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Investing in On-line Learning: Potenttial Benefits and Limitations

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Abstract: Many universities and colleges have started to invest heavily in on-line teaching. Why are institutions across the world doing this? Is the investment justified? This paper attempts to answer these questions by drawing on results from three Canadian case studies. The studies indicate that on-line learning can open up new markets. The flexibility of on-line learning makes it particularly appropriate for mature, "lifelong" learners. Students appreciate the opportunity to work collaboratively and closely with teachers and colleagues from across the world. Under the right conditions, on-line learning can be cost effective and even profit-making. However, financial management, technical support for faculty, allocation of revenues to those units that take the risk, professionalism, and a team approach to course development and delivery are all critical factors for success.

Résumé: Plusieurs universités et collèges ont commencé à investir considérablement dans l'enseignement en ligne. Pourquoi des institutions autour du monde sont-elles en train de faire ceci? Peut-on justifier un tel investissement? Cet article essaie de répondre à ces questions en recourant aux résultats de trois études de cas canadiennes. Ces études indiquent que l'apprentissage en ligne peut ouvrir de nouveau marchés. Sa flexibilité le rend particulièrement approprié pour les étudiants plus âgés ayant des responsabilités de travail ou de famille. Les étudiants en général apprécient l'occasion de collaborer de près avec des enseignants et des collègues autour du monde. Dans les bonnes conditions, l'apprentissage en ligne peut être rentable et même profitable. Cependant, plusieurs facteurs critiques sont nécessaires pour rencontrer le succès, y compris une bonne gestion fiscale, un appui technique pour le corps enseignant, l'allocation de revenus à ces unités qui prennent un risque, le professionnalisme, et un bon esprit d'équipe dans le développement et l'enseignement des cours.

INTRODUCTION

Many institutions worldwide, but particularly those in North America, Australia, New Zealand, and several European countries, such as the United Kingdom, Norway, Denmark, and the Netherlands, have started to invest heavily in on-line teaching. Sometimes the courses are offered entirely at a distance, targeted mainly at students who cannot access a conventional university or college campus. Others might better be described as distributed learning in that they combine some elements of on-campus teaching with on-line access to materials and discussion forums.

Why are institutions across the world investing so much in on-line learning? Is the investment justified? This paper attempts to answer these questions by examining preliminary findings from a cost-benefit research project conducted at the University of British Columbia (UBC) and federally funded by the Canadian TeleLearning Network of Centres of Excellence (TL-NCE).

There are many rationales for investing in on-line education, ranging from increasing access, to improving the quality of learning, to reducing costs, to preparing students better for a knowledge-based society, to responding to market demand (see, for instance, Dolence & Norris, 1995; Katz & Associates, 1999). To what extent, though, does the reality match the rhetoric?

In this paper, we look at three Canadian case studies, two in British Columbia and one in Ontario. Two of the institutions are universities (UBC and the Ontario Institute for Studies in Education at the University of Toronto [OISE/UT]) and one is a two-year community college (Kwantlen University College in British Columbia). All three institutions are conventional campus-based institutions. However, both UBC and OISE/UT also have a long history of offering distance education programs, primarily in print format. Kwantlen, on the other hand, had no previous experience in distance education prior to this case. In all three cases, distance learners were the primary target group.

PROJECT BACKGROUND

The University of British Columbia's Department of Distance Education & Technology conducted a two-year study entitled "Developing and Applying a Cost-Benefit Model for Assessing TeleLearning" which was federally funded by the Canadian TeleLearning Networks of Centres of Excellence. The methodology used was based on Bates' (1995) ACTIONS model for assessing learning technologies. The ACTIONS model was developed as a set of criteria for selecting and using new tchnologies for teaching by Tony Bates, building on 20 years of research into the use of educational media. Issues around the following topic areas were explored: Access, Costs, Teaching and learning, Interaction and user-friendliness, Organization, Novelty, and Speed. Data were collected primarily through student questionnaires and student, faculty, and staff interviews.

Cost factors investigated included capital and recurrent costs, production and delivery costs, and fixed and variable costs. Capital costs are costs for the purchase of equipment or materials. Recurrent costs are costs that occur on an ongoing basis, for example, the cost of computer support. Production costs are those associated with the development of a course/program, while delivery costs are costs associated with the delivery or "teaching" of course materials. Fixed costs are costs that do not change with output (number of students), while variable costs are those that do. For further explanations, see Rumble (1997).

Benefit and limitation factors assessed included performance-driven benefits, value-driven benefits, and societal or "value-added" benefits. Performance-driven benefits include elements such as student/instructor satisfaction, learning outcomes, and return on investment. Value-driven benefits include increased access, flexibility, and ease of use. Value-added benefits include aspects such as reduced traffic to campus

and the potential for new markets. For further explanations, see Cukier (1997).

The discussion below is based on the results of three of six Canadian case studies involved in the project:

- an on-line master's level course in Educational Studies, "Developing, Designing and Delivering Technology-Based Distributed Learning" (EDST 565f), developed at the University of British Columbia in partnership with the Monterrey Institute of Technology (ITESM) in Mexico. This was the first of five courses to be developed toward a postgraduate certificate in technology-based distributed learning. The first UBC offering of this course was analyzed (Bartolic-Zlomislic & Bates, 1999);
- an on-line master's level course in Education, "Research Methods in Education" (Research Methods), developed at the Ontario Institute for Studies in Education/University of Toronto (OISE/UT). The Research Methods course was part of OISE/UT's Distance Education master's program, the first degree program offered fully on-line at OISE/UT. The session analyzed was the second on-line offering but the first offering using WebCSILE software (Bartolic-Zlomislic & Brett, 1999); and
- an on-line undergraduate course in Creative Writing (CRWR 1100) developed at Kwantlen University College. The CRWR 1100 course was an introductory course in creative writing. A template was developed from this course to create additional on-line creative writing courses at Kwantlen. The first offering of this course was analyzed (Butschler & Bartolic-Zlomislic, 1999).

The remaining three case studies, based on courses at Télé-université, Université du Québec; Simon Fraser University; and Kitimat Community Skills Centre (in British Columbia) will be completed by the end of June 1999. The UBC, OISE, and Kwantlen case studies are posted on-line at URL: http://research.cstudies.ubc.ca. The remaining case studies will be posted at this site by the end of the year.

WHY INVEST IN ON-LINE LEARNING?

The three studies so far analyzed reveal several potential benefits to on-line learning. The main benefits include new markets, economic benefits, international partnerships, reduced time to market, and educational benefits.

NEW MARKETS

There is the potential with on-line learning to tap into markets, both national and international, that cannot be easily accessed with other more traditional forms of course or program delivery. The UBC case study, EDST 565f, for example, tapped into three different target groups: students in Latin America, registered with ITESM, Mexico, for a Masters in Educational Technology; UBC graduate students registered in an otherwise conventional, on-campus Masters of Education program; and certificate and audit students from around the world registered with UBC as "non-credit" students.

UBC thereby was able to reach a much larger market than most of its print-based distance courses and a much wider market than is possible for a face-to-face course. Of the first 40 enrolments with UBC, 10 were UBC masters' students, 18 were certificate students, and 12 were audit students (i.e., they paid full fees but did not intend to take a full certificate program and so did not have to submit assignments). The 30 "non-credit" students (i.e., the certificate and audit students) were from 17 different countries, including China, Japan, Norway, Yugoslavia, the U.S., and Australia. Of these 30 "non-credit" students, 6 already had PhDs and 12 had master's degrees. In addition to the 40 students enrolled with UBC, 80 students registered with ITESM (for more details of this program, see Bates & Escamilla, 1998).

Similarly, OISE/UT had students participating in their course who lived in Europe and the Dominican Republic, as well as several students who lived outside of the city of Toronto where OISE/UT is situated. All were intending to complete a full master's program at a distance.

Kwantlen University College was able to sustain a program that had been struggling for viable numbers in an on-campus version. When offered at a distance, class size increased to 20 students per offering, students surveyed all said that the on-line delivery gave them more flexibility, and many said that they would not have been able to take the course in an on-campus version.

In addition to the potential of admitting students from around the globe, another new market potential is in the development of fully on-line graduate degrees. There are several graduate degrees offered entirely at a distance primarily through print-based methods, such as the British Open University's MBA and its Master's in Distance Education. Several have on-line components, such as Athabasca's MBA, but still depend heavily on print. Queen's University offers an MBA through a mix of local classes and videoconferencing.

As far as we know, there are relatively few graduate degrees offered entirely or even primarily on-line. This is not surprising given that it takes several years to develop a whole master's program, and the Web is still only five or six years old with respect to educational applications. The study findings, however, suggest an increasing need for such degrees. With the growth of a "knowledge society" comes the need for lifelong learning. It is interesting to note the high proportion of students in the UBC non-credit program who already had higher degree qualifications but still felt the need to update their skills.

At the same time, economic pressures make it difficult for individuals to take several years off from work to attend university on a full-time basis. On-line graduate degrees offer the opportunity for students to continue their education while at the same time continue working in their field of business. As one student in the Research Methods course offered at OISE/UT said, "The only recommendation is that I wish that they would do [the on-line format] with more programs. . . . You can't afford not to work, but you also can't afford to give up your position because if you do who knows what's going on behind your back" (OISE/UT student B).

ECONOMIC BENEFITS

One benefit of the UBC postgraduate certificate in technology-based distributed learning program is that over the life of the first course and the entire program of five courses it is expected that all course development and delivery costs will be fully recovered from fees. Table 1 provides a breakdown of the development and delivery costs of the first course offering of EDST 565f.

Table 1: 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[a] 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:[b]					
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 (Continuing Studies)	-9,015	9,971	10,346	1,143	12,445

aDE&T is the Distance Education & Technology unit at UBC.
bRevenues are based on the following student numbers: 1997--11 graduate, 29 certificate; 1998--12 graduate, 48 certificate; 1999--12 graduate, 48 certificate; 2000--8 graduate, 24 certificate.
Note: This table is adapted from Bartolic-Zlomislic & Bates (1999).

A small profit will be made by UBC at the end of the third year. A more substantial profit will be made over the life of the entire program of five courses as start-up costs (which are substantially higher than ongoing/maintenance costs) will have been absorbed in the first course, EDST 565f. This course served as a template for the other four courses; therefore, less time (and money) was required to develop the remaining four courses. The profit serves as a contingency in case unexpected costs arise or projected student numbers are not reached.

Revenues are distributed in the following ways: to the Faculty of Education to cover their costs in accrediting this program; to Continuing Studies to pay for departmental overheads; and to the Distance Education & Technology (DE&T) unit to pay for the cost of course development and delivery (unusually, this course was developed by DE&T staff as the subject experts). Any subsequent profit after all these costs have been repaid is returned to the Associate Vice-President, Continuing Studies, for investment in new Continuing Studies programming.

The UBC-ITESM partnership provided a means for keeping costs down in a market where there is a ceiling on what people are willing to pay. As can be seen in the table, ITESM paid UBC $15,000 for the rights to offer this course in Latin America. UBC retained the rights for the rest of the world. This helped reduce the risk to both partners. The international partnership provided a context in which an on-line program can be cost-effective and where course fees are kept at a reasonable level ("non-credit" students were charged Cdn.$695 per one semester course, equivalent to three graduate credits).

The economic benefits in the other two studies were less clear. Neither the OISE/UT nor the Kwantlen program was run on a cost-recovery basis. Students in the OISE/UT program were charged the regular graduate fee (Cdn. $740) in Ontario and the institution would receive the normal weighted FTE per student, although, as in many other Canadian institutions, this is not necessarily allocated to a course or department on a strict pro-rata basis.

Kwantlen's costs were even more complex since the course was the first on-line as well as the first distance education course that the college had offered. The on-line development of the first offering of the course was out-sourced to another institution, while the second offering was developed in-house. However, as with the other two studies, the second offering incurred substantial start-up costs, which need to be

averaged over several courses.

There are several general points to be made about the economic benefits of telelearning:

- The development of on-line courses requires careful analysis of costs, as their cost structures are different from both face-to-face teaching and print-based distance education.
- Institutions will need to change the way budgets are handled so that they can track accurately the costs of different ways of developing and delivering courses; also, budgets need to be handled in ways that enable revenues generated to flow back to the various units involved in production and delivery.
- While economies of scale are possible from telelearning compared with face-to-face teaching, they are not as great as for print-based courses; on the other hand, the amount and quality of student and teacher interaction is much higher than in print-based courses.
- Finally, on-line courses, under the right circumstances, and especially when developed through partnerships, can fully recover their costs, and can be at least as cost-effective as conventional courses.

INTERNATIONAL PARTNERSHIPS

With the potential for global markets comes the opportunity for international partnerships. Pedagogical benefits due to international partnerships include access to international experts and students. Three international experts in the field of distance and distributed learning were guest tutors for the EDST 565f course. Each tutor moderated and participated in a week-long discussion forum. In this way, students not only learned from the three UBC instructors but also benefited from the expertise of three additional international experts.

Students also benefited from the highly diverse nature of fellow students due to collaborative components in the course (international discussion groups and collaborative assignments). As one of the UBC instructors noted,

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. (UBC course tutor 1)

The partnership with ITESM also enabled UBC to side-step difficult issues regarding admission and accreditation to graduate credit programs. ITESM was responsible for recruiting, assessing, and accrediting Latin American students, although they were using courses developed by UBC. Students from other countries who did not meet the UBC graduate requirements or who did not want to register for a full master's program were admitted by UBC as non-credit students.

Furthermore, the partnership with ITESM also helped overcome potentially difficult language and cultural issues. While the UBC team provided a tutor guide and on-line help, ITESM provided its own on-line tutors for these courses. ITESM students could choose to be in either a Spanish- or English-language discussion forum.

REDUCED TIME TO MARKET

Another benefit of the on-line delivery method is that courses can be developed and revised very quickly or even as the course is in progress. The EDST 565f course, for example, was developed from scratch in less than 10 weeks. Although it is not recommended to develop a course in such a short time, UBC potentially might have lost the contract with ITESM if the course had not been available in the 10 weeks following the contract signing. It would have missed the start of ITESM's academic year, and ITESM might have looked for another partner or gone cold on the idea of a partnership over a longer period.

The Kwantlen case identified three factors that relate to how quickly a course can be developed and revised: the level of infrastructure in place to support on-line courses, the choice of software, and the appropriateness of the course design for an on-line environment. For the first offering of CRWR 1100, Kwantlen had no infrastructure in place to offer on-line courses and had to rely on the infrastructure of another organization (Open Learning Agency of BC) in order to offer the course (and were required to pay a fee). Development of their own infrastructure took several months of time and the development of a new position, a co-ordinator of distributed learning, in order to get all the required elements in place for future course offerings (e.g., systems administration and registration).

The type of software used for on-line courses can also affect how quickly a course can be developed. Kwantlen found, for example, that the time needed to learn how to use a particular software (in this case Lotus Notes) can be substantial. In addition, they had to develop training workshops that were conducted prior to the course in order to help students learn how to use and load the software onto their own computers. Switching to the use of a Web browser such as Netscape alleviated the need for these training sessions. Similarly, OISE/UT found that, compared to Parti software, the use of WebCSILE cut their work time by nearly half.

Finally, simply transferring face-to-face lecture notes onto a computer and posting these on-line does not constitute an effective on-line course. The instructor for the Kwantlen CRWR 1100 course found that much of the course content came from on-line discussions and student writing samples which could be easily shared among the class participants. Some lecture notes were also included as course materials. Feedback changed from individual instructor feedback in face-to-face classes to collaborative feedback from students writing and critiquing assignments on-line.

EDUCATIONAL BENEFITS

A common benefit found in all three of the case studies was that students learned more than just course content. As the main medium of communication in these courses was writing, significant improvements in writing skills were identified. One of the OISE/UT instructors noted: "Over several years now I have observed people contributing what I consider to be higher quality work than what I have seen before. All these courses I have taught before and [the students] write better than they wrote before. . . . I attribute that to the technology" (OISE/UT instructor 1). Students reported that their computer and time-management skills also improved.

Another benefit of the on-line delivery method found in all three studies is that the associated anonymity can result in greater participation from all students, including "shy" ones. The lack of visual cues allowed the instructor to treat all students in the same manner. For example, one of the instructors reported that in a face-to-face class she would not be as critical of students whom she perceived as being sensitive or shy. Since the on-line format did not provide the visual cues from which such perceptions are made, this instructor treated all students in the same way. Instead of being a disadvantage, she found this led to greater participation by all students.

Perhaps the most important benefit from a distance education perspective is that the on-line discussion facility provided a satisfactory form of student interaction for distance learners that has been lacking in print-based distance education courses. In addition, the increasing amount of relevant resources now available through the Web, such as on-line journals and relevant Web sites, provided a rich source of resources for the on-line learners.

LIMITATIONS

Several potential limitations were also found in the three studies, namely, the need for start-up funding, adequate time, organizational preparedness, and student preparedness.

THE NEED FOR START-UP FUNDING

The UBC cost-benefit study revealed that start-up costs were substantially higher than anticipated. In fact, as shown in Table 2, the first offering of the EDST 565f course was 75% over budget! This was largely due to higher-than-anticipated time spent on instructional and administrative tasks.

Table 2: Educational Studies 565f: Researched and Budgeted Costs Source of cost Researched 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 Second 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 **Note:**This table is adapted from Bartolic-Zlomislic & Bates (1999).

The cost for the second and subsequent offerings of the course decreased substantially, as Table 1 in this article indicates. Lower costs in subsequent courses were due largely to improvements made in the way the course was administered and conducted, and better organization of the on-line tutoring. This will be explained further in the "available time" and "organizational preparedness" sections below.

Kwantlen employed several strategies in order to decrease start-up costs for the CRWR 1100 course and to make it feasible to begin work on developing an on-line program, although the necessary infrastructure was not yet in place. In addition to obtaining a provincial grant to be used toward developing on-line programming, staff sought to maximize benefits from existing resources. For example, the Department of Distributed Learning and Employee Development at Kwantlen acquired a server from another Kwantlen department (which needed a more powerful server) to be used for administrative functions. Because the server had sufficient capacity, it was also used for on-line course delivery. In addition, Kwantlen hired a co-op student to help with the conceptual and technical development and delivery of the CRWR 1100 course. Nevertheless, it is clear that a sizable amount of start-up funding must be available in order to successfully develop and deliver on-line courses and programs.

ADEQUATE TIME

All three case studies found that instructing (and learning) in the on-line format appeared to be time consuming, mainly due to the large amount of reading (of the discussion forums) and writing required. Instructional time varied depending on how the on-line discussions were handled. For example, as illustrated by the quotations below, one of the instructors for the Research Methods course answered almost every message in order to be supportive of the student's efforts, while another instructor was selective in the messages he/she chose to respond to in order to save time:

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

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

Another approach used was to allow fellow students to respond to peer questions. This proved problematic as occasionally incorrect information was provided. When this occurred, it took a substantial amount of time for the instructors to reverse the incorrect information and reteach the concept or answer to a question.

At UBC, the student discussion forums were completely reorganized for the second offering of the course. In the first course, all 40 UBC-registered students, many of the ITESM students, and the three UBC tutors participated in one discussion forum. Students were assessed on their contributions to the discussion forums, leading to numerous "statements" being posted in order to get marks. In the second offering of the course, discussion forums were limited to 20 students and one tutor, and there were no marks for participation, but the discussion topics were closely related to the assignments. This considerably eased the reading burden for both tutors and students, without diminishing the value of the discussion forums for the students.

An additional timesaver employed for Kwantlen's Creative Writing course was the development of a set of marking symbols the instructors could use to save time while marking on-line. A marking tool was made up of buttons the instructors could select to indicate, for example, spelling error or punctuation error. In this way instructors could "point and click" rather than write comments within the text.

In all three studies, there was a rapid learning curve for the instructors, in both the design of the courses and in the on-line tutoring. Extra time and training was needed for novice on-line instructors.

Students also perceived interacting on-line to be time consuming:

A weakness is the sheer amount of writing one has to do to get across a thought that you can say in twenty seconds. The fact that you are on-line and it's public, you can't just write anything. It has to be basically grammatically correct and thoughtful. I am not suggesting that a verbal comment wouldn't be thoughtful, but it doesn't sit there in print for the duration of the course. So I think [I took] a lot fewer risks in what I was writing and commenting and to me that inhibited dialogue. (OISE/UT student A)

However, when student estimates of their time spent working on the course were compared to actual course requirements, the estimates generally fell within the desired range of time. For the UBC EDST 565f course, for example, most students actually spent as much time studying as was intended, and this represented roughly the same amount of time they would be expected to spend on a face-to-face course. However, over half the student respondents said the course took more time than a conventional course and over half who responded said the course took more time than anticipated. 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.

ORGANIZATIONAL PREPAREDNESS

Some technological developments have opened new possibilities for organizational chaos, while others have made our lives more complex. - Murgatroyd (1992, p. 57)

With the development of on-line courses and programs comes the need to revise current policies and procedures in order to accommodate the on-line student and the on-line process. The development of UBC's first course toward a postgraduate certificate in technology-based distributed learning posed some challenges to existing operational procedures.

Registration, for example, proved problematic. UBC's automated telephone registration system, Telereg, does not allow graduate students to register for distance courses as part of their graduate program. This was due to a policy established over 10 years ago when graduate-level distance courses did not exist. This policy has since been modified but the computer block on Telereg has not yet been removed. Neither the Registrar nor Continuing Studies had an on-line registration system for non-credit students. Because most of the promotion of the courses was done on-line, the bulk of the registrations were received in the week before and the week after the course started. To alleviate this problem, UBC's Distance Education & Technology (DE&T) unit has now developed its own fully automated on-line registration system which allows graduate and non-credit students to register, order materials, and pay electronically. (This system is located at URL: http://itesm.cstudies.ubc.ca/info.)

Existing UBC Bookstore payment policy also does not accommodate international distance students. The UBC Bookstore requires that it receives payment (which must clear) before it ships materials to students. However, the delay in processing international money orders, which could sometimes take up to a month to process, caused students to wait long periods of time before they received the course materials. This can jeopardize the students' ability to complete the course. In addition, the UBC bookstore does not have a system set up for tracking orders that are shipped. They simply send materials to international students once payment has been processed. Therefore, there was no way of knowing the whereabouts of the course materials after they left UBC, including whether or not the students received them.

The DE&T solution to these difficulties was to develop a "one-stop shopping" approach to course delivery. Students both register and pay for the course and course materials directly through the DE&T unit. DE&T now takes responsibility for ordering the materials from the bookstore in advance of registrations and directly mailing or sending them by courier to the students when ordered. In this way, the packages sent to international students can be tracked, and the overall service is now much faster and more convenient for students.

Existing UBC Library policy also does not accommodate all distance learners. The UBC Extension Library supports UBC credit distance students by allowing registered credit students to order (on-line) up to 30 articles or books per course which are subsequently mailed, irrespective of location. The problem exists with service to certificate or non-credit students. At this time, they do not receive service from the Extension Library unless they pay for a library card (regular UBC students receive free access). Consequently, the UBC Library is now piloting access to certificate and non-credit students, to identify the impact on cost and service.

Kwantlen had to develop orientation sessions in order to help its on-line students install Lotus Notes Client on their home computers, which (at the time of the first offering of CRWR 1100) was required in order for students to be able to take the course. This, of course, would be of no use to students who could not come to campus where the sessions were held, thus negating the potential benefits of access. These sessions were subsequently discontinued when Kwantlen switched to using Netscape as its Internet browser instead of Lotus Notes Client. Netscape required much less instruction to operate.

One of the instructors for the Research Methods course at OISE/UT developed an instructional manual explaining how to use the course software WebCSILE which was posted in the course database in order to help students with their technical problems and reduce their reliance on the technical support staff.

All this lead to a much-higher-than-anticipated amount of time spent on administrative tasks and, consequently, unanticipated costs.

STUDENT PREPAREDNESS

The success of an on-line course or program is impacted by the readiness of the students to embrace this method of delivery. Primarily, students must have the necessary technology available to them (suitable computer and Internet access) before they can benefit from this type of program. In this way, some costs are transferred from the institution to the learner, as the learner must now provide for his or her own learning tools. On-line students also have the additional burden of dealing with technical delays and difficulties that may occur.

In addition, as with other forms of distance and distributed education, students must be self-directed learners. Their participation in and completion of on-line courses is entirely up to them. As one student commented, "You really have to be self-directed. You have to be really time oriented. I am finding with this course that I am spending more time on it than I do on a course that I go to class. But that's on the course time itself, but if I take into account my travel time and everything else . . ." (OISE/UT student B).

The 24-hours-a-day, seven-days-a-week access to the course may also create unrealistic expectations of the course instructor as students may expect their questions to be answered immediately:

I think the very needy students who need constant reassurance, need constant direction . . . I don't think it's a waste for them to do [an on-line course] . . . but if they pose a question and you don't get to it for three days they are, just, "oh my God she didn't answer my question. I need this information right away." . . . [If they] were in a face-to-face class [they] wouldn't get to see me again until next week. They are very needy and I don't know that this is the optimal way for them to learn. I think it's the independent folks who can manage on their own and who have got a lot of self-confidence . . . [who will benefit from this delivery method]. (OISE/UT instructor 2)

Culture may also affect the success of on-line courses or programs. It was found, for example, that the Mexican students who participated in the UBC EDST 565f course were very outgoing in spite of their difficulty with the English language. Some of the Asian students, however, whose grasp of the English language was quite good, rarely participated in the on-line discussions and collaborative assignments. This warrants further research.

CONCLUSION

This paper attempts to answer the question of why institutions around the world are investing so much in on-line learning, and whether the investment is justified. While it is dangerous to generalize from just three case studies, some of the findings are similar to those of other studies of on-line learning projects, such as those of Harasim, Hiltz, Teles, & Turoff (1995), Massey & Curry (1999), and the American Productivity & Quality Center (1999).

One of the most significant findings from these studies is that on-line learning does provide the opportunity to reach new markets. First of all, on-line learning seems to be particularly appropriate for lifelong learners. There is a clear synergy between the needs of lifelong learners and the nature of on-line learning. The facility for interaction between learners separated by space and time is really important for mature adults, who often have developed considerable knowledge and experience which they can share and add to the knowledge provided by the instructor, but cannot attend classes on a regular basis at a site that may be inaccessible to them.

Second, the flexibility of on-line learning is clearly of great value to many mature adults trying to balance work, family, and study requirements. They need access to expertise, wherever it may be located. They seem to care less about qualifications and more about the content of the material and the opportunity to share experiences. On-line learning gives them access to experts and programs wherever they may be located.

Third, in an increasingly globalized society, many learners seem to appreciate the advantages of international courses and the opportunity to work collaboratively and closely with colleagues across the world, and to have access not only to the course instructors, but to textbook authors and experts from other institutions. One of the most important benefits listed consistently by students in the UBC case study has been the ability to work collaboratively on-line with students from several different countries. This not only has inherent advantages in terms of learning from each other, but also provides learners with essential lifelong learning skills.

Fourth, for programs struggling with small enrollments for face-to-face courses, the opportunity to widen the range of potential students through on-line learning may be critical. For institutions, the benefits provided by the ability to partner with other international institutions is important at both an economic and educational level. Developing joint programs allows costs to be shared and risks reduced. Institutions that recognize the importance of internationalizing the curriculum can use on-line courses to bring both international instructors and international students into a program, thus providing economies of scale.

The economics of on-line courses are complex, fascinating, and not transparent. Under the right conditions, on-line learning can be cost-effective and actually bring in net profits for an educational institution. This requires quite a different approach to the development and management of teaching. It requires financial systems and financial management that, frankly, few higher education institutions have in place or are even ready to contemplate. For instance, it requires up-front investment, development of business plans, project management, financial and technical support to faculty, allocation of revenues to those units that take the risk and do the work, and professionalism and a team approach to course development and delivery. Is your institution ready for this? (See Bates, 1999, for a more complete discussion of these issues.)

Some limitations to consider before investing in on-line learning are:

- the need for substantial start-up funds;
- the need for additional time for faculty to learn how to use these new technologies and for students to learn to study effectively on-line;
- the need to introduce new administrative and organizational procedures that meet the requirements of on-line learners; and
- the need for students to be psychologically ready and financially able to embrace this method of course delivery.

Whether or not on-line learning can be considered successful and worth the investment will largely depend on the values and goals of the organization. For example, if the organization's focus is on revenue generation or saving money, on-line learning may not be a good choice

since a large number of on-line programs are not and cannot be cost recoverable. (They may be more cost-effective, though, in terms of learning outcomes for the same dollar spent.) Of the three cases examined, only the UBC case was fully cost recoverable, and by only a small margin. If the organization values collaborative learning, increased access for lifelong learners, and the internationalization of the curriculum, then an on-line program may be of value, even if the costs are the same or slightly more than those for a conventional course.

The type of course or course content will also determine the success of an on-line course or program. Not all courses or course material should be put on-line. In particular, young students without good independent study habits will find an on-line course particularly challenging. General principles of good instructional design should apply. The intended market should be taken into consideration and the best interests of the student should be kept in mind.

Finally, in order for an on-line course or program to be successful, the benefits and limitations to the organization and to the student should be appropriately balanced. It is important not only to focus on the costs of developing and delivering an on-line course or program, but also to focus on potential performance and value-added benefits to both the institution and, more importantly, to the student.

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