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Creating Student Interaction within the Educational Experience: A Challenge for Online Teachers

Lynne Schrum
Zane L. Berge

Abstract: The purpose of this article is to look carefully at the design and development of online courses, and identify significant issues surrounding the creation of interactivity among and between students and the instructor. With the rapidly expanding online movement, many educators are faced with teaching in this new environment and yet have had little experience to inform their practice. The article provides support for educators as they begin to create courses for an online environment. The challenges include a necessary reconceptualization of the design process, including evaluation, and a new role for educators as they begin to create courses for an online environment. The challenges include a necessary reconceptualization of the design process, including evaluation, and a new role for educators. Most importantly, each educator has to provide opportunities for student to student and student to instructor interaction. The authors identify issues, provide suggestions, and offer specific strategies to begin educators' efforts at successful use of the online educational environment.

Resume: Le but de cet article est d'etudier de pres la conception et 1'elaboration des cours en ligne et de relever des questions d'importance relatives a la creation de l'interactivite entre les etudiants et l'enseignant. La croissance rapide du nombre de cours en ligne oblige plusieurs enseignants a s'adapter a ce nouvel environnent educatif, sans qu'ils aient pour autant l'experience necessaire pour le faire. Cet article vient a I'appui des enseignants qui debutent dans la creation de cours en ligne. Parmi les defis lies a une telle demarche, l'on retrouve la necessite de repenser le processus de conceptualisation, y compris l'evaluation, ainsi que l'adoption d'un nouveau role par les enseignants. Cependant, le defi le plus important que chaque enseignant doit relever est celui de creer des occasions d'interaction entre etudiants d'une part et entre les etudiants et I'enseignant d'autre part. Les auteurs soulevent des questions, fournissent des suggestions et offrent des strategies precises pour aider les enseignants a reussir leur exploitation de l'environnement educationnel en ligne.

Introduction

Telecommunication networks are changing teaching and learning as evidenced by the increase of online educational offerings. Many institutions are feeling pressure to join the information age by offering online courses, yet most faculty and administrators feel ill prepared to do this. It is important to consider ways to assist educators as they begin to design online courses, particularly as many educators are being encouraged to join the trend and students are beginning to expect access to new models of learning.

The purpose of this article is to look carefully at online courses and identify significant issues in their design and development. The authors have many years of experience in studying various types of distance learning, and also in teaching online and place-based courses. We have noted the ubiquitous use of technology causing societal and cultural changes. Additionally, the use of computers, telecommunication, and other emerging technologies allow educators to design instruction in ways never before possible. The ideas in this article draw upon those experiences and on discussions undertaken with instructors, potential instructors, and students of online courses. Many of the issues and ideas discussed here regarding design for the online classroom centre on the changing roles of students, teachers, curriculum, and even the institutions of higher education themselves. These are some of the themes that permeate the discussions and experiences of online teachers daily.

Before any decisions can be made about delivery or instructional methods, each instructor must make pedagogical decisions about the fundamental goals and purposes of a course or program. When creating an educational experience, the salient questions have always been, "What are the instructional and personal goals of this course for all students?" "What is the purpose of this course?"

These are questions that all educators must ask themselves when designing traditional courses, and for the most part, they have become comfortable doing this. How does this activity change in the online environment? The level of interaction within any educational experience may vary by subject, goals, personalities, and other attributes. Yet all educators have their own ways of determining the levels of understanding and engagement of their learners. In what ways are these different or adapted to the online environment? The specific pedagogical concerns to be addressed in this article include the identification of learning goals, recognition of philosophical changes necessary to teaching online and changes in the teachers' role, evaluation of student and instructor, and creating interactivity within learning activities, between teacher and student, and among the students.

With the shift from face-to-face classrooms to online classrooms, there is a greater need for activities that engage the learner (Strey & Benjamin, 1996). Because in our opinion, it is this last factor that is central to all other pedagogical decisions in the online classroom, interaction is highlighted in this article. While the language and examples used here are from higher education, the principles are the same whether in K-12, the business, government, or non-profit training sectors.

Perspectives

A large institution recently moved into the online environment in a substantive manner. It devoted energy and resources to encourage, support, and teach using a groupware package that allowed faculty to place part or all of their courses on the World Wide Web (web). During a discussion of this experience at the end of its first term, faculty described their success and frustrations, and shared anecdotes.

One attendee asked the group to consider the changes in pedagogical constructs and the relationships between and among the students. Suddenly the faculty group became silent. They finally admitted that they did not know how to discuss, characterize, or even think about the ways their teaching had changed.

This story led the authors to consider that our educational community needs to begin a dialogue about the changes that may exist in teaching online courses. The literature reports an increasing number of courses and degrees delivered entirely through Computer Mediated Communication (CMC). Some of these courses are traditional subject matter courses - often undergraduate work. In some circumstances the technology is only a repository, and merely holds the materials (Boston, 1992) and in others there is evidence that the technology itself assists in a paradigm shift so that it becomes the environment for learning (Dede, 1995).

Historically, good teachers in the place-based classroom responded to students in a variety of ways. Without thinking about it, if glazed looks appeared on students' faces, an experienced teacher would have strategies to remediate the situation. It is something that experience teaches and is often just tacit knowledge. It is possible that many teachers adapt to the online environment with similar automaticity. To the extent a method or activity works or does not, the online teacher adjusts accordingly. How do we explicate, discuss, and share that which we do in the online environment? Laurillard (1996) describes a "Conversational Framework" for academic learning, and differentiates between the "discursive level" (where the teacher articulates the subject matter and the student joins the dialogue) and the "interactive level" which she says is

> .. .the level of practice, representing the way the student acts in the world, or at least in a world constructed by the teacher such that their interactive activities will give them experience of the theory in action. Here the teacher sets a task, the student acts, the world responds to their action, and the student can modify their action in order to better achieve the goal of the task. (Laurillard, 1996, N. P.)

Principles of instructional design indicate there needs to be alignment among the content of a course, the instructional goals and objectives, the evaluation, and the practice activities in which students are encouraged to engage (Yelon & Berge, 1988). Given this framework, it becomes important that the designer/teacher uses instructional methods and strategies that promote student activity that correspond to the goals for each course. More specifically, a question becomes, how do we create interactivity between and among our students who are geographically separated? This article focuses on the specification of ways to create interaction with the content, between learner and instructor, and among learners, as one key in the process of instructional development within an online learning environment.

Changes to Teachers ' Philosophy and Roles

It is evident that certain pedagogical, organizational, and institutional issues must be considered before beginning to teach an online course. The creation of interaction, however, draws specifically on pedagogical issues and on all the experience and skills of the instructor in designing the framework for the course,

the activities, and the assignments to support and encourage the communication patterns among and between all participants. One instructor, who uses online components in all his classes and recently planned an honours seminar to be taught substantially online, stated, "I begin with two premises. First, active learning is a good thing. Second, bringing students into frequent contact with class peers, and world wide peers, promotes active learning. Basically my experience has been that electronic communication promotes active learning" (Smith, personal communication, 1994).

To work toward changing models of teaching and learning is important. It takes courage to move away from the idea of classroom lectures of stable content, delivered by expert teachers to students who are homogeneous, passive recipients and who work alone as they learn. Technology such as networked access to worldwide information, electronically-mediated collaboration with other people, multimedia, and powerful computer simulations permit learning environments where students are encouraged to explore and learn in teams, where there is sensitivity to the diversity of students, and which positions teachers and other experts as mentors, guides, and collaborators in learning new and ever-changing content. Certainly there are barriers to technologically-rich learning environments: copyright issues, faculty reward structures, high front-end costs, training, equal access, student support, administrative challenges, technical issues, and faculty resistance, to name a few. But the major barriers to the use of technology involve the culture of our institutions and people within them. The type of structural changes required in facilitating these changing roles are those that carry the most resistance to change (Berge, 1996).

Berge (1996) identified the following changes to teachers' roles. Teachers or the functions teachers perform are:

changing from oracle and lecturer to consultant, guide, and resource provider

become expert questioners, rather than providers of answers

provide structure to student work, encouraging self-direction

shifting from a solitary teacher to a member of a learning team

changing from the teacher having total autonomy in the classroom to activities that can be open, observed more broadly, and assessed by more persons

changing from total control of the teaching environment to sharing with the student as fellow learner

placing more emphasis on sensitivity to student learning styles

seeing the teacher-learner hierarchy breaking down

Along with these changing roles and functions of teachers are concomitant changes in students' roles. Perhaps the most notable is the change from the students as passive receptacles for "hand-me-down knowledge" to students as constructors of their own knowledge. Further, all this is occurring within an environment that emphasizes acquiring more effective and efficient individual and collaborative learning strategies.

Designing the Online Environment

The course designer may choose to redesign an existing course, or create a new course, but it is unwise to simply transport an old course to this new medium. The structure of the course, the planning for educational and personal needs, and the teacher's role, all must be re-conceptualized. It is clear that if active and constant striving for independent learning must take place, then the designer will have to determine what actions will promote this type of learning. Further, from adult learning theory we know that authentic learning, relevant materials, and negotiated assignments are required to ensure the participation, engagement, and action necessary to meet these goals.

For example, consider how an instructor typically determine the students' level of engagement in a classroom setting. Such activities as eye contact with individuals, requiring students to turn in weekly papers, and arranging small group discussions with accountability to the larger group, all can help as indicators of engagement. In what ways can the online instructor similarly check for student engagement? Could private e-mail on a regular basis offer information on each student's understanding? Would a team approach be more useful? Each student might have a partner with whom to discuss and question, then be required to create a reaction to the "discursive level" of the course.

Development of an online educational environment is not a trivial task, and it is important to realize the amount of time it takes to design an effective online learning experience. Wiesenberg and Mutton (1996) identified three major challenges for the designer to consider: increased time for delivery of the course (they estimate two or three times what is necessary for a traditional course), challenge of creating a community online, and encouraging students to become independent learners. They also reported less interaction than expected from participants of an online course. Additionally, Gottschalk (1996) suggested following a specific development process before taking a traditional course and putting it online. These include design, development, evaluation, and revision. A teacher or designer does not necessarily need to start with course objectives, move through decisions about objectives and then content and finally evaluation in a linear fashion, but all these elements must be aligned at some point for effective instruction.

Let's explore an alternative path to designing a topic in a course. Imagine there is a particular assignment that has proven useful and authentic for the learners and the instructor in a previous classroom or that a colleague has described. This might be creating a small project, identifying specific content, reacting to a scenario, or synthesizing activities. The instructor must consider how this could work in an online experience. Would specific materials be available to individual students, with the students then required to compile, share, and work together? Would the activity require students to work independently gathering resources and then present them online to the rest of the class? Should students take turns having the responsibility for organizing and leading a discussion? It is through thinking and

re-thinking the interaction with the content and other persons that the students will receive, that an important element of online course design emerges.

Evaluation. The nature of online teaching requires the instructor to rethink the evaluation process as well. The evaluation component must be ongoing and continual, so that just leaving everything to one midterm and a final paper would put everyone at a disadvantage. It is important that the instructor become familiar with each student's work, and the only way to accomplish that is clearly through many instructional activities. Additionally, without visual cues the instructor might not be aware of a student's confusion or total misunderstanding of subject matter or of assignments.

The feedback loop is also essential in both directions. One of the most significant difficulties for faculty is acknowledging the possibility for them to make revisions. It would not be unusual for this trial and error evolution to take a few iterations. Certainly the feedback from the learners would be important in this process. In order to obtain information from the learners, it is often wise to identify specific times during the course when students fill out an anonymous questionnaire regarding their progress. (Note: anonymity is difficult in an online environment, so technical staff may need to offer suggestions for your particular setup). Some faculty have included one question per week to require students to consider various aspects of the content, interaction, and affective components of the online environment.

As essential as it is for the instructor to gain understanding of the learners' perspectives, it is important that the instructor's feedback to the learners be timely, specific, and authentic. All educators have learned the necessity of giving students information about the quality of their work, but in the online environment this is especially true. It is also significant to note that the manner of responding to learners' work is consequential. Online communication has a reputation for exaggerating sarcasm and heightening misunderstandings: this is not the time for vague or subtle comments, and getting confirmation from the student that the comments were understood should be part of this ongoing communication pattern.

Asynchronous or Synchronous Learning. The instructor is going to need to decide whether to have the course interactions occur at the same time (synchronously) or in the time/place independent manner (asynchronously), or some combination of the two. While we acknowledge our bias toward using an asynchronous communication channel, both modes have advantages and disadvantages. For most tasks that require thought and reflection, the synchronous model may not be very useful. If the group consists of more than 3 or 4 persons, individuals report frustration with synchronous communication in keeping track of what others are typing and also being able to type their own contributions. Frequently, one person who can type very rapidly is able to dominate the real-time conversation. Also, the timing may not be viable or convenient for all participants. If a synchronous mode is chosen, then very careful structures, advanced organizers, and monitoring are essential. Still, there are teachers who find synchronous

communication very helpful online, especially in building a sense of community among students, and when seeking immediate feedback, or simply to allow for more informal discussions.

Creating Student Interactivity in an Online Environment

Everyone is likely aware that the amount of interactivity might vary widely in a traditional course. Consider that learners interact with the content, the instructor, and with other learners (Moore, 1989). While the potential exists for many types of interaction, some courses on campus are basically one instructor who lectures while the students try to take notes. The online environment offers some possible ways in which desirable interaction might occur within these categories of interaction.

It is easy to consider how students can interact with the content in a variety of ways. However, as in most areas of learning, self regulation and active participation are essential. The instructor might require discussion on topics of the course, or have students post comments upon various readings for others and provide information about global resources that have been investigated. Having access to the instructor's personal notes and pertinent questions can often focus the readings. Students can also post other artifacts of their work (drawings, web pages, slides) that demonstrate their conceptualizations.

The instructor and each individual student are likely to create their own preferences for how interaction occurs. Electronic mail has supported interaction for some time, but the instructor might improve the use of e-mail through considering the suggestions of Laurillard (1993). She describes four ways of supporting interaction with learners in an electronic environment. These include a need for discursive language in order to understand each other's conceptions; adopting an adaptive perspective, so that the focus shifts as each student's needs shift; authentic activities for students to demonstrate their understandings, and reflection on the student's work.

Student to student work that is collaborative in nature requires another level of consideration. A learning activity may be designed to support the learning objectives, such as groups of learners solving a problem, creating a simulation for others, designing a product, or completing a task. These activities may or may not carry a mandatory requirement and the groups may be self selecting or may be created by the instructor. Some instructors have each member of the class post the type of project they would like to do, and also list something about their work style (e.g., individuals who are comfortable finishing at the very last minute may not work well with those who wish to be finished a week ahead of time and be able to devote energy to revision, or students who wish to talk about a project only after midnight might clash with someone who prefers to work at 6 AM).

Historically, teachers and designers have emphasized the need to create interactivity between student and content, and between students and the instructor. Use of such techniques as study questions to help guide textbook readings, and

impromptu questioning during lecture has been effective to varying degrees as incentives for students to interact with content and teacher. The technologies used today in the online classroom promote an emphasis on discussion and interaction among students as well.

Creating Successful Online Interaction Among Students

Blumenfeld, Marx, Soloway, and Krajcik (1996) state:

> The effects of group work depend on how the group is organized, what the tasks are, who participates, and how the group is held accountable. Teachers must consider the purposes in designing group work and address potential problems of process if group work is to be successful, (p. 37)

The literature is replete with factors that affect the success of collaboration (Forum Corporation, 1996, 1997; Guzdial, etal., 1997; Hamm and Adams, 1992; Hendrix, 1996; Huszczo, 1990; Larsen, Mclnerney, Nyquist, Santos, and Silsbee, 1996; Lipnack & Stamps, 1997; Parker, 1994; Scholtes, 1998; Uhlfelder, 1996) including: the goals or tasks of the team, the talent and competencies of the team members, leadership and roles within the team, the ability of the team members to effectively plan together, trust, the ability of the team members to communicate effectively in all their internal and external interpersonal relationships, and the need for an active reinforcement systems for sustaining teamwork. Rather than a detailed or exhaustive description of each of these factors, below are listed examples in the three areas that the instructor has the most direct control over when designing online collaborative work: the tasks, promoting an environment of trust, and creating an active assessment and reinforcement system for sustaining teamwork.

Tasks. From one set of research activities Schrum, Fitzgerald, and Luetkehans (1997) found that some activities are logically completed collaboratively (brainstorming, identifying the problem, choosing the place to begin, designing a solution, and testing out that solution) and others for which groupware and collaboration are not particularly useful (constructing and writing documents). Those creating such projects would be wise to structure activities with organizers and frameworks that encourage learners to explore ways in which the tools actually enhance their work.

Giving learners control and support for self-determination of appropriate uses will accomplish the goals more successfully. However, their participants also reported that it was helpful to have one or more of their teams participate in all activities in an asynchronous manner, to provide thoughtful reflection, offer summarizing comments, and to take a synthesizing role.

Trust. Another conclusion reflected the need for substantial team and trust building that require a significant amount of time to evolve, before true collaboration can occur. This suggests that the instructor may need to create small tasks that lead to larger projects over time (Schrum, Fitzgerald, and Luetkehans, 1997). It became clear that not everyone has the same mental model of what collaboration means, or how it is accomplished and a shared vision must evolve through authentic

activities. This issue is summarized by King and Kitchener (1994) in the following thought, "The demanding nature of such an approach sets the stage for learning how individuals typically reason about such issues, not how they would reason given the opportunity to think long and hard about them (p. 104).

Assessment. Effective peer collaboration and discussion needs active reinforcement systems and feedback for sustaining interaction. Standards for accountability and modeling appropriate interaction needs to be shown and otherwise communicated. There should be an expression of appreciation to learners for contributing to the discussion and performance evaluation should reflect contributions made to the participation observed.

Conclusions and Implications for Practice

Online courses meet the needs of some students. Those students who are unable to attend a university or whose university does not offer the desired course, those in remote locations or in gridlocked urban areas, those already comfortable with computers, and most certainly, those who prefer to work without time and location constraints are among those who benefit most from the virtual classroom. The characteristics and questions that emerge from understanding the students participating in online classes can be used to help construct guidelines for making decisions about the creation of courses.

Keeping in mind what was said in the article about our perspectives and biases above, some of the points we believe need to guide practice when designing online instruction include:

define/describe each activity, level and types of social and instructional interactivity desired and their purpose(s), reframe it in light of the online personnel and technology resources available;

define the levels of teacher-control, guided-teacher-control, student control, and group-control that is desired regarding each activity;

if face to face meetings are a possibility, determine if a mixed mode of online and face-to-face classroom meetings would enhance the overall learning experience;

take into account the amount of student support that can be anticipated because of student skills, knowledge, and comfort with the online environment;

consider what level of technology each student has access to as you make decisions about the minimum hardware/software configuration needed to take the course;

recognize that while online environments such as the web permit multiple-media, currently text and graphics are the easiest to use. If, in your course design you choose a heavy reliance on audio or full-motion video, you may need to include CD-ROM, video or audio tape in addition to web-based instruction;

while much has been written about learning styles, do not forget that the instructor delivering online courses also has a teaching style(s) that he/she is comfortable using and needs to be considered in the design of the course.

One way to view the design of online learning is to describe the interaction that students will need with regard to content, the instructor, and other learners. Once done, the design task mainly involves aligning the content, objectives, and evaluation with these inter-activities. Interaction with content can take the form of posting materials, summaries and leading discussions by students; developing working papers on material; reflection papers, abstracts of related scholarly work; or the creation of test questions; development of presentations, critique of theoretical material. Interaction between the learner and the instructor often is determined by the instructor structuring his or her availability for individual or small groups to interaction; the use of such two-way communication channels as video conferencing, telephone, fax, e-mail, or face to face meetings. The design for interaction among learners includes joint projects or investigations, collaborative development of multimedia projects and demonstrations; and sharing materials and perspectives through online discussion.

Teachers and learners can not duplicate the interaction with students as during face-to-face instruction regarding "immediate feedback, inquiry, questioning, control of pacing, sequencing, and other interactive controls available in the live classroom" (Gilbert and Moore, 1997, N. P.) Perhaps they should not! Perhaps much of face-to-face teaching is not the shining exemplar that should be held up as the epitome of interactive learning. With today's technologies, the planning of interaction may be limited only to the designer's imagination and what makes sense in the service of teaching and learning.

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Case Studies of Internet Use in Alberta Schools: Emerging Issues

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Abstract: A case study approach was used to collect data on how Alberta schools were using the Internet and how teachers were learning to use it, as well as data on the perceptions of educators and parents of its value as an educational tool. The study took place in six schools in Alberta in the Winter 1997. The study schools are described in the paper in terms of five "traditional" schools and three "virtual" schools. The researchers found that teachers, principals, and parents were excited by the potential of the Internet but were concerned about the quality of the available information and the schools' approaches to controlling access. Overall, a limited number of teachers and students were Internet users. Teachers were overwhelmed and frustrated by the vastness of the Internet and many were unaware of what was available. Teachers' Internet use was influenced by training in Internet use and school context.

Resume: Une methodologie d'etude de cas a -ete adoptee pour rassembler des donnees sur 1'emploi de 1'Internet par les ecoles en Alberta, sur Fapprentissage de 1'Internet par les enseignants, ainsi que sur les perceptions qu'ont les enseignants et les parents de I'utilite de 1'Internet comme outil educatif. L'etude a /mplique six ecoles albertaines pendant I'hiver de 1997. Dans cet article, les ecoles a 1'etude sont decrites comme etant cinq ecoles "traditionnelles" et trois ecoles "virtuelles". Les chercheurs ont trouve que si les enseignants, les directeurs et les parents etaient enthousiasmes par le potentiel de 1'Internet, ils etaient egalement preoccupes par la qualite de 1'information qui y est disponible et les demarches entreprises par les ecoles pour y controler 1'acces. Globalement, un nombre limite d'enseignants et d'etudiants etaient internautes. Les enseignants se sentaient depasses et frustres par 1'immensite de 1'Internet et plusieurs d'entre eux n'etaient pas au courant des ressources qui y sont disponibles. L'emploi que faisaient les enseignants de 1'Internet etait influence par leur formation sur ['utilisation de 1'Internet ainsi que par le contexte de I'ecole.

Introduction

The Internet resources into their teaching (see Schoolnet's Grassroots Projects Program, in Schoffro, 1996). At this point, however, the actual extent of Internet use in Alberta is undocumented.

Little research addressing Internet use in education currently exists. The research that has been done to date suggests that effective use of the Internet is dependent upon such factors as availability of sophisticated technology in terms of hardware and software (Maddux, 1994), teachers' technological skills (Peha,

1995), and new models of teaching and learning (Follansbee et al., 1996). While the use of the Internet can change teachers' attitudes towards the computer as an instructional tool and can encourage them to restructure their classes, continued and effective use requires ongoing training, technical support, home access, and time to learn how to incorporate it into teaching (Gallo & Horton, 1994; Hack & Smey, 1997; Honey & McMillan, 1993).

Research available on the Internet and student learning suggests that students tend to accept electronic resources as accurate, current and authoritative and that they have difficulty evaluating Internet resources (Brauch, Gerhold & Pratt, 1996; Futtoran, Schofield & Eurich-Fulcer, 1995). Kafai and Bates (1997) found, for example, that elementary students experienced difficulty in selecting good Web sites. They also found that, although students were able to extract information from bookmarked Web sites, it was not until grades 5 and 6 that they were able to effectively use search engines and search strategies. McNicholas and Todd (1996) found that senior secondary students (as well as their teachers) were "woefully under-prepared for the diversity and enormity of search results" (p. 41) when using the Internet.

Factors such as the ambiguity, unpredictability, lack of structure, lack of selectivity, and variable information quality which characterize the Internet have been found to contribute to the intricacy of the Internet as a learning environment (Todd, 1996).

Provincial government funding of access to the Internet in schools has provided an excellent opportunity for beginning a longitudinal study of the growth of Internet use in Alberta schools. This exploratory study, conducted from February to May, 1997, of how Alberta schools are developing and using their access to the Internet reveals some of the complexities of Internet use in schools.

Purpose of the Study

The purpose of this study was to investigate the use of the Internet as an educational tool in Alberta, through case studies conducted in rural and urban schools. The case studies form part of a proposed five-year longitudinal study of Internet use in Alberta schools. The focus of the case studies was on collecting and analyzing base data about how some schools were using the Internet, about how selected teachers in those schools learned to use it, and about the perceptions of educators and parents of its value as an educational tool.

Research Design

A case study approach was chosen because of the exploratory nature of the study. Yin (1989, p. 23) defined the case study as "an empirical study that investigates a contemporary phenomenon within its real-life context, when the boundaries between phenomenon and context are not clearly evident, and in which multiple sources of evidence are used." Three methods were used to collect data: interviewing of key informants, visiting the schools, and reviewing of documents.

Interviews were tape recorded and transcribed. Tape recording and transcription permitted the review and analysis of complex interview information for both factual and affective content. Field notes were kept, related to interview sessions and to visits to schools. Relevant documents such as the technology plans of the schools and the districts were reviewed.

Data were coded and analyzed using the content analysis approach recommended by Berg (1989). This approach involved a systematic combing of the transcripts, field notes, and documents and a thorough immersion in the data until themes began to emerge. When the data had been thoroughly examined, coding frames, that is, ways to organize data and identify findings, were determined. Successive sorting of the data using those coding frames allowed themes to arise from the data. Data were analyzed by the co-investigators first by individual case and then by using cross-case comparison techniques.

Six case study schools in and around Edmonton, Alberta were selected from across the K.-12 sector. All of these schools were reputed to be advanced in their use of Internet and were selected in consultation with the superintendents and/or consultants of the four school districts represented. One school declined the invitation to participate on the basis of limited Internet use; the principal of the school nominated a second school which agreed to participate. Research assistants, trained by the co-investigators, worked in each school for at least 30 hours over a four month period beginning in February 1997 and concluding in May 1997. They kept field notes of their observations and conducted semi-structured interviews with principals, technology support personnel, two teachers, and two parents in each case study school.

Description of the Schools

The study schools are described here in terms of five "traditional" schools and three "virtual" schools. The five traditional schools included two K-6 schools, a K-9 school, a 7-9 school, and a 10-12 school. The three virtual schools included a 7-9 school, and two programs within two of the traditional schools, one for Grades 3-6, and one for Grade 10. For the purpose of this report, a virtual school is defined as a school or a program within a school serving students off-site and delivering instruction primarily through electronic communications.

Traditional schools

School A was a new K-6 school with 300 students and 14 teachers. The school was built three years ago with an open plan design and a vast array of technology, including a closed circuit video system, incorporated into the building. The school had 40 Internet connections. There was one in every classroom, about twelve each in a lab and in the library, and four in the office and workroom area. When the school first opened, it shared the services of a district technology facilitator with eight other schools who helped the teachers to design the school's Web page and to begin to publish student projects on the Web. Each year in the Fall, the teachers have had in-school inservices on computers, and in Fall 1996 the full-day workshop

was on Internet use. The principal and a lead teacher provided inservice and individual assistance to teachers in the area of technology. The school had developed a three-year technology plan with the support of the parents in their community.

School B was a K-6 school with 400 students and 17 teachers. Built in 1983 with an open plan design (the library at the center), the school now has 4 portable classrooms. Until December of 1996, the only Internet connection was in the principal's office. At the time of the study, there were 15 connections in a lab setting, 3 in the library and 3 in the office and workroom area. The school was in the process of developing a Local Area Network and hoped to have Internet in all classrooms by 1998. The principal and lead teacher provided inservice and technical assistance to teachers. A Learning Resources Coordinator (0.5 FTE) has been hired for the 1997-98 school year to assist teachers with the integration of technology into instruction. A three-year technology plan for the school has been developed as part of the school's three-year business plan.

School C was a K-9 school with 350 students and 22 teachers. When the school was renovated three years ago, a schoolwide computer network (WAN) was installed. At the time of the study, there were two Internet-connected computers in every classroom, computers in two lab settings with a total of 43 Internet connections, and several other connections in the library and in the school office and workroom area. The principal took a strong leadership role in the integration of technology into instruction, providing inservice to the school as a whole and to teachers on an individual basis. Two lead teachers (each with 0.1 FTE release time) also provided technical assistance, inservicing, and individual consultations for teachers using technology. The school developed a three-year technology plan which included curriculum integration and training of staff, students, and parents.

School D was a 7-9 school with 450 students and 21 teachers. The school had 18 Internet connections, 11 in a lab off the library and the others in various places throughout the school. The library technician and the information processing teacher provided technical assistance and inservice assistance. A full-day workshop on the Internet and its use was provided for the staff in Fall 1996 by a district consultant. The library technician worked with teachers at noon hour and the information processing teacher made himself available after school to assist teachers and students. The principal used e-mail as well as productivity software, both for administrative purposes, but was at the beginner stage in Internet use.

School E was a 10-12 school with 850 students and 40 teachers. The school's main Internet connections were in one of the school's three computer labs (30 connections). Other connections were in the library and the office and workroom area. Inservicing and technical support were provided by two lead teachers. In addition to inservicing teachers in their school, they also provided inservicing to about 100 other teachers in the district. The Internet was being used in the grade 10 social studies program; there was one CTS module on the Internet; and noon hour classes were available for students interested in using the Internet for research

projects. The school's administrative communication was primarily by e-mail, and the principal used Internet in connection with his own administrative work. The school's schedule had been organized to provide staff meeting and professional development time one Friday a month, and the principal supported provision of technology inservices at that time. The school had a home page which was being used to provide links to relevant sites for students and teachers.

Virtual schools/programs

School F was a virtual program in its first year, with one teacher and 20 students in grades 3-6. The teacher was an experienced elementary teacher who worked full time in the virtual program, from an office space in a traditional school. Her students worked in their homes, located in Alberta and beyond. One was in Turkey, for example. About one-third of the students had experienced problems in the traditional classroom because of Attention Deficit Disorder; others were students who wished to move quickly through the curriculum; a few were students with health problems. The teacher was an experienced computer user and had taken a number of inservices on technology but became an Internet user only in the six months before she began working as a virtual teacher. She had participated in the inservicing provided in the traditional school where she worked and she made use of the Internet resources made available by district consultants on the district's Web page. The teacher saw herself as providing support to parents who were homeschooling—facilitating that learning and teaching—rather than providing instruction in the traditional sense. She responded to the requests and questions from parents and students, provided resources they might need, and organized small group meetings with students and parents.

School G was a 7-9 virtual school with 260 students and 11 teachers. It had been in operation for two years at the time of the study. Most of the teachers worked full-time for the school. They worked from their homes and provided on-line lessons to students as far away as Ontario and parts of the United States. Technical assistance and inservicing forteachers, parents and students was provided by a technician on contract from a private consulting firm. In-depth inservice was given to the teachers when they began working in the virtual school. Parents and students received a 90 minute computer orientation as part of the school's Fall one-day orientation program. Students were provided with computer equipment and Internet access (up to 3 hours per day for students and one hour a day for parents for $150 / year). Students were generally from families interested in homeschooling or looking for a low cost alternative to private schooling. The principal and teachers, and the students and their parents used e-mail and the WWW as part of their work. There was also provision for interaction among the participants in the school through callbacks several times a year, organized by the school. The students had access to social and athletic activities in host schools around the province, and the parents organized activity nights as well.

School H was a virtual school program in its first year, offering a grade 10 program to 50 students. All 14 of the teachers in this virtual school (4.5 FTE) were

full-time teachers working in the traditional school of which this virtual program was a part. About 25% of their time was assigned to virtual teaching. The teachers were given some additional preparation time in order to develop course materials for the virtual program. The school expected to expand the virtual program to grade 12 over the next two years. All teachers in the virtual program had an Internet connection where they worked. The students in the virtual school could lease computer equipment from the school ($160 / year) and they also could purchase Internet access ($ 100 / year for 50 hours access per month). Some students enrolled in the virtual school to continue homeschooling; others, because of medical or behavioral problems; and still others, because of dissatisfaction with the local school or because their parents' work involved extensive traveling. The students in this school came from all over Alberta. The school had an orientation for students and parents in the Fall. The student and teachers in the program communicated through e-mail and a chat program. The virtual program was coordinated by a teacher, and technical assistance and inservicing was provided by two lead teachers.

Findings

A number of major themes have been identified across the six case study schools. The investigators make no claims that the schools or these findings are representative of the schools in Alberta. However, the study does highlight issues that are likely to be of importance to other schools as they begin to use the Internet. The findings have been clustered under the headings of educators' and parents' perceptions of the value of the Internet, use of the Internet by students and teachers, Internet knowledge and training, and the impact of the school context on Internet use. Excerpts from interview transcripts have been provided in italics throughout this section in support of the findings. The speaker has been identified in brackets following each quote as either a teacher, administrator or parent. Also identified is whether the speaker represents a traditional school (t) or a virtual school (v). Readers should bear in mind that the administrators, teachers, and parents interviewed were those individuals most knowledgeable and experienced in relation to the Internet in each of the case study schools.

Perceptions of the Value of the Internet

Perceptions of teachers and administrators

Overall, teachers and administrators who participated in this study concurred that the Internet has a great deal of potential as a teaching and learning tool. The benefits they most often cited included immediate access to current, relevant information; world wide connection; the ability to better meet the needs of individual learners; the ability to provide alternative education delivery; and, the positive attitude towards school and learning generated by computer use.

While all of the teachers interviewed acknowledged the potential benefits of Internet use, concerns with its use were also noted. For example, censorship issues

influenced the teachers' willingness to use the Internet. The majority of schools in the study did not allow "free" surfing although time to explore was recognized as being a valuable experience in using the Internet. Most of the case study schools had opted for a user policy with one either already in place or under development. Permission had to be signed by the parents before students were allowed access to the Internet.

When we're teaching our kids to drive, we don't suddenly say, 'OK, there you go. We get in with them. We drive with them. We teach them and, as they get better, we let them do certain things ... Probably even after they get their driver's license , the first time they get in the car, they don't get to go on a trip to Calgary ... Why do we do it any differently with computers or the Internet? *(Principal, t)*

In other cases, website access was further restricted by using a search engine such as Magellan in order to filter out what were deemed to be inappropriate sites. This raised some concerns for some teachers, however, as they found that personal judgment was still needed at times when visiting filtered sites. A number of teachers interviewed were more comfortable with bookmarking sites for their students ahead of time.

> I think initially I can act as a guide. I can go to some of these sites ahead of time and determine what will be of value or useful for students. At the same time, I certainly don't want to limit their explorations and their own research. *(Teacher, t)*

While teachers expressed some concern over the quality of the information provided on the Internet, they generally felt that inappropriate information has always been available to children in other forms. It was generally recognized that supervision to some degree was necessary when students were using the Internet, however, this supervision did not appear to exceed what would normally occur.

Teachers and administrators generally felt that a more effective way of addressing the censorship issue for children would be to teach critical viewing skills, so that they can learn to make judgments about the appropriateness of websites for themselves.

> I don't believe that censoring information is the answer. We need to teach students to deal with the information they access. I still see a place for the personal element in teaching. Technology won't replace teachers. An adult will always need to be there to guide students and help them to use the information properly. (Principal, *t)*

> Yesterday we were in the computer room doing China research ... They [the students] had finished the bookmarks that I had found for them and they were looking for some other things. One of the girls came across a massacre that had gone on in ancient Chinese history. The site had a warning: 'Contains disturbing pictures.' I was quite impressed because

> she read this and said to me, 'This has a warning. Do you think I should go there and look at these pictures?' That was a really interesting experience for me because we are so concerned as teachers ... yet here is a kid monitoring herself as to whether or not she should got to the site. (Teacher, t)

Most of the teachers felt that with proper training and familiarity with a user expectation policy students would be responsible for appropriate Internet behavior. It was recognized that a small minority of the student population might abuse that responsibility but no more than in any other circumstance where choices were involved.

Perceptions ofParents

Generally the parents in the case study schools were excited about the potential of the Internet.

> It's a way of communicating globally...From my kid's perspective it makes a difference learning about Japan through a textbook to learning about Japan by talking to people in Japan and having that instant connection. (Parent, t)

The interest in the Internet as an educational tool was just beginning to spread. Some parents used the Internet in their work; some used it for recreational purposes and to located information on topics of personal interest; and others had not used it in any way as of yet. All parents concurred that they wanted their children to "have every advantage" in their schooling and that technological knowledge and skill would help to "prepare them for the real world." Parents in the virtual schools also liked that the Internet offered their children an alternative method of delivery.

In the majority of the cases, the parents acknowledged that their children had more technological skill than they did. For most of these parents, finding the time to learn about the Internet was the major stumbling block. Most claimed that their children taught them everything that they had learned about it to date. Others noted their appreciation of the opportunity provided by some of the schools to attend parent and child Internet training sessions at the school site.

The parents expressed some concerns about the use of Internet in schools and at home. Some felt that it should only be used as an educational tool rather than for playing games and chatting. One parent noted that there was "too much surfing and not enough school work "going on when using the Internet. Another was concerned that her children were too "sedentary" already and the Internet would further promote that lifestyle choice. While some were impressed with the possibilities as a communication tool afforded by the Internet, others talked about the importance of face-to-face communication in developing social skills and felt this was discouraged through Internet use.

It's easy to hide behind the machine because you're an unknown. You can use a pseudonym or an alias and say and do all kinds of stupid, illegal, destructive

things, but nobody knows you...But you need to have the ability to interact with people and if we're going to be like that kind of society then I think we're in deep trouble. (Parent, t)

Others were concerned over the issue of privacy and the unknown. One parent mentioned that her child was scared by having to converse over the Internet. Other parents talked about how cautious children need to be with this public way of communicating and cited concerns that they saw with the use of chatlines in particular.

> My child finds e-mail and the Internet kind of scary...There is something scary about those faceless people to him. He writes something and sends it out there and he doesn't know where it goes and he's found that uncomfortable." (Parent, v)

Some serious censorship concerns regarding the Internet were expressed by parents except in the schools where there was not widespread use of the Internet. While parents noted concern about the inappropriateness of some of the information on the Internet, they generally "trusted" their children and allowed open access at home. Several parents felt that it was their responsibility to help their children learn to make value judgments about sites.

> I think that if I train my children right, and something surfaces accidentally, they could quickly remove themselves from it...I am more inclined to be concerned over information that children receive through technology that they think is always the truth and that people can give them misinformation and they would accept it. *(Parent, v)*

Several parents also noted that their children were unhappy with access restrictions caused by their school's acceptable use policy.

One final concern mentioned by parents was the cost of providing this tool for their children and the fear that their children would get further behind if they did not provide it.

Use of the Internet

Use of the Internet by Teachers and Administrators

Some of the variety of purposes that the Internet was being used for by teachers and administrators included: professional development, such as taking on-line courses, contacting other professionals using newsgroups and listservs, downloading professional documents, researching educational issues and visiting sites to ask questions related to teaching; developing lesson plans by surfing sites to find unique lesson plan ideas; delivering lessons via e-mail; sifting to find appropriate sites for students to visit; providing virtual tour experiences for students; looking for specific educational software through online catalogs; for professional communication with the school and district administration, and virtual parents

and students via e-mail; for personal communication especially to e-mail relatives and friends: and, for searching the world wide web or contacting user groups dedicated to specific hobbies, interests and recreational purposes.

The most common Internet service used by teachers was e-mail, and, in the traditional schools, this was highest where administrative information such as daily announcements and student attendance reports were communicated in no other way. The next most commonly used service was the World Wide Web, which teachers were using to find curriculum resources and lesson plans. The virtual teachers rarely used the WWW lesson plan resources because those resources were primarily designed for traditional classroom teaching and were not generally suitable for virtual teaching. The WWW curriculum resources most frequently mentioned were sites with topic information that teachers could use in preparing instruction and sites that could be bookmarked for students to visit. The use of the Internet for newsgroups, for news updates, and for file transfer was rarely mentioned by the teachers. Several teachers noted their preferences for CD-ROM resources, over Internet resources, because they were more convenient and less time-consuming to use.

Teachers noted that identifying appropriate sites required an extensive amount of time outside of school. The vastness and tentativeness of the sites on the Internet frustrated their searches at times as well.

> When you are on that thing surfing, you are looking for one thing, but there is so much that comes up along the way. Instead of going where you are going, you end up going around in a circle...That's the hard part. (Teacher, t)

> We have so many different browsers ... you know, all those things, and I really don't have an understanding of each of them and how they work. (Teacher, t)

> I would like to improve my skills on the question of searches, to be able to zero in more on a specific subject rather that waste a lot of time on the larger topics. (Teacher, t)

Several teachers reported that they could cut down on their searching time by making use of their district designed webpage which contained previously bookmarked sites that were curriculum and subject area specific. Another school offered an after school club for students who were given the responsibility of locating specific websites requested by teachers for use in their planning or instruction.

In the schools represented in this study, the use of the Internet as a research tool was strongest at the elementary and junior high levels. The higher the grade level, the less time was spent on the Internet at school. One high school teacher claimed:

> If you want to get technology in your high school, you've got to do it in grade 10 when the kids have flexibility. You have to follow that up in grade 1 1 because in grade 12... kids want to get marks so they can go on to higher institutions. If technology will help them they'll use it. But they don't want to spend time learning it. (Teacher, t)

While the Internet was being used in a variety of ways by both teachers and students, this use was restricted in traditional schools to a small number of people. As well, schools were using only a few aspects of the Internet. Surprisingly, some of the schools who were well-equipped with technology were only using the Internet as a communication delivery system rather than as a research tool. Although students and teachers in the virtual schools used the Internet daily, their use rarely extended beyond e-mail for lesson materials and assignments. There was an overall recognition by staff interviewed that they had just begun to address the "tip of the iceberg."

> We are just starting to introduce the Internet to the staff and get them to understand the opportunity that it can bring related to information or knowledge acquisition. (Principal, t)

> Currently, we're still in the development stage, although I don't know when that will ever end with computers. We are not using the Internet directly. (Teacher, v)

Use of the Internet hv Students

Teachers reported that their students were using the Internet for the completion of class projects, such as researching for information, communicating with professionals, building home pages, contacting key pals and subject area experts, as well as for e-mailing friends, teachers and penpals; game playing; accessing chatlines; and, generally, surfing for fun on topics of personal interest including finding information on upcoming movies, learning about music groups and watching film clips on specific websites.

Student access to and use of Internet resources in all schools varied a great deal, and was heavily dependent on the their teachers' interest in and knowledge of Internet resources. In one school high levels of use were reported for the academically gifted. In only a few instances was student use part of a planned unit of instruction and even more rarely were students involved in publishing their work on the WWW. Some students were involved in learning how to develop their personal home pages, but the most commonly reported uses were "exploration" and visiting sites identified by URL or bookmarked by their teacher.

Overall, teachers and administrators noticed increased student enthusiasm and excitement about the use of technology and the Internet in their schools.

> I have seen the children excited about what it is they are doing with the technology. And if they are that excited about what they are doing then that must mean they are thinking. (Principal, t)

However there were also some concerns voiced by the teachers. One teacher expressed a concern about the nature of student assignments that she saw being produced using the Internet.

> When something comes in to me I have no idea where it originated. Plagiarism and copyright violation are rampant on the Internet and reproducing material in assignments just gets easier and easier. (Teacher, t)

Still others were worried about what direction computer use in schools would take.

> I worry that information recovery is going to be given greater importance than information processing. Some of my students think that computers are going to give them the answer to everything and they won't have to think about it. (Teacher, t)

The teachers and administrators generally noticed similar stages occurring in the students' use of the Internet. Most students began with a "play and learn" approach to "get used to how the technology works" and then they advanced to "seeing a purpose" for using it to complete a particular task. It was emphasized that allowing for exploration time was very important for encouraging more students to want to use the Internet.

Knowledge and Training

Level of Experience

A critical factor that influenced Internet use was the level of the user's Internet knowledge. For example, prior Internet experience was a variable that affected the teacher's attitude toward the Internet as an instructional tool, and attitude affected use. The skill level and comfort level of users tended to be much higher among staff and students who were online at home, therefore, the use of the Internet in school was highly correlated with home use.

> I would say, on a regular basis, clearly those four people who have it at home are using it with their students at school. (Principal, t)

Recognizing this correlation, some parents, teachers and administrators raised the issue of equity of schooling experience. There was deep concern that those without the funds to provide computer and Internet access at home would fall further behind while those with home access pulled ahead.

> It's a problem in that some kids have a whole bunch of additional resources

> available to them ... I think at times that could have a bearing on how complete a particular project is. (Principal, t)

Learning to use the Internet

The majority of the teachers and administrators who were knowledgeable about the Internet in this study were largely self taught. Many noted that they learned from their students at times because students who were frequent users of the Internet were more knowledgeable and skilled with its use. Teachers who were interested in learning about the Internet did so regardless of the inservicing support offered. Many teachers and administrators suggested that unless there was this interest in learning to use the Internet and a vision for how the Internet might change their teaching style, then inservicing would have little effect. In schools where there was a high level of commitment and enthusiasm for the use of the Internet, an interest and excitement in exploring this new avenue for its potential in assisting students' learning was cited by teachers. Student and teacher attitudes with respect to learning about the Internet were positively influenced by using the Internet to research topics, to design projects, or to communicate with someone about topics that had personal relevance to them.

> There should be a willingness to learn that technology...There is so much to learn and if you have that mind-set that you are prepared to learn, I think that it's a great way to role model for not only other teachers, but for the kids. Because if they see you working and enjoying it. it shows that you are learning too. (Teacher, t)

Staff mentoring

While acquiring knowledge and skill in the use of the Internet was integral to the teachers willingness to use it as an instructional resource, on-going support in that use was also imperative. Having someone available on staff who could mentor the novice user was particularly influential in encouraging beginning use.

> Most of what I learned about the Internet was through this phenomenal person. She had three different projects going on the Internt... I got to sit back and watch and learn that way, but also she gave me little projects to do, starting small ... so I did them. I was keen and she basically was my mentor. (Teacher, t)

In the traditional schools, lead teachers were designated by the principal and, in two schools, lead teachers were provided with small amounts of release time to assist other teachers in Internet use. Administrators with considerable success in bringing teachers to the Internet tended to start small, usually one class at a time. Demonstration of what was possible on the Internet was found to be a powerful tool in encouraging others to use it.

Encouraging peer sharing was also a powerful motivation for increased use. Staff helping other staff in small groups was commonly done in schools that had a high number of staff online at the school. A team work approach in a collaborative atmosphere was common on staffs who were willing to experiment and incorporate the Internet into their curriculum.

> We like literally all of us sit down ... and surf together ... and every time someone finds a really good site, full of lesson plans or sites the kids would really just love, they share it with the rest of the staff. (Teacher, t)

Inservicing

Inservicing provided support and encouragement for Internet use.

> I think there is a real need for inservicing. I know a lot of times I'll help staff members just by chance. There isn't anything beyond the basics, in terms of professional development. I think that is an area that really needs to be looked at, just for getting comfortable with the various things that we have available . (Teacher, t)

Administrators attempted to address the issue of increasing user knowledge of the Internet by offering inservicing both within the school and at the district level. The principals and lead teachers often provided both formal and informal inservice to their staffs and, in two schools, provided inservice to other teachers in the school district. In all of the traditional schools, full or half-day inservices for teachers on Internet use had been provided on an annual basis at the school level, and all the teachers had access to district inservice programs. These district level inservice sessions were not always well attended. Many teachers noted that they were not willing to invest the substantial amount of time required to learn to use the Internet, especially when it was after school time that was required. Most administrators recognized that there was a steep learning curve associated with learning to use the Internet and attempted to offer some release time for teacher exploration in addition to school level and district level inservicing or arranged for technology training to be the focus of professional development days. Teachers in the virtual schools reported less involvement in inservice, reflecting perhaps their selection of and attraction to virtual teaching because of higher levels of technology knowledge and experience.

Impact of the School Context on Internet Use

Location of computers

One of the factors that influenced the willingness of staff to use the Internet was how accessible it was to them. The location of the computers with Internet hookup within the school either encouraged or discouraged Internet use. The teachers claimed that a lab setting was the least desirable set up because scheduling

and supervision problems caused frustration for them. The most effective place to have access, they felt, was in the classroom so that the Internet was easily accessible when needed.

> Because we don't have any networking that goes directly out into the classroom yet, our teachers are not using it yet on a daily basis with their students. (Principal, t)

Capabilities of available computers

Another crucial factor in determining a teacher's commitment to learning to use new technology was ensuring that the technology needed to implement the technology plan was available in the school. Ensuring hardware and software compatibility, functioning equipment and committing resources to keeping up with fast paced change were very important.

> So you have a lesson booked for Block 2 to take them surfing on the Internet, and you get there and half the computers don't work. That in itself poses a lot of problems and it happens all the time. It's just life with computers. They don't always work ... I know many teachers at the school who have planned out their lesson they're going to do on the Internet, and they're very new at it so they're a little nervous. So they take their kids in the lab and half the computers don't work so they say, 'Forget it,' and they go back to class. It's too much hassle. (Teacher, t)

Technical assistance - installing and keeping the technology running - fell in large part onto the shoulders of principals and lead teachers. In one school, the principal estimated that only 10% of the time allocated for Internet support went into inservice; the rest of it was eaten up by hardware and software concerns. Where technicians were available, they were district or private industry personnel whose services were provided through contract or other fee for service arrangements. In all but one school, teachers had the task of troubleshooting hardware and software problems. In none of the schools was there an in-school technician who maintained the computers. Technical support for any serious problems came from outside the school and usually involved substantial wait time.

> When all the problems come up I can't always solve them and then you get frustrated because you have to wait for someone to come out and fix them. (Teacher, t)

The capabilities of the equipment also influenced access especially in terms of the amount of wait time required for getting on-line and for downloading certain files.

> When I was doing searching, it was slow, it was treacherous. You were waiting around for the information to come back to you. The searches were taking a lot time. So, you know, this technology is great and the

> information is good but ifthings don't happen in the hardware end ... then it becomes useless. (Teacher, t)

Scheduled lab time could easily be wasted trying to locate relevant sites due to the vastness of the information available:

> You can surf and you're going to sit there twenty minutes while your computer whirls around and brings up the site. You are always going to be one step behind technology. We spend lots of money on computers and we have computers that are outdated. It's just a part of life. (Teacher, t)

Administrative support

The principals in all of the schools but one took a strong role in supporting the use of Internet technology in their schools. The attitude and support of the administration directly affected the quality of the enthusiasm regarding Internet use in the school.

> We wouldn't be where we are at this school without the vision of the principal and the desire to put in the money so that the technology can be supported. I know [the principal] is very interested in the Internet personally. When the access was only in his office, he would say to the teachers, 'Come and bring your kids in. I've got this really neat site they can visit' or Til show you how you can show your kids." So you'd have 25 kids crowded on the floor looking at a certain site. *(Teacher, t)*

Administrators who had a vision regarding technology and consistently modeled the various ways it could be used appeared to have had an easier time convincing staff members to take risks in their learning. Having a well thought out technology plan with considerable staff input tended to move a school closer to implementing a goal of computer and Internet literacy. Principals of new schools cited a willingness to learn about new technology, rather than an expertise with it, as a criteria for selecting staff.

Community support

Parental and community support for Internet use was also cited by teachers as an important factor in their willingness to use it as an instructional tool. The school that had the least number of parent consent forms returned also had the most significant teacher apathy regarding the value of the Internet as a teaching tool. To encourage community support, some schools offered a program that allowed for inservicing of parents on the Internet to either show them how to use it, show them how it was being used as educational tool in the school or both. Support from the community for use of the Internet and technology in general appeared to be affected by socio-economic status.

Discussion

The six case study schools featured in this article served students in urban, small town, and rural settings in and around the Edmonton area. Some of the students in virtual schools lived in the same area but others lived in other provinces and in the United States. In the virtual schools, all students had home access to the Internet. In the traditional schools, the estimated proportion of students with home access ranged from 10% to 30%. School access for students in traditional schools in the study ranged from a ratio of 5 students per connection in a small town school with a connection in every classroom and two lab environments suitable for whole class teaching to a ratio of 27 students per connection in a city school with connections in one lab and in the library. Only one school had a schoolwide plan that specifically addressed the integration of technology such as the Internet into learning.

This purposive sample of six schools is not representative of Alberta schools overall. The schools were selected because, in the Winter of 1997, they appeared to be at an advanced stage in the use of the Internet. They had the appropriate technological infrastructure in place to support Internet use and its integration into teaching and there were administrators and teachers in each school known to be Internet users. Most teachers in this initial study, however, were at the exploratory stages of using the Internet as a research tool. In the traditional schools, the proportion of teachers with a high level of Internet knowledge and use, based on principals' estimates, was quite small, ranging from 20-35% of staff. Teachers were still trying to discover what was out there and to negotiate their way through the maze of information.

Most staff interviewed felt that the Internet was the wave of the future but were not always clear about what that meant. Several people felt that textbooks would eventually become obsolete as they were no longer cost effective in the light of the advances on the Internet. Others expressed concerns regarding the lack of interaction that increased computer use (especially through virtual school programs) would promote and emphasized the importance of socialization and the human dimension to learning.

All teachers noted that they lacked in search skills and in knowledge how to effectively use search engines. There appeared to be no teachers in any of the schools with specialist knowledge in information searching and resource evaluation (such as, for example, a teacher-librarian). There was also a general lack of awareness amongst students of search engines and search strategies. Student lack of skill in locating information also meant that the teacher or library staff had to spend a great deal oftime giving individualized assistance with the student searches. Generally, locating and evaluating sites, learning how to use search engines and learning how to search efficiently were looked upon as drawbacks when using the Internet. Time for teachers to access and search the Internet was voiced as an issue at virtually every school.

The findings from this study in six schools are consistent with what little research addressing Internet use in education currently exists. In the study schools, the use of the Internet was influenced by the availability of appropriate and reliable technology. Teachers' use of the Internet was limited by their technological skills and by the lack of time they had available to learn how to incorporate it into teaching. Some teachers were beginning to envision the potential of the Internet to support new models of teaching and learning. However, they were experiencing frustrations with searching the Internet and with finding appropriate resources on the Internet. School and district administrators will need to find ways of encouraging and supporting teacher learning in this area if the Internet is to be put to effective uses by more than a few teachers in each school. As one of the principals in the study stated:

We can have all the technology in the world but unless we know how to use it and feel comfortable, and have someone who supports us and guides and encourages us and excites us to want to use it, it's not going to get used.

Future Studies

Based on the findings from the case studies, a province wide survey was conducted in Spring 1998 focusing on how the Internet is being used in the schools of Alberta. It is anticipated that the findings of the provincial survey will be used to guide the design of a national survey. The case studies have also opened up a new area of inquiry related to teachers' knowledge of information searching strategies within the context of research as a literacy task. This has been the focus of a follow-up study conducted in the Fall of 1997 in the same case study sites presented in this report.

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Virtual Sociology: The Class List Considered by Teacher, Teaching Assistant, and Student

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Abstract: This paper discusses a class list that was implemented for an Introduction to Sociology course at the University of British Columbia. The list proved popular on all sides, extending the discussion between students, teacher and teaching assistant well beyond the familiar constraints of the classroom. Yet its success as an alternative discursive space exceeded its putative intent, for it altered, not just the teaching of sociology, but the sociology of teaching and learning. The discourse about sociological knowledge, through the new opportunities and problems afforded by the list, made manifest the dynamics of the presentation and production of that knowledge: in short, a virtual sociology. Reflections on these themes are given from the three perspectives of teacher, teaching assistant, and student.

Resume: Get article discute d'une liste de diffusion qui a ete mise en place pour un cours d'introduction a la sociologie a la University of British Columbia. La liste de diffusion s'est averee un succes en poussant la discussion entre etudiants, professeur et assistant a 1'enseignement au-dela des contraintes traditionnelles de la salle de classe. Pourtant, son succes en tant qu'espace discursif alternatif adepasse son intention putative en celaque la liste de diffusion amodifie non seulement 1'enseignement de la sociologie mais egalement la sociologie de 1'enseignement et de l'apprentissage. Le discours sur les connaissances sociologiques qui est ressorti des nouvelles occasions et des nouveaux problemes engendres par la liste de diffusion ont clairement revele la dynamique de la presentation et de la production de ces connaissances: en somme, une sociologie virtuelle. Les reflexions sur ces themes sont presentees de trois perspectives, celles du professeur. de l'assistant a 1'enseignement et des etudiants.

Virtual Sociology: Three Perspectives on a Class List

The list in an undergraduate introduction to sociology course

Lists are rudimentary group-oriented extensions to now ubiquitous e-mail. They are enormously popular with those on the Internet, and their subjects span the gamut from Bourdieu to female bodybuilding to *Ally McBeal.* because they are often managed through university computer networks, they are usually easy to implement on any campus. At the University of British Columbia (UBC), a one-line e-mail message to the local "majordomo" suffices. The heart of a list is a virtual post-box that is maintained on a central server (a dedicated networked computer). Each e-mail message sent to that post-box is automatically distributed as a "post" to every subscriber to the list. In a university setting, a list comprised of students, teacher, and teaching assistant(s) provides the means to an extended -

although not real-time - discussion via the Internet. Many institutions provide universal, if invariably limited, Internet access to their students. At UBC, students are automatically given ten free hours per month through their library privileges, with additional time available at moderate extra cost. Free terminal access is provided at various locations across campus, including large centers at both the undergraduate library and a central Faculty of Arts facility, as well as smaller departmental, sites. Of course, many students have their own computers and modems, and can log in at their convenience from home. So while access is universal at UBC. it is by no means equal. Owing to the popularity of the Internet, students who don't have their own personal computers often have to line up for many minutes to use a time-limited terminal at the library. Nonetheless, it is our position that the Internet is sufficiently accessible for every student at UBC to make a class list viable.

During the 1996-97 academic year, a list was instituted for one of several sections of Introduction to Sociology at UBC. Subscription to the list was highly recommended and heavily promoted, although not mandatory. 15% of the final grade was allotted to participation, but those marks could be earned outside of the list as well, through classroom participation, private e-mail with the teacher, and/or face-to-face discussion with the teacher and/or teaching assistant. Here are a few parameters of our particular situation: of a total of 85 students registered in the course, 73 ultimately subscribed, although a few of those did not do so until very near the end of term. Every one of those 73 posted at least once to the list. 42 posted at least five times, and many posted much more frequently. The highest number of posts from any one student over the length of the course was 78. An average weekday had about seven new posts.

What follows are three reflections on this list, by the teacher, the teaching assistant, and a student who participated extensively on the list.

Subverting the Thoroughness of Sociological Knowledge: The Teacher on the List

A class list is typically figured as a pedagogical tool or technological resource, and therefore as a kind of extension with respect to the classroom. Such relegation is necessary to sustain the classroom as the definitive locus of teaching. However, our list exceeded its putative supplementarity, and by asserting its relative independence, reconfigured itself as a kind of virtual symposium. Moreover, since, in good Lacanian fashion, the virtual or the imaginary is the condition of the real, this has meant that the fundamental relation of the classroom to teaching has been transformed.

This shift was somewhat by intent, although my own real power in the matter, even as the teacher who set up and managed the list, was always limited, institutional privilege notwithstanding. By the nature of its own artifice, a list tends to exploit its potential to open up an alternative discursive space, even in the face of determined policing to the contrary. Having less of the patrol officer in me than many suspected, I sought from the beginning to advance this quasi-liberation from the classroom, and limited my explicit regulation of the list to cautions about

netiquette. No "flaming" was allowed - that is, no insults, smears, or snide denigrations were tolerated. Of course, everyone on the list knew that I would be reading everything that was posted, so over and above my modulated moderation there was always the absent presence of my surveillance. Still, I was hardly the only observer, for while any list is as much a panopticon as it is a symposium, the crucial twist is that everyone on the list can watch - or at least read¾ everyone else. The Internet has a name for people like me, who subscribe to a list but rarely join in the discussion: a lurker. I can't know with any certainty what effect my lurking had, but I do know that the list was very well-mannered compared to others I belong to. Thankfully, no student compared any other to animal excrement, as I have seen happen on other lists.

Despite my invisible restraining hand, the independence of the list was plain, for it was chiefly there that students regularly challenged and debated what I and the teaching assistant said in the classroom. If, lurker that I was, I didn't completely disappear from the list, regardless of how deliberately reticent I was, my status nonetheless changed significantly. The list altered the social structure of the course, insofar as it provided a virtual space for an alternate, mostly acephalic structure. As a collective *logos* of a situated *socius,* it returned to the classroom to reconfigure the latter's sociology, in more ways than one.

It is by now a commonplace that good teaching seeks an interactivity of the classroom. While the truth of this commonplace is still moot, that quality is definitive of a list, because, if the teacher is truly reticent, the list is constituted as pure interactivity. It is initiated, sustained, directed and transformed by the polyvalent and mutual discourse of its subscribers. In this respect, it is nothing like a lecture or even an ordinary Internet homepage, both of which are paradigmatically articulated by one person and read by many (which may explain the growing and suspect popularity of homepages in the academy). A list works against the discourse of the Master - which means that it effects, if not some radical democracy of the classroom, certainly a displacement of the teacher's institutionalized status as *sujet suppose savoir* (Lacan's term for the "subject assumed to know"). And the displacement of the master of knowledge entails a displacement of the status of knowledge as such.

The standard UBC teaching evaluation has a question that asks if the teacher "demonstrated a thorough knowledge of the subject." The great promise of a list for me as a sociology teacher is that it offered me the opportunity to score lower on this question. Of course, I'm being rather disingenuous in saying this, for as a sessional teacher desperately hoping for contract renewal and as a PhD candidate looking apprehensively ahead to a dismal job market, I craved high evaluation marks as much as any other teacher. Nonetheless, in an impossibly ideal world, where job offers and tenure would fall like the gentle rain of heaven upon the productive and conscientious, 1 still maintain sociology would be precisely the place where the thoroughness of knowledge would be challenged.

If we take sociology seriously - more seriously, alas, than other disciplines are wont to take it these days - then we must take its oft-ballyhooed reflexivity to heart.

That is, sociology must be meet for sociological critique, and the sociology of knowledge must inevitably lead to the contestation of any body of knowledge as utterly self-consistent, objective, falsifiable, or complete. What sociology is ultimately about is the subversion of the very thoroughness of knowledge. The discourse of the institutionalized and disciplined academy is no less a social construction of reality than any other social phenomenon, and therefore no less contestable or resistible.

Postponing, for now, any dive into the deep and treacherous waters that this proposition opens up, let me close by merely noting that the theoretical prominence of language has been the engine of much of the best social theory of the *newfm-de-siecle.* From that perspective, the singular power of the list is that it is discourse distilled down to language. On a list, only words appear on the computer screen. The list is therefore effective sociologically because it is articulated, in both senses of the word: it is enunciated in language and it is coupled in ways that allow flexibility, jointedness, movement and intellectual life. A list is much less linear than its name implies. It exemplifies what John Fowles wrote of language itself: it is "like shot silk; so much depends on the angle at which it is held" (1969, p. 457-458). In the sociological inquiry into the social, what matters most is the sometimes deft, often clumsy, but always ongoing manipulation of such angles, whose different lights illuminate precisely the shortfall of thoroughness of discursive knowledge. The list simply provides that other and critical space by which the real articulation of sociology is made possible.

Teaching in the virtual community: The teaching assistant on the list

The classroom electronic discussion list. A medium over which I enthused, and in which I lost myself too often. What a great idea, I thought- until, that is, I began to consider my role vis-a-vis the list, as the teaching assistant in the class. How should I use the list, and for what? Should I be a presence on it at all? If I am to be involved, how much should I intervene? Should I respond as a fellow cyber-being? Should I maintain a distance? Was I a peer? Should I ask questions to facilitate direction and sociological thinking?

A recent discussion on an electronic list of college and university based sociology teachers (TeachSoc) had provided many examples of classroom discussion list experiences and not a few suggestions for their future use. Few teaching assistants, however, posted on the topic. The role of one had been merely to record the number of posts per student (anonymous post, 1996), whilst another conducted discussions and

On our list, the virtual community slowly swelled as students came on line. Some were lurkers, some gained the courage to enter into the discussions. Some posted often, others hardly at all. A fairly large group was vociferous from the very beginning. The quality of on-line interaction had concerned several members of the TeachSoc list. They had found that little critical thinking occurred, even when structured questions to encourage this were posted. Those questions tended to be answered somewhat inadequately and discussion did not result as expected. Individual creativity and group dialogue were limited (Scarce, 1996). This was not so in our case. Timidity, at least in expressing one's ideas, did not seem a factor, even for those for whom a list was a new experience. Discussions of newly introduced sociology concepts quickly took off. Discussions weren't limited to textbook concepts, but instead extended to other texts, such as those of poetry and popular culture, as well as brief student narratives of life experiences. Not everyone agreed with others' positions, and the sociology of the list was happily evidenced in vigorous debates. Posts often concluded with questions that were simultaneously deferential and inviting: "What do you guys think?" "Any comments?" "Am I way off track?"

I loitered for a while before subscribing to the list, and once I did. I too lurked. At first students contacted me via personal e-mail about administrative issues or to request advice on essays. Over the course of the term, many continued to use this route. My first forays into what was fast becoming a virtual classroom thus occurred off the list, in my providing of references and suggestions. My feelings about the list itself remained somewhat schizophrenic: I agonized over unintended consequences of directive approaches, yet still wanted to be a full participant. Ironically, my procrastination turned out to be a saving grace, preventing what could easily have become a flaming row between one of the students and myself.

On one day, oppression and privilege were fresh on everyone's minds, because that had been the topic in class. I had used myself as an example to illustrate the consequences of group membership and the power relations between various groups.One student had posted the following immediately after class:

> This brings me to Raewyn's comment about herself being part of a majority, but also part of a minority. She declared herself female and therefore in a minority because of job limitations. Again people make of their life what they want to and for all of those who feel they are part of a minority, GOOD, it allows for more opportunities for us who feel we are part of a majority. I guess the new president of this university has not effected *[sic]* the outlook on women and their job limitations.

I read this as a personal attack, and it was all I could do to keep my fingers from scurrying across the keyboard, tapping out an instant response. Had I failed so miserably in class instruction that one of my students continued to believe that social structure had so little to do with the shaping of our lives? At a more personal level, what of the accusation that I, as an individual, was to blame for life circumstances that was now being constructed as undesirable? Taking netiquette seriously, I waited a few days before replying. In the meantime, many of my

students eloquently intervened, in some cases speaking on my behalf, in others pointing to the sociological aspects of this misadventurous message.

Once the list established itself, the class came to consist of two collective cultures: a virtual community and an IRL ("in real life") community. The latter was an aggregation of personae interacting through words and stories, stripped of the nuances of voice and intonation, of glances, shrugs or smiles. A virtual classroom is one of asynchronous conversation, where multivocality becomes explicit and enhanced, in which those silenced in other circumstances may perhaps participate more fully and aggressively (Maxwell, 1996). This too was noted on the TeachSoc list, and several of those subscribers observed that some of the most thought-provoking comments on their lists came from students who didn't speak at all in the IRL class (Scarce, 1996; Brewer, 1996; Wood, 1996).

All participants could produce messages at once in the virtual community of the list if they so desired. Students entered into and out of the community at will, and subject matter that had apparently faded on the list could resurface at any time. Several discussion threads occurred simultaneously, and not only was there group multivocality, but also individual heteroglossia.

In contrast, it was an IRL community that met to learn in a physical classroom. Characterized by oral language, it was for the most part, a space in which only one person could speak at a time. The teacher became the orchestrator of turn-taking protocol, and group attention became a scarce commodity. Those members of the group most accustomed to wielding power, or the most competitive, usually got the largest share of this resource. IRL communication is based on visual identifiers, whereas in cyberspace, everyone is in the dark (Rheingold, 1993).

The two communities did not, however, exist separately. Discussions oral and virtual opened new discursive spaces, creating new opportunities for learning. Face-to-face classroom discussion was picked up and extended in the virtual classroom, 24 hours a day, seven days a week. Students became noticeably more vocal in the IRL classroom, possibly buoyed by having thought through and tried out their ideas on-line. Other teachers have noted that a class list encouraged an emerging sense of "groupiness," which fed into class morale and identification (Wood, 1996; Rosenwein, 1996).

Computerized learning in sociology has been hailed in the literature as beneficial to students in a variety of ways. Whether seen as simulating the fast changing, high tech environment in which their futures lie (Magnusson-Martin, 1995, pp. 1, 6; Hartmann, 1991, p. 54), or legitimizing the discipline, or providing an alternative learning style to a visually-oriented student population (Magnusson-Martin, 1995, pp. 1,6), the use of computers in sociology classes has been enthusiastically lauded. Teachers vigorously applaud the more creative and independent work-style among students, the classroom high in enthusiasm and engagement with the material, and the students' fast-developing critical thinking skills, motivated by the teacher's new found and enhanced ability to deliver instruction (Hesse-Biber and Kesler-Gilbert, 1994, p. 19). Whilst not referring to electronic discussion lists per se.

many of these same benefits have accrued in the interaction between the physical and the virtual communities of the introductory sociology class.

Misunderstanding as a way to sociology: A student on the list

I felt angry and decidedly misunderstood. I was close to tears as I sat in front of my dull computer screen and stared at the most recent message. The class list had been discussing the notion of culture when I had responded to another student's comment. I thought that my post was in good faith, framed with the respectful decorum expected on our list; nevertheless, this student had come back with a sharp and obviously annoyed retort. After making considerations of my tendency to be overly sensitive, I remained surprised and hurt. Not only had she completely misunderstood what I had written, she also thought that I had personally attacked her. It seemed that 1 had become her enemy and 1 didn't even know why.

I was so perplexed that 1 scanned through my out-box and brought my original post up on the screen. How could she have come to the conclusion that I had specifically challenged her. when I couldn't even recall mentioning her name or questioning the validity of her views? I knew that I had been careful to avoid stridence in all of my posts and rereading them confirmed it. After all, I had been thoroughly trained in the norms thought appropriate for undergraduate students. Academic discourse, I had accepted, always sought to uphold the virtues of mutual respect and maturity. In this spirit, I tried to sift out what had led to her evident irritation.There was nothing. Annoyed myself now by her flagrant misinterpretation, I shut off my computer and vowed to never again submit to the list. That determination lasted less than a day, however, and I was back on the list trying to justify and explain my previous assertions about culture. I had more than one reason to want to resolve that miscommunication. Just a few days before, I had agreed to join my teacher and our teaching assistant in a joint presentation on the merits of a course list. How could I extol the virtues of something that had just proven to be so problematic and irritating?

Until this point in the course, I had recognized the list as a literal space in which I could freely participate with my peers, so that its challenge for us all was one of self-expression and articulation. After this confrontation, however, I began to see the list as a more dynamic and less coherent community, one that often required clarification in its language as it negotiated the uncertain relations between its participants. I quickly learned that my previous assumptions about the list did not capture its totality. The list was not simply a discussion of sociology, but also comprised the kind of social group that sociology took as its object of study. When we argued about sociology, we were reflexively enacting sociological process, and either complying with or resisting the norms of our group. Submitting to the list, therefore, had both literal and metaphorical meanings. Likewise, misunderstanding became both a failure in the process of understanding and a simple disagreement or quarrel.

Regardless of my increased awareness about the list, why this misunderstanding had to rear its ugly head at me was beyond my own reasoning at this point. Wasn't

I the same clear and articulate writer that my high school teachers had praised? Wasn't I the conscientious and agreeable student that I had always striven to be? After some reflection, the paradoxical answer I discovered was that I was and I wasn't. As the debates, rebuttals, clarifications and misunderstandings on the list continued, I began to realize that language did not always function as an effective and objective tool of communication. Not because it isn't a tool, but because it is much more than that.

In fact, these subtleties and discrepancies in the use of language seemed to have somehow transmuted from being problems of communication to the very force, which drove the list. Although these occasional frustrations and misunderstandings first appeared to be nothing short of trivial disagreements, they kept the list alive and open - they thwarted the terminal effects of closure. Misunderstandings required clarification, evoked passionate responses and ultimately furthered the discussion.

Frustration became my teacher. When I was faced with the seeming misunderstanding of my classmate, my frustration pushed me to become aware of the ways in which the incongruities of language could provide alternate ways of approaching a particular issue. The point was that I was still the articulate writer that my teachers had praised, but simply being articulate wasn't always enough. Even clear writing misfired and I was forced to recognize, in good sociological fashion, that such misfires were inseparable from the social locations of myself and my classmates and the social differences between each of us. Consequently, I had to be sociological enough to reinvent my discursive self on the list. When I sat down to respond to my classmate's comments, I had to approach them differently and momentarily deny the "proper" perspective in which I had been schooled so well. As Saul Bellow writes, I was necessarily "drawn back to the periphery in order to return to the center from one of [my] strange angles" (1989, p. 54). It was in this way that I began to grasp how the list paradigmatically challenged the notion that knowledge can be completely embodied between the covers of a textbook or the minutes of a lecture hour. Sociology, I had been taught, prided itself on its reflexivity; it seemed the necessary consequence of the list's distinct reflexivity was the destabilization of sociological knowledge itself. Our experiences on the list began to establish an important sociological lesson about the nature of language and discourse.

In a sense, the list necessarily had to fail in order to succeed. Void of these misunderstandings, the list would not have a life of its own, but rather be a regurgitation of debates we had already read in the text or heard from our teacher. I witnessed how the best sociological discussions were initiated when a student on the list felt passionately about an area of knowledge and had invested an obvious amount of personal interest in it. After all, we had been told that sociology is about discovering why we have these investments in certain knowledges. My frustration with the misunderstanding on the list consequently uncovered my attachment to a specific school of thought. It causes me to return to my opinions

and question why I was so desperately trying to defend them. What knowledge was 1 so concerned about that a simple misunderstanding could bring me to tears? In answering questions such as these, we were all forced to not only talk about sociology, but observe it in our own lives.

My experience of misunderstanding in it multifaceted sense mirrored the discourse on the list, a discourse that indeed depended so much on the angle at which it was held. This and other misundersandings on the list challenged particular perspectives and developed and sustained a thorough contestation of knowledge, one approached from every student's own personal angle.

The Sociology of Virtually Not Communicating

These have been three very subjective and limited perspectives on the ramifications of a list in a sociology class, and it would obviously be poor sociology to extrapolate substantial general conclusions from them. Instead, we will conclude by simply explicating a theme shared by these reflections: the sociology that emerged on and from the list derived less from any communicative efficacy than it did from the way that communication misfired. Each of us was affected by that common and conflicted emergence in our individual ways. For Doug Aoki, the instructor of the course, the list materialized the immanently doubled sense of articulation. That is, the list demonstrated how social discourse consistently and irreversibly moves in various ways beyond the strictures of any communicative intent. It is a sociological truism that the pedagogical discourse of sociology is itself a variable social production, but sociology instructors can always profit by being reminded of that fact, and one asset of the list is how it never ceases to make that reminder. The implication is any consistent sociology must teach the inevitability of its own inconsistency, it's own thorough lack of epistemological or pedagogical mastery. For Raewyn Bassett, the teaching assistant, the list delivered two related lessons on pedagogy and sociology. First, the interactivity of the list means that any teacher can be confronted with the impossibility of communicative mastery- as crystallized for Raewyn in that awful moment when she had to ask herself, "Have I failed so miserably in class?" Second, the list, because it is both interactive and multivocal, and can at least partially recuperate that impossibility as pedagogical success. Raewyn also discovered that the peculiarly reductive nature of identity on the list forced her to reconsider her identity in the classroom. It is in such ways that the virtual continually returns to the "in real life." The sociology of identity was also a critical issue for Angela Pridmore, as a student on the list. Miscommunication there unexpectedly pushed her into an engagement with sociology at a personal level, with an intensity that unproblematic communication never could have accomplished. In a way, she discovered herself through the list precisely because she resisted how others interpellated her on the list. Her identity, and thereby the production of identity, were revealed as deeply social and discursive, and these were no mean sociological lessons.

Self-knowledge and the inconsistency of knowledge; teaching and its confrontations; language and its complications$^{3}/_{4}$ these are all aspects that we hold

to be vital to sociology and its pedagogy. One of the large benefits of the list that we each experienced, albeit in different and differently located ways, was its ability to make these aspects tangible and thinkable, even if always virtual. We have therefore come to believe in the value of such a list for a certain special capacity: it allowed us to not communicate.

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Computer Mediated Communication Inside a Classroom: A Study Using CMC Technology with ELT Students

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Abstract: A team of teachers, with little prior experience of CMC technology, learned how to design and conduct activities to teach language, communication, and employability skills to a culturally and linguistically diverse class of students. The learning activities were unique in that they used the potential of CMC to foster collaboration among students and between students and teacher to teach students the employability skills they need to perform successfully in today's work place with its emphasis on teamwork. Group journals, audio- and videotaped observations, and interviews were used to provide an on-going record of the students" and teachers' responses to CMC technology and its usefulness in learning and teaching.

Resume: Une equipe d'enseignants qui avaient peu d'experience avec la communication par ordinateur (la technologic CMC), ont appris a elaborer et a mener des activites visant I'enseignement de la langue, de la communication et des competences relatives a I'employabilite a un groupe d'apprenants avec des antecedents culturels et linguistiques divers. Les activites d'apprentissage etaient uniques en ce sens qu'elles profitaient du potentiel de la technologie CMC pour encourager la collaboration entre apprenants d'une part et entre les apprenants et I'enseignant d'autre part, dans le but de faire acquerir aux apprenants les competences relatives a I'employabilite qui sont necessaires pour reussir sur le marche du travail actuel qui favorise le travail en groupe. Les reactions des apprenants et des enseignants a la technologie CMC et a son utilite pedagogique ont etc saisies par le biais de journaux de groupe, d'enregistrements audio et video, ainsi que par des entrevues.

Introduction

To prepare for post-secondary studies in business, technology, trades and career programs and for success in the workplace, English language training (ELT) students (also referred to as ESL students because so many have English as a second language) need to acquire high-level communication, cultural, and employability skills as well as language skills. We conducted our study to explore the potential of e-mail, conferencing, and chats for helping students acquire those skills.

We will begin by providing background information on the need for ELT students to acquire such a wide range of skills and by giving an overview of our study. We will then discuss the unique features of our use of CMC and make recommendations for our co-pioneers in the use of CMC in and outside the classroom.

Needs of ELT Students

Each year thousands of new immigrants (41,252 in 1994) arrive in British Columbia, mostly from Asia, the Middle East, Eastern Europe, and Central America (Ministry of Education, Skills, and Training [MEST], 1996 August). Nearly half of the elementary and secondary students in Vancouver (49%) and Richmond (42%) need ESL support. The need for ESL support for students in the other municipalities of the Lower Mainland ranges from 15% (North Vancouver) to 21% for Burnaby and 25% for Surrey (The Province, 1996 November 19). Relevance and access are two primary goals for the public post-secondary education and training system in British Columbia, as outlined in the Ministry planning document, Charting a New Course (MEST, 1996 March).

Need for Relevance of Instruction

Relevance for ELT programs in B.C. is defined in terms of the students' employment, settlement, and citizenship needs and their need to understand and interpret the context in which they live and to make informed choices (Koehle, 1996 June). While 42.7% of students in a MEST survey reported participating in Canadian life as their single most important reason for studying English, 17.8% reported they were studying English to get into a college or university, and 15.5% said they wanted to improve their English so they could get a job (1996 August).

The main reasons for students entering our ELT program at the British Columbia Institute of Technology (BCIT) are, according to the same MEST survey, to prepare for further studies (49%) or to improve career prospects (23%). In 1993, BCIT surveyed instructors, graduates and employers on the skills needed for all graduates of its two-year technology diploma programs. The nine skill areas identified in the survey, in order of importance, were: problem solving and creative thinking, oral, interpersonal, teamwork and leadership, writing, reading, visual literacy, electronic office, and intercultural (BCIT, 1994).

Debling and Behrman identified 13 employability skills required in new recruits by small- and medium-sized businesses in B.C., including knowing the business, exploiting information technology, behaving appropriately, speaking and listening, and writing (1996 July). The Conference Board of Canada identified three areas of "foundation skills for employability": academic (communicating, thinking, and learning skills), personal management (positive attitudes and behaviours, responsibility, and adaptability), and teamwork (1992).

Need for Access to Instruction

Koehle's study (1996) of ELT programs in British Columbia found that access to ELT programs is provided only to "a reasonable extent" (p. 5). According to Koehle, interactive technology and distance delivery have attracted interest as a way to "improve and enlarge access" (p. 5). However, he also points to problems anticipated with students of certain levels in certain skill areas. The study concludes that questions of student acceptance have been raised and that "ELT service providers should thoroughly research and assess technologically accessible learning

systems in order to ensure that these systems not only provide access within financial constraints but do so with a human face accessible to ESL students" (Koehle. 1996, p. 5).

The challenge for teachers, curriculum designers, and program administrators is to transform the classroom into a site where such a sophisticated combination of skills can be acquired and practised by such large numbers of linguistically and culturally diverse students.

Overview of the Study

BC1T offers certificate, diploma, advanced diploma, and degree programs in business, engineering, and health technologies and in trades. The Institute has approximately 6,000 full-time and 36,000 part-time students. The goal of BCIT's Pre-Entry Program is to give students the language skills they need to communicate effectively at BCIT, and, later when they graduate, in the technical and business work place. Over 800 students a year are registered in the program, which is taught by 10 to 12 instructors.

For our study, we developed two CMC modules for an existing 88-hour course in the Pre-Entry Program, Introduction to BCIT for Students of English as an Additional Language. The course met from September to December 1996, with 14 students, in an Advanced Management Technology Lab, for which the School of Business waived its normal lab user fee. The two CMC modules were taught in the first hour of one of the course's twice weekly four-hour sessions. Each module consisted of five one-hour sessions, for a total of 10 hours for the entire CMC component.

Objectives and Assumptions of the Study

The two objectives of the study were 1) to use CMC to teach language, communication, culture, and employability skills, and 2) to build a team of teachers with the attitudes, knowledge, and skills needed to design, develop, and teach curricula using CMC.

The study was based on two beliefs. The first belief is that people with limited English language skills can wrestle successfully with a high level of computer technology, communication tasks, and intercultural techniques, at the same time they are learning English. Students with limited English language skills should not have to wait until their English is "good enough" before engaging in higher level and high status tasks. The second belief is that CMC technology might offer unique techniques for teaching and learning. These techniques could only be discovered by having teachers and students use CMC in the classroom. The study set out to discover them.

Student Participants

Of the original 16 students, 75% were male. Nine of the students were 25 to 34 years old, six were 18 to 24, and one student was 35 to 44. Three students had Grade 12 or less, four had some college or university, five had a college certificate

or diploma, one had a trades certificate, and two had a university degree or professional designation (one student left that question blank on our survey).

We decided not to pre-screen the students for high levels of interest in or familiarity with computers or for an advanced level of English. Because the Pre-Entry Program is a revenue generating program, we could not afford to use CMC if it meant turning away otherwise eligible students who were prepared to pay the tuition.

We surveyed the students in two other sections of the same course to ensure that our group was representative. We also compared the student demographics in all three sections of the course with the demographics for the whole program in regard to sex, age, and level of education. In addition, we examined the written pre-tests of the students in all three sections to ensure their level of English was similar.

All but two of the students in the study had their own computer at home or had access to a computer. Almost 70% had used a computer at work, and seven had taken computer-based training. Thirteen had used Windows, and five had used e-mail and six the Internet. Fifteen of the students either strongly or completely agreed that computers could be helpful in learning English; one student was not sure. We surveyed the students' feelings about computers and computer-based training for learning English by giving them an illustrated series of five facial expressions from a large smile to a large frown. None of the students chose a frown to illustrate their feelings about computers, although two chose a neutral expression. Ten chose the large smile. In regard to computer-based training for learning English, eight students chose a large smile, six a medium smile, and two a neutral expression.

Teacher Participants

As early as May 1995, six teachers, including the Pre-Entry Program Head, began to think of ways of using technology in the course for which we later developed the CMC modules. These teachers had been part of a team that had been developing three modules to revitalize and update the course, and the idea to use CMC was an outgrowth of that project. We received an Instructional Enhancement Grant from our institution's Learning Resources Unit for training on how to use the CMC software to teach.

The teachers on the team were not experts in the technology: one teacher had to learn Windows in order to use the CMC software. They were all enthusiastic and willing to learn. In addition, the technical support person for Distance Education at our institution, gave us technical training and assisted in all sessions with the students.

In May 1996, we received a Locally Initiated Curriculum Project grant from the Centre for Curriculum, Transfer, and Technology of MEST to prepare curriculum materials which would include the rationale, learning outcomes, resources, student learning activities, class organization, skills taught, and assignments and evaluation instruments.

Advisory Committee

We formed an advisory committee of people at our institution who were unconnected with our subject matter but interested in Internet technology, distance education, curriculum development, and other subjects taught at BCIT.

Unique Features of the Study

Unique features of the study include the student learning activities which reflected our integrated approach to the teaching of language, communication, computer, and employability skills and cultural awareness, and our use of journals, videos, and audio interviews to provide an on-going record of the students' and teachers' responses to CMC technology and its usefulness in learning and teaching.

Student Learning Activities

The CMC course component consisted of two modules. The first module, Learn How to Do CMC, taught students how to open, reply to, and send e-mail and how to open and send conference messages. The students learned CMC while they were using it to do something else and they had to communicate with each other to do it, in the same way, for example, that many teachers learn to word process in order to produce their teaching materials, that the general public learns how to use a VCR in order to watch videos, and a technician learns how to operate a certain piece of equipment in order to test the quality of a product. In all these cases, the technology is a tool, which people learn how to use so they can do something else they need to do.

Emphasis on Work Place Language and Employability Skills

This approach to technology as a tool for getting a job done is similar to the function of language in the work place, where language only commands attention when it is related to content, that is, when it either aids or interferes with successfully completing the work task at hand (Vance & Fitzpatrick, 1994).

In Module 1, the students learned how to do CMC in order to survey their class. We chose to have the students survey each other on their knowledge, skills, and attitudes toward computers, but they could survey each other on any topic. Module 2, Learn How to Use CMC to do Group Problem Solving, taught students how to use chat and conferencing to follow a common approach to problem solving: to decide upon criteria, gather information, evaluate according to the criteria, and arrive at a consensus solution in groups.

The problem we selected for the students in Module 2 was to choose a business, engineering technology, health or trades program they wished to enter. Again, the students could have turned their attention to a very different problem, using the same problem-solving approach and developing the same skills. Because the module is designed to teach employability skills and cultural awareness in context, the problem should be practical and applied, rather than theoretical. For example, proposing an office recycling system is practical and applied, as opposed to discussing the Greenhouse Effect. In addition, the problem must be presented in a

way that requires the students to make choices, so that students are not merely learning the rules and conventions of English, but also engaged in deciding what to say and what to do in order to achieve an intended, immediate, practical result (Mohan, 1986).

Students received a schedule of activities for each session. In the list of outcomes for each module, language skills were always listed third, between computer skills and communication skills and organizational skills and employability skills, so that the students could see that the skills were interrelated and that it would be impossible to develop language skills without developing the other skills and impossible to develop the other skills without having language skills.

The communication and language skills.featured were those most needed in technology: defining terms, asking questions to gather data and to ensure data is clear and adequate, and giving and receiving instructions. The emphasis on feelings (students were expected to identify and use four common expressions each for describing positive, negative, and neutral feelings) was based on the increasing demand in the work place for effective oral and interpersonal skills (Cradock, 1992; Maes, Weldy, and Icenogle, 1997; Waner, 1995).

Netiquette Exercise and Culture Surveys

By culture, we meant a system of beliefs, values, customs, and behaviours that a group of people shares and that causes them to see the world differently from another group. We also meant the "unwritten manual" that members of a group often do not even realize they are living according to but which causes them to feel uneasy and sometimes even hostile when someone else doesn't live by their manual.

We used the term culture in its broad meaning so as to include, for example, the culture of a people with its own language and its own country, the culture of the Interior of British Columbia, the culture of a specific business, and Internet culture. Thus, our Netiquette Exercise, which is based on a handout distributed in an informational technology department in the work place, covers the need to respect confidentiality and privacy, ignore hoaxes, avoid flaming, and be sensitive to cultures that may be more or less formal and more or less direct than yours.

We understood multiculturalism in Canada to mean that all cultures are respected, that individuals define their own cultural identity, and that no individual is required to assume any other cultural identity. The object is to increase the students' and the teacher's awareness of cultural differences and similarities and the effects they can have.

Thus, the outcomes for the second module include being able to recognize the importance of stating personal preferences for an individualistic approach to problem solving, being able to explain four characteristics of an individualistic approach, and being able to describe the problem-solving approach the student prefers.

Students completed a problem-solving survey which consisted of a series of statements requiring them to agree or disagree on a five-point scale. While the statements, for example. "Conflict within a group can lead to better decisions" and "I sometimes have to pretend I understand what someone has said in order not to embarrass them or make them feel bad," are based on research on cultural difference (Bosley, 1993), the survey is meant to be no more "scientific" than self-administered surveys from popular magazines and is intended solely to stimulate self-reflection and discussion. The culture survey applies to the teacher's experience as well as to the students, and there are no right and wrong answers. In this way, the survey avoids a hazard of some activities for teaching culture to ELT students where the activity is "used as a club over the head of the student or as a subtle method of having students give up their 'bad behaviour' and learn how to 'do it right'" (Archer, 1986, p. 176).

Teamwork and the Changing Role of the Student

Most of the activities in the two modules required the students to work in groups of three. The teacher assigned the groups so that each group included at least one student with relatively strong computer skills. We justified teamwork to the students as being critical to their success in their post-secondary studies and in the technical and business work place. The employability skills taught to students were the ability to assess their work team's strengths by identifying the knowledge, skills and attitudes of the team members; assess their work team's effectiveness by recognizing what they are doing well as a team and what they need to improve; compare themselves to others in a balanced, objective way in order to develop an appropriate level of confidence; give and receive effective feedback by stating the positive, the neutral and the negative and by providing sufficient detail; and work together to reach a consensus decision.

The effect of having the students working in groups was to move the students from a "passive-receptive" into an "active-productive" mode and to "shift the responsibility for discovering and creating knowledge from the teacher back to groups and individual learners" (Gajdusek and Gillotte, 1995, p. 51). The students' schedule of activities consisted of a series of tasks with models, notes, questions, examples, and evaluation tables, which served as a "scaffolding" or "stepladder" for the students to use to guide them through the tasks at hand and subsequent activities (Applebee and Langer, 1982; cited in Gajdusek and Gillotte, 1995, p. 49).

The Changing Role of the Teacher

The teacher did not teach front and center; the students received her instructions and her feedback on their work by e-mail. She observed the students at their terminals, intervening only to encourage, recognize achievements, and lead those who had gone astray back to the right path. The emphasis on teamwork had an effect in the classroom similar to the effect it has in the work place: the classroom

became flatter and less hierarchical in structure, and the students less isolated, more interdependent, and more apt to cooperate and take risks.

The teacher's role changed in ways similar to the ways a manager's role changes in a work place that adopts teamwork (Sherriton and Stern, 1997. see pp. 53-60): the teacher was less in control, responsibility was shared between teacher and students, much of the work formerly done by the teacher was delegated to the students, the students were empowered and the teacher ceased to be the center, information sharing increased, the teacher became less distant and autocratic, and the teacher was better able to observe the process and evaluate the results.

At the beginning of each session, each group of students opened a journal message from the teacher responding to the group's last journal entry and giving the group instructions for the next. At the close of each session, the group completed its journal entry for that session. Students were frequently asked to report in their journal on how they were functioning as a group. Thus, by structuring a time-out for reflection on process, the journals formed the foundation for effective teamwork, which is to ensure that "teams are mindful of how things get done as well as what" (Sherriton and Stern, 1997, p. 185).

On-going Record of Students' and Teachers ' Responses to CMC Technology

The weekly journal provided an on-going record of the students' response to CMC and served as a "feedback loop" for the teacher and students on the effectiveness of the CMC modules for learning computers, English, and teamwork. The students always received specific questions to answer in their journals, and we composed the questions weekly based on the current week's outcomes and the last week's journal entries. The teacher's journal entries included detailed feedback on the language and content of the groups' entries.

Student-Teacher Communication in Journals

In their first-session journal entry, one group e-mailed the teacher that they would like to receive and send individual messages as well as group messages. When the teacher responded by announcing that the students would be sending individual messages at the next session, the group e-mailed in their journal entry how excited they were that they had communicated by e-mail with the teacher and that the communication had worked. The teacher noted in her journal entry that she was happy the group had acknowledged her response.

When some groups reported in their journals that they needed more time to finish their work, we, in our weekly CMC development meeting, rescheduled activities to give them more time. One group reported they found it more interesting to receive messages than to send them, and so we planned activities to ensure the group received at least as many messages as they sent. We asked students in their journals if they preferred instructions on computers to paper instructions, and when we received mixed responses, we continued to offer both electronic messages and hardcopy handouts.

When we asked the students how the computer was making it easier to learn English and how it was making it more difficult, some groups reported that they found they made fewer mistakes on the computer than writing by hand, whereas others reported that it was more difficult to find and fix errors on the computer. One group reported that they didn't have enough time on the computer to explain their ideas. As a result, we had the students print some of their messages and expand and revise them by hand.

Similarities Between Electronic and Hardcopy Journals

Thus, the group journals allowed us to respond quickly to meet student needs and to let the students know we were responding. We found that the "electronic" journals served similar functions to the "hardcopy" journals used by other teachers. They allowed students to engage in "real communication directed to a real audience" (Green and Green, 1993, p. 20). According to Kirby and Liner (1988, p. 60), in their journals students "volunteer all kinds of evaluative comments about the English class, and they usually do it in ways [the teacher] can accept and profit from." Furthermore, the teacher's response, when it is to change a class routine, reinforces the students' view of communication as a real activity that produces results. In this way journals allow students "to experience the satisfaction that comes with writing to be read and acknowledged" (Spack and Sadow, 1983, p. 589) and acted upon.

Applebee (1984, 1986) complained that writing in school should not be produced solely for teacher evaluation; writing should have a "genuine communicative purpose such as informing, persuading, or narrating experiences" (Green and Green, 1993, p. 20). Thus, journal writing provides students both with a real audience and an achievable purpose for writing and serves as a "developmental bridge or scaffold" (Gajdusek and Gillotte, 1995, p. 49) to academic and transactional writing (Green & Green, 1993, p. 23; Staton, 1988, p. 198).

Abrams (1987, p. 12) describes journal writing as "interactive writing" that aids learning in a way that is similar to the way children learn language by interacting with others. In the teacher's journal replies, students are able to "read a personalized text" (Staton, 1988, p. 200). Referring to James Britton's work on The Development of Writing Abilities (1975), Hirsch (1988) describes the importance of having students explore what is new to them and relating what is new to what they already know and in this manner to make the subject matter their own. Curry (1996, p. 30) uses journals to teach managerial communication to ESL students and finds journals useful to "explore students' feelings and opinions about writing," in the same way that we used journals to explore the students' feelings and opinions about learning computers, English, and teamwork.

The students' writing, including their journal entries, was generally evaluated solely in the manner in which all work place writing is evaluated: you don't get a mark for it; the only test is whether or not the message achieves results. Only the final piece of writing, which the students printed and edited on paper, was graded. The group journal entries were never graded.

Student Groups ' Responses to Using CMC to Learn English

For their final journal entries, we asked the groups if they would recommend someone take the course with the CMC component or without it. All five groups recommended the course with the CMC component for the following reasons: 1) CMC makes learning English more interesting and exciting and less boring (four groups mentioned this reason); 2) CMC teaches you how to work with partners (one group), and partners help you learn English (two groups); 3) CMC allows you to learn English and computers together (two groups); 4) Computers help you learn English faster and better (two groups); 5) You learn computer skills (two groups) and computers are important and a must to know for the future (two groups).

We video - and audiotaped one group during Sessions 2 and 3 of the first module. At least a third of the comments made in the group were procedural: what to do next and how to do it. Procedural comments ranged from the students reading the outcomes and the schedule of activities aloud to clarifying the task ("We have to compare with Group B. Compare what?") to figuring out how to do CMC ("I don't know what happened. It's [the message] gone. Maybe we can find it."). The rest of the students' comments were concerned with grammar ("But don't put 'will' because it is past tense. 'We have learned how to.. .."') and content ("How about, 'Tell me more about you think it is a necessary skill for you'?").

In the students' chats, which they conducted in groups of three, to brainstorm their criteria for choosing a program of study, the student in charge of the chat and even the other students participating made several comments to keep the group on task, such as "to everybody, what are your criteria", "everybody, give me some other criterion, please" and "Thank you. Robert, I think this is a good criterio[n]. But, how about the cost of the program, time, etc."

Individual Students' Responses

Each person in the group that was videotaped was also interviewed individually.

Their individual responses to learning English through computers were as follows:

> Student A: [I] find computer really interesting. So, better than sitting in the classroom. At least you don't get bored. Time is really fast. Everybody thinks like that. We use [computers] because everybody in the world use the computers. If I want to study, I have to get interested. Most important thing is to get an interesting thing - learn really fast. Everybody uses the computer so you have to learn. Best way [is] to learn English and a computer. You can learn English while learning the computer.

> Student B: [I] like something I can touch like a textbook. Computer makes me feel uncomfortable. You can highlight a textbook, take notes. Computer you need to look at a screen. If you want to take notes or do writing it is impossible. It's my personality. [I] like textbook. They [others

in the class] learn write e-mail but not English. I don't think they use much writing skills in writing e-mail. Mostly just send and receive e-mail and do our schedule. [Recommend] less computer time.

Student C: Everytime you can learn something new about computer. Netiquette not usual in my country. Where I work . . . used some software, programming, never use e-mail. I didn't see clearly what I can learn. Now I can see. You must become familiar with terminology in English. When you write e-mail, you have to use grammar. Maybe some people they didn't realize they are learning but I think so they are learning. I feel more comfortable when I write on computer because I'm used to. You have more facility if you make a mistake. It's a tool for the language. You learn in the standard classroom, and you can apply that on computer.

Teachers' Responses

The team of teachers had their final training session by observing the students in one lab and then conferencing and chatting on their observations of the students, who were sending messages, asking questions, and revising and resending their messages when they were required to clarify their requests in order to get the information they wanted. According to one of the teachers, "Overall, I would say the computers were making it easier for the students to learn English - they get a number of chances to get it right, and they're able to see that the receiver was able, or unable, to understand their message."

One teacher commented on how much pressure there is on everyone in our society, including teachers, to learn the new technology or be left behind, and remarked how. for the students, "the pressure is compounded by the fact that learning new technologies, for the most part, means learning in English. In this way, lack of fluency in English and lack of computer skills become interlocking forces of marginalization." This same teacher also questioned the validity of separating computer skills from English and group work skills, "as if they were not part of one complex experience."

Recommendations for Our Co-pioneers

CMC offers unique techniques for learning and teaching by providing students and teachers with an exciting tool for communicating with each other. E-mail, chat, and conferencing tend to demand, or at least to entice others to, an immediate response and thus promote collaboration. For this reason, CMC is particularly well-suited for learning and teaching language and communication skills and such employability skills as teamwork and interpersonal skills.

Effectively using CMC for collaboration and teamwork needs to be taught: participation by groups and individuals in a valuable exchange of information does not automatically occur because someone posted a topic and told everyone to talk on-line. Furthermore, collaboration, teamwork, communication, interpersonal,

and intercultural skills are required in all fields of study. Therefore, we recommend teachers and curriculum designers, who work in many different subject areas and with students of various levels of linguistic and intercultural competence, structure activities that provide the stimulus and guidance to allow their students to build on their existing skills in these areas and to develop new skills. We also recommend that teachers and curriculum designers use on-line and in-person journals, interviews, and observation to evaluate how effective CMC is in helping students and why.

We recommend teachers collaborate in teams to use CMC in their courses. The teachers themselves can use CMC to communicate with each other and thus will become co-participants with the students in any studys with the technology. The teachers will need to be flexible, to be able to cope with sudden disaster, and to be willing to adopt the sense of confidence and humour that teamwork helps instill.

We recommend that administrators acknowledge the value of using CMC both inside and outside the classroom and allocate the support resources needed to train and build teams of instructors and to provide necessary technical support.

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Book Reviews

Diane Janes, Editor

Distance Education: A Systems View. Michael G. Moore and Greg Kearsley. Wadsworth Publishing Co., 1996. ISBN 0-534-26496-4.

Reviewed by Mark Bullen

Anybody involved in the teaching of distance education knows that finding a good textbook on the subject has been a difficult task. There have been several attempts to produce introductory books on the topic but they have not been very successful. Moore and Kearsley with their Distance Education: A Systems View go a long way to go a long way to filling that gap.

Their book presents an avowedly systems and American perspective on distance education and as long as that is kept in mind and other sources are used to balance the picture, then the Moore & Kearsley text fulfills a useful function in the field of distance education as a subject of academic study.

The first three chapters provide the historical and contextual background of distance education by defining the term, describing the systems approach, discussing the various forms of distance education and tracing its development from correspondence education through to a brief mention of computer networks and multimedia.

Chapter Four provides a summary of research on various aspects of distance education: effectiveness of technologies, media effectiveness, effective course design, teaching strategies, cost effectiveness and policy research.

Chapter Five focuses on how different technologies and media are used in distance education and Chapters Six through Ten deal with the different components of a distance education system: course design and development, teaching and tutoring, the distance education student and administration, management and policy.

Chapter Ten presents an overview of distance education theory. Chapter Eleven describes distance education activity in some countries outside of the United States, and Chapter Twelve presents some issues related to the restructuring of education that the authors claim will be the inevitable outcome of the growth of distance education.

This book certainly does not fall short in its breadth of coverage. The twelve chapters cover most of the important aspects of distance education, but it is a relatively short book (246 pages) and most topics are dealt with in only a few pages. The chapter on the theoretical basis for distance education, for example,

contains only 15 pages. Otto Peters work is given three paragraphs and the work of Bjore Holmberg is only mentioned in passing in the discussion of Moore's theory of transactional distance. The theoretical contributions of people like Terry Evans and Daryl Nation are not mentioned or provided as options for further reading. In the Technologies and Media chapter, computer conferencing is covered in one page and there is no mention of the Internet and the World Wide Web. The authors admit in the preface that the book is "somewhat superficial". They justify this by saying it is an introductory text "intended to give an overview of the field and, quite frankly, to make a complex subject as simple as is appropriate for a first reading about the field." Simple and superficial are not synonyms. The book is designed for graduate students who should be used to dealing with complex concepts. Distance education is not a self-contained discipline with its own concepts and terminology. It draws on other fields such as educational psychology, adult education, and educational technology, fields that most graduate students will already be familiar with. There is no need to "dumb down" an introductory book on distance education simply because it is the readers' first exposure to the subject.

Despite some of its shortcomings, Moore and Kearsley's book is a valuable contribution to the literature on distance education and anybody teaching the subject will find it useful. However, it is not the comprehensive text that one might expect and so it should be used in conjunction with other readings to provide a balanced picture of the field.

REVIEWER

Mark Bullen is a Project Manager in the Distance Education and Technology division of Continuing Studies at the University of British Columbia. He is currently completing a PhD in Adult Education. His research interest is in the area of instructional design and computer-mediated communication.

The Program Evaluation Standards (2nd Edition), The Joint Committee on Standards for Educational Evaluation. London: Sage Publications, Ltd., 1994. ISBN 0-8039-5732-7

Reviewed by Brian D. Kerr

> "A standard is a principle mutually agreed to by people engaged in a professional practice, that, if met, will enhance the quality and fairness of that professional practice, for example, evaluation" (p. 2).

The Joint Committee on Standards for Educational Evaluation has compiled 30 standards, which are based on "...knowledge gained from the professional

literature as well as from years of experience by educators and evaluation specialists." The goal was to develop standards to help ensure useful, feasible, ethical, and sound evaluation of educational programs, projects, and materials.

They have organized their Standards according to what they feel are the four important attributes of any evaluation: utility, feasibility, propriety, and accuracy. The Utility Standards are identified to assist with the planning of an evaluation and cover a range of preliminary steps from stakeholder identification to information selection and scope; Feasibility Standards cover evaluation design and procedures; Propriety Standards concentrate mostly on ethics such as the rights of human subjects, disclosure of findings, responsibilities, conflicts of interest, and things of that nature; and Accuracy Standards focus on the findings of a particular evaluation, and examine the validity of results.

The Joint Committee explains that, these Standards are to be used as guiding principles, and not rules. It is stated in their that the aim of this book is to act as a guide for evaluating educational and training programs, projects, and materials in a variety of settings. Although, the Committee does caution that, "The Standards alone cannot guarantee or ensure the quality of any evaluation. Sound evaluation will require the exercise of professional judgement in order to adequately apply the Standards to a particular evaluation setting" (Preface, xviii).

The intention of this book on Program Evaluation seems to be to help people make decisions concerning evaluations and evaluation methodology. This covers everything from designing evaluations, to judging the findings and recommendations of any evaluation report. But please note, the Standards do not present specific criteria for making judgements. Again, according to the Joint Committee, "...they are intended to stimulate and facilitate thoughtful dialogue among clients, evaluators, and other stakeholders, and, where the evaluation is conducted by an evaluation team, reflection within the team itself (p. 4).

The Joint Committee has developed a systematic public process for establishing and testing their new Standards. The process involved many experts in, and users of, evaluation. It was impressed to thumb through the nearly 10 pages of Appendix which documented all the support groups having input into this project.

The Joint Committee explains that the Standards were developed for use by teachers, administrators, school board members, trainers, evaluators, curriculum specialists, legislators, personnel administrators, counselors, community leaders, business and educational associations, parents, and others. Basically, that means anyone who commissions or conducts an evaluation, or who uses evaluation results to improve education and training. Now that encompasses a pretty large and diverse audience!

The book begins with what is called a "Functional Table of Contents", where all the Standards are reorganized in terms of the major tasks for a program evaluation (i.e., deciding whether to evaluate, designing an evaluation, collecting information, analyzing information, as well as reporting, budgeting, contracting, managing, and staffing an evaluation). The entire book is organized in a similar

fashion. Right from the start a set of general steps are provided as a suggestion to follow/consider when applying the Standards. The book has four sections associated with the earlier-mentioned evaluation attributes (i.e., utility, feasibility, propriety, and accuracy). Each representative section begins with an overview of the specific attribute and associated Standards, then in smaller sub-sections, each standard is examined in detail beginning with a definition and an overview of intent, followed by guidelines and common errors associated with the application of that standard. For each standard, illustrated case studies are provided (at least one, usually two) that act as an aid to the reader in understanding the practical application of the standard in question. Each case or scenario is laid out to help the reader identify how to best use the standard, while examining the various attributes as related to the case in point. A final analysis is also provided, and of course, every section is followed with references to supporting documentation.

The book is well organized and easy to read. I especially like, and regularly use, the "Functional Table of Contents" which takes the reader right to the information being sought. The book itself is designed for reference with dark tabs on the outer edge of each page to assist the reader when s/he is thumbing through to find information on a particular standard. The black and white typeset throughout the book may not be a feast of colour for the eyes, but the content is still very clear and easy to read. I applaud the page layout and organization of content.

As a bonus, the Joint Committee has also supplied a checklist for applying the Standards, and permission has been given to photocopy this form. In addition, a process is suggested/offered to be used with this checklist to help promote effective evaluation practices and to serve as an audit for any evaluation process.

And, last but not least, a comprehensive glossary of evaluation terms is provided. While not quite as detailed as Michael Scriven's Evaluation Thesaurus (4th ed., Sage, 1991), it is a nice addition, and makes this book an ideal desktop companion for evaluators at any level.

The only downside I can see would be for those who are not adequately familiar with evaluation terminology. Such individuals may quickly start to wear a path to the glossary at the back of the book, and this may disrupt the flow of information. Regardless, the book definitely offers a wealth of information for the evaluator, whether new or experienced. I have no hesitation in recommending this book to anyone with an interest in evaluation.

REVIEWER

Brian Kerr is a Graduate Student involved with Instructional Design/Development and Evaluation at Memorial University of NF, St. John's, NF.

Microware Reviews (by Title)

Book Reviews (by Title)

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