees @465/student	5,115	5,580	5,580	3,720	19,995
Certificate Fees @695/student	20,155	33,360	33,360	16,680	103,555
ITESM Rights Payment	15,000	6,000	6,000	6,000	33,000
Total Revenue	**$40,270**	**$44,940**	**$44,940**	**$26,400**	**$156,550**
Profit (returned to AVP, Continuing Studies)	-**$9,015**	**$9,971**	**$10,346**	**$1,143**	**$12,445**

The adjusted budget (new procedures) includes the cost of the time of the Director and Course Administrator on developing or implementing new

procedures such as credit transfer arrangements, electronic funds transfer for international students, new arrangements with the UBC bookstore for integrated ordering and payment of materials, etc. resulting from the first time delivery of distance education internationally over the Internet.

The estimate of student numbers is based on enrollments in the first year and an assumption that there is a limited market for these courses (see table 12). So in the fourth year a decline of 50% in certificate students has been allowed for. If numbers hold up, the program will continue beyond four years, with a substantial increase in profit. Note that as well as the courses making a profit, UBC Master's students receive extra courses without extra cost to the university, and as the average cost per student of these courses is roughly $750 per course, Master's students are receiving a subsidy of $285 from the certificate and audit student fees and from the ITESM payment. Because of the agreement with ITESM, certificate students also receive a subsidy of $55.

Table 12 <u>Educational Studies 565f - Actual (1997) and Projected Student Numbers</u>

Student Classification	Year			
	1997	**1998**	**1999**	**2000**
Graduate	11	12	12	8
Certificate/Audit	29	48	48	24

Based on the adjusted costs and projected revenues illustrated in Table 11 and the projected student numbers in Table 12, the break-even annual enrollment can be determined.

Average annual total costs can be determined as follows:

Total fixed costs ($78,800) averaged over four years are **$19,700** per year. This is the average annual fixed cost. The average fixed costs per student per year is $19,700/48 = $410.42.

Total variable costs per student can be determined by taking the total variable costs ($65,305) and dividing by the total number of projected students (192). The total variable costs per student are therefore **$340.13**.

Total Fixed Costs/4 years = $78,800/4 = $19,700 average annual fixed cost (or $410.42 per student)

Total Variable Costs = $65,305/192 (total enrollment) = $340.13/student

therefore, Total Annual Cost Per Student = $410.42 + $340.13/student =
$750.55 per student

Total revenue per student can be determined by taking the total revenue
($156,550) and dividing by the total projected enrollment (192).

Total Revenue = $156,550/192 (total enrollment) = $815.36/student

With a few calculations we can determine that for these projections, the
break-even annual enrollment must be 44 students.

Total Costs (4 years) = $144,105
Average Cost Per Year = $36,026.25
Average Revenue Per Student = $815.36

Since break-even (number of students) = Average Cost Per Year/Average
Revenue Per Student,

Breakeven = $36,026,25/$815.36 = 44.18

The average annual enrollment for this course based on the above student
projections is 48. Therefore, total annual **revenue** at 48 students is $39,137.28
while total annual **costs** at 48 students is $36,026.40. Therefore, the annual net
revenue (profit) obtained from this course is $3,110.88. [Over four years the net
revenue is $12,443.52 which compares to the total profit figure in Table 11
($12,445). (There is some error due to rounding)].

Total Annual Revenue = 48 x $815.36 =	*$39,137.28*
Total Annual Cost = 48 x $750.55 =	*$36,026.40*
Annual Net Revenue = $39,137.28 - $36,026.40 =	*$3110.88*

A linear cost and revenue structure does not apply here, however, because
there are two different enrollment fees paid by students. (UBC Graduate
students are subsidized and therefore pay a lower fee than audit and certificate
students).

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/on-line costs", "parking", and "other (please specify)". Of the 40 UBC
students who took the course, 20 responded to the questionnaire. Table 13 (over)
illustrates students response to expenses associated with this course.

Table 13 Student Expenses Associated with the Educational Studies 565f Course

Type of Cost	Number of Students Responding to Question	Mean Costs ($)	Standard Deviation	Range ($)
Tuition	16	529.56	276.28	45-1,000
Travel	2	1,005.00	1,407.14	10-2,000
Accommodation	1	8,000.00	n/a	n/a
Per diem	1	50.00	n/a	n/a
Long distance	3	30.00	17.32	20-50
Postage/Courier	3	58.33	79.43	10-150
Textbooks	17	176.74	67.23	60-300
Software	n/a	n/a	n/a	n/a
Internet/On-line costs	9	58.89	23.15	30-100
Parking	2	260.00	339.41	20-500
Other[7]	2	57.50	60.10	15-100

Because of the relatively low student responses and wide variation of responses it is difficult to interpret the data in this table. Appendix E provides response distributions for each of the student expenses.

There was a large discrepancy in the cost reported for tuition fees by students. The actual fee for the course, as mentioned above, was $465 for UBC graduate students and $695 for certificate students. 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 student society fees.

Similarly, the range of costs reported for the textbooks may have resulted from some students not including the readings package in this category and/or some students only buying one textbook.

Table 14 is provided for comparative purposes and indicates what the minimum student expense would be if students only paid for tuition, the custom course materials, and the two textbooks. As shown, UBC graduate students are required to pay a minimum of $666 while the minimum for certificate/audit students is $896.

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[7] Stationary ($15); computer repair ($100)

Table 14 <u>Minimum Student Expenses</u>

Type of Cost	Student Classification	
	Graduate	**Certificate/Audit**
Tuition	$465	$695
Custom Course Materials	$40	$40
Textbooks	$150.15	$150.15
GST[8]	$10.51	$10.51
Minimum Cost[9]	$665.66	$895.66

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 15 illustrates the results of this question.

Table 15 <u>Distribution of Who Pays for the Educational Studies 565f Course</u>

Who Pays	Number of Students	Mean Costs ($)	Standard Deviation	Range ($)
Myself	15	375.47	307.58	64-1000
Employer	7	590.86	256.12	50-850
Institution	3	790.00	182.48	670-1000
Other	n/a	n/a	n/a	n/a

Fifteen of the twenty students paid for their own costs. Amounts ranged from $64 - $1,000. The mean is calculated without the inclusion of one individual who paid $8000 in accommodation costs and $2000 in travel costs. Only seven students reported that their employer paid for this course. Amounts ranged from $50 - $850. Three students reported that the institution offering the course (UBC) paid. Amounts ranged from $670 - $1,000.

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 16 illustrates the student response to these questions.

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[8] GST (7%) is paid on the purchase of the custom course materials and text books.
[9] Assuming the purchase of both textbooks and the custom course materials.

Table 16 <u>Student Response to the Costs of the Educational Studies 565f Course</u>

Statement	Response Distribution					Number of Students Respond -ing	Mean	Stan- dard Devi- ation
	SD				SA			
Delivery method costs less than other methods	3	6	7	3	1	20	2.65	1.09
Course is not worth its cost	7	8	3	1	0	19	1.90	0.88

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

Students indicated an almost neutral response to the question of whether on-line 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.

Although most students felt the course was worth the money, for a few students, cost was still an issue:

> *There is some amazing dribble about the wonders of this stuff and how great it is and how it's going to empower the poor. It's so far away from being that-costs you a minimum of $2,000 a year to maintain and operate the kind of computer (needed) and another $1,000 of your time to learn programs, constantly updating your knowledge. If you don't have your own computer, try doing a course like this in a public library. They'd kick you off after half an hour. You try doing it in the computer lab where there's a whole bunch of freshmen, all sitting around chatting about you know, who they know back in Trail that somebody else knew. It's not conducive to concentration.* (Student B)

This was however, a course aimed at students already with a computer.

At least one student found the cost of the course to be very high compared to their standard of living.

> *I had been introduced to the costs before the course began. They were too much for our standard [of living] but I made up my mind. There was nothing to surprise me.* (International student A)

This supports the teams decision to keep the cost for international students as low as possible.

Table 17 provides a summary of the main cost findings.

Table 17 Main Cost Findings

Findings
• The partnership with ITESM was a major factor in making this course cost effective to the DE&T unit (ITESM paid for half the course development costs) and to students (the ITESM payment subsidized their tuition fee).
• Start up costs were higher than anticipated.
• In spite of the increased start up costs, over the life of the course, a profit will be made.
• A substantially higher profit will be made over the entire program of five courses. Therefore, on-line courses can be cost effective, especially when marketed internationally.
• Annual break-even enrollment for this course, based on projected costs, revenues, and student enrollment over four years is 44 students.
• Students thought the course was worth the money it cost them to take it.
• The costing methodology developed provided an accurate means of measuring the full direct costs of on-line 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 18.

Table 18 Student Response to Access and Flexibility of the Educational Studies
565f Course

Statement	Response Distributions					Number of Students Responding	Mean	Standard Deviation
	SD				SA			
Unable to complete the course without on-line delivery	6	1	1	2	9	19	3.37	1.83
Flexibility	0	0	1	8	11	20	4.50	0.61

As indicated by the response to the first question, students were ambivalent as to whether the on-line format of the course increased their access to this type of course. They did however, indicate the on-line format gave them greater flexibility in their studies.

Several important issues relating to access and flexibility came out of the student, instructor and course developer interviews. Access to international experts and students, accessing from a distance, flexibility, and technological limitations are discussed below.

Access to International Experts and Students. One of the important benefits of on-line learning and particularly with regards to this course is student access to international experts in the field and to students from all around the globe. For this course, UBC met three different target groups:

1. students from ITESM,

2. UBC graduate students, and

3. certificate and audit students from around the world,

thereby reaching a much larger market than most print-based distance courses and certainly reached a much wider market than is possible for a face-to-face course. Students registered in the course came from 17 different countries such as China, Japan, Norway, Serbia, USA, and Australia.

> *We would not be able to have the makeup of the students that we presently*
> *have if we did it in any other way. Right now, we've got 70 students on*

the UBC side and 200 odd on the Mexican side and at various levels they're collaborating. I mean we have students in Australia, South Africa, Europe, Canada and North America. We wouldn't have anywhere near that, we'd have half a dozen local students - UBC local. They might be from other provinces and so on but they would only be UBC registered students if we didn't do it on-line. I don't even think we would attract the number of students we've attracted even by correspondence or some other forms of distance. So I think on-line has really opened up the possibilities for students to get involved with a program that they would normally not get involved with. (Course tutor 3)

Accessing from a Distance. Another benefit of on-line learning is simply that it can be done off campus. This has been beneficial to both course instructors and students. Instructors were able to work from home or while traveling. International students were able to take and benefit from this course - a course that was not available locally.

I had absolutely no problems accessing the course from home, although I had only a 486 33 clunker at home. Bottom line was, I was quite able to work from home. (Course tutor 3)

This is almost like an extra curricular activity for me. I do it outside my normal working hours and that means usually accessing from home. But as it is a local phone call, it's not been a problem going from home. It's only when you're calling long distance it's a problem and I think we've solved that problem now. The way we solved it was by getting me a CompuServe account and getting one for the tutors so that wherever they go they can dial in on a local number and get Internet access to CompuServe and then from there into our own server. That's a much more reliable way than using long distance phone calling to our own server. (Course tutor 1)

This technology enabled me to learn and to get information. Otherwise, it would have been almost impossible for me to do it. I can't travel and stay on campus for so long. In other words, I would have never been able to learn what I had learned without this technology. (International student A)

Without this delivery method I would be unable to take this course. The technology reduces/eliminates the barrier of distance. This will have a great impact (positive) on my career and my options for employment. (Student 16)

Flexibility. A third benefit of on-line learning is increased flexibility. Tutoring an on-line course required and allowed flexibility in one's work schedule:

> *Fitting this course into my day meant restructuring some things, it meant not booking two or three meetings every single day. It meant maybe having one to two meetings a day but always making sure that at least one day a week I didn't have any meetings so I could catch up on things. It was simply re-arranging what I was doing. Now in that rearrangement, when I had a deadline to meet in my project management life or a deadline to meet in my tutoring life then something got put aside until I had that done.* (Course tutor 3)

> *I never had to set aside three hours to teach a class. I could always spend a half hour here or there.* (Course tutor 2)

Students were also able to study around their daily activities and obligations.

> *Since I am employed and 35 with two children and have a lot of other obligations, I prefer studying this way. The most important point for me in all this is the opportunity to organize myself and work in the time when I am ready and free.* (International student A)

> *The WWW delivery allowed me to work mostly at night and on the weekends. In that it has helped. Otherwise, it was not much different from how courses are conducted in university I guess. (Although the mix of students was an interesting asset, it also proved problematic as my second paper, which I was supposed to do with another student, did not come through because the other student could not access her e-mail/www on her many travels).* (International student C)

> *Studying and working when time is available is the most important benefit. It is difficult to balance work, family and study because my job requires travel.* (Student 17)

At least one of the students however, still thought the course was too structured. They were not able to participate in the on-line discussions at their convenience. The discussion questions were structured in one week blocks where students had approximately one week to converse about a particular discussion thread.

> *Although [the course was] in principle flexible, time constraints limited my possibilities to participate fully in on-line discussions (i.e. the*

windows set for discussion of certain topics/questions on-line did not always go with my time availability). (Student 12)

Technological Limitations. Although on-line courses can increase access to education in a global sense, this access is only increased for those who have the necessary technology (computer, internet, etc.). Therefore, an on-line environment can limit access to education to those individuals who are unable to obtain the required equipment. It is therefore, important to have a variety of available delivery methods.

Unless you have suitable Internet access and a suitable computer then these kinds of courses are not accessible. So it does immediately exclude a certain portion of the student population. So that's the major dilemma that we face all the time. If you wait for everybody to have access to this technology, you'll never do anything. You have to find a middle-or a ... some point where you think there's enough who are going to have access that it's worth it. (Course tutor 2)

Another limitation of on-line learning is that it is dependent on technology which can be prone to difficulties. If the technology does not work properly, the learning process is interrupted. The severity of the interruption depends on the specific technical problem that occurred.

[I had] a few technical problems due to computer problems (breakdowns). Without a computer which works, the course comes to a halt. (Student 15)

My own computer is a bit slow, even though it meets minimum course requirements (modem). [I also had a] connection problem with an international student when I was assigned for a collaborative project. (Student 5)

Other technological difficulties involve time and money constraints.

I experienced problems due to the different time zones (Norway-Canada) while I was cooperating with fellow students from Canada. It was sometimes difficult to keep the deadlines! (International student 4)

There were time delays in posting messages to the discussion forums - this interfered with the discussion forums. For example, it took me 15 minutes to post a response to a discussion. When one has limited internet time as a student (5 hours a month) this waiting around eats up valuable time. (Student 9)

The real problem is not related to the delivery method itself. I am connected to the Internet at work, i.e. I do not have access at home. Since I pay for the usage of the Internet (and it is not a small sum of money) I have to use it reasonably. That means that I prepare and study everything at home and access the web site only to check messages, information, etc.. I rarely search the web freely. I usually print the material and study at home or in any spare time I have. (International student A)

In summary, several benefits and limitations of access and flexibility of this on-line course have been mentioned. These are included in table 19:

Table 19 Benefits and Limitations of Access and Flexibility

Benefits	Limitations
• There was access to international experts and students. • Students and instructors could access from a distance. • The on-line format fits a flexible work schedule.	• Timing of the discussion forum was not as flexible as desired. • Access is limited to those with the necessary technology. • Technological problems can interrupt the learning process.

It is important to note that this course was designed for a niche market. Therefore, the students were expected to have the appropriate technology already available to them.

We have identified a fast growing area of expertise for which there is limited but specific demand on an international scale. Our target group, because of the subject matter, is more likely to have access to the technology, be skilled in using the technology, and comfortable in using it for their studies. Because most students are already working in a professional area, they have been able to find the money to cover the full costs of the course. Nevertheless our approach, and in particular our use of technology, will not be appropriate in many other contexts.
                    (Bates and Escamilla de los Santos, 1998, pp. 49-66).

Teaching and Learning Functions

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

Course Content. Students were asked: "Is the course content what you expected it to be?" Response categories were simply a choice between "yes" or "no". In addition, students were asked for specific comments on their expectation of the course content. Of the 19 students that responded to this question, 14 indicated the course content was up to their expectations while 5 said it was not. Of those who were not satisfied, some students thought the course was too simple for a graduate level course.

> *I expected the content to be a little more advanced with respect to the perception on learning: I expected the discussion to be more focused on modalities of learning, and how technologies can facilitate those, than on different delivery methods.* (Student 12)

> *I learned what I expected, but not to the extent I expected. I had expected to be a little more challenged in my search for new ideas in the area of ID. But I must say that my objectives/expectations may also be fairly highly set.* (International student C)

On the questionnaire however, students were asked to respond to the following statement: "The course content is at about the right level of difficulty." Responses were based on a five point Likert type scale (1= strongly disagree, 5 = strongly agree). Table 20 provides the results.

Table 20 <u>Student Response to the Level of Difficulty of the Educational Studies 565f Course</u>

Statement	Response Distributions					Number of Students Responding	Mean	Standard Deviation
	SD				SA			
Course content is the right level of difficulty	0	1	0	13	5	19	4.16	0.67

Of the 19 students that responded, most of the students were quite happy with the level of the course. Therefore, the comments made above are clearly not the opinions of most students taking this course.

Some students indicated they would have liked a more applied focus rather than an academic focus.

[I expected] design training. (Student 6)

[I expected] a less academic and more practitioner related course. The course title is misleading except in academic circles. (Student 19)

It is not concerned with training. It is not concerned with continuing education. It's all credit education. There is overlap, but I think for their own sakes they ought to broaden it because I think they'll attract a bigger market. (Student B)

Students were also 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 21 depicts these results:

Table 21 <u>Student Response to Course Objectives for the Educational Studies 565f Course</u>

Statement	Response Distributions					Number of Students Responding	Mean	Standard Deviation
	SD				SA			
Course objectives are specific and meaningful	0	0	2	12	6	20	4.20	0.62
Course objectives, content, and assessments are consistent	1	4	1	7	6	19	3.68	1.29

The students, therefore, strongly thought the course objectives were useful and felt there was a 'good fit' between the objectives, content and assignments. The course tutors were in turn, quite satisfied with the learning that took place.

I think we moved some students quite considerably from their initial prejudices to a different position which I think is always a test of a good course, if you feel there has been a substantial transformation in a student's view of things. In other cases I think we just reinforced their existing position on some topics but I don't think it would take a lot to shift them anyway. I think we did meet all the objectives we set out to

meet and I think we found a couple extra that we hadn't thought about, particularly collaborative assignments. That was a strategy that worked better than we expected at the beginning. (Course tutor 1)

Course Materials. There were 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 22 provides the results.

Table 22 Student Response to Course Materials for the Educational Studies 565f Course

State-ment	Response Distributions					Number of Students Respond-ing	Mean	Stan-dard Devi-ation
	SD				**SA**			
Course materials are well organized	0	2	2	10	6	20	4.00	0.92
Course materials are relevant	0	0	3	9	8	20	4.25	0.72
	Poor	**Fair**	**Aver-age**	**Good**	**Excell-ent**			
Course material rating	0	1	4	11	4	20	n/a	n/a

Students thought the course materials were both well organized and relevant to their personal and professional needs and generally rated the materials as "good". Although there was some inconsistency in response to which _part_ of the materials needed improvement, of the students that responded, most students were satisfied with the custom reading package while they felt at least one of the textbooks was not as useful as they would have liked. The course tutors responded to this by changing one of the required texts for the next course offering.

What I liked in this course was the availability of reading material. Since the literature about distance education almost does not exist in my town or country, it was essential to get it from someone. The selection of articles related to this course was very helpful. I think it was the result of a well-designed course. (International student A)

Some of the texts are less useful than I had hoped. In one case, I could have done without the text completely. I prefer the custom course material approach for selection of meaningful and useful articles. (Student 5)

Too much reading material. Textbooks did not contribute very much. Perhaps excerpts from the textbooks would be better. On-line resources and articles were helpful. (Student 9)

Course materials [were] excellent. Possibly more evaluation or direction to relevant on-line readings [would be helpful]. (Student 15)

Most articles (print and on-line provided) are interesting and challenging. Books did not completely respond to my expectations. (Student 12)

Materials were good. Great readings, but so many that it got confusing. I often had the feeling that I was supposed to please the course designers, not please my own curiosity. (Student 3)

Hard cover books with a clear structure of content would be better than loose pages/copies of pages. (Student 4)

Discussion Groups. On the questionnaire, students were asked to respond to the following statements using a five point Likert type scale (1 = strongly disagree, 5 = strongly agree): 1. "The discussions helped me to understand the course content." and 2. "I was not satisfied with the way the discussion groups are organized." Table 23 provides the results of these items:

Table 23 <u>Student Response to the Discussion Groups for the Educational Studies</u>
<u>565f Course</u>

Statement	Response Distributions					Number of Students Respond- ing	Mean	Stand- ard Devi- ation
	SD				SA			
Discussions helped my understanding of the course content	2	3	4	10	1	20	3.25	1.12
I'm not satisfied with the organization of the discussion groups	0	3	6	5	6	20	3.70	1.09

Students were neutral as to whether or not the discussions helped them understand the course content and were not satisfied with the organization of the discussion groups.

Students were asked to give specific reasons of why they liked or did not like the discussion groups. One of the main complaints was the size of the discussion groups:

A problem was the size of the discussion groups. Initially there were forty something people in the discussion group which is so absurd and then the group expanded to more than eighty when the Mexican students joined us for some discussions. Not only did the Mexican students add to the number of postings we had to read, but they posted even longer essays than the Canadian students and quoted extensively from the literature we all had read. In retrospect I realize they probably did this because they were not confident writing in English and quoting extensively enabled them to give a well-written answer. They were excellent students and their answers were good, but it was exhausting to read so much material, especially off a computer screen. (Student B)

To large. Smaller groups that stay together longer would have worked better. (Student 1)

> *Small groups [are] needed [as well as] clear guidelines for discussion.*
> *Users should have more responsibility in facilitating these groups.*
> (Student 9)

The tutors recognized this problem and near the end of the course split the one large discussion group into four smaller groups:

> *We didn't get the discussion groups right. We had too many students to*
> *handle all in one large discussion group for each topic. That caused a lot*
> *of student overload actually because everybody posted up their messages.*
> *I think [another] mistake we made, although it's more controversial and*
> *arguable, is giving the students a grade for their contributions to*
> *discussion groups. The positive side was we got everybody contributing,*
> *but the negative was that students were posting comments whether or not*
> *they had already been said by other students [just] so they could mark*
> *their presence.* (Course tutor 1)

Students were also asked to respond to the following questions: "Two discussion formats were used in this course: a) an open format in which everybody could participate and b) a small group format in which students were split into separate discussion groups. The form of discussion group I most prefer is: 1. open, 2. small group, and 3. other." Three students preferred the open format while 11 students preferred the small group format. Five students liked both formats while one student indicated they would prefer the groups to be voluntary. The following comments indicate that the students were happy with the change made to smaller discussion groups :

> *Discussion groups in last half of the course seemed more useful because*
> *smaller, but I found I was unable to stimulate discussion with many*
> *students.* (Student 18)

> *During the latter part of the course the discussions were split up in*
> *manageable groups.* (Student 12)

> *Participation in the discussions was far too much work. Only at the very*
> *end of the course did the discussions improve when the size of the group*
> *and correspondingly the number of postings we had to read was reduced*
> *from between 40 and 80 people down to 20 and the questions were ones we*
> *could answer from our own experience, rather than by summarizing the*
> *literature. For most of the course, the questions demanded at least a 500*
> *word essay. I say demanded, because we were required to participate and*
> *were graded on our discussion postings.* (Student B)

Other problems with the discussion groups that students mentioned include poor moderation, unanswered questions, intimidation, and a language barrier:

No guidance. Need summarizing - closer maintenance. (Student 6)

The discussions were repetitive. [They] needed to be in smaller groups and summarized by the moderators as a means of highlighting and shaping preferred behavior. (Student 11)

Poor moderation. I stopped even following it - too much of very little value! (Student 19)

Many hanging questions were never answered. (Student 16)

Sometimes during the discussions, we do not clarify the content of the material. I think the discussions have to be less open to allow [for] the analysis of the material and feedback from the tutors. (Student 10)

It was intimidating at first but I became very comfortable after the first two weeks. (Student 17)

I had little time to join the groups. I used very much time to translate my messages from Norwegian to English. (International student 4)

Time Demands. Five 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?", and 5. students were asked to respond to the following statement: "This course is not worth the time it takes to complete." This item was rated on a 5 point Likert type scale, 1 = strongly disagree, 5 = strongly agree. Table 24 provides the results:

Table 24 Time Demands of the Educational Studies 565f 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 3-20 hrs)	n/a	n/a	n/a	n/a	n/a	20	10.05	5.23
The course took more/less time than a traditional course	8	1	5	0	0	14	n/a	n/a
The course took more/less time than expected	10	3	6	0	0	19	n/a	n/a
Amount of time spent traveling (5 hrs, 20 hrs, 24 hrs)	n/a	n/a	n/a	n/a	n/a	3	16.33	10.02
	SD				SA			
The course is not worth the time spent	10	4	2	3	1	20	2.05	1.32

Time spent working on the course ranged from 3 - 20 hours per week, the average being approximately 10 hours per week. The course was designed for a workload of 12 -15 hours/week. Therefore, of the students who responded to the questionnaire, most fell within this range. Of the 14 students that responded, 8 said this course took more time than a traditional face-to-face course, 1 said it took less time, and 5 said it took about the same amount of time as a face-to-face class. Of the 19 students that responded, 10 students said they spent more time than they expected, 6 said they spent the same amount of time as they expected, while 3 spent less time than they expected. It is important to note that students were informed of the time requirements in the introduction (block 1) to the course. It is interesting to note therefore, that while most students actually spent as much time studying as was intended, and that this represented roughly the same amount of time as they would be expected to spend on a face-to-face course, a substantial number (8 of 14 who responded) said the course took more time than a conventional course and over half who responded said the course took more time than anticipated, contradicting the time they actually spent. While the actual time spent was similar to that spent in a face-to-face course, it

seemed to take more work. This is possibly due to the sequential and more intense nature of the discussion forums in this course, as can be seen from some of the comments below:

> *[The course took] well over 12 hours a week. This was more than expected (expected 8-12 hours). I did have to cut corners, especially concerning participation in discussions. I did that also because that was the least satisfying part of the course (not so much towards the end of the course when adjustments were made in discussion organization).* (International student C)

> *Reading the postings of so many people was enormously time consuming. One night I read all of the discussions for one of the blocks and it took me five hours. Five hours. I know it took that long because as a consultant I automatically keep track of my time. I've been doing that for years, so I know immediately when things are taking too long. And I just didn't have all this extra time.* (Student B)

A few of the students indicated that they preferred face-to-face interaction over on-line interaction due to the demands that accompany on-line interaction:

> *Asynchronous discussion is tedious beyond belief. In face-to-face classes with a good professor, and good students, which is the case for our department, really good discussions develop. When you and others express yourself, you feel like you have really learned something. In on-line education you have to spend twice as much time or more, on discussion. Not only do you have to be much more careful about carefully wording what you say to avoid giving offense, you have to spend extra time proofing your postings for spelling and grammatical mistakes. Verbal discussions are much less demanding for me although I realize there are people who are too shy to speak in a group and they may find participating in Web discussion better.* (Student B)

> *I'm the kind of person who likes to enter into heavy discussion - intellectual discussions - and that's typically easier face-to-face. I think there would be a constraint on the volume of dialogue. I'm not a good typist so there is a constraint there, whereas I can speak fast and furious. So, that would be my preference but that of course would be mitigated by the fact that then I would have to arrange my schedule around travel to the site, so there is a trade off there.* (Student D)

The tutors responded to students' concerns regarding workload by eliminating one of the assignments as part of the course requirement and by reorganizing the discussion forum. Instead of having one large discussion

forum, students were split into smaller groups. Another suggestion made to the students was to read discussion postings selectively.

> *The irony is that students complain about the volume of work, but they were creating it themselves. What happened is they got seduced into the technology. Quite interesting. Some of the discussions were very intense and students were complaining about how intense it was. Nobody was forcing them to log on and read the comments and they just couldn't leave it there, they had to respond themselves. So, in a sense, you know what was a criticism of the course was very much a success for us.* (Course tutor 1)

> *One of the tutors suggested that maybe I didn't have to read everything. Well listen, you don't know whether it's worth reading until you've read it. And right in the middle of all this junk, would suddenly be some really brilliant line or posting that was worth reading.* (Student B)

Only three students reported traveling, one 5 hours per week, one 20 hours per week, and one 24 hours per week but some may have been on-campus students at UBC commuting. No explanation accompanied these responses. In general, students believed the value of the course outweighed the time demands associated with completing it.

Each of the three tutors had a different experience of the workload associated with teaching this course. One of the tutors felt it was comparable to face-to-face teaching:

> *Looking back at how much time I spent each day my estimate would be that it was roughly the same if you compare the amount of time you would spend in a classroom plus preparation time, marking assignments and so on. The difference is that it's spread out over every day of the week almost and so you're having to be present more consistently for little amounts of time. So when you add it all up, it's probably roughly the same but psychologically it feels like more because you're sort of always checking in and reading e-mail.* (Course tutor 2)

Another tutor didn't fully realize the extent of time put into teaching this course until asked to estimate for the purposes of this study. Finally, the third tutor indicated he/she was 'swamped' with e-mail messages relating to this course. The amount of time spent tutoring was related to the style of tutoring each individual took, with one tutor spending almost twice as much time as the other two.

Assignments. On the questionnaire, students were asked to respond to the following statements based on a Likert type scale (1 = strongly disagree, 5 = strongly agree): 1. "The assignments are relevant to my learning." and 2. "The amount of work the assignments require is more than that for similar courses." Table 25 illustrates the results:

Table 25 Student Response to Assignments for the Educational Studies 565f
          Course

Statement	Response Distributions					Number of Students Respond-ing	Mean	Stand-ard Devi-ation
	SD				**SA**			
The assignments are relevant to my learning	1	2	3	7	6	19	3.79	1.18
The assignments require more work than that for similar courses	0	2	7	5	3	17	3.53	0.94

The students did believe the assignments were useful learning tools but did indicate they were somewhat more work than other assignments they have done for similar courses.

Students were then asked about their preferences with regards to type of assignment: "Three types of assignments are used in this course: a) assignments done individually, b) assignments done in pairs, and c) assignments done in groups. The type of assignment I prefer is: 1. individual assignments, 2. pair assignments, 3. group assignments and 4. other." Of the 20 students who responded, 10 preferred individual assignments, 3 preferred pair assignments, 2 preferred group assignments, 1 preferred a combination of individual and group assignments, and 4 preferred a combination of all three types of assignments. Similarly, students were asked: "The type of assignment I least prefer is: 1. individual assignments, 2. pair assignments, 3. group assignments, and 4. other." Of the 17 students who responded, 2 least preferred individual assignments, 1 least preferred pair assignments, 12 least preferred group assignments, 1 least preferred both pair and group assignments, and 1 said "it depends". See Table 26.

Table 26 <u>Student Response to Preferred and Least Preferred Type of Assignment</u>

Statement	Response Distributions							Number of Students Responding
	Indiv-idual	Pair	Group	I&G	All 3	P&G	It depends	
Preferred type of assignment	10	3	2	1	4	n/a	n/a	20
Least preferred type of assignment	2	1	12	n/a	n/a	1	1	17

Overall, students seemed to prefer individual assignments and least prefer group assignments.

One of the complaints about the collaborative assignments made by the students is that there was some difficulty in finding partners to work with. Some students like choosing their own groups as long as there is some place in the course site to facilitate this process while others would prefer that the tutors form the groups for them. During the course, for the first collaborative assignment the course tutors did choose the groups for the students. They however, mixed graduate students with certificate and audit students. This caused some difficulty as the level of motivation to work on these assignments varied between the types of students. For the second collaborative assignment the tutors let the students choose their own groups but did not set up a means of making this task time efficient and easy.

> *Another odd thing about this course is they mixed non-credit students with credit students with audit students. Now to pass that course was a hell of a lot less work than getting 85%. And as you well know if you want fellowships you better have your marks in the high eighties at least. So that was fairly irksome.* (Student B)

> *The whole idea of this according to those proponents of Web education is that we're all supposed to be developing teamwork skills for the techno-workplace that they're preparing us for. Well, I work in teams. When we work in teams, we know what the subject is, we know who the team members are. We know who's in charge. All those things are determined for us. In this, people are wandering the Web going "Excuse me but I'm doing a project and would you like to work with me? Oh, sorry I already have somebody". I felt sorry for some of these people. It took them a long time sometimes to find partners. Then they have to negotiate what subject*

they're going to do it on. Then they have to negotiate who's going to do what. And then on top of it all, the poor sod who is a native English speaker is going to have to edit the words of the other students whose English in some cases is pretty bad. I like the idea of collaborating but I would rather have everybody post the topic they're working on and those people who are interested in helping each other, work on their own topic. (Student B)

I think it is interesting to work in a group, but I prefer a tutor to form a group rather than choosing myself. I do not have time to read all the learners' biographies and find someone I like. (International student A)

Through all the bumps, trial and error, the tutors still felt the students gained from the collaborative experience:

I think a lot of students came a long way in moving from being nervous about collaborative learning to being very enthusiastic about it, particularly our grad students. We had one or two students who refused to co-operate but generally I would say that 75% of the students were in a very successful collaborative learning group where they did a joint assignment. (Course tutor 1)

In terms of grading, students were asked to respond to two statements 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 27.

Table 27 Student Response to Course Grading

Item	Response Distribution					Number of Students Respond-ing	Mean	Standard Devi-ation
	SD				SA			
Grading criteria are clear	2	2	4	7	5	20	3.55	1.28
Marking is fair	0	1	3	8	6	18	4.06	0.87

In both cases, students indicate the grading and grading criteria was appropriate.

Teaching Method. Students were asked a series of questions about teaching method specifically related to the course content. Students were asked to respond to the following statement: "In this course we attempted to model three teaching styles: a) didactic, b) cognitivist, and c) constructivist. Indicate the extent to which you think each of these styles was successfully modeled (regardless of your opinion of the teaching style): 1. didactic, 2. cognitivist, and 3. constructivist". Response categories included: "very well", "adequately", and "poorly". Table 28 outlines the results:

Table 28 Student Response to the Modeling of Three Teaching Styles

Teaching Style	Response Distribution			Number of Students Responding
	Very Well	Adequate	Poor	
Didactic	4	14	1	19
Cognitivist	7	9	3	19
Constructivist	8	6	5	19

For the didactic teaching style, of the 19 students who responded, 4 indicated it was modeled very well, 14 said it was modeled adequately, while 1 student indicated it was modeled poorly. For the cognitivist teaching style, of the 19 students who responded, 7 thought the style was modeled very well, 9 thought it was modeled adequately, and 3 thought it was modeled poorly. Finally, for the constructivist teaching style, of the 19 students who responded, 8 thought it was modeled very well, 6 thought it was modeled adequately, while 5 thought it was modeled poorly. Overall, the students reported that the three teaching styles were modeled somewhere between adequately to very well. Students were also encouraged to give specific reasons for their response. Not many of the students gave specific reasons. Of those that did, the following are comments related to the modeling of each of the three teaching styles:

1. Didactic:

The system approach section was initially confusing. (Student 5)

[It was] teacher/content centered and controlled. (Student 7)

The sequence was consistent, the information presentation also. (Student 10)

2. Cognitivist

> *[We] were challenged to develop [our] own argument.* (Student 12)

> *[The tutors] take in consideration the students profile to make it possible.*
> (Student 10)

> *[We were] forced to use an analysis framework.* (Student 7)

3. Constructivist

> *I do not think the constructivist approach was modeled very well. I did
> not see the discussion threads incorporating challenging and new ideas.
> Readings also did not provide clear examples.* (Student 9)

> *I found it difficult to approach the course from my own specific interest.
> Only the last block really allowed me to dive into it.* (Student 12)

> *Our own conceptual schemes of the material were perhaps tolerated,
> sometimes acknowledged, rarely solicited, and never encouraged.*
> (Student 3)

> *[There was] not enough time or proper resources (e.g., only used text-
> based exchange of information).* (Student 7)

> *I think we walked toward a constructivist approach during the course.*
> (Student 10)

Students were also asked, "How can we improve our modeling of these teaching
styles?" The following are some of the student responses to this question:

> *Redesign activities to take advantage of the on-line medium. Summit
> statements and the assignments that elicit them are a waste of time.*
> (Student 1)

> *Keep to small group discussions and have tutors challenge students more
> often. Have discussion forums be about specific topics or questions.*
> (Student 9)

> *[Allow] students to take more responsibility for discussions. Encourage
> collaboration at the start.* (Student 6)

Use the [model] that best fits the students and the content. Then allow a lot of time for it to grow and develop naturally. (Student 7)

Humanize the [web] pages. (Student 10)

I'm not sure if modeling different styles is necessary when so much else is focused on. Perhaps [this is] a bit of overkill especially as all (?) students are education majors. (Student 11)

Provide more concrete examples through the periodical readings. (Student 17)

Students were asked to respond to several statements about the teaching method used for this course. Responses were based on a five point Likert type scale (1 = strongly disagree, 5= strongly agree). The first statement was: "The team teaching approach (3 instructors/tutors) was effective for my learning." The second statement was as follows: "I prefer to have only one instructor/tutor." The third statement was: "The guest tutors were a useful part of the course." Table 29 depicts the results.

Table 29 <u>Student Response to Teaching Method</u>

Item	Response Distribution					Number of Students Respond-ing	Mean	Stan-dard Devi-ation
	SD				SA			
Team teaching was effective to my learning	0	4	6	7	3	20	3.45	1.00
I prefer only one instructor	3	8	5	1	3	20	2.65	1.27
Guest tutors were useful	4	3	4	7	2	20	3.00	1.34

There was a small positive response to the team teaching approach. Students responded negatively to the idea of having only one instructor for the course. In addition, students were neutral about the usefulness of the guest tutors.

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 30 depicts these results.

Table 30 <u>Student Response to Course Feedback</u>

Item	Response Distribution					Number of Students Respond-ing	Mean	Stan-dard Devi-ation
	SD				SA			
Instructor feedback is useful	2	1	5	7	5	20	3.60	1.23
Feedback is individualized	1	1	3	13	2	20	3.70	0.92
Feedback is not timely	4	10	3	2	1	20	2.30	1.08

These responses indicate that the students felt slightly positive about the usefulness and individuality of the feedback provided. The students thought the feedback was timely.

One of the students felt the other students in the course were the best sources of instruction:

> *My best teachers were fellow students who know less of the subject matter than I did. They managed to point out to me exactly where my poor points of understanding were.* (International student C)

The tutors felt the teaching was more individualized than that possible in a face-to-face class:

> *I am probably more conscientious about students who are not contributing to discussions than I would be in a face-to-face class. So I do occasionally send e-mails to individual students, not criticizing them for not participating, but giving them a role to play in the discussion. So I might say, "Could you with your experience come in and add some comments to this discussion?" So that's one thing I do that's very different than in a face-to-face class.* (Course tutor 1)

The tutors also indicated that teaching on-line was different than in a face-to-face class in that their primary role is that of facilitator rather than purveyor of information. This is because the course material is prepared ahead of time.

> *I'm actually probably more prepared when I walk into a face-to-face classroom.. I guess because I have to walk into a structured period of time and work with the students, not only [on] what they want to see as an end result of the course, but also things I feel they must have in order to*

properly move on to the next course. On-line, all that is done in advance. My time is then spent talking to the students through e-mail, answering their questions on-line. [It's] more of a facilitation/monitoring kind of role. (Course tutor 3)

The instruction becomes much more a matter of trying to encourage interaction in the discussion groups and dealing individually with student questions and issues and not actual presentation of the material. (Course tutor 2)

     Delivery Method. Students were asked to comment on three statements about how the delivery method (on-line) 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 31 provides these results:

Table 31 <u>Student Response to the Delivery Method's Effect on Learning Experience</u>

Item	Response Distribution					Number of Students Respond-ing	Mean	Stan-dard Devi-ation
	SD				SA			
The technology helped me learn with greater understanding	1	1	11	3	3	19	3.32	1.00
The technology helps me learn more relevant information	0	5	4	8	2	19	3.34	1.01
I learn better using print materials than by working on a computer	1	6	8	2	2	19	2.90	1.05

These statements indicate that students think the technology moderately improved their learning experience. This may have been due to the way this particular course used the web:

> *It probably depends on age and other characteristics but I think many students still prefer to have print versions of materials rather than doing a lot of reading off screen. So we tended to use the Web as more like a study guide and a course guide.* (Course tutor 1)

Also, the UBC graduate students had relatively good access to face-to-face instruction. In other words, these students were not dependent on distance learning as their way to get an education.

> *If I were somewhere else, and this was the only way I could learn, I think that it is better than the correspondence program that I took in the sense that there is an opportunity to interact with the other students and with the teachers.* (Student B)

There is the opportunity to improve writing and self management skills in addition to what is learned through the course content.

> *I think that with the right course load [on-line learning] certainly does improve ones' writing skills. It probably would develop somebody's self management skills.* (Student B)

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 32 (over) depicts these results:

Table 32 <u>Student Response Regarding Motivation/Personal Responsibility</u>

Item	Response Distribution					Number of Students Respond-ing	Mean	Stan-dard Devi-ation
	SD				**SA**			
The technology increases my motivation to work on this course	1	3	4	6	6	20	3.65	1.23
The course requires more personal responsibility than a face-to-face course	2	5	3	4	6	20	3.35	1.42

Responses indicate that students felt the technology motivated them moderately and felt this type of course required moderately more personal responsibility.

Another issue discovered during student interviews was to do with the permanency of the postings in on-line courses:

> *I found on-line discussion very demanding. I'm a professional writer. I don't put my words out publicly in a permanent form without thinking long and hard about them. The permanence of Web postings was another feature I particularly disliked. In a face-to-face class, when you say something stupid it hangs around for a few embarrassing moments and then it's gone. In a Web course, it's there for the duration of the course and then who knows what happens to it after that. Also who has ownership of the words we create? Surveillance is another issue. If postings remain on view to the end of the course, and even worse are archived for months or years, the chances of someone monitoring the postings are much greater. If students realized this, I think many would be much less willing to discuss controversial and sensitive issues. In a f2f class, the likelihood of discussion being monitored is far, far lower. I don't think my fears are just 1960's paranoia. With postings computerized, I would think that scanning them for certain words and phrases would be very, very easy.* (Student B)

Several benefits and limitations related to teaching and learning functions have been discussed. Table 33 (over) provides a summary of the benefits and limitations.

Table 33 Benefits and Limitations of Teaching and Learning Functions

Benefits	Limitations
• Course tutors were very satisfied with the learning that took place. • Course materials were rated 'good'. • Assignments were useful learning tools. • Collaborative assignments were possible allowing students to share ideas globally. • Feedback was useful and timely. • Tutors felt the teaching was more individualized than that possible in a face-to-face course. • There was the opportunity to improve writing and self management skills in addition to learning the course material.	• Some students would have liked a more applied focus to the course. • One textbook was not as useful as expected. • Initially organization of the discussions groups was lacking - it was too large. • Discussion groups needed more moderation and summarization. • Although time demands fell within the suggested range, many students thought the course was too much work. • Discussion on-line takes more time than face-to-face and was found to be less preferable. • Students didn't find the guest tutors useful. • There was some negativity towards the permanency of on-line postings.

Interaction and User Friendliness

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

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 34 provides these results:

Table 34 <u>Response to Interaction in the Educational Studies 565f Course</u>

Statement	Response Distribution					Number of Students Respond-ing	Mean	Stan-dard Devi-ation
	SD				**SA**			
Adequate amount of interaction with instructors	0	5	3	7	2	17	3.35	1.06
Adequate amount of interaction with students	0	4	3	8	5	20	3.70	1.08
Instructor interaction relevant	0	0	4	9	7	20	4.15	0.75
Student interaction relevant	0	1	3	9	7	20	4.1	0.85

The students were neutral as to whether they thought there was enough interaction with the instructors and were slightly positive about the amount of interaction available with other students. They did however think the interaction with both instructors and students was relevant to their learning experience.

The interviews give a clearer picture of the benefits and limitations of on-line interaction. One of the benefits is that it allows students to interact freely with both the instructor and other students:

The web allows for communications to facilitate interaction among students. Normally when I was a distance education tutor, [the students] would never talk to each other. They would always phone and talk to me. This way, at least they can talk to each other and share ideas and things like that. That's the fundamental advantage of this kind of communication, in that it allows interaction among students, among teachers and students so it facilitates communication. (Internet specialist)

In addition, there is the potential to have a lot more interaction in this medium:

The amount of interaction that is possible between students and between the students and the instructor - I think there is a potential there for a lot more doing it on-line. (Course tutor 2)

Furthermore, on-line interaction allows the instructor and students to get to know each other on an individual basis:

> *I think I like the on-line environment because it's less demanding in terms of concentrated time in some sense it's less intimidating. You know, you're not facing 30 or 50 students at once. I think it gives you a chance to connect a bit more with individual students than you would in a face-to-face situation with a large group.* (Course tutor 2)

> *I certainly felt I got to know the students pretty well. Not all the students obviously, but certainly most of the UBC students quite well. I could tell you who were the constructivists and who were the behaviorists and so on amongst the students. If you ask me, I had a pretty good idea of their backgrounds and so on.* (Course tutor 1)

One of the limitations however, is that it is sometimes difficult to know if the students are having problems with the course material:

> *With the face-to-face students you know the ones that are quiet so you can engage them because you're face-to-face with them. You have a sort of sense of when it's appropriate to ask. With the quiet ones on-line you can never tell if they're quiet because they're really afraid or quiet because they're just not interested or quiet because they're too busy but they're still engaged.* (Course tutor 3)

Similarly, there is the potential for miscommunication with e-mail:

> *We as human beings rely an awful lot on face-to-face interaction to be able to tell when someone is happy, sad - you know eager, all those emotions that accompany learning. The bottom line is that we have to work a little harder through the technology to actually send our personalities along the line. It's a matter of people getting used to it and I suspect that there is a couple of generations coming up the line that won't see on-line collaboration any different than face-to-face.* (Course tutor 3)

> *When you write an e-mail, it's hard to convey tone and it could be very easy to come across as being-especially when you are in a position of authority, you can be perceived to be harsher than you really are unless you go out of your way to be kind of conversational and informal. ... I noticed that generally with e-mail you send out an e-mail then you get a response from somebody and then you can tell by their response that they were picking up something else that you hadn't intended. So I think that I did get that from some student responses. I try to be more informal and*

also I am trying to send out more e-mail as a regular update. Saying we're at this part of the course and this is where you should be and just trying more deliberately to get away from a formal style of e-mail. (Course tutor 2)

Now there were a couple of cases where I feel that there was a little bit of an edge in the comments between ourselves and students and between the students and us. I think that could have been more easily handled in a face-to-face situation. Occasionally I think we could have diffused some of the tensions in the course at the beginning, because of the overload, if we'd been in more face-to-face contact with students. On the other hand, of course, it could work the other way. I think there is less likelihood of a personality of the instructor really rubbing the students the wrong way in this kind of environment although we did have one tutor whose comments upset students. (Course tutor 1)

Delivery Method. Students were asked to respond to two statements regarding comfort with the delivery method: 1. " When I began this course, I was worried about the delivery method." and 2. "At this point in the course I am comfortable with the delivery method." Responses were based on a five point Likert type scale (1 = strongly disagree, 5 = strongly agree). Table 35 depicts these results:

Table 35 <u>Comfort with the On-line Delivery Method for Educational Studies 565f</u>

Statement	Response Distribution					Number of Students Respond-ing	Mean	Stan-dard Devi-ation
	SD				**SA**			
Began worried	6	6	1	4	2	19	2.47	1.43
Now comfortable	0	0	1	9	10	20	4.45	0.61

These results indicate that initially students were neither worried nor completely comfortable with the on-line delivery method. After one month into the course (the time when the first batch of questionnaires were completed), the students became very 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. Seventeen of 40 students responded to this

item. The mean was 2.59, sd. 1.23 indicating a rather neutral response to this statement.

Interview data reveled that some students may have benefited from some training prior to the course:

> *Students sort of learned as they went. Basically as I said there was a lot of learning about attachments, how to send attachments, a lot of problems with that. I don't think really that it was a major obstacle for most students, the technology, I think they had problems sometimes getting on-line things like that. We kept it very simple. As long as they could type, and do a few clicks on the screen they could do this course. I am maybe tending to over estimate their abilities. I think one or two of my colleagues think that the students had more problems than that.* (Course tutor 1)

> *There were problems between IBM and MAC computers. My first partner had a MAC and she would send me stuff and the quotation marks all got turned into numbers. So I had to clean it up. She was having to send it to me in e-mails because somehow she couldn't send me attachments. She didn't know how. And there is an assumption on the part of the people who run these courses that we're all highly literate.* (Student B)

Software. Students were asked to respond to three statements about the software used in this course (HyperNews and the web): 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 36 provides the results:

Table 36 Student Response to the Software Used in the Educational Studies 565f Course

Statement	Number of Students Responding	Mean	Standard Deviation
Software - Boring	10	1.50	0.53
Software - Easy	11	4.36	0.51
Not satisfied with the software	11	2.55	1.29

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

Interview data provides insight into some of the limitations of HyperNews. One is the fact that it can be slow to use:

> *Even though I am quite experienced in using electronic and on-line media, I did encounter some problems with the delivery of the course. HyperNews was often cumbersome to use and it was often frustratingly slow.* (Student 1)

> *Because it runs on a series of Pearl scripts, it requires quite a bit of computational power to run it. That takes away from the computational power that is needed to run other elements of the course. When we keep student registration low, like under a 100 students or so it seems to work okay but we noticed in the last course when we started to run more and more and more students, I was told by some students that the server response time was a lot slower. That's the result of HyperNews and the result of HyperNews using Pearl.* (Internet specialist)

Another limitation is that it is not entirely convenient to use. There is some difficulty with the threading of messages:

> *I guess the HyperNews discussion forum isn't the most user friendly although again it's fairly robust and works. It's fairly simple for students and tutors to use but it's harder to control the discussion than some other software like First Class, but it's free and it's Web compatible and so long as you've got somebody like Chris Brougham with a UNIX background to organize it then it's fine. I guess I would still like to be in a position where I didn't have to go through somebody else to do HTML mark up, or I had time to get trained to do it myself. Two of the tutors have learned to do it themselves but I don't have time to do that and it's really still a clunky environment. It's not like a clean word processing environment.* (Course tutor 1)

> *It took students a while to work out that they have to post to the right comment otherwise it doesn't thread, and if they don't, it comes up in the wrong place. One of the big problems is that the students wanted to cut and paste their comments from one discussion topic to another. It doesn't allow end users to do that. Once you've placed it you're stuck. Chris Brougham can get in and change it, but I didn't want them going through Chris all the time. You have to be an expert to do that and that's a real drawback. I find it frustrating that you always have to preview your message before you can post it and you know I have hundreds of comments to make, so it just slows up the whole process. And also sometimes students get confused. You have to refresh or reload to see your comment*

posted up and students got frustrated because they thought they sent a comment and it hadn't gone but in fact it had gone but they couldn't see it because they had to reload and that's very annoying. (Course tutor 1)

There are some problems in the way HyperNews threads messages. Students have complete control over where they put their message, so if they don't do it properly you can end up with a long list of messages that are all related which ideally would all be under one thread. So that's a problem, a constant problem because ... I just dealt with one this morning on the current course where a student had posted a message and it was supposed to be posted to a thread and it wasn't. She put it in a new topic, so I had to go in as an administrator and move that message. If you don't do that then the message ... the discussion gets out of hand ... organizationally gets out of hand because people respond to that message in the wrong place and so all the responses appear in the wrong place. (Course tutor 2)

The technology is so young that things that shouldn't be happening happen. For example, I got an e-mail this morning from a student. Her software just won't allow her to post in the frames that HyperNews requires. Even after two courses, two well, one and a half courses, this woman is still having trouble posting to a discussion group. Now how much of that is her technologically being illiterate and how much of that is time pressure and how much of that is really the technology, I'm not sure. But when it comes right down to it, it really doesn't matter why, it simply is (a problem). (Course tutor 3)

Overall, there weren't any serious problems with the use of HyperNews.

I've never found HyperNews to give me any real trouble. I have never lost any e-mail messages I've sent. When I've needed to move things it's moved properly. I don't expect a lot from it, so therefore I don't get disappointed when I can't do something. (Course tutor 3)

Course Web Site. Issues with the course web site will be divided into the following four sections: general use, navigation, organization, and features.

General Use: Students were asked three questions with regard to their use of the course web site. The first question was: "What do you find to be the biggest problems in using the EDST course web site?" Response categories include: "not being able to determine where I am (i.e., 'lost in hyperspace')", "not being able to return to a page I once visited", "not being able to visualize where I have been and where I can go", "it takes too long to view/download pages", and

"other". Students were encouraged to respond to all the selections that applied to their situation. Table 37 provides the results:

Table 37 <u>Students' Biggest Problems with the Educational Studies 565f Course Web Site</u>

Problem with the Web Site	Number of Students Responding
Not knowing where I am	1
Not being able to return to a previous page	4
Not being able to visualize where I've been/where I can go	4
It takes too long to view/download pages	4

This table shows that generally, students did not have the problems suggested with the course web site.

Navigation: Students were asked to respond to four statements regarding navigation of the web site: 1. "I found it easy to locate and view pages (navigate) within the EDST course web site.", 2. "I often used the navigational controls supplied with my browser (Netscape), such as the Forward and Back buttons, when viewing the EDST course web site.", 3. "I found the navigational controls within the EDST course web site (such as those along the left side of the screen) were easy to understand and use.", and 4. "I found it very easy to always know "where I am" within the EDST course web site." Responses were based on a five point Likert type scale where 1 = strongly disagree and 5 = strongly agree. Table 38 provides the results:

Table 38 Student Response to the Navigation of the Educational Studies 565f
Course Web Site

Statement	Response Distribution					Number of Students Responding	Mean	Stan-dard Devi-ation
	SD				SA			
Easy to locate/view pages	0	1	1	9	9	20	4.30	0.80
Used navigational controls of web browser	0	3	0	10	6	19	4.00	1.00
Easy to understand/use	1	0	1	7	11	20	4.35	0.99
Easy to know "Where I am" within the site	0	2	2	8	8	20	4.10	0.97

These results indicate that the students were satisfied with the navigation and navigational controls associated with this course. Despite this, there have been improvements made in the navigation of the course web site:

> *Well, it was difficult to navigate. It was not always clear where you were. It wasn't easy to get to the most important things quickly. It required a number of clicks before you got to various places and so on. That's been rectified in the second course.* (Course tutor 2)

Organization: Students were asked to respond to two statements regarding the organization of the course web site: 1. "Hyperlinked text items in the EDST course web site have meaningful names, and give me an idea of where I am going." and 2. "The information in the EDST course web pages is organized effectively." Responses were based on a five point Likert type scale where 1 = strongly disagree and 5 = strongly agree. Results are illustrated in Table 39:

Table 39 <u>Student Response to the Organization of the Educational Studies 565f</u>
           <u>Course Web Site</u>

Statement	Response Distribution					Number of Students Responding	Mean	Standard Deviation
	SD				**SA**			
Hyperlinked items are meaningful	0	1	3	10	6	20	4.05	0.83
Information is organized effectively	0	3	3	7	7	20	3.90	1.07

These results indicate that overall, the students found the organization of the course web site satisfactory. A couple of the students indicated in interviews that they would have liked a little more refinement of the web site:

> *The problem with the UBC web site was the structure: important material introduced in the first block (mostly defining important concepts) was not easily accessible throughout the later parts of the course, which caused sometimes for me some loss of overview.* (International student D)

> *Refinements to the on-line learning environment to make its interface more consistent, easy to use and conducive to learning activities is required. This is a design issue for the creativity of teachers, not a systems problem.* (Student 8)

   Features: The following question on the student questionnaire determined which features of the course web site were most and least used: " Please indicate the features you use the most and the least on the EDST course web site by rating the following list of items from 1 to 12 with a 1 indicating the most often used feature and a 12 indicating the least often used feature." Response categories included: "tutor biographies", "announcements/notices (i.e. homepage)", "on-line articles", "links to external sites", "blocks (i.e. content of the course)", "block discussions", "student biographies", "international cafe", "schedule (course and discussion)", "research resources", "guidelines (on-line code of conduct, discussion)", and "extension library". The following table identifies the features of the course web site from most to least used. See table 40:

Table 40 Use of the Educational Studies Course Web Site Features Displayed
from Most to Least Used

Feature	Number of Students Responding	Mean	Standard Deviation
Block discussions	20	2.75	2.53
Content blocks	20	2.75	2.59
Announcements	19	3.32	2.38
On-line articles	19	4.74	1.66
Schedule	20	5.75	2.23
International cafe	19	6.56	3.04
Links to external sites	19	6.74	2.10
Student biographies	19	7.58	1.95
Research resources	19	7.63	1.95
Tutor biographies	19	8.79	2.32
Guidelines	19	10.26	2.54
Extension library	18	11.06	1.73

Therefore, the block discussions and content blocks were the most frequently used features of the course web site while the guidelines and extension library were the least used features.

Students were then asked to: "Please describe what you feel are the best features of the EDST course web site." Some of the student responses are listed below. Best features include:

easy access, (Student 1)

It can be changed mid-course when something isn't working. Also, reliable connectivity is a nice feature, (Student 5)

student-student interaction, (Student 9)

links to learning resources, (Student 15)

up to date materials, (Student 18)

block discussions, clarity of structure, student bibliographies and content blocks, (Student 12)

resource links, (Student 3)

easy navigation, (Student 16) and

access to articles. (Student 17)

Students were then asked to: "Please describe what features in the EDST course web site need the most improvement." The following quotes are a sample of the responses made:

[There needs to be] navigation within the site and the use of a spatial metaphor to ground movement for users. The site is an educational/learning environment and its architecture should reflect that. (Student 1)

Lack of archiving of old messages slows uploading of pages. (Student 5)

[There needs to be] some ability to find ideas or search the discussion postings. (Student 15)

[There needs to be a] discussion thread overview, main objectives of the course and main description of the course content at a more prominent place. (Student 12)

The format for interaction/moderation/etc. - should set up 1 "page" per question and allow free flow of discussion - provide daily weekly summaries by the tutor and then "archive" the discussions. (Student 19)

Finally, students were asked to: "Please list any additional features that you feel should be added to the EDST course web site." Following are the student responses:

[There should be] consistent navigation structures to allow access to the entire site, fixed grouping/archiving of some discussion areas (e.g. International Cafe - organize it on a weekly basis), a chat facility, the ability to not view read messages in the bulletin board, and a more graphical interface with small icons and image maps assisting navigation. (Student 1)

[There should be] more navigational buttons for moving around the course content. (Student 5)

[There should be a] discussion group on the design of EDST 565, hyperlinked student bios, less linear site mapping, and an automated record of what we've already done or read. (Student 3)

The HyperNews icons were very annoying, the template for contributions should reinforce the importance of header information as the means of threading, the graphics (of flags) on the home page overlooked the non Canadians/non ITESM participants, the student info/biographies could have been sorted more helpfully - more information about the class could have been shared (e.g. statistics on age, sex, location, experience, full time vs. part time etc.). (Student 11)

I would like to see ongoing comment from the head instructor which is related to the current work. I felt I did not get the benefit of Tony Bates' experience as I would have in a traditional classroom. This place for the head instructor is where he could combine his own extensive experience with the content. I have seen this done in other on-line courses and it's great. The instructor posts a one page comment at the first of each week which helps focus the students that week. It's similar to how a guest instructor might be brought into the course. I often wondered where Tony Bates was. I presumed he was working with the Mexican group (could be a wrong assumption) - he just didn't seem to be "around". I really enjoyed the comments he posted. Probably because I don't trust purely academic judgments. I value academic viewpoint which has been influenced by practice. (Student 16)

[There should be] more links with the other web sites relevant to the course. (Student 20)

[The course should provide more mediums for expression and communication of ideas: visual and auditory. This course was heavily based on print based communication. (Student 7)

Initially, the course tutors/developers wanted to include more graphics in the course web site to make the course more interesting. This would, however, increase the time it would take students to access the site. Since there was little pedagogical benefit to adding graphics, they decided to keep the course web site simple and relatively quick to access:

We would like to find a better way of getting more graphics and making the site look more lively but that's another cost, you know. The question

is, is it really integral to the course or is it just cosmetics? I think that the discussion groups to some extent provide the motivation for students. So if you add that element in, the graphics become less important as motivators because they have other things. The kind of topics we teach aren't always very visual anyway; they are conceptual rather than visual. I'm sure there are ways to enhance the graphics, to make it easier for students to understand the concept and so on, but again maybe it's the rush in which we got it out, but also our lack of visual thinking amongst the faculty as well. We wanted to keep download speeds very fast.
(Course tutor 1)

We're trying to keep [the speed of access] at a level that will be accessible to all students. If you add all those graphical elements in, it slows down and there isn't a lot ... it's a fairly abstract kind of course. There isn't much in it that requires illustration. Adding graphics would really not improve the instruction or the learning. It might just make it look prettier. I think there is an expectation when you go on the web to see these kind of things. When you see kind of a bare bones web site you get disappointed but once you work with it I think you appreciate it for its speed. (Course tutor 2)

Finally students were asked to respond to the following summative statement regarding the course web site: "Overall, I would say that the EDST course web site is very user friendly." Responses were based on a 5 point Likert type scale where 1 = strongly disagree and 5 = strongly agree. Table 41 illustrates the results:

Table 41 <u>Student Response to the User Friendliness of the Educational Studies 565f Course Web Site</u>

Item	Response Distribution					Number of Students Respond-ing	Mean	Stan-dard Devi-ation
	SD				SA			
The course web site is very user-friendly	0	2	2	11	5	20	3.95	0.89

Overall, students felt the course web site was user friendly.

Several benefits and limitations of interaction and user friendliness have been discussed. Table 42 (over) provides a summary of the benefits and limitations:

Table 42 <u>Benefits and Limitations of Interaction and User Friendliness</u>

Benefits	Limitations
• There is the ability to interact with the instructor and other students. • There is potential for more interaction than in a face-to-face setting. • The course web site was user friendly.	• It is difficult to know if 'quiet' students were having problems. • There is potential for miscommunication over e-mail. • HyperNews was slow to use and not entirely user friendly. • Some features of the web site need improvement.

Organization

Several organizational issues are discussed in this section. These include issues regarding: publicity and research, registration, technological support, bookstore operations, library operations, office support, and partnerships. Information on these issues was obtained through student surveys and interviews and faculty and staff 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 43 indicates the results of this item:

Table 43 <u>Student Response to Support Services Offered for the Educational</u>
<u>Studies 565f Course</u>

Item	Response Distribution					Number of Students Respond-ing	Mean	Stan-dard Devi-ation
	SD				SA			
Support services are unsatisfactory	0	7	7	5	0	19	2.90	0.81

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

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

Publicity and research. An important issue was identified by a few students regarding one of the methods used to publicize these certificate courses. After the completion of the first course in the certificate program (the course analyzed here) a reporter from the UBYSSEY student campus newspaper was given a guest password in order to look at the course web site and write a short article for the newspaper. He was however asked NOT to access the discussion forums, and did not in fact do so.

> *Do you think that ethically we can allow a journalist to participate in the course without telling the students that somebody's observing the course for two weeks? This happened in the second Web course and very few students were aware of it. Shortly after the second course started, veterans from the first course were e-mailed to see if they would consent to being interviewed by a journalist who had been given two weeks access to the course in order to see what it was like. Only those few of us who had taken the first course were even notified that this journalist was reading our postings* **(Note: he was not)** *and this was only after the journalist had been given a password. Although I was very annoyed by this , I said nothing at the time because the journalist had already been given permission to observe and I didn't want to make trouble by making a stink about it. But I thought it was really inappropriate to do such a thing without asking our permission in advance and giving us the chance to veto the idea. Not notifying us about the presence of the journalist was even worse. In a face-to-face class you know who is participating. You can see them. I didn't know whether the President of the University, Martha Piper, was reading our words. I didn't know whether the Dean of Education was doing so. Perhaps people all over the world had been given temporary passes in order to promote the course. Students could give out their passwords as well and who would know. I would actually like to see the course staff and students sign an agreement guaranteeing not to give passwords to outsiders. People could still look over a student's shoulder while they participate in the course, but if everyone has signed an agreement to bar outsiders, the chances of their being present is much lower.* (Student B)

As is indicated in the quote provided above, not all of the students were notified that there was a reporter observing the site (since he accessed it after the

course was over). After one student complained, DE&T brought in a policy that guest passwords would be issued only to members of the course team, course tutors, the Academic Review Committee (in order for them to evaluate the course as having an appropriate standard for a Master's level course) and a technician who needed to check that the computers in the Education lab could access the course.

Requests to access the discussion forums for research purposes are denied, unless the request has been approved by UBC's Research Ethics Committee, and students in the discussion forum(s) being researched agree to the research in advance. (In fact the researcher for this study, a staff member in UBC's DE&T department, accessed only the course content web pages and did not access any of the student discussions).

However this does present a major problem for promoting, researching and evaluating on-line courses, as it needs only one student to object to prevent any research or evaluation on student interaction or on-line discussions. One strategy being adopted by DE&T is to develop public demonstration pages for each on-line course, including examples of discussions, with prior permission of the participants, and all identifiers of the participants stripped out from the demonstration site. The research and evaluation issue is more complex, and could be solved by developing software that could blank out, or better still, automatically re-code, all participant identifiers, to protect the identity of students.

Registration. Another problem that arose had to do with the registration of UBC graduate and certificate or non-credit students who register in DE&T courses. UBC undergraduate credit students normally register for courses through UBC's automated telephone registration service - Telereg. However, as this was the first graduate level course to be offered as a distance education course at UBC, its Telereg system would not accept registration into this course. (There was a policy decided over ten years ago that graduate students were not to be allowed to take graduate courses at a distance. This policy has since been modified but the computer block on Telereg has not been removed.) Telereg does not register certificate or non-credit students, either.

Therefore, 40 UBC students had to register through the DE&T office. This caused a lot of unanticipated work for the course administrator who was responsible for the registration process. This alone was a full time job during the first few weeks the course was offered. This was reflected in the higher than anticipated administrative costs outlined in the 'cost' section above. Under the circumstances, the course administrator (Heather Francis) did a remarkable job as is indicated by the following student comment:

*Heather Francis who looked after registration was most helpful to deal
with. Her friendly and efficient manner was very important in my
decision to take the course. She gave me a very positive impression of
UBC - made it seem approachable. (Please note - I am not easily
intimidated, but who needs the unnecessary hassles!) I don't want to be
unfair to ***** as he/she is a knowledgeable instructor but my first contact
to ask about this course was an e-mail to *****. His/her response was
rather curt and unfriendly - I was a bit concerned that the course was
going to be a hassle...Attitude in e-mail is very important - it's about
customer service. I know the other students have had the same experience
with ***** - I expect he/she can improve his/her approach. I hope he/she is
willing to as he/she is an asset to the course.* (Student 16)

DE&T has now developed its own fully automated on-line
registration system for later courses, which allows students not only to
register, but also to order materials and pay electronically. (Go to
http://itesm.cstudies.ubc.ca/info/ to see this system).

Technological Support. Students were informed prior to registration that
they were responsible for their own Internet access, computer hardware and
software, and were expected to have basic computer skills (i.e. ability to
send/receive e-mail, send/receive attachments, etc.). Generally, students
managed well with the technology. As was indicated above (of the 20 students
who responded to the questionnaire) all but 3 were proficient at using a
computer. The only major difficulty was with attachments:

*We made the students responsible for their own Internet access. We told
them that we expected them to have the computer skills already to send e-
mail and to do keyboarding and so on, and they would know how to open
up their computer and so on. They would already have Netscape and we
just gave them Netscape 3.1 as a standard. That way we kept the technical
requirements of students pretty simple and the only problems we really
encountered were with e-mail attachments. We did advise students to use
Netscape Mail, so that we were all using the same e-mail system. We had
both PC's and Mac's amongst the tutors so that if one of us got an
attachment that we couldn't open, we forwarded it to one of our colleagues
with a different machine and usually that worked. Attachments were a
pain, particularly when students were sending attachments to one another
on the collaborative assignments. That was a problem for them because
they didn't always have the technical support to open their attachments.*
(Course tutor 1)

One of the students reported satisfaction with the technical support that was provided:

> *The technical assistance provided by Chris Brougham was very good - timely and right on.* (Student 16)

Another student suggested a study guide be provided for on-line learning:

> *Include a module in the class on study skills for on-line learning.* (Student 6)

Bookstore operations. Another serious organizational issue that surfaced was the UBC bookstore's difficulties in dealing with distance students.

The main problem was in their payment policy. The UBC bookstore requires that they receive payment (and payment must cleared) before materials can be delivered. However, international money orders can sometimes take up to a month to process. In the meantime, the student must wait before he/she can receive the course materials.

Another problem that arose was that the UBC bookstore did not have a system set up for tracking orders that were shipped. They simply sent the materials to the international students once their payments were processed. After leaving UBC, they had no way of knowing what happened to the course materials, including whether or not they were received by the students. In one case, the course materials sat at the customs office for over a month since the student was not notified of their arrival.

In order to solve these problems, the DE&T department at UBC has developed a 'one stop shopping' approach. Students both register and pay for the course as well as the course materials through the DE&T department. DE&T orders the materials from the bookstore and then mails or couriers it directly to the students. (Students can choose which option they want). In this way, the UBC Bookstore still clears copyright for the articles, and the packages sent to international students can be tracked:

> *The main problem was student payment. Students had to register for the course and pay for that, and then they would have to go through the bookstore to get their materials and pay for that, so if you were a student in Serbia imagine the problem of having to get two international money orders two separate times and how long it would take to get your materials delivered that way. The bookstore wasn't set up to handle international*

long distance requests. It's taken us two courses to get that sorted. What we have now is a centralized service so we get one request handled by us and then we get the materials we need from the bookstore and mail it out to the students ourselves. So the bookstore still orders the materials and clears copyright for the printed articles that we use and gets the materials in, but we handle one request from students and one payment from students and do the shipping ourselves. And that's the solution for the future. (Course tutor 1)

Library Operations. The UBC Library receives special funds from the university to support UBC credit distance education students, through a service called the Extension Library. Registered credit students can order (on-line) up to 30 requests per course and the article or book will be mailed to the student, irrespective of location. A problem with the library services at present is that students enrolled as certificate or non-credit students do not receive the same service (unless they pay for a library card - UBC students receive free access).

It is unfortunate that students enrolled in Continuing Studies cannot use the UBC extension library or even regular library services. As a distance learner, I am still able to go to the campus, but I have no privileges for use. (Student 5)

The service from the library and accessing information proved to be difficult. (Student 17)

Consequently, UBC Library is now piloting access to certificate and non-credit students on one of the subsequent courses, to identify the impact on cost and service.

Office Support. DE&T faculty and staff indicated the need for increased secretarial/clerical support to help with the course development and delivery process. There is at this time no secretarial/clerical staff available to provide this support for these courses.

There is a lot of things that I don't have assistance with that I would normally ... or in the past that I would have assistance with ... secretarial things ... you know instead of spending hours standing in front of photocopiers there would be somebody to hand it off to. So those kind of clerical things take up some of the days. (Course tutor 3)

It would have been much easier to develop this course if there were adequate administrative clerical support. We have a pretty small staff and everybody is doing five or six jobs and I think the whole development would have been much more efficient if there had been more division in the

labor so the people would be able to concentrate on what they were really being paid to do. I think I was involved and probably some of the other developers were involved in actually getting some of the materials up on the web which is really not what we should be doing and we don't really have ... we have an Internet specialist but even he is not supposed to be doing that. If there was actually a web publisher who could handle all that and we could just give that person the finished product to get up on the web, that would have made the process a lot more efficient. (Course tutor 2)

DE&T has now re-organized its Web support so that there is now a desk-top Web editor and a Web programmer, to support these courses and other on-line courses currently in development.

Partnerships. As with all partnerships the development of this course and subsequent certificate program has had its good and bad points. As the following quotes suggest, the partnership with ITESM was crucial to the success of the program. The DE&T course team reported that ITESM had been excellent to work with. Although the Faculty of Education had also been in general supportive, there was some conflict due to departmental politics and finance allocations:

We couldn't have done this certificate program without ITESM because they put up half the development money. They've been fantastic partners. They've never interfered, they've always been facilitating rather than obstructive. ….We've had … problems with the Faculty of Education here. We've had a lot of support from the Department of Educational Studies and three individual faculty members and the Head of the Department ….but we have had to jump through all kinds of unnecessary (Faculty) hoops which the Department of Educational Studies had steered us through. Monterrey [ITESM] has been terrific. We've used video conferencing a lot to keep them informed. The only disappointment that I have is that they could have contributed more, I think, on the content side than they did and we are trying to address that in the revision. (Course tutor 1)

One of the political issues is that because there are no Faculty of Education staff involved in actually teaching the course, it's perceived as not their course. I think there are some people in the faculty that think they should but then they don't have anybody there who's really qualified to teach it. (Course tutor 2)

In general, however, the partnerships have been a success. For more discussion of the UBC-ITESM partnership see Bates and Escamilla de los Santos (1997).

In summary, several benefits and limitations related to organization have been described. Table 44 (over) summarizes these findings:

Table 44 <u>Benefits and Limitations of Organization</u>

Benefits	Limitations
• Existing policy is being reviewed while new organizational processes have been developed to accommodate student needs such as a 'one stop shopping' approach for international students. • Partnerships with ITESM and the Faculty of Education at UBC have resulted in the success of this program.	• Student confidentiality is a sensitive issue and places restrictions on marketing and evaluation activities. • UBC's telephone registration system does not allow students to register for distance education credit courses at a graduate level, and an on-line registration system had to be developed for both graduate and non-credit students. • The UBC bookstore did not have a system in place to handle orders from distance students in terms of payment and shipping procedures. • Increased administrative support was required to handle new procedures for international students.

Novelty

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

Novelty of the Delivery Method. On-line courses, especially those that contain an interactive component, are still relatively new to university students. As time goes on, more and more students will have learned in this way but for this offering of this course (September 1997) the on-line delivery mode was still a novelty. It was also the most appropriate way to teach the course content as the course was about "Developing, Designing and Delivering Technology-Based Distributed Learning":

First given the subject matter it was very appealing to students to learn this way. A lot of the students wanted to try an on-line course to see what

it was like, so there was the novelty aspect of it that was very appealing to students. Second, because we were teaching about using technology, it was an appropriate use of the technology, ... students were learning by doing it. (Course tutor 1)

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 45 provides the results of this item:

Table 45 <u>Student Response to Using the On-line Delivery Method</u>

Item	Response Distribution					Number of Students Respond-ing	Mean	Standard Deviation
	SD				SA			
I would not take another course using an on-line delivery method.	13	5	2	0	0	20	1.45	0.69

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

Institutional Renewal. Other important benefits of this course offered in this fairly novel delivery method is the contributions made to institutional renewal. First, this course is part of a brand new program. There were no courses prior to the development of this certificate program in the Faculty of Education available for graduate students interested in the development of technology-based distributed education. This is however, an area of growing demand so the development of these courses was quite important.

Second, the course tutors, which in this case were also the instructional designers, have learned a lot from the development and tutoring of this course. It has helped in their professional development, has provided publication opportunities, and has added interest to at least one instructional developer's job:

*I think we are going to get a lot of papers out of this course, a lot of professional development particularly for **** and **** (two tutors). I think they have learned a huge amount from this and it will really help in*

their professional development. They'll be much more sympathetic when they work with faculty. Their doing these on-line courses will make them much more knowledgeable but also they are going to get published papers out of it as well. So am I and it's been really helpful for the department in terms of providing a model for other subject areas for this kind of course. So the spin offs are huge from this course, not just in the direct benefits but the indirect benefits as well. (Course tutor 1)

The ITESM program is why I got into distance education in the first place ... The project management model puts me in a position where I administer the process as opposed to actually create and teach and it's the creation and the teaching that really fire me up. So sitting down and arguing and discussing and debating how we're going to do this course, ... what book's we're going to use, how we're going to collect the articles and when it's going to get done and who's going to write what sections - those kinds of things excite me. Those are the things that really make what I do fun. So, for the first time ever in the year that I was here, the meetings with the project team and the ITESM group last summer were a rejuvenation for me. (Course tutor 3)

In summary several benefits related to novelty were addressed. These are summarized in table 46:

Table 46 Benefits and Limitations of Novelty

Benefits	Limitations
• The on-line delivery method is a novel way for students to learn. • The on-line delivery method was the most appropriate delivery method for the course content. • This course, which is part of a certificate program, fills a gap in the Faculty of Education course offerings on Distance/Distributed Education. • Development of the certificate program (including this course) provided professional development, publication opportunities, and job interest to course developers.	• With novelty comes the need for more time to learn and make mistakes.

Speed

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

Course Development. One of the potential benefits of developing an on-line course is that it can be developed very quickly compared to other delivery modes such as print based delivery. Due to the partnership with ITESM in developing this course as part of a 5 course certificate program, this aspect was crucial to the success of this partnership as the contract may have been lost to UBC if the course could not have been developed in 10 weeks:

> *A benefit, very important for this course was that we had a ten week turnaround time, from the time we got the contract to the time the first students were enrolled. If we hadn't met that deadline we would have had to wait another year and possibly lost the contract because the client, the Mexican university, in that period of time may either have decided to go to another supplier or may have decided not to go ahead with the idea. So we were able to deliver it while it was still warm, so to speak, and again the technology, partly the target group, because it's a grad course, but also the technology, allowed us to get it up and running very quickly, much more so than with a print based course.* (Course tutor 1)

Even though this course was successfully developed in 10 weeks, this short timeframe for course development is not generally recommended:

> *If I was doing it again I would have wanted more than ten weeks start-up time. It's nice, it's a bit of a macho thing to say, yes, we did it in ten weeks but it wasn't good for the design process and it wasn't good for the students. It was good for the university as a whole but I wouldn't do that, I wouldn't want to do that again.* (Course tutor 1)

> *My issue is that, yes, it's a hoot to create a course in ten weeks. It's not a hoot to do it every single time.* (Course tutor 3)

Another benefit to developing a course on-line is that the course can be developed and revised as the course is in progress allowing student suggestions to be considered. In addition, the development process is quicker and easier because there is very little paper that needs copying and distributing. Each member of the development team is able to access the site and make immediate changes:

I think it may be easier to develop a course on-line, because the material is always ... you can make it always available to the various people who are involved in the development process. So it is a little easier to work as a team ... project team ... when you're doing development on-line versus when you're working on a paper based course. There is a lot of paper that has to be distributed and so on. With ITESM it's just all there, people can look at it and make changes. (Course tutor 2)

We got so confident that what we would do is actually do a first draft and put it up into the course probably a few days early and have our colleagues comment on it and have the changes actually added while the course was on the fly, whereas on a print based course for instance, you normally get all that done beforehand. This allows you (I suppose it's a bad thing) to leave it very late to get everything up, but also it really speeds up the production of the course. (Course tutor 1)

However, because of the ease of updating on-line courses, there is an expectation that these courses should be kept current (more so than a print based course). Therefore, time needs to be set aside for revisions of on-line courses on a regular basis.

Course Materials. Although there were some logistical problems that were not quite worked out by the time the course started, the largest and most serious problem to the students was the delay in receiving the print materials (i.e. textbooks and custom course materials).

One of the problems was the inability to obtain one of the textbooks from the publisher. One publisher took four months to deliver a required text, then was only able to meet half the order.

The other problem was getting these materials to international students. As described above, the UBC bookstore was not set up to deal with international students. Some students had additional delays in receiving their materials because the materials arrived and were held at international customs offices without the students' knowledge. There was no way for DE&T staff to know where the materials were at any given time in the shipping process, to be able to inform the students.

Following are comments on the delay in receiving course materials:

We had to really scramble to get the course out and to be honest we really hadn't gotten all the logistics sorted out by the time the course started, so

students got their materials late. Secondly, the biggest problem we had (it's very ironic) was in the old technology of print. We had a major problem getting the books in time from publishers and in fact, it wasn't until the last part of the course that students got the textbooks, although in both cases they were ordered three months before. They were ordered as soon as we got the contract, ten weeks ahead of starting. (Course tutor 1)

I enrolled the week before the course commenced - my print materials arrived at the end of the second week. I was one week late getting on-line. I think this initial delay was significant in creating a feeling of playing "catch-up", thinking that the rest of the class had an advantage. The workload was consistent so getting behind became a real problem - I dropped back to "audit" the course and didn't ever get on top of the demands. (Student 11)

The only complaint I have is on the delivery of the printed course material. I was late with my payment, but not as late as to receive my material at the beginning of November. (The course lasted until November, 15th.) I had a real hard time working on my assignments. (International student A)

I have had problems obtaining my course material. I had to complete Block 1 - 4 without the materials. I could only use the on-line resources. (Student 4)

I had trouble finding the Collis text but eventually borrowed it from another student. In a true distance course this would have been impossible. (Student 6)

The photocopied material required for the course wasn't ready before the session started, so it was necessary to wait in 45 minute line-ups at the bookstore to purchase the material - not an encouraging start for someone who tried to avoid the rush by purchasing texts a month before. (Student 18)

Once again, as described above, the Distance Education & Technology department at UBC has rectified these problems by becoming a "one stop shopping place" for international students. Payments are made directly to the DE&T department and the materials are mailed or couriered to the students directly by the DE&T department.

In summary, there were several benefits and limitations of speed for this on-line course. These are summarized in table 47:

Table 47 <u>Benefits and Limitations of Speed</u>

Benefits	Limitations
• There is the potential to develop courses very quickly. (This resulted in solidifying a partnership with ITESM). • Revisions can be made while the course is in progress. • Time and money can be saved as there is little need for copying and distributing paper during the development process.	• There is the potential for work to be left to the last minute as a result of knowing changes can be made quickly. • Courses are expected to be up to date. Therefore, time for revisions must be allocated on an ongoing basis. • Problems with the technology of print (textbooks/course materials) caused delays for students as these materials arrived late.

Conclusions

The course studied was innovative in a number of different ways:

1. It was delivered using its own Web design, although it also used a previously developed and publicly available discussion forum software.

2. It was the first graduate level course offered at a distance at UBC.

3. The course served three different target groups: UBC regular, campus-based Masters students; non-credit students requiring assessment or a certificate; and audit students

4. The course was offered internationally, with a total of 120 students from 17 different countries.

5. It was developed within ten weeks.

6. It was developed and delivered in partnership with another university in Mexico.

7. The course will eventually recover all its costs and will probably make a small profit.

8. The course made use of collaborative assignments, with students often from three or more countries working together on-line.

Consequently there were also risks, and there were a number of problems with the course that were specific to the context, rather than to the on-line mode of delivery in general. The course team in fact made a number of changes, often during the course itself, to deal with these problems of innovation:

First offering

1. The discussion forums were re-organized, to break students down into smaller groups.

2. The assessment strategy was changed from a requirement of four to three assignments, to reduce workload.

Second offering

3. The course budget was adjusted to take account of unanticipated costs arising from the first offering, and to spread some of the costs associated with innovation throughout the program as a whole.

4. One textbook was changed.

5. Students were not assessed on their on-line contributions, to prevent students from posting long statements in order to 'grade grub'.

6. Students were allowed and encouraged to find their own partners for collaborative assignments, so that they were not dependent on unmotivated or audit students

7. A number of administrative changes were made to improve the quality of service for international students and to provide a 'one-stop' service to students.

Perhaps the most important finding was the higher than anticipated cost of innovation. The first course offering came out at almost twice the cost originally budgeted. While it has often been stated that there is a steep 'learning curve' for innovative users of on-line teaching, this is the first time we believe that it has been recorded and accurately costed.

Another important finding is that despite the unanticipated costs of innovation, it is possible to develop highly cost-effective, indeed profit making, on-line courses within a niche market, at relatively moderate cost to learners.

However there is also a heavy burden put on the first students of such innovative courses. While some problems might have been avoided by a close study of the existing literature (such as the impact of large numbers of students within the same discussion forum, where contributions count towards assessment) others could not have been anticipated (such as international student payment difficulties.) Only by taking the plunge can such problems be identified.

The importance of putting in place appropriate administrative systems for innovative courses cannot be stressed too highly. This requires highly creative and hard working administrative staff who can find quick and workable solutions, which eventually need to be rolled into the main administrative services. It also requires the course team to be quick on its feet in changing

policies and practices to meet the new and previously unidentified needs of students working in such a new environment. The students on this course are above all to be congratulated on their determination and tenacity. Of the 40 students enrolled with UBC, 28 (70%) completed the course, by reaching the pass grade or beyond, through the submission of three assignments. Of the remaining 12, eight had opted for audit status from the beginning, although four changed to audit status during the course. All the Masters students successfully completed the course.

These courses have raised a number of major policy issues for the university, such as the pricing of graduate courses, the relationship between certificate and graduate courses, the need to provide a different service for lifelong learners compared with on-campus full time-students, etc. These issues will need to be dealt with if such courses are to become more common and sustainable.

Lastly, it is somewhat surprising that the technology itself, while not without problems, was a relatively minor issue compared with those of course administration, student services and instructional design.

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 is now being used as a benchmark within the DE&T unit, and which should be easy to adapt and apply to other telelearning contexts.

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Appendix A

Teams and Committees for UBC's Technology-Based Education Courses
(developed in partnership with ITESM, Monterrey, Mexico)

Core Course Team:

Mark Bullen	DE&T[10] Academic Co-ordinator for the Project
Tony Bates	DE&T Project Manager
Diane Janes	DE&T Course Designer
Edith Kirkpatrick	DE&T Student Services & Administration Manager
Chris Brougham	DE&T Internet Specialist
Heather Francis	DE&T External Relations Coord. (course administrator)
Jo-Anne Naslund or Dana McFarland	Extension Library
Dan Pratt	Faculty of Education
Jose Escamilla	ITESM Project Manager

Associated Course Team:

Beth Hawkes	DE&T Course Development Manager
Peter Moroney	Continuing Studies Certificate Manager
Kevin Moody	Pharmaceutical Sciences Continuing Education
Hilde Colendbraner	Extension Library
Silvia Bartolic-Zlomislic	DE&T Research Associate
Starr Owen	DE&T Research Associate
Mary Wilson	Faculty of Education Graduate Student

Marketing and Registration Team:

Tony Bates	DE&T Project Manager
Edith Kirkpatrick	DE&T Student Services & Admin. Manager (Chair)
Mark Bullen	DE&T Academic Co-ordinator for the Project
Heather Francis	DE&T External Relations Co-ordinator
Peter Moroney	Continuing Studies Certificate Manager
Dan Pratt	Faculty of Education

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[10] Distance Education & Technology

Tutoring Team:

Tony Bates	DE&T Project Manager
Mark Bullen	DE&T Academic Co-ordinator for the Project (Chair)
Diane Janes	DE&T Course Designer
Starr Owen (observer)	DE&T Research Associate
Jose Escamilla	ITESM Project Manager

Certificate Program Advisory Committee:

Tony Bates (or Beth Hawkes)	Distance Education & Technology Division
Peter Moroney	Continuing Studies Certificate Programs (Chair)
Dan Pratt	Educational Studies
Deb Shackleton	Emily Carr (Multimedia Certificate with UBC)

Academic Review Committee (Faculty of Education):

Dan Pratt	Educational Studies
Hans Schuetze	Educational Studies
Tom Sork	Educational Studies
Roger Boshier	Educational Studies

Appendix B

UBC's On-line Code of Conduct

Appropriate Use Guidelines

The University of British Columbia is committed to ensuring a working and learning environment in which all persons treat others with humanity and respect.

The computing and communication facilities and services provided by DE&T are primarily intended for teaching, research, and administrative purposes. Their use are governed by all applicable University policies, including the Human Rights, Sexual Harassment, Patents and Licensing and Student Discipline policies, as well as by all applicable Canadian federal, provincial and local laws and statutes, including the Criminal Code of Canada, the BC Civil Rights Protection Act, and by the BC Human Rights Act. These are supplemented by the appropriate use policies and guidelines established by those networks to which UBC's campus network is interconnected, i.e. the Internet, which includes, for example, Bcnet and CA*net.

The user bears the primary responsibility for the material that he or she chooses to access, send or display. The computer facilities may not be used in any manner which contravenes the above policies, laws or statutes. Those who do not adhere to these guidelines may be subject to suspension of computing privileges.

Abuse of these computing facilities should be reported to the Manager of Internet Information Services, Distance Education and Technology (1-604-822-1699) or by electronic mail.

Use of DE&T's computing services denotes that the applicant has read and understands the guidelines available on-line and also denotes acceptance of the above-stated terms of use.

Responsible Use of Information Technology Facilities and Services

Responsible use of computing and communications facilities and services requires that you:

1. respect the legal protection provided by copyright and license to programs and data,

2. respect the rights of others by complying with all University policies regarding intellectual property,

3. respect the rights of others by complying with all University policies regarding sexual, racial, and other forms of harassment, and by preserving the privacy of personal data to which you have access,

4. respect the privacy of others by not tampering with their files, tapes, passwords, or accounts, or representing others when messaging or conferencing,

5. use only computer IDs or accounts and communication facilities which you are duly authorized to use, and use them for the purposes for which they were intended,

6. respect the integrity of computing systems and data, for example, by not intentionally developing programs or making use of already existing programs that harass other users, or infiltrate a computer or computing system, and/or damage or alter the software components of a computer or computing system, or gain unauthorized access to other facilities accessible via the network,

7. use computing and communications facilities in a manner which is consistent with the ethical principles set forth by the University and with accepted community standards, and

8. respect and adhere to any local, provincial or federal law which may govern use of these computing and communication facilities in Canada. These include, but are not limited to, the Criminal Code of Canada, the BC Civil Rights Protection Act, and the BC Human Rights Act.

Inappropriate Use

Certain activities are considered inappropriate use of computing facilities. These include electronic chain letters, pyramid schemes, mass-mailing of unsolicited e-mail, and "spamming". Spamming refers to the mass posting of a single message to multiple Usenet newsgroups regardless of whether the message is relevant to each group's topic.

Appendix C

Breakdown of EDST 565f (September, 1997) Content Blocks

Block 1

Welcome
What do we want to do in this block?
Who prepared this course?
Why this course?
What is 'distributed learning'?
What do we expect you to be able to do when you have completed this course?
What's in this course?
Course schedule
In what way do we expect you to study this course?
What sources of information will you have?
      Activity 1
      Activity 2
What tutorial help is available?
      Activity 3
What are the discussion groups for?
      Activity 4
      Activity 5
How will you be assessed?
Conclusion to Block 1

Block 2

Overview
Learning Objectives
Readings
Introduction
Epistemological Traditions
      Activity 1
Behaviorism
Cognitivism
Conceptions of Teaching
A Framework for Analyzing:
      Instructional Design
      Development
      Delivery

Student Support
Institutional Context
Summary
Activity 2
Optional Readings

Block 3

Overview
Readings
Introduction
Activity 1
Activity 2
Strengths and Weaknesses
Activity 3
Graded Assignment
References

Block 4

Overview
Theory and Assumptions
Characteristics
Activity 1
Alternatives
Delivery Systems
Institutional Context
Activity 2
Student Support
Assignment
Instructions
Lesson Content

Block 5

Overview
Discussion Groups
Assignment
Growth and Development
Readings
Framework for Analysis
Strengths and Weaknesses
Conclusions

Where now?
References

Block 6

Overview
Assignment
Evaluation
Next Course(s)
Adios

## Appendix D: Technology Background: HyperNews

General Notes on Functions

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

***Descriptions of Functions, Developer, & Pedagogical Foundations**.* HyperNews, a software which supports asynchronous conferencing through the web, was originated by Daniel LaLiberte of the National Computational Science Alliance. In the most common use of the system HyperNews sets up a forum which is rooted in a "base article". The "base article" can be anything for discussion including a document, report, or story. Discussion takes shape through the list of messages or "replies" sent in and which physically follow the base article. Developed within the HTML context, the "base article" and replies form a web page.

Replies may be directed to the base article or they may be replies to another reply. To recognize these distinctions and to reflect them, HyperNews creates a hierarchical structure with the base article considered the 0th level of the hierarchy. The messages which respond directly to the base article form the 1st level; replies to those messages form the 2nd level and so on. The replies are displayed through an indented tree format that shows how they are related.

Figure: 1 Example of HyperNews Hierarchical Structure

When drafting a message in reply or response, HyperNews allows the sender to identify the relationship between this reply and the previous, related message. There are a range of selections replete with icons including: question, note, warning, feedback, idea, more, news, ok, sad, angry. With respect to sending a message, HyperNews reflects its web roots, affording the flexibility of several different formats: Smart Text, Plain Text, HTML, and http URL.

For viewing messages individually, the top of each message contains: the message title, base article's name, the messages to which it responds (when applicable), the posting date, and author. When scanning a set of messages, for the reader's ease, the most recent messages sport a "new" icon.

A "frames" icon allows the user to opt for a three frame display: a "base frame" in the upper left corner, an "outline frame" in the upper right, and "a message frame" filling the bottom half. The base frame displays the base or original message, while the outline frame displays the headers of all related messages. The message frame shows the message which has been selected.

Message information may be displayed through "outline" or "inline" mode. "Outline" uses indentation to represent the tree of messages, displaying which messages are replies to other messages. Only the titles, authors, and dates are presented for each message. Alterations may also be made to determine how "deeply nested" the outline is.

"Inline" mode provides an alternative to using the outline format. The messages are displayed sequentially in "digest form after the message or base article to which they reply. "Digest" form means that all the messages can be vied in one "file". (Paraphrased from, *HyperNews Instructions: Reading Forums and Messages*, p.1, http://hypernews.org/HyperNews/get/hypernews/reading.html.)

Navigation through messages echoes the web format. "Buttons" include: Next message, Previous Message, Out (or Next thread); and More (or Next-in-thread).

Subscribers can receive e-mail whenever a message is posted, relieving the need to constantly check for updates. HyperNews now features a bi-directional e-mail gateway. This means the user receives notice of new messages through e-mail and can also reply through e-mail. E-mail notification is optional. Some may decide not to use this option for fear of cluttering up participants' mailboxes. This option was not used for the Education Studies 565f course.

One of the essential features to this software is that it organizes responses and is capable of reorganization as new ones arrive. In HyperNews documentation, control over reorganization is attributed to the base article's author. Reorganization is suggested in two ways. New base articles can be generated or a "subtree" may be deleted or moved to another base article with a placeholder inserted to refer readers on to any new location. (Paraphrased from, *Collaboration with HyperNews,* p. 3, http://www.hypernews.org/~liberte/hypernews/overview.html.) However, this requires a Webmaster skilled in UNIX programming.

The flexibility associated with HyperNews is being explored on a number of fronts. In addition to the primary use of HyperNews as a threaded conferencing tool, the system has also been used as an annotation server allowing readers to literally add annotations to any supported document. HyperNews also has a forms based interface to manage information and it can be used to set up password controlled access to a Web site. At least one university has indicated a wide variety of uses outlined hereafter in "Ascribed Benefits".

Historical Background. HyperNews is reputedly one of the first ventures in conferencing software of this kind. Based on early documentation, it appears that the author, Daniel LaLiberte, of National Computational Science Alliance, developed HyperNews to meet several challenges which UseNet raised -- particularly to seek out approaches to archiving exchanges. He has expressed the need for enhanced methods of organizing information, retaining it, as well as distributing it. The Internet's variety of indexes suggested to him that "we need multiple indexes because there are multiple valid ways to organize things". (*HyperNews homepage, Evolving Information Systems,* p.1, http://www.hypernews.org./HyperNews/get/hypernews/evolution.html)

The author's aim was to create a system that might be organized over time by the users as they use it. Thus the early documentation is described in terms of structure ó information nodes, with each node being "an HTML text node referencing any number of other nodes *". (Evolving Information Systems,* p.1.)

The earlier adopters of the system as a conferencing forum reflect a broad base of organizations with access to the web. Its users include the International WWW Conference (for on-line Hyperproceedings; the World-Wide Collectors Digest (for live auctions); and the Stock Club (for on-line discussion forums). A list of ongoing forums using HyperNews resembles a search engine index including "entertainment , humanities, science, computers, government, business, education, and culture. Some universities have included information about HyperNews in their web pages geared towards offering professors

teaching/learning tools, as exemplified by California State University as Northridge's virtual course web-site (http://www.vcsun.org).

Ascribed Benefits.

- Unlike UseNet, HyperNews preserves the full context of discussion, allowing users to enter the dialogue at any point in its past as well as its present.
- HyperNews can create a vast number of separate discussion pages, allowing one to sharply focus and delimit a topic with discussion preserved in one easily accessible document.
- It allows messages to be moved from one document to another. If a discussion page becomes too long, a new document can be created with whole message threads or combinations thereof moved to a new page. Discussions can thus be refocused and reorganized. (At least one user has indicated that the time taken to complete these shifts discourages making such shifts frequently.)
- HyperNews can be attached to web documents including scholarly papers, an Internet resource page, or a course assignment, turning them into dialogues. (Paraphrased from, *HyperNews is HyperDiscussion,* http://lrc.csunedu/HperNews/get/~john//hypdis.html.)
- Its flexibility allows multiple uses for interactivity including: forums to discuss on-line weekly assignments, text readings, and documents found on the web; group work; student portfolios; stimulation of thinking prior to class discussion; and interaction with other classes. (Paraphrased from, *Let Me Count the Ways: Or, Some Uses of HyperNews at C.S.U.N.,* p.1 http://www.vcsun.org/~ilene/hnwkshop.html.)

Software & Hardware Requirements[11]

This section will include: server and client requirements.

Server. HyperNews requires a UNIX http server with standard CGI support provided by most UNIX http servers including CERN's httpd, Apache, Netsite, Plexus & NCSA's httpd ó 1.5 or 1.52. According to the author, at present there is no existing port to NT, Windows (3.1 or 95), or MAC. HyperNews also requires Perl 5. The host acts as a mail server which comes as part of most UNIX systems. Knowledge of sendmail configuration is an asset for HyperNews administrators. Sendmail is the most common e-mail server software used on Internet hosts.

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[11] (Excerpted from the HyperNews web-site at:
http://www.hypernews.org/HyperNews/get/hypernews/source.html).

Disk space requirements for the software are less than 1 Mb. As well, each message requires an administrative "overhead" of 2Kb. A typical Linux computer (an almost free version of Unix) with a very modest cost for an Apache server on a 2 Gb disk drive would provide considerable room for HyperNews. For the certificate in distributed learning course, UBC uses a Sun SPARC computer system, a high-speed, high-reliability UNIX-based Web server that runs the Apache system software. The platform for the distributed learning courses has 64 MB of RAM with a 2 GB internal hard drive and a 1 GB external hard drive.

Client. The author indicates that no changes to web clients are required "since the scripts return standard HTML documents. (*Collaboration with HyperNews,* p.3
http://www.hypernews.org/~liberte/hypernews/overview.html.)

Considerations On Use[12]

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

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

- *Suitability for a variety of presentational requirements*. HyperNews has been used for many different subjects both inside and outside the academic setting. Within the academic milieu, History, English, and science courses, among others, have used HyperNews for responses to articles and various other kinds of documentation.

- *Suitability for creating appropriate learning environments*. The software use extends now into instructors being able to create HyperNews pages for a variety of purposes including a discussion page for course topics, private pages for each student to post assignments and afford a place for private discussion, as well as pages for working groups to work collaboratively on a project. Taking full advantage of its web base, HyperNews allows a

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

discussion page to attach to any web document. Apparently HyperNew's use has been extended by various groups for annotating documents, voting, and even "bidding" for auctions.

- *Availability of pedagogical support*. Reflecting its roots in computational science, much of the web reference materials address informational structuring. While not framed in educational terms, references to how groups organize information certainly relates to educational aims. As well, there is a HyperNews "education" forum and several educational references offered at the web-site.

Ease of Use. This section will discuss installation and maintenance, repairs, updating, and renewal.

- *Installation*. The single largest possible impediment lies in what platform can be used to host the server. Currently, it seems there are no versions running on Windows or MAC. In addition, the user who manages HyperNews should have root access on a Unix system, be a web administrator, or have access to a web administrator who will engage in configuration of the http server more than once. A user without root access can run the web server that is hosting HyperNews from their own directory but some features like automatic restart after a reboot would be more difficult to implement. The author notes that if the server allows creation of CGI bin directories or the use of CGI scripts, this may be sufficient. A directory that the server can write in is required, and the author recommends this be created by someone with considerable server expertise in this area. Installation will require expertise in several areas: UNIX administration, sendmail, and web server expertise.

- *Maintenance, Repairs, Updating and Renewal*. The user can operate fairly independently because administration is managed via the web. Repairs should only be necessary after serious hardware failures. One of the features of the server selected as the host should be the provision of regular backups and tested crash recovery procedures.

Accessibility. Access from various locations poses no problem, given HyperNew's web base. Remote administration via the web is also a straight forward matter. Initial configuration requires command line access to the server. This can be accomplished remotely using telnet, although the server console can be used as well.

Security Features. Security constraints are available to the administrators of the forum. As previously described, HyperNews can be used to set up password controlled access. Each of the following functions may be constrained:

becoming a member, reading, creating base articles, adding responses, deleting or moving responses and subscribing. For each function, there are 3 access levels: member access, administrator only access, or no access .

Availability of Technical Support. The software's author offers support in addition to a HyperNews forum giving opportunity for exchange among users. . In addition, the home page invites individuals to freely advertise their support services for installing HyperNews or customizing it for others. Installation instructions are provided at the HyperNews homepage along with documentation on features and "Bugs". A "Bugs" forum and a test site are also available there.

Cost Variations. Concerning costs, currently the software is available for free to be copied, installed and used. Those who wish to set up a forum are invited to set it up on their own server. It may be downloaded from the HyperNews web-site. If searching for server software which is extremely modest in cost, Linux and Apache should be considered.

In summary, HyperNews is most likely to be suitable for teaching contexts where there is a skilled UNIX/Web administrator available to provide regular ongoing support to the teaching. This was the case for this course. UBC's Distance Education & Technology unit offers over 120 courses of which approximately 12 are Web based. The unit has a full time Web program administrator.

Table 48 Response Distribution of Course/Registration Fee (N=16)

Value	Frequency
45	2
65	1
350	1
393	1
565	1
600	2
650	1
670	1
695	2
700	3
1000	1

Table 49 Response Distribution of Travel (N=2)

Value	Frequency
10	1
2000	1

Table 50 Response Distribution of Long Distance Charges (N=3)

Value	Frequency
20	2
50	1

Table 51 Response Distribution of Postage/Courier Fees (N=3)

Value	Frequency
10	1
15	1
150	1

Table 52 Response Distribution of Textbooks (N=17)

Value	Frequency
60	2
100	1
130	1
150	3
200	7
105	1
300	2

Table 53 Response Distribution of Internet/On-line Costs (N=9)

Value	Frequency
30	1
40	2
50	1
60	3
90	1
100	1

Table 54 Response Distribution of Parking (N=2)

Value	Frequency
20	1
500	1