Explorations in Extending Educational Interaction

Findings from the Second Implementation of the Distributive Environment for Collaboration and Learning
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This is the second monograph written by the authors that examines the efficacy of distributive learning. It examines and reports the results of a detailed evaluation of a second course taught to BT managers in London by University of Michigan Business School faculty in Ann Arbor through communications technology. The course subject is “Developing Effective Leaders” and the course design and delivery builds on the findings from the first course, which was the subject of the previous monograph.

Like the first offering, this course was taught using the model we call the Distributive Environment for Collaboration and Learning (DECAL). DECAL is a modern approach to educational communication. It integrates asynchronous and synchronous mechanisms to support flexibility, continuous interaction, community formation and collaboration in both local and distance learning contexts. This report is a summary of evaluation data gathered during this “Developing Effective Leaders” course.

The critical learnings from the first program were that the participants must be technology proficient, have good working technology and support, and that the course content must be seen as immediately relevant to the work responsibilities. These issues were all satisfactorily addressed in this second course, and, as a result, this monograph mainly focuses on issues of course design and instructional design.

The evaluation shows that the DECAL approach holds real promise. The issues that plagued the first course were successfully overcome, resulting in the participants being able to fully engage the course. The major findings emerging from this second course are that synchronous sessions must be designed to be highly interactive, and
whenever possible all presentations should be moved into the asynchronous environment. The evaluations also reinforced the importance of team project work and community formation to the learning experience.
In today’s business environment, knowledge is a critical competitive advantage. Recognizing this, progressive companies are viewing learning as a continuous process of collaborative experiences, formal education and informal learning. In a world wired for technology, there is little distinction between where one form of learning stops and another starts. To accommodate this integrated approach to learning, progressive companies are seeking technology-based management education that can be delivered directly to the workplace.

Since 1992, the Business School has been developing technology-based instruction for its Global MBA program, and for the last two years has been delivering experimental courses directly into the workplace. Delivering and evaluating in-company experimental courses is how we learn about the use of technology-based learning environments. These courses are based on current research and our previous project experience.

This report is the result of the analysis of data gathered during the development and implementation of a course, called “Developing Effective Leaders” (DEL), conducted with BT participants during the winter of 1998. This is the second course we have conducted with BT. Like the first one, discussed in an earlier monograph (Mercer & Barritt, 1997), the DEL course blends synchronous (video conferencing) and asynchronous (World Wide Web) interactions using digital communication technologies. We call this instructional model the “Distributive Environment for Collaboration and Learning” (DECAL). With DECAL, asynchronous Web-based interactions are appended to the traditional classroom model of discrete
interactions and time dependence (class sessions) to create a hybrid synchronous/asynchronous communication environment of ongoing interaction and relative time independence.

The design process followed in this second course was the same process outlined in the April 1997 monograph. Two fundamental principles were followed:

1. The design of the project was based on careful investigation and full understanding of the instructional context.
2. The process was circular, with project evaluation feeding back into design and development via both formal and informal processes.

We gathered data using a variety of methods based on a qualitative research paradigm. Interviews were the primary data-gathering technique with additional data gathered by observations, surveys, and Web site use data analysis.

This document is a report on the findings from this second course and the conclusions and recommendations derived from them. It is intended to be of primary interest to faculty and program managers considering DECAL-style courses.
DECAL, the “Distributive Environment for Collaboration and Learning”\(^1\), changes educational interaction from a conventional model of discrete synchronous interactions and time dependence to continuous interaction and relative time independence by integrating online asynchronous communication and interactions. The DECAL instructional model is a hybrid of asynchronous, Web-based communication mechanisms and synchronous face-to-face communication mechanisms. (This and other combinations of digital communication mechanisms are referred to as “mixed mode” by Berge (1996).) The DECAL mixed-mode instructional model and various characteristics of integrating online asynchronous interactions into an educational context, are, as Kaye (1989) points out, not only appropriate for distance education but can...

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\(^1\) This description of DECAL is a revision of text from the April 1997 report (Mercer & Barritt, 1997).
apply equally well to conventional, non-distance classroom teaching. “Asynchronous” in this context refers to interaction which is spread out over time; individual participation can occur at different times. In computer network-based, “online,” asynchronous interaction, individual contributions to a “conference” or some other form of (usually) written interaction are stored electronically. These contributions are made available to other participants on demand. Asynchronous interactions in the DEL course were primarily Web-based.

“Synchronous face-to-face,” in this context, refers to interaction in which each individual involved must participate simultaneously and be able to see and hear each other. This type of interaction is usually spoken, not written, and is typically conducted “in-person” (with the participants physically in each other’s presence, e.g., a conventional class session). Digital technology-based communication mechanisms allow synchronous face-to-face interaction to occur “electronically,” with participants at a distance from each other. Depending on the technologies used, participants may be either at pre-defined video conferencing sites or anywhere an appropriately configured computer is connected to a network.

In the case of a non-distance implementation of the DECAL model, the synchronous face-to-face interaction might be a conventional in-person class session. In a distance implementation of DECAL, the synchronous face-to-face interaction happens in an “electronic” context with, for example, video conferencing technology providing the link between the participants. We will refer to these technology-mediated, face-to-face interactions as “electronic face-to-face” interactions. We will refer to conventional face-to-face interactions (between people who are in the same room) as “in-person face-to-face” interactions. DEL synchronous interaction included both electronic face-to-face via video conferencing and in-person face-to-face interaction.

In a conventional course context (or a conventional video conferencing-based distance learning context) nearly all participant interactions occur synchronously during scheduled class times. During these times there can be spontaneous and active communication between the instructor and participants. Outside these times course members generally do not see or communicate with each other; there is very little or no interaction. The DECAL paradigm is intended to bridge synchronous sessions with asynchronous class sessions and opportunities for continued asynchronous interaction.

DECAL is intended to have several characteristics:
1. Create the opportunity for continuous interaction and communication.

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2 We use “conventional” to refer to a stereotype of that style of education which is particularly common in our schools, universities and training centers, where a teacher stands at the front of a single room facing students who are sitting at desks or tables and speaks to them for some period of time while the students take notes and observe. Periodically, there is prompted or spontaneous interaction between the teacher and students. A “course” in this context consists of weekly or twice-weekly sessions of this type with solo, paper-based reading and writing tasks for the students between sessions.
2. Allow a dispersed learning environment to be created and delivered to individuals on the job or elsewhere.

3. Continue to provide opportunities for spontaneous face-to-face interaction (either in person or electronically mediated).


5. Accommodate and equalize individual differences in ability to contribute to discussion.

6. Allow learning and interaction to occur in accordance with individual time schedules.


8. Support student work which serves an "authentic" purpose beyond the demonstration of learning.

9. Integrate access to external resources and information into the course “space.”

10. Lessen the dominance of the instructor as the main source of knowledge and authority and the nexus of class communication.

11. Support multiple modes of content representation.

12. Allow discussion to occur in a way that permits time for careful reflection.

13. Allow information to move directly from the instructors' or participants' desks to all other members of a learning community.

The DECAL model does not reject conventional synchronous teaching styles (based on spontaneous face-to-face interaction). Instead it appends new asynchronous structures to the established synchronous structures in order to create expanded opportunities for interaction and communication.

**Goals of the DECAL Instructional Model**

DECAL is an evolutionary step in education that can potentially extend learning through all facets of society. There are several specific characteristics of DECAL which contribute to its power and effectiveness; these characteristics comprise the general goals of the DECAL instructional model and the specific goals of the DEL course.

**Continuous Interaction and Engagement**

The creation of continuously linked communication and interaction in a learning community.

Replacing conventional paper-based asynchronous communication with Web-based asynchronous mechanisms represents a transition from discrete, segmented information delivery to continuous, linked communication and interaction. This is a result of the relatively ubiquitous and flexible nature of the Web. Information that is added to or changed on a Web site is immediately available to all users of that site. Changes to Web materials can be made by an individual from any location that has a connection to the Internet. This ability to interact with the site, and therefore with other course participants, is available to all participants, not just the instructor, and can occur at any time of any day. When appropriate, however, DECAL administrators and instructors can easily control the Web
site, limiting the access of particular individuals or groups to specific documents, collections of documents, areas of the discussion spaces or functions (such as creating but not deleting documents).

In contrast, conventional paper-based asynchronous mechanisms such as course packs and paper handouts are distributed physically. They are more limited both in terms of when they can be distributed and updated, and the ease with which participants can contribute to them. In a conventional course, if an instructor wants to add a few thoughts and corrections after that day's face-to-face synchronous session, he or she writes up these additions, photocopies them and distributes them at the next face-to-face session. In a DECAL-based course, the instructor can sit down at a desk immediately after the face-to-face session and enter additions and corrections to the appropriate page or discussion area of the course Web site. Students logging onto the Web space that afternoon can see the changes while the session is still fresh in their minds. Also, instead of interaction being limited to once or twice weekly, participants can keep a discussion going every day.

**Distributed Learning Communities**

Create and support learning communities consisting of individuals who are not necessarily in close physical proximity to each other.

With DECAL, individuals can participate in a learning community\(^3\) from locations other than the classroom, for example, an office, a dorm room, a home, a computer lab or perhaps wherever a portable computer is available. These locations can be in the same city or on different continents. Participants also can switch locations from one session to the next: at the office for one interaction and in a hotel room while attending a conference for the next. In this context, the location of a learning community becomes virtual. It is “on the network,” and individuals in the community can be anywhere network connections exist.

It is also possible for individuals to participate in the learning community when they have no network connection whatever. They can download all or parts of the course Web space onto a portable computer and work while disconnected from the network. Later, when the portable computer is re-connected, their work can be moved into the course Web space. In this context, a learning community is no longer defined by geography but rather by the relationships and interactions among individuals.

**DECAL Integration into Daily Life**

Integrate digital mechanisms for communication and collaborative learning into the fabric of daily life.

One effect of the dispersed nature of the Web, and DECAL courses which use the Web, is that Web-based information and interaction is available at any time on any given day and from

\(^3\) Here, we define learning community as a group of people involved in a learning activity which depends on shared interests, collaboration and interaction.
almost any location. There are fewer and fewer places and times when we are out of reach or unable to access the network.

With a portable computer, DECAL participants can carry out a discussion or collaborate on a group assignment at home on the weekend. They also may be able to do work unrelated to the course, such as reviewing a document for a colleague or using the company database from home.

All this has profound implications, both personal and professional. The new technologies can save us time and streamline our work, ostensibly giving us more control of our lives. But they also can have the opposite effect, intruding into time spent away from the workplace. Using DECAL in learning situations, and integrating the Web into the workplace, requires that some attention be paid to such unintended consequences. The positive results that come about when learning is a seamless, continuous process must be weighed against possible personal costs. Discussing these issues and providing support to help individuals avoid the negative effects of technology must therefore be part of the DECAL model.

**Functional, Easy-to-Use Technology**

One intention of the DECAL environment is to make communication mechanisms simple and functional. Hardware and software selections must be made thoughtfully and carefully since the final configuration will have a major impact on the individual’s learning experience.

Each student is involved in installing and running the necessary software and dealing with technical glitches that might arise. Thus, any problems with technology may be experienced directly by all course participants, multiplying what might be minor difficulties into widespread frustration. For this reason, DECAL should employ simple, highly functional, accessible software and hardware that is easy to use and, if possible, familiar to participants. These goals point to the use of standard Web technologies consisting of common Web browser software such as Netscape or Microsoft Explorer along with commonly used browser extensions such as RealPlayer (for the playback of audio and video) to provide multimedia functionality, and Adobe Acrobat for document access.

**Asynchronous Class Sessions**

Create a virtual analogue for a conventional class session which is relatively independent of time and location.

DECAL’s use of the asynchronous Web environment creates an analogue to a conventional class session: the asynchronous class session. In a sense, this session is “virtual” in that it does not occur at a single location or a single time. Instead, it exists on the computer network, accessible from...
many locations and spread out over a period of time. Asynchronous class sessions resemble conventional class sessions in that they provide similar elements and interactions; however, they use different communication mechanisms. An asynchronous session uses a course Web site to offer participants a venue for:

- reading and preparatory tasks
- directions and context-setting from the instructor
- delivery of content information
- questions directed at the instructor, and his or her responses
- structured and unstructured group discussion and interaction
- group work
- work assignments as a follow-up to class presentations and discussions

An asynchronous class session has a start and end time, but on a longer time scale than a conventional class. Whereas a conventional class may last for an hour, an asynchronous class session might be scheduled over a period of days. During that time, participants can review materials, listen to and view pre-recorded presentations, discuss session issues electronically, complete work assignments and send and respond to e-mail. Throughout the days of an asynchronous session, participants can work with the materials and interact at their own pace. They can order their work tasks, review material as many times as they wish and have time to read and respond to discussion content thoughtfully.

## Multiple Representations of Information

Provide learners with a variety of information forms and access opportunities.

Howard Gardner writes about multiple intellectual competencies which he terms “multiple intelligences” and how individuals have proclivities for learning from different representations of information. As he notes, some people are more visually oriented, some more linguistic, some more interpersonal and others respond best to logical description (Gardner, 1983). A DECAL approach provides opportunities for multiple modes of representation, which support these proclivities, as well as for flexibility in time, pacing and location of access.

In a DECAL course, information often is available in multiple representations and at different times. The audio from a face-to-face session may be recorded and made available asynchronously on the Web. An issue discussed on the Web can be discussed in a synchronous face-to-face session or via synchronous chat, i.e., a real-time typewritten conversation on the Web. Following a formal lecture, the instructor can post related discussion issues on the Web and provide links to other information sources.

All this allows participants to view concepts in multiple ways. If one way of presenting the concept does not work, then another may be more helpful. It also means learners have more choices as to how they receive the information and can identify learning modes that fit well into their lives. If a student
misses a synchronous session, DECAL provides ways to review the materials and listen to the lecture at a later time.

For an instructor, there are ways to continue synchronous class interaction and discussion asynchronously between sessions. An instructor can, for example, explain a concept in a live class session, then respond to questions about that concept or show something to demonstrate it in the online, asynchronous environment.

**Connecting Learning to the Outside World**

Extend communication and information access beyond the boundaries of the class.

DECAL mechanisms for interaction within a learning community also work well for making connections to the outside world. Participants can easily insert links into their responses or documents in the DECAL Web environment, connecting to articles or discussions from outside the class. This is analogous to bringing a printed article to a conventional class, but in a more flexible way.

Interaction with other areas of the Web is easily available to DECAL participants. This might include linking to an international publication, a local government report or an online discussion among people involved in a particular issue or event.

Connecting a learning community to the outside world fosters a two-way flow of communication. This in turn creates an opportunity for class participants to have “authentic” work assignments, in the sense that student work can be produced for an audience beyond the course instructor and a purpose beyond demonstrating that material has been learned. Instead, student work can make contributions to work issues or be shared with others and perhaps even “published” on the Web. This provides a strong incentive for student work and achievement.

The ideals of continuous learning and learning organizations is more than simply dispersing the learning community and allowing learning activities to happen at any time and in any place. To succeed, learning must be successfully integrated with the function and purpose of everyday work.

In a conventional course model, boundaries between “life” and “learning” are more than temporal or physical boundaries; they include boundaries related to function and purpose. In the DECAL environment, the boundaries of function and purpose become fuzzy, the communication tools for learning are similar to the tools for work. Consequently, learning activities can be integrated with work and other areas of life in useful ways.

**Electronic Discussion Environment**

Provide asynchronous environments for conducting discussion.

The electronic discussion environment is one of the most interactive elements in asynchronous DECAL. As such, it does more than play a critical role in information delivery; it helps to engage students in learning which is under their own control. Educational computer software often is billed as being interactive. But what does interactivity bring to a learning con-
text? At the most basic level, it allows users to control the pace of learning activities, starting and stopping at will. At a more complex level, interactivity allows the learner to exercise control over the sequence and content of a course. Finally, interactivity can mean the learner controls what is to be learned. For example, within a project-based learning context, educational goals develop around real-world issues under the direction of the learner.

The electronic discussion environment brings the first two levels of interactivity into class discussion, allowing for individual control and self-pacing in group discussions, something that usually is missing in face-to-face (synchronous) discussions. This provides opportunities for more thoughtful interaction, which can result in improved quality of class discussions and improved community formation. Individual control is also compatible with the implementation of project-based learning. Electronic discussion environments bring a number of characteristics to class discussion:

- Participants gain the ability to control the pace of the discussion for themselves, allowing them to “speak-up” and contribute even if they do not respond as quickly as others.
- It is possible to carefully consider one’s contributions to a discussion.
- Participants can focus on particular “threads” in the discussion.
- Participants can return to discussion elements at any time; what is said in the discussion is automatically archived and available later for review and study.

Collaboration
Build instructional interaction around collaboration.

Increased connectivity to the outside world and increased interactivity within the class itself lead to inevitable changes in student/student and student/instructor relationships.

An instructor’s role as the sole source of knowledge and authority is muted by the characteristics of DECAL. When a participant needs to have an issue clarified, he or she can call on any number of resources. Students can post questions on a discussion area in the class Web site to which their peers can respond. A student peer might resolve the issue, or might reference an authoritative source outside the class and provide a direct link to the source. Someone outside the class also could be invited to respond to the issue via e-mail, a listserve or direct electronic dialogue.

The experience in the course is that of a community working together to answer questions and respond to issues posed to them or by them. Such an experience develops both formal and informal collaboration skills. In contrast, a conventional course is much more dependent on communication from an instructor to all members of a community, on solitary work and resolution of issues and on individual communication back to the instructor.

These changes in the nature of the student/teacher relationship can present challenges for anyone accustomed to a more conventional teaching context. An instructor may feel threatened by the diminishment of his or her role as the source of authority and the
nexus of most communication within the class. It will take time and effort for instructors to redefine themselves as guides and companions to learners in this new environment.

**Instructor Workload**

Make implementation of a DECAL course roughly equivalent, in terms of instructor time and effort, to that of a conventional course.

Ideally, the work involved in preparing and delivering a DECAL course should be comparable to that of a conventional course. This goal recognizes that instructors are frequently overloaded already and that any new structure for teaching would do a disservice if it created additional demands on faculty time. Therefore, a primary goal in developing the Web environment for DEL was to keep additional work for instructors at a minimum.

The teaching workload can be divided into course preparation and course delivery. Tasks need not be larger or harder in a DECAL environment than in a conventional environment during the preparation phase. For instance, documents and references to documents can be inserted into a DECAL asynchronous environment without reproducing and distributing them to the students. This alone should simplify the instructor’s work and allow greater flexibility to make additions and edits.

The multimedia elements of DECAL course preparation (such as recording the audio portion of asynchronous class sessions) are more likely to create new work for instructors. Procedures must be developed for accomplishing these tasks with a minimum of effort.

Once a course has begun, in the course delivery phase, an instructor’s workload in a conventional course frequently consists of three major components: teaching the face-to-face sessions, limited interaction with students outside class time through office hours and tutorials, and review and assessment of student work. The implementation of DECAL should have a relatively minor impact on face-to-face sessions and the assessment of student work. However, DECAL has strong implications for an increased workload involved in out-of-class communication and interaction. Although this increased interaction is one of the pedagogically desirable effects of a DECAL model, the workload issues associated with this must be addressed.
The DEL course was designed, developed and delivered by the International Programs Office of the University of Michigan Business School in collaboration with the staff from the BT Training and Development Center in Milton Keynes, England. It was designed and developed during the summer and fall of 1997 and taught during January and February 1998. The participants were mid-level BT managers who were part of BT’s Potential Senior Executive Program (PSEP).

In designing the DEL course and selecting participants, careful attention was paid to the findings from the first DECAL course. From that earlier course several issues emerged that had a strong bearing on the participants’ motivation and ability to perform:

1. There must be a strong relationship between course content, participant work and development goals.

Although this is true for conventional courses, it is particularly relevant to DECAL courses. With DECAL, the participants learn in their work environment and, as a result, are constantly forced to balance time spent on the course versus other (pressing) work priorities.

2. Technology must be working at all times, the participants must be sufficiently skilled in its use and there must be integration with local support services. Frustrations due to technical failures or inexperience can result in poor course performance and in participants dropping the course.

3. For DECAL to be fully effective a learning community must be established. This can be done online but its development is quicker and more effective if initiated through in-person interaction.

“Lessons from an earlier implementation of a DECAL-delivered course between UM and BT were used to support and improve the context setting and participant preparation for the course.”
Work/Content Relationship
From the first course, it was recognized that desired levels of participant motivation, commitment and learning could only be achieved if the participants perceived a strong link between course content and their work. This requirement was closely attended to in the selection and development of the DEL course with the result that this course content was viewed by the participants as being highly relevant to their work and important to their career development. DEL overcame the motivational problems of the first course as participants elected to enroll in DEL rather than being persuaded to enroll.

From a motivational perspective, participants found the period between their committing to the course and the start of the course to be overly long. Most participants committed to the course by September 1997, but the course did not begin until January 1998. The participants reported feeling motivated and excited about the course immediately upon signing up but then having their motivation dwindle during the three- to four-month wait. Unfortunately this long lead time was necessary to ensure all participants were technically ready to engage the program and to allow them to successfully schedule the class sessions in their diaries. At their request, some course reading material was given to the participants one month prior to the course start. This had the effect of engaging the participants and reenergizing them as they prepared for the first course sessions.

Developing and Supporting Technical Capability
From the first course we learned that having the participants skilled in the use of DECAL technology and comfortable interacting and collaborating through it must be a requisite to starting the course. Equally true is that participants must have computers that are fully functioning with robust access to the WWW prior to the start of the course. Without participant skill and fully functioning technology the course will be frustrating for the individual, and their resultant learning will be limited. The overall course environment also will be affected, since the class needs a critical mass of active participants in order to be fully successful. To develop participant skill and ensure fully functioning technology, a pre-course workshop (called “Collaboration via DECAL”) was developed and special access to technical support was arranged for the participants.

Pre-Course Workshop - The Collaboration via DECAL workshop was designed to introduce the participants to the DECAL technologies and communication mechanisms and provide them with an opportunity to meet in-person, face-to-face prior to the beginning of the course. This would begin the process of community formation. The workshop would also introduce the participants to a “Team Charter” activity which was intended to help site groups to develop norms and rules of behavior. The Team Charter activity would be started during the workshop and continued asynchronously on a Collaboration via DECAL
Web site with the resulting Team Charter document being carried over into the DEL course Web site. The workshop was not intended to cover any course content. Participants would spend the morning and early afternoon in a classroom computer lab receiving presentations and doing hands-on practice with various DECAL Web and communication tools. Participants would then begin the Team Charter activity. The late afternoon would be spent familiarizing the participants with the video conferencing environment that would be used for the synchronous elements of the course. This workshop was conducted in November 1997.

**Technical Support** - From the first course, it was discovered that the demands of a DECAL course on BT’s computer support organization (CSO) did not match the “standard” levels of support available. “Standard” support from CSO involved submitting a request for service and waiting for a response within three business days. For a DECAL course this was unacceptable since the participant could be without access to the course (which depended on regular participation for its success) for a prolonged period of time. To address this problem CSO staff were included in discussions regarding the unique needs of DECAL course support, and special support structures were established for the DEL participants. These support structures guaranteed immediate attention in the event of a technical problem. Additionally a CSO support person was assigned to visit all participants prior to the Collaboration via DECAL workshop and help manage (and expedite) the process of bringing their computer “kit” (hardware and software) up to specification for the course.

**Community Formation**

To take full advantage of the DECAL course model, the DEL class would need to develop into a strong learning cohort. This is required by the collaborative nature of the DECAL environment and the intended role of the instructor as facilitator and coach rather than a more conventional role of didactic knowledge source and sole controller of communication and interaction. In this second course this community formation process was designed to be initiated as an integral part of the pre-course workshop and to continue with the formation of strong “Site Group” teams within the class.
The DEL course was based on the DECAL model with the instructor being based in Ann Arbor, Michigan, and the participants at three different BT sites in London, UK. Each site consisted of a small team (or learning cohort) and a site group observer/facilitator, whose role was to help with community formation (not to assist with the delivery of the course content). The video conferencing sessions were a mixture of short lecture presentations, site group discussions and whole class discussions. In the asynchronous sessions there were readings, team (site group) exercises, open discussions, and a few short audio presentations.

The course design was conservative (or “defensive”) in nature in that the video conferencing sessions were used to deliver some “must know” information which was also presented in the asynchronous environment via readings. This was purposely done since the instructor had concerns that the participants might not access, or might have technical difficulty accessing, the asynchronous material. The instructor’s concern was that without also covering the “must know” information in the synchronous sessions meaningful discussion in the class would be difficult.

Throughout the course each site group was designed to be its own learning cohort, which shared its learning during video conferencing sessions with the other sites. Participants were assigned to a site group location depending on its geographic convenience to them. Each site could accommodate up to seven participants and one observer/facilitator. The site groups were identified as Westside, Ambassador House and Docklands. At the beginning of the course the Westside site group had six participants; Ambassador House and Docklands had five participants.

“The DEL course was a distance implementation of a course between a UM instructor and BT participants using the DECAL communication model. Participants were organized into small teams which met in-person each week to participate in synchronous video conferencing class sessions with the other teams and the instructor. Synchronous class sessions were bridged with asynchronous, Web-based interaction and readings.”
The video conferencing sessions were conducted on Mondays at 1:30 p.m. GMT (8:30 a.m. EST) and scheduled to last for 90 minutes.

Ongoing asynchronous activity took place between the video conferencing sessions. These asynchronous "sessions" helped to bridge from one video conferencing session to the next. There was a two-week asynchronous work period at the end of the course with no accompanying synchronous session. During this time the participants were expected to be engaged in a course project. To conclude the course there was a final video conferencing session followed by a social gathering.

**Site Groups** - One of the primary reasons for trying to develop cohesive learning cohorts at each site group was because we believe effective learning has a social element imbedded in it. Having site groups with regular weekly face-to-face meetings and continuous asynchronous dialogue and discussion was seen as an effective and practical way to address the interactive and social aspect of learning. The site group size was limited to fewer than eight both by the small size of the video conferencing rooms available and in order to have manageable small group discussions. (If larger rooms had been available then slightly larger groups sizes would have been created in order to assure functional group sizes even when there were absences.)

**Synchronous Sessions** - The video conferencing sessions were intended to be similar to conventional class sessions. They were the only time the instructor and the participants could engage in real-time dialogue and discussion. They were implemented using ISDN technology. These sessions were segmented into presentations, site discussion and class discussions. This was done in order to vary the pace and keep the participants' attention and interest as well as to create an interactive, collaborative learning experience. Individual presentation topics were limited to 15 minutes in length. Interspersed in these sessions was time for the site groups to discuss certain topics and report their conclusions to the whole class. These discussions and reports were intended to increase the level of interactivity. This programming of interactivity was an important aspect of the video conferencing session design.

The video conferencing implemented a "continuous presence" display, which allowed each site to be visible at once as a quadrant on the monitor. Having all participants visible and audible at

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4 Using three "multiplexed" lines to create a 384 kbps connection which allowed relatively high quality video and audio transmission.
all times supported ad hoc interaction and discussion in the class. However, this resulted in the individual participant images being small.

**Asynchronous Sessions** - Course readings, discussion areas, presentation handouts and audio recordings were all part of the asynchronous environment. Copyright permission was obtained for all papers and articles, and these readings were put into the asynchronous session in PDF format. Site groups had their own discussion areas that could not be accessed by the rest of the class. However, the instructor could access any site’s discussion. There also were “open” discussion areas open to all class members.

**Project Work** - During the last two weeks of the course the participants were asked to take a particular approach to apply the concepts learned in the course to their own work situation. During this time the individuals were expected to work asynchronously sharing and dialoguing and developing their final concepts with their site groups. At the end of this time participants would share their results with the entire class via the final synchronous session.

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5 “PDF” stands for “portable document format” and is the file extension for files created with the Adobe Systems Incorporated Acrobat product. We have adopted PDF files as our standard file format for attachments to DECALWeb sites. This allows word processing documents, presentation application documents, graphic documents and others to all be accessible and printable to the student participants with a minimum of software installation on their computers. They need only install the free Adobe Acrobat Reader application.
To evaluate the course, a survey was collected from all enrolled participants, course usage data which was automatically collected from the Web site was analyzed, observations from the synchronous sessions were conducted and interviews were held with most course participants, course staff and observers/facilitators. In addition, debriefing sessions were conducted with the site group observers after every video conferencing session (via phone and video conference).

Two participants formally withdrew from the course prior to its start due to conflicts with changed work duties and schedules. Some participants had changing work responsibilities keep them from a number of the course synchronous sessions but chose to remain in the course. This seemed to result in a gradual reduction of their participation and isolation from the Web-based asynchronous activities. These two types of attrition resulted in a regular cohort of four participants at Westside, five at Docklands and as few as two participants at Ambassador House. Others participated periodically as they could, resulting in a total of up to 14 active participants in the course.

**Participant Motivation** - Pre-course surveys and participant interviews show the DEL participants were genuinely motivated by the course content — to learn about the particular perspective on leadership taught in this course. These participants knew continued leadership training was important for them professionally and personally, and they saw this course as contributing to this need. In short, the difficulty of participants not being motivated about the course content which occurred in the first DECAL course was successfully avoided in this course.

“Technology and organizational issues which hindered the first DECAL course were successfully resolved in the DEL course. Learnings of the DEL implementation move beyond basic DECAL implementation issues and focus on course culture, interaction, and curriculum design issues. Findings support the team “site group” structures for community formation and suggest that future DECAL implementations should increase the dependence on the asynchronous environment for information delivery in order to support increased flexibility for interaction in the synchronous environment.”
Participants were highly motivated to develop their knowledge and abilities as leaders. Participants were, however, also interested in the Internet technologies and communication structures employed in DECAL. Nearly all participants reported having some measure of split interest. They were most strongly interested in the leadership content of the course and secondarily in learning about the Internet and other technology-based collaboration mechanisms employed in the course.

**Site Groups: Experience and Effectiveness** - The site group structures in the DEL course proved to be extremely effective. The intention was to create strong group communities and collaboration in the course by dividing the class into sub-groups which met in person on a weekly basis for the synchronous class sessions. These site groups defined the project and discussion groups for both the synchronous and asynchronous portions of the DEL course. Each site group was defined by the physical location it used for the weekly synchronous class sessions. On the asynchronous course Web site the site groups defined the memberships of the private discussion areas in the class. Participants reported their site groups became relatively well formed and they were able to communicate and collaborate well within these groups. However, they did not feel as though they had the opportunity to form an effective community between groups, within the class as a whole.

Synchronous class sessions were designed to alternate between short lectures and site group discussion activity. Periodically the DEL instructor would present the class with an issue and ask the groups to talk among themselves for 10 or 15 minutes then report back to the class on their conclusions. Participants reported finding these “syndicate sessions” to be of very high value; they suggested there should be more of them and they should last longer. The participants said future DECAL courses should increase the amount of group work and full-class interaction and reduce the amount of lecture material during the synchronous sessions (participants felt some of the presentation material could be moved to asynchronous presentations and/or covered entirely in the course readings).

Each site group was assigned a “site group facilitator/observer,” who were BT training staff with experience in facilitation. This was a somewhat active and somewhat passive role — somewhere between a traditional facilitator and observer role. The precise nature of the relationship which developed between the groups and their observers/facilitators varied with the approach and personality of the individuals involved; however, all site groups reported finding this role valuable. Each site group elected to arrange (at the urging of the facilitator/observer) regular meetings outside the synchronous session meeting times (as well as an initial meeting prior to the first class session). One group convened a weekly audio-only conference call (on Friday afternoons), one group met early and had lunch together before the synchronous class sessions and another group conducted meetings after each synchronous session. Two groups planned to get together again some months after the end of the course for additional leadership-related activities.
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or to review the effects (and ongoing explorations) of the group members related to the DEL content. When questioned about this, the DEL course participants said they had not been in any other training where they had planned to convene again after the course. We believe this is a positive development and provides evidence of the strength of the small “site group” structure (and of the facilitator/observer role) in the DEL course.

The Docklands group had a number of ongoing technical difficulties during the synchronous sessions. The audio from their site would produce a loud buzzing sound for the other sites. Therefore, they were asked to keep their microphone on “mute” unless someone from their group was talking. During the last synchronous session an additional problem in their system caused them to lose the video image from the other sites--they could hear all the others but were looking at a blank video screen. These difficulties appear to have contributed to community formation in the Docklands group. Dealing with these problems and sharing this experience contributed to their becoming a closer knit group. The constant use of the “mute” function also gave them the opportunity to carry out brief side conversations and ask each other questions during the class sessions without being disruptive to the class as a whole. They found this ability helpful.

One participant described the Westside Site Group as not reaching much beyond the “Forming” stage and just beginning to get into the “Storming” stage. This and other feedback from the participants suggests that although they felt the site groups did progress to a certain level of formation they did not progress as far as they might have. The participants valued the site group structure and expressed a desire to have seen the groups form even stronger bonds and become more functional as collaboration groups than they did.

Video Conferencing Design

There were two innovations in the video conferencing design of the DEL course. One was the use of “continuous presence” video conferencing. As noted earlier, this allowed all participants and the instructor to see and hear all other participants and the instructor at all times; everyone was “continuously present” or visible on the TV monitor (see figure 2, pg. 20). This successfully supported ad hoc interaction in the course allowing anyone to raise their hand or speak a question at anytime. However, since this required the division of the TV screen into four quadrants and the presentation of each site’s image in one quadrant, the result was relatively small images of the sites and difficulty discerning detail in the images. The second innovation was the use of a rear-screen projection of the session presentation slides at the instructor site. The instructor stood in front of this screen enabling him to gesture toward these slides as he would if presenting in a conventional on-site context. The projected image of the slides and his gestures would be visible to the remote.

6 This is a reference to Tuckman’s (1965) taxonomy for the stages of small group formation.
DEL participants and help them follow the lecture. Participants also would have printed copies of the presentation slides.

This second innovation was somewhat problematic, however. The smaller image size of the continuous presence system made it difficult to discern the details of the slides projected behind the instructor. Thus, the use of this projection became nothing more than allowing the instructor to teach in a manner familiar and comfortable to him. It was only a small aid to the participants, prompting them when to turn the pages of the presentation slide printouts which they were requested to bring to each session. Early in the course, the participants were asked if this system was a problem for them. The general response was that if it helped the instructor, it was okay with them. Although they could not make out the text on the screen, they could relate the shapes with their printouts and help locate themselves in these printouts during the presentation. However by the end of the course the participants reported that they had come to be bothered by the low resolution display of the presentation slides.

Participants suggested the presentation slides might be “shared” with the participants during the synchronous sessions via the Internet itself — with computers in the site group locations which would display the presentation slides under the instructor’s control. This is part of the DECAL model but was not implemented in the DEL course due to a lack of Internet connections, computers and projection capability in the BT site group rooms. The evidence of the DEL course is that this use of the Internet for distribution and display of presentation slides during synchronous sessions should be implemented in the future.

**Presentation and Interactivity Design** - As mentioned previously, the participants gave strong feedback that they valued the opportunity for interaction in the synchronous sessions and found the presentation schedule in the DEL design to be somewhat in conflict with this element of the course. They found that on a number of occasions, interaction and discussion which did occur was cut short due to the need to get through the planned presentations. The overwhelming recommendation by the participants was to make use of the ability to “give” some of these presentations in the asynchronous environment to create more time and flexibility in the synchronous sessions for interaction. The participants also related that this would provide more opportunity to enrich the content, to “mine” the knowledge, real-world examples and experiences of the instructor during synchronous sessions. The instances where the instructor did discuss real-world examples from his experience were repeatedly mentioned in the end-of-course interviews as examples of what was particularly valuable.

The DEL design was “defensive” in the sense that it included redundancies and pacing choices intended to protect against possible technical, motivational and organizational difficulties on the part of the participants. From the instructor perspective the concern was that material which was delivered to the participants only via the asynchronous environment and readings
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might not be read by all participants or might not be accessible to some participants. The experiences of the initial DECAL course taught the UM team that this circumstance was possible.

The DEL design incorporated numerous improvements (as described earlier) that were intended to address motivational, technical and organizational issues which might limit use and access to the asynchronous materials. Given this context the correct course of action in DEL would have been to trust in the design changes and proceed under the assumption that the improvements would be effective. Doing this would allow for leaner and more flexible synchronous sessions which would not have to cover an extensive array of lecture material but could more easily be adapted to interaction. Prudence would suggest this trust should be accompanied by vigorous evaluation early on in the course to confirm that material was being received by the participants and that the course was not “missing the mark.”

In hindsight it is clear that this “defensive” curriculum design guaranteed muted results. If participants were successfully accessing the asynchronous materials and were properly motivated to complete course readings and activities, then the design of the synchronous sessions might feel slow and unsatisfying to them. They would wonder why materials discussed in readings were covered again in class (at least with some overlap) and why the synchronous session presentation schedule took precedence over spontaneous class discussion. If, however, the technical, motivational and organizational difficulties did reoccur in DEL, then the defensive synchronous session design would salvage the course for the participants but only to some moderate degree. The synchronous session presentation of material was not sufficiently complete to serve as the only source for the participants. The only possibility for a high level of success lay in trusting the DEL design improvements and designing the synchronous sessions with the assumption of motivated, technically functional and organizationally supported participants.

A related issue was the participants’ reaction to having been introduced to asynchronous presentations (streamed audio and slide presentations delivered via the Web site — something like an on-demand slide show with audio) in the Collaboration Workshop but then not encountering any use of this structure in the DEL course. Some participants objected to having been told to prepare their computers to be able to receive streamed audio but then not making use of this capability (with one exception); some objected (as mentioned above) to the lost opportunity for offloading presentation tasks from the synchronous sessions, which would have allowed more interaction and discussion.

The scheduling of the synchronous video conferencing sessions on Monday afternoons was a problem for most participants. They felt that following the synchronous sessions they needed the weekend to fully engage with the topic, complete readings related to the topic, and begin their interaction in the asynchronous environment. With synchronous sessions on Monday afternoon the participants found themselves waiting until
the following weekend to fully engage with the topic and then having almost no time to interact asynchronously before the next topics came up the following Monday. The participants suggested that scheduling the synchronous sessions on Thursday or Friday (just prior to the weekend) would be more conducive to successful asynchronous interaction.

As mentioned earlier, the group breakout sessions (called “syndicate sessions” by the participants) were highly valued by the participants. The overwhelming feedback from the participants was that this structure should be retained and expanded in future DE-CAL courses.

Content - Participant feedback on the DEL content was extremely positive. The content was reported to be stimulating and worth recommending to someone else. Most participants related having “taken things away from the course” which were new and useful to them in their professional lives, and which they intended to continue to think about and work with. Some participants related that the DEL perspective on leadership issues was unique and different from their previous exposure to leadership discussions.

Feedback from the DEL participants makes it clear that there is a need in a DE-CAL context to provide a particularly comprehensive outline early in the course (or prior to the course). The participants in DEL called this a need for a “roadmap” to help them know the relationship between elements of the course. The unfamiliarity of the communication and interaction mechanisms in the DE-CAL context and the more limited opportunities for synchronous interaction with the instructor make this need more pronounced than in a conventional context.

The final project activity in the course attracted both negative and positive comments from the participants. The language used to define the project was obscure and the participants struggled to internalize a clear understanding of the activity. In addition the two-week period set aside for this activity was too long without any scheduled class interaction. However, most participants reported that by the end of the course they did grasp the essence of the project and recognized the value in continuing to develop this for themselves. The course designers did not expect the participants to complete their project during the course; it was presented as being a large, personal task which they would finish on their own. Given the expectation that the projects would not be completed during the course it might have been better to retain the regular weekly course interactions and schedule the project activity to occur during a single week.

During the two-week “break” for the project activity the class interaction and “actions” on the asynchronous environment nearly stopped. (The weekly interactions during this time were dramatically reduced from the average from the previous four weeks.) At the end of this two-week period few participants had completed substantial project work. The participants reported the two-week schedule made it too easy for other work responsibilities to gain priority. The two-week period reduced the immediacy and priority of the DEL course activities, and they failed to return to the task in a timely fashion.
Transfer of DECAL technology to Other Work - The participants approached the DEL course both from interests in further leadership learning and from an interest in learning about Internet-based collaboration and communication technologies. The asynchronous (Internet) elements of the DEL course directly affected the participants’ work lives outside the course. They discussed numerous ways in which they were adopting Web-based communication technologies in their work as a result of their DEL experience. For example, one participant was planning to implement an asynchronous discussion environment for her unit in order to allow unit-wide discussion of issues (for the first time); another participant intended to use an electronic discussion environment as a tool in a client bid process for their unit.

Technology Issues - Technology issues arose with less frequency and less immediacy during the run of the DEL course than they had during the first course. The evaluation data suggests the improved planning and preparation for the DEL course and the inclusion of the Collaborative Workshop to prepare the participants for the use of the DECAL technologies was largely successful.

Recommendations, noted earlier, were addressed in the design of DEL with the positive result that in the DEL evaluation emergent issues were primarily about course design, interaction styles and communication, and content rather than about DECAL technologies and organizational/cultural issues.

Although the DEL participants were not much more familiar with the DECAL technologies at the beginning of their course than the EoN participants had been (as judged by the pre-course survey responses from both courses), the process of preparing the DEL participants and supporting their use of DECAL was more proactive and complete — resulting in fewer frustrations and distractions caused by technical issues. DEL participants were able to retain more of a focus on the course content rather than being distracted by technology-related problems.

A simple measure of the improvement in technology access and use in the DEL course is a comparison between the level of use per participant in the EoN course asynchronous environment and the level of use per participant in the DEL course asynchronous environment. On average participants in the EoN course accessed the EoN course Web site and performed 74 "actions" per person per day, while in the DEL course, participants performed an average of 119 "actions" per person per day.

Figure 3, Average Per Person/Per Day "Actions"

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1 "Actions" in this context represent mouse clicks performed. Each click (and click-and-hold) performed by a participant was registered as one action.
tions” per day. Participants in DEL accessed their Web site and performed on average 306 “actions” per day.

Participants in the first course described frequent instances where they were unable to connect to or successfully use their Web site due to technical difficulties. Clearly the DEL participants did not experience technical issues of the same degree; regardless of other motivational and contextual differences, the DEL participants were able to connect to the Web site more often and use it more reliably than the EoN participants were. Additionally, the distribution of Web site usage was significantly more uniform in the DEL course; in EoN two participants accounted for twice the actions of all the other class participants combined, whereas in DEL there was a relatively uniform distribution of actions among all participants. These differences do reflect an improvement in both the participant training and the technology provision and support for the DEL course; in EoN two participants accounted for twice the actions of all the other class participants combined, whereas in DEL there was a relatively uniform distribution of actions among all participants. These differences do reflect an improvement in both the participant training and the technology provision and support for the DEL course and center on two elements: the inclusion of a pre-course DECAL workshop and expanded technology support from the central BT support organization (CSO).

The participants reported finding the enhanced access to CSO support for the course critical in at least three areas: expedited purchasing of required hardware and software, expedited action on BT Remote Access requests and speedy access to support as needed during the course.

Course Interaction

There were three broad categories of interaction in the DEL course: synchronous class session interaction, asynchronous Web site interaction and interaction between site group members outside of DECAL mechanisms (via in-person meetings, phone conferences, fax, etc.).

There was a progression from less toward more interaction over the course of the synchronous sessions. The initial session (VC1 for “video conference 1”) was viewed by the participants as mostly one-way delivery of information with limited interaction. There were 12 course participants present, eight of whom spoke up at least once during the session. However, most interactions consisted of single comments or responses to questions with no further discussion. Near the end of the session there was one sustained interaction between the instructor and a participant. There were two group breakout periods in this session with report-backs.

VC2 was similar to VC1 in structure and participation. There were 11 course participants with eight contributing at some point during the session. There were two breakout periods for group discussion and report-backs. The level of interaction went up slightly from VC1 with more exchanges between participants and the instructor. This session lasted just over an hour.

VC3 had 12 participants and marked the emergence of substantial joking and visible (and audible) good humor. This session was longer than the previous two, lasting the full 90 minutes, and had one formal group breakout period. Interaction was noticeably improved with all participants but one joining in and most contributing repeatedly during the session. At one point in the middle of the session,
five participants carried out a conversation with each other rather than with the instructor. This was halted after a few minutes by the instructor to move on to the next topic.

VC4 had 11 participants attending with a twelfth joining the session via an audio conference link. Like VC3, this session began with a fair amount of joking and laughter which continued during the session. Participants presented system diagrams at the beginning of the session with lots of audience reaction and supportive applause during and after these presentations. There was one formal breakout period and a number of less formal questions and reporting opportunities for the groups. Throughout the session all participants (except one) spoke up, seven of them more than a couple times and three more than five times. Participants made numerous references to each other and directed comments at fellow participants during the session.

VC5, which occurred after the two-week project work, was a retreat from the level of interaction which had developed in the previous sessions. This session was about an hour in length, and there were no group breakout periods. Individual participant reports on their final project activity work were short, and there was no discussion. (Most participants had no significant work to report; the one who did report on some substantial work did not receive much feedback from the instructor or the other participants.) There were 11 participants, but only six contributed during the session and there were no sustained discussions.

Participant feedback on the synchronous sessions recognized the progression from relatively little interaction in VC1 to much more interaction in the later sessions with the exception of the final session. The participants valued the more interactive sessions highly and were particularly enthusiastic about the periodic breakout periods in the sessions (they suggested there should be more of these in future courses). They felt they had to work through a period of developing familiarity and comfort with the DEL course synchronous mechanisms and that the instructor appeared to have a similar settling-in period.

Participants also reported feeling uncomfortable because of a lack of contextual understanding of the course at the beginning, of not having an understanding of where individual topics and sessions fit in a larger framework. When this issue was raised by the participants, they called it the "roadmap" issue. This came up after the second synchronous session and was resolved in the asynchronous environment (through questions posed by participants in the Open Discussion area and responded to by the instructor) the following week. The instructor’s responses to the roadmap question in the asynchronous environment were viewed positively by the participants and contributed to increased participant comfort. There also was a feeling the instructor was following too rigid a schedule and that opportunities for synchronous interaction were lost because the instructor felt he had to move on to the next topic. Participants talked of their synchronous responses being "ac-
These comments seem to be closely related to the suggestion that synchronous class time be more flexible and be used for more discussion and that some presentations be moved to the asynchronous environment and to course readings.

Asynchronous interaction occurred via the threaded electronic discussion environment which was included in the DEL course Web site. There were private discussion areas for each site group organized by asynchronous session and one “Open Discussion” area which was shared by all course participants. The session-specific discussion areas were for site group discussions to discuss problems which were set for them each week. The Open Discussion area was for the discussion of any other issues related to the course; participants could initiate new topics in both these areas or respond to ongoing topics. There was less use of these discussion areas than anticipated by the course designers—critical mass was not achieved.8 One comment the participants made in the DEL evaluations was that they felt somewhat abandoned by their peers when their postings in the site group discussions were not responded to.

An analysis of the archive of the DEL asynchronous environment suggests a relatively constant level of topic and response generation up until the last asynchronous session (the two-week project work period). All but one of the 14 participants who remained in the course posted at least one item in the asynchronous environment. Five of the 14 participants posted more than 10 items, and five of the participants posted fewer than three items. A majority of the participants contributed to each of the first three asynchronous sessions and to the Open Discussion area.

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8 Critical mass is a criterion frequently discussed in relation to electronic discussion environments. It refers to sufficient use of the environment for the environment to become self-sustaining. When critical mass has been achieved, a user will discover enough new activity when they log-on to the environment to encourage them to log-on again in the near future. Achieving critical mass also suggests participants will find sufficient response to their own postings to make future postings seem worthwhile.
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The longest sustained exchange consisted of nine responses and the topic item. There were six exchanges of five responses or more. There was an average of 3.3 responses per topic. As these measures indicate, there was a steady but minimum level of interaction in the DEL asynchronous environment.

What these figures on discussion area topic and response generation don’t represent are the participants’ use of the asynchronous environment as a resource area — to read articles and to review material prior to a synchronous session, for instance. Measures of the total number of “actions” (mouse clicks by the participants) performed in the site indicates a good deal more use than is reflected in the asynchronous interaction figures (counting topics and responses created by participants) reported above (see figure 3 on page 29).

The image which emerges is of an asynchronous environment which was an important and constant element in the DEL course but which was not the primary mechanism of communication. The synchronous class sessions and additional site-group-specific synchronous communication opportunities (via more conventional means such as in-person meetings and telephone) were the primary interaction mechanisms for the class. The asynchronous environment served first as the course materials and resource area and second as an interaction mechanism. Evidence from other courses suggests that asynchronous interaction environments can play a more central role and that achieving critical mass can help such an environment contribute more to a class than occurred in DEL.

DECAL establishes a variety of communication channels, both synchronous and asynchronous, which are available to participants to use and combine as appropriate for their inclinations and needs. The role for the asynchronous environment which emerged in the DEL course may have been the most appropriate and positive for these participants, under these circumstances.

One recurring concern involving the inclusion of asynchronous discussion environments into educational interaction is that (with critical mass) this can create tremendous workloads for both faculty and students. Critical mass in an electronic discussion environment can create extensive writing and reading demands for course members. If this is on top of previously established work requirements (instead of replacing some of these requirements), faculty and students may become overloaded. Partially to address this problem, DECAL is intended to implement shared responsibility within a class for responding to asynchronous interaction — getting away from the model of instructor as the center of all communication and encouraging peer support and discussion.

The site group structures of the DEL course created an additional structure which we learned might alleviate faculty overload in asynchronous/synchronous course structures. By creating private group discussion space and designing asynchronous session activities as group activities, the expectation that communication is accessible to and directed toward the instructor changes. Extensive amounts of classroom interaction which discusses and explores content issues can occur explicitly as
peer-to-peer interaction. This could contribute both to realigning the faculty/student relationship toward greater collaboration and collegial interaction and allow faculty to play a mentoring and facilitating role in a large course without becoming overworked.

**Evaluation**

In the context of a relatively successful and smooth technology implementation, some participants said there was too much focus on ongoing monitoring of their feelings and motivations in regard to the course and the use of its technologies in their work environment. The weekly feedback sessions conducted by the site group observers/facilitators (and reported back to the UM designers and instructor) were interpreted by some participants as being technology focused, creating an impression that the course was more experimental and focused on technology than it actually was.

Although this might have been unavoidable, it does point out the sensitivity of participants as to why they are being asked certain questions during an evaluation and that designs which do not in and of themselves create a feeling of being experimental can create this feeling unintentionally through their evaluation elements. Some participants mentioned the level of evaluation in the course led them to feel that they were guinea pigs in an experiment, more so than the course itself did.

**Some Recommendations for Change**

Participants made a number of recommendations for change. Most of these have been mentioned in the previous sections of this report and are summarized here. This summary is limited to issues which seemed not to be in dispute and which had wide acceptance by the participants.

- Provide some level of access to, and involvement with, DECAL course content when participants initially commit to participate in the course (even if this is well in advance of the course start) — particularly with course readings. Find ways to keep motivation and engagement with the course at a positive level during the wait for the course start (given that time is necessary for participant kit preparation).
- Create opportunities for more in-person interaction and site group community formation in the Collaborative Workshop.
- Require Collaboration Workshop attendance for participants.
- Retain the Team Charter element of the Collaboration Workshop and lead-in to the course but make this activity more concise and relevant.
- Implement larger site group sizes (between eight and fifteen per group) to assure sufficient numbers for successful group interaction during each class session (given temporary absences).
- Provide comprehensive and detailed “roadmap” information to the course participants prior to or at the beginning of the course.
• Schedule DECAL synchronous sessions late in the week, on Thursdays or Fridays; don’t schedule them on Mondays.

• Clarify the timing and length of DECAL synchronous sessions.

• Make use of Asynchronous Presentations and reduce the dependence on material presentation in the synchronous sessions.

• Retain and strengthen the role of breakout (“syndicate”) sessions in the synchronous session design.

• Improve the flexibility of the synchronous sessions to allow increased engagement in interaction and discussion.

• Improve the visual clarity of slide presentation via the video conferencing channel or move this to the Internet as a parallel channel of communication and presentation during synchronous sessions.

• Incorporate more examples and “enrichment” content in the course (in the synchronous sessions particularly).

• Retain and strengthen the site group community structure.

• Retain the site group observer/facilitator role.

• Reduce the role/visibility of evaluation in the DECAL course experience.

• Retain the weekly session schedule through the end of the course; do not implement a longer activity period at the end of the course without regular class sessions.
DECAL continues to be an educational communication model which shows promise and deserves further development. The data from the two BT tests have indicated both the strengths (and potential) of this method of communication in an educational context and areas needing further attention. The dramatic improvement in contextual, organizational and technical circumstances in the DEL course indicates that the adjustments to the model implemented after the initial EoN DECAL course are on the right track.

Work outside the University of Michigan Business School and BT also shows support for the tenets of the DECAL model. The coordinated combination of synchronous and asynchronous interactions, the retention of a central focus on synchronous (face-to-face whether electronic or in-person) interaction, the use of electronic discussion environments for continuous interaction between synchronous sessions, re-conceptualizations of the model of instructor as something other than the center of all course communication, and even the use of the Internet as a side-channel in video conferencing-based synchronous interaction all appear in current research and design as well as in currently available distance learning products.

Issues next on the research and development agenda for DECAL include: continued improvements in the contextual technical and organizational issues surrounding DECAL implementations; continued adaptation of synchronous session design to support breakout sessions and to maximize the use of synchronous time for interaction and discussion; reductions in the instructor time to create asynchronous presentations; development of viable production models for DECAL courses of varying sizes (12-300); improved
structure to support the establishment of critical mass in the asynchronous environment; explorations of DECAL use in appropriate on-site Business School courses; Web site template improvements; and improved file download, network performance and streamed audio and video performance. With these explorations we hope to continue the productive evolution of the communication model in management education, moving toward an improved educational experience for participants and faculty and greater reach, flexibility and global presence for the University of Michigan Business School.


