An Integrated Approach to Business Education

Appending Asynchronous Technology to Traditional Teaching
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Developing New Educational Forms

Using computer technology for collaboration, learning and accessing information is already part of the educational experience for most K-12 students. Even elementary school children use technology to search for information and talk to friends from other parts of the world. The extensive and growing use of computers in our society will mean future generations may think and learn differently than previous generations. These future generations will expect to be active participants in the learning process, and may expect an approach that incorporates experimentation and synthesis of experience, rather than a passive and linear information delivery approach.

This change in student needs and expectations is not the only force driving change in higher education. Companies are increasingly embracing Internet and Intranet technology to conduct business and as a medium for communication, marketing and sales. Society's needs also are changing. The need for education and lifelong learning is now an economic imperative, and not just education in the traditional sense, but one that offers high-quality customized education, at an affordable cost and at a time and place convenient to the learner. This change in societal needs and learning styles requires a new communication paradigm in education that embraces computer technology in appropriate ways.

Computer technology has many roles in our society. In this monograph we will focus on how the synchronicity of the classroom can be enhanced by the addition of a media-

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1Duderstadt (1996)
2CommerceNet and Nielsen Media Research (1996); Emerging Technologies Research Group (1995); Miller & Clemente (1997); Moozakis (September 1998)
rich, asynchronous, computer-based environment. We will explore how technology can create learning communities that extend beyond the classroom’s traditional boundaries, and how instructors and students can incorporate access to a variety of information, interaction and presentation forms into learning. Quite simply, we will show how asynchronous, computer-based communication can enhance classroom learning.

Large-scale integration of computer-based communication into conventional on-campus teaching will require new effort and new learning on the part of instructors and students, yet there are few mentors to act as guides and little institutional experience to draw on. This integration of communication structures may cause teaching to shift from instructor-centered toward student-centered, and toward the creation and management of learning experiences rather than instructors as the sole source of knowledge and content delivery.3 The instructor’s class time increasingly will be focused on high-value activities, such as helping students find and interpret information and discussing alternative views, rather than on content delivery. The resulting learning experiences will tend toward active and collaborative process and time for reflective thought and discussion. Educational communication will become more flexible and involve high levels of student engagement. Students will bear an increasing responsibility for their own learning. This will be demanding for instructors and students, but potentially it will create very rewarding and effective learning experiences.

In a few years, what we now consider to be advanced or experimental computer technology will be an integral element of all higher education institutions. The advent of the World WideWeb from infancy to a ubiquitous and media-rich information source in only a few years bears witness to how fast technology is moving. This rapid change is providing both institutions and instructors with the same problem—deciding when to engage the new computer technology. The one constant with computer technology is that something more powerful, easier to use and less expensive is always on the horizon. Worrying about when to begin can lead to paralysis, which inevitably results in falling further behind competing institutions and student expectations. Clearly, computer technology will play an increasing role in the higher education environment. To harness its power and avoid paralysis we must be able to use it effectively. Through this monograph, we seek to advance our collective understanding of how technology can be used now to enrich classroom teaching at the business school.

3Brown (1996); Doherty (October 1998); Lander (1977a & 1997b)
An Integrated Approach

Introduction

Changing to an integrated approach that combines computer-based communication with conventional teaching will become increasingly important as the “digital generation,” with their different expectations and learning styles (and who are subject to different expectations from employers), enter the higher education system. The primary motivation for this integration must be to support improvements in the teaching and learning environment. Toward this goal we believe effective learning involves active engagement on the part of students.

This student-centered view of education requires openness and trust among all members engaged in the learning experience, including the instructor. The approach is active learning with its emphasis on group process, critical reflection and enterprising curiosity. Though a student-centered approach to learning does not require the use of technology, computer-based communication technologies can facilitate the process. This monograph focuses on using technology as an integrated element of a student-centered approach, and will describe teaching, learning, collaboration and communication within that context.

It is important to note that the integrated approach described here represents one end of a spectrum of instructional change. At the other end are simple applications of asynchronous technology to existing courses. This might involve posting a simple (non-interactive) informational Web site to accompany a conventional course. From these simple beginnings instructors can make incremental changes and explore how much of an integrated approach is appropriate for their courses and subject matter.
The Instructional Design

As previously stated, we believe there are compelling motivations, consistent with good teaching practices, for combining the synchronicity of the classroom with the reflective and collaborative aspects of asynchronous, computer-based communication. Before we discuss the efficacy of this approach, we should describe what the total experience might look like, and how it might be viewed from both an instructor and student perspective. We also must establish a label we can use to refer to “this approach.” There are a wide variety of labels used for various computer-based technologies in teaching and learning. However, there are no established terms to refer to the hybrid we will describe here of conventional synchronous teaching elements and new, computer-mediated asynchronous technologies. Therefore we will use “integrated approach” as our shorthand for the concept we are presenting in this monograph. We will use this label throughout this paper.

The Structure of an “Integrated Approach” Course

It is perhaps easiest to think of an integrated approach course as an alternating sequence of synchronous (classroom) and asynchronous (technology) sessions (see Figure 1). This starts with a conventional class session structure and then appends asynchronous, computer-based interaction and information dissemination “sessions” which occur in between the class sessions. Ide-

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4Barritt (1998)

<table>
<thead>
<tr>
<th>Classroom - Synchronous</th>
<th>Online - Asynchronous</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Regularly scheduled sessions (e.g., twice a week)</td>
<td>• Regularly scheduled periods of time for session activities; within these boundaries participation occurs at any time (“asynchronous”)</td>
</tr>
<tr>
<td>• In-person group interaction (participants in the same room)</td>
<td>• Participation from any location</td>
</tr>
<tr>
<td>• Same-time interaction (“synchronous”)</td>
<td>• Supports reflective interaction, exploration of information and collaborative work (group interaction)</td>
</tr>
<tr>
<td>• Supports spontaneous one-on-one and group interaction</td>
<td>• Student control of individual pace and scope (supports mastery learning)</td>
</tr>
<tr>
<td>• Instructor control of pace and scope</td>
<td>• Faculty as coach, mentor, facilitator</td>
</tr>
<tr>
<td>• Instructor as leader</td>
<td>• Access to recordings of synchronous class sessions</td>
</tr>
</tbody>
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Figure 1. Integrated Approach Course Structure
ally these alternating sessions are integrated into a coherent single course design which flows seamlessly.

In this course model, the student has more control over their learning experience. They are free to pace themselves in the asynchronous environment, to explore alternative sources of information and to discuss their findings with their learning cohort (in this approach the instructor would be considered part of the learning cohort). Interaction within the cohort can follow a “networked” structure where all participants are equally accessible and able to originate discussion (including the instructor) (see Figure 2, Grenier & Metes, 1995).

Face-to-face time with the faculty (during the synchronous classroom sessions) is considered a high-value opportunity that can be used for exploration and interpretation rather than primarily content presentation. The asynchronous sessions can be used to offload simple content delivery tasks from class sessions. In this approach, presentations would be pre-recorded and conducted through technology. Questions and issues that arise can be answered and explored by the learning cohort in the asynchronous environment (via “electronic discussion” tools) or carried over to the next synchronous class session for in-person discussion.

It is important to state at this point that integrating technology into the curriculum requires both instructor and student skills and a robust (and appropriate) technology infrastructure. During evaluations of experimental technology-dependent courses, it was

<table>
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<tr>
<th>Traditional Learning</th>
<th>Networked Learning</th>
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<tbody>
<tr>
<td>Instructor</td>
<td></td>
</tr>
<tr>
<td>Participant</td>
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- Ubiquitous learning paths and time independence enable continuous interaction.
- Everyone can ask everyone else questions, not just direct them at the instructor.


Figure 2
found that students and instructors were at risk of spending an inordinate amount of time resolving technical issues and learning how to use technology which was new to them. In these experimental programs, developing a one-day workshop that focused on collaborating and learning in an online environment greatly reduced these problems.

An Instructor’s View

The following is a fictional journal entry of an instructor teaching two on-campus, integrated approach courses. It is a literary device to help communicate what teaching in this integrated environment could be like. Although the details are fictional, it is based on the authors’ experiences of evaluations of actual courses, on the experiences of instructors involved in them and on a review of the literature on computer-mediated communications technology within a higher education setting.

A typical day

“It is Wednesday at 8:30 a.m. and I’m not planning on going into the office until early afternoon. My Monday/Wednesday class doesn’t meet until 3 p.m. and I have some writing I want to work on at home. I quickly check my e-mail and read a few messages. One is from a collaborator on a paper I am writing and another is from one of my students saying he will miss this afternoon’s class. I remind him to review the presentations and to listen to the audio recording from today’s class that will be available on the Web site afterward. I also ask him to submit two substantive entries in the course discussion area related to today’s class topics. This is part of my class policy when students are absent. I also receive an e-mail from another student who feels the course pace is too slow. This is potentially good news, since I have some additional material I would like to add to the next few sessions.”

The instructor and students can easily stay in communication between class sessions. The instructor can receive regular feedback and make adjustments to the course as required. Since some presentations and a majority of group collaborations are taking place outside the classroom, and an audio recording of each classroom session is placed on the Web site, she is comfortable providing students with a measure of flexibility.

“There is a lot of activity on my Tuesday/Thursday class Web site. The discussion area is full of new topics and responses. Most discussion is on the topic I introduced last week, and there are a couple of really insightful responses. I will try to build on those during tomorrow’s class session and prompt a live discussion of the topic. In another topic in the discussion area a student has posted an interesting response to another student’s question. I think I will leave it and see how the class answers it. My TA has done a great job facilitating another separate discussion that has been going on since the course began. However, I think it is time to bring closure to that topic. I have some thoughts I will post and suggest some ways the topic can be brought to closure. I checked the homework submittal area of the Web site and looked at the submittal time; it looks like two students were late submitting their assignment. I am going to have to talk to them in the next class. Time to start grading;
as soon as I finish I will e-mail the results back to them.

Throughout the course, the instructor is monitoring and participating in asynchronous class discussions and exploration. Doing this provides her with an understanding of how the class is progressing. Note that the instructor might choose to wait to participate in a new discussion topic—giving the students an opportunity to respond to each other and take responsibility for an issue. This supports the goal of more active student engagement and learning and helps to keep the faculty workload manageable. This collaborative mechanism also provides students with the freedom to explore other information sources and to discuss different and perhaps opposing points of view. The richness of this asynchronous interaction subsequently provides excellent material to support highly interactive class sessions. All homework assignments are submitted electronically, which simplifies collection of the students’ work, various administrative elements of the process and the dissemination of grades and comments.

“I am nervous about this afternoon’s class even though I have taught this course three times. I posted an audio version of my content presentation for this session along with PowerPoint slides and readings to the Web site. I used to present this material in class, but since I’ve given them this material on the Web site, I’m going to conduct a group activity during the class session instead. I also will monitor the class discussion on the Web site about the content prior to the class and attempt to integrate ideas from the discussion into the group activity. We will see how it goes.”

The instructor recognizes the in-person class session is an opportunity for a powerful learning experience based on interaction and engagement and seeks to create a high-value add session, but the participatory nature of her plan is making her nervous. She will have less control and will be more “on the spot” if the activity does not go well than she is if she just gives a familiar lecture.

“This afternoon’s class went well. There were many good questions and serious engagement from the students during the group activity. In fact, the students conducted an interesting debate with little intervention from myself; it seems they are starting to understand the material. After class I realized I missed making a point that could be important to the students’ understanding. When I get home I will add a few comments to the Web site and perhaps even record a short audio clip.”

Using technology allows the class to be extended beyond the confines of the classroom. In this case the instructor wants to add an additional point of view that she missed in the class. This is a straightforward and natural thing to do in an integrated environment.

A Student’s View

The following is what a typical student might experience in taking an integrated approach class. Like the instructor’s view, these journal entries are fictional but are based on evaluations and discussions from students engaged in similar courses.
A typical day

"It is Tuesday evening and I am sitting in my room reviewing the class Web site. The last time I accessed it was last night when I posted a comment in the online discussion; I’m interested in seeing what the response has been. My comment was in response to a link and its accompanying remarks that had been posted by a classmate. His remarks, I believe misrepresented the information in the link and I wanted to draw the class’ attention to that. I was nervous about doing this since he is a class leader and his comments were well stated. I also did not want to seem to be too confrontational."

In his entry the student talks about his reluctance to post a contrary comment even though he feels strongly about it. This reluctance reflects the fact the written word tends to be viewed in more absolute terms than the spoken word. Also, the asynchronous medium encourages reflective responses rather than spontaneous ones, so comments tend to be viewed as defined positions rather than transient thoughts.

"I am relieved to see there are five responses to my posting. There seems to be some agreement with my thoughts, and someone even posted links to another information site that generally supports my view but takes the point in a slightly different direction. It’s interesting and it feels good to see my peers discussing something I started. I’ll think about it a bit more before posting another response myself. I sent an e-mail to the TA with a question about the final paper we have been asked to write; she is always good about posting a quick response. Tomorrow’s class notes and slides were on the Web site so I downloaded them to my hard drive and printed a paper copy to take to class. Just as I was about to log off I got a response from the TA; that was quick, she must have been online at the same time."

Our fictional student is obviously relieved at receiving some reinforcing comments and motivated to realize his ideas are interesting enough to engage his peers. This experience might make it easier for him to express his opinions in the class in the future. As illustrated, Web sites can facilitate quick responses and allow for easy support of students.

"I went into the computer lab this morning before class and noticed the instructor had added another handout for this afternoon’s class and I printed it out. The TA had some additional thoughts on my question about the paper and has posted a link to a site that might help me. I will need to look at it later. The afternoon class was great. We split into groups and developed an assessment of various perspectives on the topic. We presented these to the class, and there was a really interesting discussion. The instructor made guiding remarks and basically let the discussion flow. After class the instructor said she wanted to talk to me about some ideas she had in response to my question on the paper (my TA had copied her when she first replied to my question). I am going to be out of town over the next few days for some interviews so we agreed we would ‘talk’ online."

In this example, there is integration between asynchronous class activity and the classroom sessions. Content presentation and discussions starting in the asynchronous environment migrate to and support classroom activities and vice versa. Quite simply, each is an extension and a complement to the other, and the course as a whole becomes a more continuous experience than a conventional course.
An integrated approach has different characteristics than those of either a conventional classroom or an asynchronous distance education environment implemented individually. It is the combination of asynchronous (computer technology-based) and synchronous (classroom, in-person) interaction that produces added value and some interesting characteristics, some of which are described below.

**Synchronous and Asynchronous Interaction**

Creating opportunities for continuous interaction, increased time and location independence, greater student control over learning, and reflective discourse.

The pedagogic value of an instructor occurs primarily through their interaction with students. Without interaction they have no effect on learning. The core of formal education is, therefore, based on this interaction which can be one-to-one, one-to-many or a combination (as is common with most classroom situations, at least when the student/instructor ratio is not excessive). The introduction of computer-mediated communication technology into the learning experience increases the opportunity for fast and accessible faculty/student and student/student interaction at any time. It allows for asynchronous interaction to occur between class sessions. The asynchronous interaction complements the synchronous interaction of the classroom and facilitates a continuous exchange of ideas in a class “environment.”

The traditional classroom approach limits interaction to discrete opportunities (class sessions and office hours) with limited if any mechanism for interaction beyond those times. Introducing computer-based asynchronous mechanisms into the learning
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Asynchronous communication used in traditional classroom approaches. Using the Internet and related technologies, the integrated approach builds on this traditional model by replacing these physically cumbersome and one-way communication mechanisms with dynamic, persistent and multi-directional mechanisms. For example, instructors who would like to submit some comments to a class immediately after a classroom session is finished can post these comments to the asynchronous discussion space where they are immediately available to the class. In this way, discussion and information flow can be continuous and the instructor/student interaction enriched. From a pedagogical viewpoint, the capability to interact on an immediate “as needed” basis and to review previous class interaction is a positive addition. However, this can increase the instructor and student workload. This concern will be discussed in subsequent sections of this monograph.

Distributive Communication

Retaining the ability to change materials and information made available to an entire course population.

In a Web-based environment, information is made available in a “distributive” rather than a “distributed” fashion—information made available to a dispersed audience is still available and changeable by the person who originated the information (or, if desired, by all participants in the course). This is in contrast to distributed material, where once the material is made available to the class it may no longer be available to

experience allows a mixture of spontaneous and reflective discussions to occur, which results in a richer learning experience. In this context “asynchronous” refers to interaction where “individual contributions to a discussion or some other form of interaction are stored electronically and made available to others on demand.”7 Asynchronous interaction has a number of characteristics that can contribute positively to communication within a class. These include:

- Time independence – Students and faculty can participate at any time convenient to them.
- Location independence – Students and faculty can participate from any location convenient to them (the only limitation being an adequate Internet connection).
- Persistent artifacts – All interactions are captured and archived, thus allowing participants to review existing discourse before adding their own contribution.
- Minimization of inequalities – Interaction is more democratic since the physically shy and bold have equal opportunities to contribute to a discussion.
- Reflective discourse – Time independence provides an opportunity for considered and reflective discourse.

Asynchronous communication and information dissemination is an element of a traditional classroom approach; course packs, readings, letters between class participants and e-mail are all examples of the types of

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7 Barritt (1998), p. 219
delivery, such as “asynchronous presentations” which deliver audio linked to presentation slides accessed via a Web page. (Other examples of such delivery might be text-based, audio, video, computer simulation or a multi-media combination.) By delivering content in this asynchronous form, students can take a mastery learning approach by setting their own pace, reviewing material and mastering each topic before moving on. Asynchronous presentations also free up in-person class time for activities other than content delivery, for activities that depend on face-to-face spontaneous interaction. These activities can be a critical element of how instructors add value in a learning situation. If desired, synchronous class sessions can be recorded (audio or video) and made available in the asynchronous environment. Doing this allows students to spend more time with difficult material or review a missed class.

In many respects, the classroom is a less-than-ideal place to deliver a lecture. The strength of the classroom is that it creates opportunities for spontaneous interaction. If class time is used solely to present material, then it is not being used to advantage; some presentations might be more effectively accomplished in an asynchronous form. By delivering presentations asynchronously the students can adapt the pace to suit their needs. They can stop the presentation to take notes, review references or consider complex issues, which changes the presentation from a passive to an active experience. Having the presentation in a documented form allows the students to focus on considering and understanding (and perhaps questioning) the content rather than simply cap-

Flexible and Self-Paced

Increasing student control of pace and mastery while working with course content.

Using computer-based technology for communication, presentation and information dissemination allows the instructor and student a degree of scheduling and location independence. An instructor or student can access a Web site at any time to review material or add to a discussion. Similarly, they can access a Web site from anywhere in the world (providing there is an adequate Internet connection). However, freedom of time and location may be moderated by the schedule of the in-person class sessions, which are still at a specific time and location, and by the start and end dates for a course.

Asynchronous computer-based communication technology also presents a new opportunity to deliver content in a form other than classroom
turing it through note taking (student as stenographer).

An example of a presentation delivered via a Web site could involve a “streamed media” file with slides, audio and video blended together to form the presentation. Although this type of presentation is in one sense fundamentally one-way, some interactivity could be created through links to asynchronous discussions and team collaborations. These linked mechanisms would allow students to post questions and discuss issues from the presentation with their peers and the instructor.

Asynchronous Discussion Environment

Changing the characteristics of group discussion to allow for improved equality, focus and reflection.

In an asynchronous discussion environment each topic is kept visually separate. A topic is started when a student or the instructor creates a new document, titles it and types in text that defines the subject. Other discussion members can view this topic and write a response. Responses are displayed in chronological order under each separate topic heading. A sequencing of responses is called a “thread,” and by reading down through the sequence a participant can follow “the thread” of the discussion.

An asynchronous discussion differs from a face-to-face discussion in several critical aspects, including: (1) participation can occur at any time and without competition for the opportunity to speak, (2) contributions tend to be reflective rather than spontaneous, (3) everyone has equal opportunity to contribute regardless of their status or physical presence and (4) discussion stays focused on the topic until a natural end point is reached (digressions to other topics can be split off to separate threads).

Which is better, asynchronous or face-to-face discussion? The spontaneity of face-to-face discussion can be creative and energizing, but it also can exclude valuable contributions and minimize thoughtful responses. On the other hand, an asynchronous discussion tends to be thoughtful and inclusive, but lacks spontaneity and requires participants to write their contributions. A mix of asynchronous and face-to-face discussion with its combination of spontaneity, reflection and some location and time independence can be extremely effective. This combination allows discussions to extend beyond the limited opportunities for face-to-face interaction and leads to greater opportunities for total class interaction, thoughtful interaction, community formation and group work.

An important characteristic of asynchronous discussions is that they have persistence. Everything that is “said” is automatically recorded and can be referenced at any time by anyone in the class. This persistence allows students (and the instructor) to review previous discussion entries. It allows for self-pacing and a mastery learning for individuals participating in discussion/learning topics. The persistence of asynchronous discussions also supports archiving for future reference.

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8See the Glossary section for a description of “streamed media” and other terms used in this monograph.
Increased Student Responsibility and Control

Opportunities for increased interaction and increased student control over learning increase student responsibility.

An integrated approach provides a natural opportunity via the asynchronous environment for an evolution in instructor and student roles and responsibilities. This evolution moves toward active student engagement, increased student responsibility and instructor roles that are shifted in the direction of mentoring and coaching. One motivator for this evolution is the “networked learning” characteristics of asynchronous computer-based communication mechanisms\(^9\) that help to place all course participants on an equal communication footing. Instructors are “nodes” on this network as are students. It is no longer natural that all communication is directed at and managed by the instructor (as can occur in conventional class settings). In this environment student participation becomes more of a responsibility and less of a simple response to stimuli or pedagogic coercion. It becomes essential that students are engaged and motivated in order to achieve critical mass in the course interaction. When this critical mass occurs and there is active student participation in class discussion and issue resolution, then the learning rewards can be substantial.

Another mechanism that promotes this evolution toward changed student and instructor roles is the delivery of content presentations in the asynchronous environment. By taking advantage of the opportunity to move simple content delivery tasks out of the classroom and onto the asynchronous Web environment, instructors can release face-to-face (synchronous) class time for other, more active and engaged activities (such as discussion, group work and report-backs, problem-solving exercises, role playing exercises, etc.).

The student’s experience of content delivery in an asynchronous environment has the potential to allow a high degree of active engagement. This is surprising given the common assumption that moving content out of a classroom and into a computer-based medium creates a static, unyielding experience. (A common reference to the process of moving content to this environment is that it is “canned.”) However, from a student perspective quite the opposite can occur. A traditional lecture presentation in class cannot easily be adapted to the needs of any one student and requires a relatively passive student role. An “asynchronous presentation” on a course Web site (involving, for example, recorded audio linked to presentation slides) is controlled by each student individually, allowing them to manage their own movement through the presentation. This allows students to stop, to review material, to spend as long as necessary taking notes or to spend time during a lecture researching an issue they don’t understand or want to know more about. Students also can pose questions to the class and the instructor in the asynchronous discussion area of the Web site while they are working through an online presentation. Thus lecture deliv-

\(^9\)Grenier & Metes (1995) - see Figure 2 earlier
ery of content, which can be inherently passive and non-adaptive in the classroom, can become self-paced and mastery-focused in the asynchronous environment. As with the asynchronous interaction environment this requires an increased level of motivation and responsibility on the part of students. Unlike a lecture-based class session, the instructor does not directly control the delivery of this content to the students. Students must be (externally or internally) motivated and choose to use the asynchronous presentation material during their study time.

### Active Project Learning

Providing natural opportunities for making student work more “authentic” and motivating.

The communication in a conventional course is inherently private and non-distributive. Discussions within a classroom remain within the classroom. What is said is immediately gone—preserved only in the memories and written notes of the participants. Written student work may be viewed only by the faculty and may be for only one purpose—to demonstrate a student’s understanding of the material. In this sense student work can be artificial; it only simulates professional work because it does not serve its natural purpose (for example, a student’s market analysis is not in fact used by anyone to make business decisions).

In an integrated approach, communication can include asynchronous discussions (which are automatically persistent, they can be used and reviewed later). Also via the asynchronous communication environment student assignment and project work can easily be made available to a broader audience than the course instructor. This can be limited to course participants (where each student’s work is made available to the entire class for their study and benefit), or student work can be published on the Web and shared with interested parties outside the class. Where appropriate, student work can in effect be published to the world directly from the course environment. These characteristics can have substantial motivational effects on students. When student work is no longer private between student and instructor, it invariably has a motivating effect on the students’ efforts. It also encourages group learning since individual work can be easily discussed and reviewed and serve as an active contribution to the learning of others.

### Developing Technology Literacy

Technology literacy becomes a natural outcome of learning in an integrated approach environment.

As stated earlier, there is a cultural context around the question of using technology within higher education. This context states that employers, in order to remain competitive, need graduates who are skilled in the use of communication and computer technology. This forces higher education institutions to supply graduates who are technology literate or risk an erosion in the market value of their degrees. Technology literacy can be developed by introducing appropriate course material into the core curriculum, or through exposing students to technology as a natural part of the
learning experience. In an integrated approach, students develop technology skills as a natural outcome of the learning experience. As they progress through a course they gain the practical skills necessary to effectively use digital technology for communication, information access and teamwork.

**Archiving Course Material and Submissions**

Changing the ephemeral nature of course interaction.

The mechanisms used to implement asynchronous communication and interaction lend themselves to the storage and reuse of class materials. When a user types an entry into an asynchronous discussion or posts a document to the Web site, it is stored by the computer and held until another user requests it (this is the mechanism that permits the time independence of the asynchronous Web environment). This asynchronous environment is a natural storage environment as well as one for communication and interaction. This characteristic makes it particularly useful in archiving the asynchronous elements of a course in an easily reusable format, including class discussions and communication, not just the course-pack type materials and presentation notes.
Issues Arising from Using an Integrated Approach

Integrating technology into a traditional classroom context has specific consequences and effects on the lives of faculty, students, staff and administrators. We have seen examples of these emerge in our own programs and also in the educational literature. We will present some of them here (focusing on the experience of faculty) and describe what we believe are effective responses that minimize problems and maximize benefits.

Course Preparation

Transitioning a course to an integrated approach requires substantial work and might be compared to preparing an entirely new course.

In discussing the issues surrounding course preparation we should keep in mind three perspectives: (1) Transitioning a traditional course to an integrated course, (2) Developing a new, integrated course and (3) Maintaining a fully developed integrated course.

Transitioning a traditional course to an integrated course is labor intensive. The actual time required depends on the technical literacy of the individual instructor, but it may be only slightly less time consuming than developing a completely new course. Like any course, when an integrated course is taught repeatedly the preparation time is dramatically reduced. Material might have to be updated but not recreated from scratch, presentations may have to be reviewed and edited but not entirely replaced and assignments may have to be modified but not re-conceptualized. The process of updating materials in an integrated environment is somewhat simplified; the subsequent physical duplication and distribution of
material is unnecessary since material updated on a Web site is immediately usable.

Even after an integrated approach has become part of the school’s teaching culture some issues will remain with course preparation. The instructor learning curve will no longer be an issue, but preparing asynchronous presentations (audio or video) and related material can be time consuming. An asynchronous presentation typically consists of an audio or video recording, accompanied by presentation slides and text material. Faculty can create these presentations on their office computer, but learning to do it efficiently can be a challenge. Due to their asynchronous nature, these presentations must be prepared in advance, with the instructor often having to visualize the words, structures and approaches to use before having even met the students. Complicating this situation is that the instructor cannot adjust the presentation in mid-stream like a traditional class, based on visual or spoken feedback. Consequently, the material must be well designed so it is capable of “standing alone.” This can result in the instructor spending much more time preparing and checking their presentations than if they were giving them live.

There is an understandable perception of increased formality in asynchronous presentations compared to live presentations. In live presentations, it is accepted that the presenters may stop in mid-sentence to catch their thoughts or correct themselves. However, in recorded media our expectations tend to change. We perceive a need for perfection; we are accustomed to perfection in other broadcast forms of such recordings (TV, radio and movies). Instructors producing presentations encounter this bias for perfection (both their own and the students’). Unfortunately, striving for perfection is extremely time consuming, virtually impossible to achieve and adds little instructional value. To avoid thisordinate use of time, it is critical that an expectation of informality be created. The allowance for a certain level of informality recognizes that hesitations and mid-sentence corrections are a normal part of everyday discussion, and that a measure of this is acceptable in recorded asynchronous presentations.

One outcome of transitioning courses to an integrated approach is that it forces a thorough evaluation and re-design of the course. This can have a beneficial effect since each element of the course has to be examined in a way that would not normally occur.

**Changed Control Dynamics**

Shifting education from instructor-centered toward student-centered provides students with new opportunities for engagement in learning but can challenge instructors with change.

As discussed in the previous section, integrating an asynchronous environment into the learning experience can alter the student/instructor control relationship, resulting in a shift from an instructor-centered toward a student-centered model. Some results of this are subtle, but some are much more dramatic. Quite simply, the students cannot be passive in this type of learning experience, or the appropriate level of discourse, exploration and learning will not occur.
The resulting student-centered model encourages students to introduce materials for discussion or review without the authorization of the instructor. The desire for exploration is pedagogically desirable, but it can present the instructor with an adjustment and some level of discomfort. It requires a different instructional style, one many instructors are not familiar or comfortable with. They must become a guide and designer of learning experiences. This has the potential to increase the faculty workload since there is a constant need to review and respond to student interaction, which adds to the existing instructional tasks.

The characteristic of more engaged and responsible students is a natural outcome of combining highly interactive classroom sessions with an egalitarian, asynchronous environment. This integrated approach, which encourages students to raise issues, explore other information sources and submit additional course material, creates active student involvement in the gathering and synthesis of information. And although this engenders active engagement, and a critical awareness of the “knowledge” representation in the given topic, it does require the instructor to be equally engaged.

**Instructor Workload**

An integrated approach can increase or alter the nature of instructor workload for teaching.

An integrated approach involves appending new communication opportunities and structures on top of the existing communication that occurs in a traditional classroom approach. Thus, the instructor will spend more time between class sessions interacting with students than in a traditional course. This increased interaction has obvious pedagogical advantages but it inevitably entails additional work for the faculty. Also, as discussed previously, instructor workload can increase due to the additional requirements of preparing asynchronous presentations. Before deploying an integrated approach, the instructor should carefully consider these increased time demands and develop coping strategies for them.

The increase in workload is due to the combined effect of: (1) instructors having to develop technology-dependent skills, (2) the increase in course preparation time and (3) the additional demands of continuous engagement. Teaching for the first time in an integrated environment involves a learning curve, which varies according to the technology competence of the instructor and their comfort with change. This is a non-recurring time demand that is inevitable when any new venture is undertaken. Like the increased preparation time for developing new courses, the time to transition a course to an integrated approach should be amortized over the life expectancy of the course.

An increase in workload due to the expanded communication opportunities can be the result of the instructor remaining at the epicenter of the class, that is, the instructor tries to maintain a position “at the front of the class” with all communication being directed through him or her (see Figure 2 earlier). Trying to retain this control
position quickly leads to overload. It also works against the basic student-centered premise of an integrated approach. One technique the instructor can use to avoid falling into this position is to not be the first to respond to questions and to avoid giving discussion-ending answers. By doing this the instructor increases student engagement, encourages active learning and reduces time demands (the instructor still has to keep up with reading discussions but does not have to write extensive responses). The instructor’s responses should be carefully considered and provide the guidance to help students reach productive resolutions of issues.

In an integrated approach, face-to-face time with the instructor should be a high-value added component. Since some course material is presented asynchronously, the time needed in the classroom for content delivery may be reduced and more class time may become available for highly interactive, value-adding activities.

**Technology Support and Preparedness**

An integrated approach puts instruction at risk of technology-related failures and requires increased levels of technical support, infrastructure and preparation.

The more technology is used as part of the learning experience, the higher the probability a technology failure will adversely affect the experience of the course participants. Delays and slow operation, lack of access to course materials, unreliability and lost files are all possibilities with an integrated approach; they are unpleasant experiences and can be very frustrating. These can be largely avoided if during the implementation phase the following is designed into the process:

- Students, instructors and staff are provided with the appropriate levels of training.
- Students, instructors and staff are given access to all the necessary technology.
- Technical help is planned for and provided in a timely manner.

The first two are preventive measures since technology failures often result from inadequate equipment or training rather than broken technology. Instructors and students must be at an appropriate level of technical literacy prior to the start of the course. If they are not, this literacy can be developed through workshops, self-study, one-on-one training, experimentation or some combination of these. The school also needs to ensure appropriate hardware is available, software is compatible, programs run the way they are supposed to and access is available to all who need it. Failure on any of these points once the course has begun would be disruptive for those involved and could result in the inability to keep up with the course. If the individual involved in this disruption is the instructor, the consequences could have serious implications for the entire course.

Even the best planned training and technology installations sometimes fail, and when this occurs access to quality and timely technical support is critical. As described by Mercer & Barritt (1998), in an integrated teach-
ing environment the demand for technical support can be greater than conventional support organizations provide. Prompt attention is required. Conventional response times, which might involve something like a three-day response after a problem is reported, can leave individuals out of touch with a course which continues without them. They can't participate in class interaction and might not be able to complete their work. Their ability to succeed is quickly compromised. If it is the instructor who is affected, the results can quickly be detrimental to the course as a whole.\textsuperscript{10} The technical support organization must be able to very quickly address technical problems related to course use of computer technology.

Copyright, Intellectual Property and Ownership

Instructors retain traditional degrees of ownership of course content while the institution may have ownership of software environments used to deliver content and support interaction.

When moving materials into a Web site, copyright issues apply as they do with regular course packs; the instructor must conform to “fair use” guidelines or acquire permission from the copyright holders. Some copyright holders have demonstrated concern about granting permission to put their content on aWeb site. (This concern often is minimized if the site is password protected and removed from the network at the end of the course.) The perception (and reality) is that by allowing electronic versions of their materials to be used, they will experience an increased risk of unauthorized copying and distribution. Similarly, instructors often are concerned about intellectual property rights for courses they develop using an integrated approach. It is the understanding of the authors of this monograph that the content created by instructors and placed in aWeb or other template environment remains the instructor’s intellectual property. The ownership of the Web environment or template software developed with university resources, however, may be the property of the university (or have shared property rights).

\textsuperscript{10}Mercer & Barritt (1977)
Conclusion and Future Developments

The Sloan School of Management recently announced they it is moving beyond allowing prospective MBA students to apply for admission online to requiring all applications to be submitted this way.\textsuperscript{11} A number of other business schools allow online applications. This highlights a point we made in the introduction—we find ourselves in the midst of a culture that has begun to expect some level of use of the Internet and the Web for interaction and information access. A student population which is potentially Internet and Web savvy enough to apply online is likely to expect the use of these tools in the teaching and learning activities of a school. This, coupled with the expectations of a business community that increasingly makes use of these technologies, suggests the business school must incorporate technology into its teaching and learning activities just to meet minimum expectations from students and their future employers. Happily there are also strong pedagogic motivations (as we have attempted to show in this monograph) for the incorporation of technology into on-campus teaching. We find ourselves both compelled (culturally) and motivated (pedagogically) to find appropriate ways to integrate technology into education at the business school.

This integration of new computer-based communications technology will affect how we teach and how our students learn. Like earlier technology innovations, such as the blackboard and chalk, that have become a part of the familiar teaching culture, a seemingly simple addition can have substantial and complex effects. The characteristics we have described of an "integrated approach" that affect the

\textsuperscript{11}San Jose Mercury News (1998)
control and responsibility relationships in a course, the active engagement of students, access to information, persistence of course interaction and course preparation times and procedures are all examples of important shifts in the teaching and learning culture. Unlike the integration of the blackboard into education, the computer-based communication technologies involved in the integrated approach are having a similar effect throughout society at the same time its presence is being felt in education. Its integration into higher education conforms to a general societal evolution and thereby strengthens the relevance between activities in the classroom and the world outside (regardless of the field of study). As evidenced by recent surveys, its relevance in a business community is particularly strong.12

We have discussed the integration of technology into teaching at the business school as a modification to the asynchronous elements of classroom communication. Where there has conventionally been one-way, static asynchronous mechanisms (such as a printed course pack and paper assignments), the new asynchronous computer-based communication technologies offer multi-directional asynchronous interaction and distributive information sharing. Added to conventional synchronous classroom sessions, this creates a continuous interaction environment and the "integrated approach" we have described.

This is not a simple addition, however; it is a change which will replace some course mechanisms, modify others and inspire the creation of others which are entirely new. It is an environmental change that will prompt an incremental evolution of teaching and learning for each individual instructor, step by step. Instructors will not be able to simply "throw a switch" and suddenly inhabit this new environment and the new perspectives that may come with it. Instead, instructors likely will adopt initial elements of an integrated environment and make a few changes to their course. From this experience they will learn to see a bit further into a new perspective, and from there they will be able to see even further ahead and visualize the next possibilities for change. The cycle will repeat itself and migrate by example to other faculty. The incremental nature of this evolution will afford individuals the opportunity to keep up with change, to "get inside" new perspectives enough to understand how to accomplish their teaching and learning tasks within them. Instructors must have the opportunity to understand a new environment well enough to apply their skill and vision to shape their teaching appropriately. Students must understand the environment well enough to know how to work within it and use the information and communication channels it depends on. In this way, change to the teaching culture at the business school will be evolutionary.

We have discussed elements of an integrated environment that add work to the instructor teaching workload. Some of these are not simple additions to the faculty workload; they

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12CommerceNet and Nielsen Media Research (1996); Emerging Technologies Research Group (1995); Miller & Clemente (1997); Moozakis (September 1998)
are changes from one communication structure to another. Something is dropped at the same time something new is picked up. For example, a faculty member who spends time participating in an electronic discussion of a course assignment before it is due may spend less time than they used to on remedial support to students afterward.

During this evolution we must retain our focus on the primary mission of teaching in the school—the successful learning of our students. This is a fundamentally human goal, involving the intangible art called “good teaching,” as well as lots of hard work by instructors and the application of their experience to their teaching. It is also a goal that requires the active participation and motivation of the students and lots of their own hard work and application of experience and commitment. The technologies we use in the evolution of teaching must serve this fundamental goal. They must not become the central focus of our attention or become the central goal themselves.
Asynchronous: In the context of this topic, “asynchronous” refers to interaction which is spread out over time; individual participation can occur at different times. In computer network-based asynchronous interaction, individual contributions to a “discussion” or some other form of interaction are stored electronically and made available to other participants on demand.

Asynchronous Electronic Discussion Environment: Sometimes called “threaded electronic discussion environments” and “electronic discussion environments” this refers to computer conferencing systems structured around topics (called “threads”). In such an environment each topic is kept visually separate. A topic is started by a user creating a new topic document and typing in text which defines the topic. Subsequent users of the environment (or the same user at a later time) view this topic document and have the option of writing a response, which then is displayed “under” the main topic document (it appears lower down in a scrolling text display window). Subsequent responses also are listed under the main topic document in chronological order. These responses create what is called the “thread,” just as a series of utterances in a face-to-face discussion might be called a “thread” (as in, “I could follow the thread of their conversation”). In an asynchronous discussion environment a thread has a visual identity, as a scrolling, hierarchical list of main topics (main headings) and subsequent responses (sub-headings).

Computer Conferencing: Computer conferencing is a general term for asynchronous discussion envi-
environments (defined above). Asynchronous discussion environments are computer conferencing environments. A seminal predecessor to modern asynchronous discussion/computer conferencing systems is a system created at UM by Bob Parnes in the mid-1970s called “Confer.” Confer was a threaded asynchronous discussion environment as described above; it was one of only a handful of applications responsible for the formation of the concept of a threaded asynchronous discussion environment.

**Internet:** The Internet is a collection of standards and agreements about the format, structure and addressing system for a computer network. This particular collection of standards has become dominate and ubiquitous across the world. In effect, computer and software makers around the world have agreed to share one addressing system and one “language” for negotiating basic communication tasks between computers. When a computer is said to be “on the Internet,” that computer has some physical connection to a computer network, has an Internet address (unique to that particular machine) and can communicate with other computers which are “on the Internet.” Some organization’s network installations keep the same Internet address assigned to the same computer at all times; other installations maintain a pool of addresses and assign a particular address to a particular computer each time it boots up (this is called “dynamic addressing” and is the method used at the Business School). A primary concept behind the Internet is that it is not based on one central (massive) database of addresses. Instead, the Internet address information is dispersed and organized into a hierarchy of address spaces. The responsibility to maintain records of the addresses under any particular node in the hierarchy, and to route communications flowing through that node, belongs to the organization which runs the computers at that node. As communication is directed from one computer to another, it traverses this address space being directed up the hierarchy away from the originating computer until it encounters the level in the hierarchy which it shares with the computer it is addressed to. Then the communication is moved “horizontally” in the address space until it can be directed back down the appropriate branch of the hierarchy in order to reach the target computer. The dispersed nature and shared responsibility for maintaining addresses and routing communication on the Internet (which is an artifact of its cold-war origins where it was intended to allow computer networks to continue to function after a portion of the network had been destroyed in a nuclear attack) makes the Internet something which is to a large extent “owned” and maintained by people and organizations across the world.

**Streamed media:** Streamed media refers to audio and video delivered to a computer user over a network in a “just-in-time” fashion. Digitized audio and video files tend to be large. Instead of downloading an entire file to a user’s desktop computer before beginning playing the file, a streamed media file plays while it is being downloaded. As soon as the first portion of the file has arrived on the user’s computer it begins playback. The rest of
the file continues to download as the audio or video plays, arriving at the user's computer just before it is needed for playback.

**Synchronous:** In "synchronous" interaction participants interact at the same time. This might include conversations or class sessions in which people are physically in the same room, video conferencing interactions or telephone conversations. Technologies are becoming available which allow synchronous audio and video interactions to occur via computers on the Internet as well.

**Threaded:** In an asynchronous discussion or computer conferencing environment, a "thread" refers to the series of contiguous written statements which exist within and make up a delineated discussion topic. "Threaded" environments are structured around the management and display of these topics.

**World Wide Web (WWW or Web):** Tim Berners-Lee is credited with being the inventor of the World Wide Web. A document on the W3C Consortium Web page (the organization founded and directed by Berners-Lee) describes the concept behind the World Wide Web: "The W 3 [referring to the Web] principle of universal readership is that once information is available, it should be accessible from any type of computer, in any country, and an (authorized) person should only have to use one simple program to access it."14 The Web is a collection of protocols and software which allows this conceptual goal to be achieved using the Internet computer network as its conduit. (To use the popular metaphor of a "highway," if the Internet is the road system then the Web represents destinations along the roads and Web users are the vehicles moving as they choose on the roads.) The protocols which form the core of the Web include URL (Universal Resource Locator), HTTP (Hypertext Transfer Protocol) and HTML (Hypertext Markup Language). URLs are Web addresses. Much like the address for your house uniquely locates and identifies it, each "page" or piece of information on the Web has its own unique URL. HTTP identifies the Web's protocol for transmitting pages of information. HTML is the language in which native Web documents are coded. The other critical element of the Web is software (available for all computer platforms per the conceptual goal statement above) called "Web Browsers" which can use URLs to find Web documents and can display HTML-coded documents. Netscape and Internet Explorer are examples of Web browser software.

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14 W3C Consortium (1992)


