

# Working Professionals as Part-time Online Learners

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## Introduction

This paper discusses teaching and learning in an online graduate degree program leading to an M.S. in Information Systems (MSIS). To provide some particular examples throughout the discussion, the paper focuses on an introductory course in systems analysis. This course is typically the first course taken by students in the degree program.

The online MSIS is part of an initiative of the College of Information Science and Technology (IST) at Drexel University to develop ALN capabilities. Other goals of this Sloan funded initiative include efforts to apply ALN techniques to training in industry, and to develop the delivery infrastructure for ALN training and education.

## Environment

The College of Information Science and Technology is a multi-disciplinary college focused on application of technology to meet information needs of individuals and organizations. The College began over 100 years ago as one of the first library schools in the country, and for many years only offered a graduate program in library and information science. In the 1970's, the faculty had the foresight to realize that the future of their profession was unavoidably tied to information technology, and started a transformation of the College that continues today.

At present, the College has over 1,100 students, and offers 5 degrees. For undergraduates the College offers a B.S. in information systems. At the Master's level, the College has programs in library and information science, information systems, and software engineering. The College also offers a Ph.D.

The student population has grown steadily and the faculty has expanded rapidly in recent years. The faculty members represent a variety of disciplines, and research strengths include information science, database systems, human-computer interaction, and software engineering.

The Drexel online initiative began in 1994 and has evolved through several phases. At present we are offering an MSIS degree entirely online. Students accepted into the online program take all of their classes completely online and never need to come to campus.

The first several groups for the online degree were comprised entirely of students from corporations with whom Drexel developed partnerships for delivering the degree. While Drexel continues to work with existing partners and to develop new partnerships, individuals may now apply for the online degree program also.

## **The MSIS Online**

The MSIS, delivered online or traditionally, is a professional degree with no research option. The students are typically part-time students who work full-time. The program consists of an 8 course core plus 4 distribution courses and 3 electives. Students with substantial relevant professional experience can request a reduction in the number of elective courses required. The online program is structured so that students qualifying for this reduction can complete the degree in about 3 years of part-time study.

The first group of students in the online degree program began their course work in fall, 1996. The degree they are completing is equivalent to the degree offered on-campus in traditional classes, but these students will never have to attend a class on-campus. All their work will be done via ALN. This notion of one degree with two delivery modes is central to our approach. In every way possible, including the set of courses, the faculty, course content, admission requirements, and graduation requirements, the degrees are the same. The method of teaching may vary as appropriate for the medium, but the goal is to provide an equivalent learning experience.

Students in the ALN degree program move through their courses in a group. This approach has helped make the program startup more manageable since we do not need to have all the courses available in ALN versions at once. The cohort approach also fosters the building of an online learning community. Students have more time to get to know each other and to learn about each other's working style.

## **Rationale**

The systems analysis course was converted for online delivery because it is a required course for the online MSIS. The motivation for the online degree included the following factors:

**Market expansion** - The ALN project was an opportunity to expand the market for the MSIS. Since the student population for the traditional degree is primarily working professionals, almost all of the students come from the Philadelphia metropolitan area. The online degree makes the MSIS available to students beyond commuting distance from the Drexel campus. It also makes the degree available to students who cannot attend traditional classes due to other time demands such as business travel and child care.

**Fit to the College** - IST emphasizes applied research related to information science and technology. The College is building research strengths in areas such as human-computer interaction and computer-supported collaborative work that are closely related to delivery of a degree by ALN.

**Ability of Students** - Students in the MSIS tend to be technically adept relative to the general population. This makes the student population strong candidates for being able to deal successfully with the technology of ALN.

**Appropriateness for Students** - Our students are increasingly operating in an online world in their professional lives. One side benefit of the degree is that students get a lot of practice in communicating and performing group work online. One of our initial

industry partners in the degree program found this aspect of the degree particularly appealing. As with many large corporations, this organization had major information systems groups scattered across multiple locations. Increasingly, people in these locations work together in virtual teams. The sponsoring managers felt that the ALN experience might help these teams by building some relationships across sites and helping people develop skills at working online.

### **Initiative**

Faculty in IST started the ALN effort as a combined research and education project. Full-time faculty have been involved with all phases of the project from course conversion to teaching and evaluation. The full faculty of the College provided formal approval for delivering the degree via ALN. The project has also had administrative support all along, but the faculty role has been central to the form that this program has taken.

### **Evaluation**

Since the Drexel project involves a degree program, the evaluation framework encompasses the degree as well as individual courses. Some of the evaluation instruments we are using include:

**Background Questionnaire** - This questionnaire is administered before students start the program and is used to gather data in several broad categories. The first is demographic data such as age and gender that will allow us to look for systematic differences among students based on demographic factors. A second group of factual questions addresses possible predictors of success and failure. These include factors such as native language, typing ability, technical background, and prior education. A third group of questions probes perceptions and expectations about the ALN program. This will allow us to track changes in these factors as students participate in the program.

**Baseline Knowledge Test** - This test samples student knowledge at the beginning of the degree program. The test is a series of short essay questions that are graded by expert evaluators. We adopted this more subjective evaluation approach after careful consideration of a knowledge test based on objective questions. We concluded that to evaluate a graduate program essay questions would provide more insight into overall student knowledge and higher level skills including analysis and synthesis.

**Post-Course Evaluation** - This questionnaire gathers student opinions and student estimates of some factual items at the end of each course. The opinion questions explore the student's reaction to course content, the instructor, and what the student learned without reference to ALN delivery. It also asks about the ALN aspects of the course. In addition to providing opinions, the students provide estimates of the time they spent on the course, when they did the work, and where they worked. They also provide input on problems they encountered due to the ALN.

## **Background**

The online MSIS was the first substantial effort in online education at Drexel University. In addition, the online degree was unusual for Drexel in that the university does not have a tradition of offering degrees via any form of distance education.

On the other hand, the notion of technology supported education is very much a part of Drexel's orientation. The University's strengths are in technical disciplines and this bias among the faculty translates regularly into approaches to education. Drexel was one of the first universities to require all incoming freshmen to have access to a personal computer. The University selected the Apple Macintosh in 1984 when the machine was first introduced. Over the years, extensive use of education software, messaging, class list servers, and course materials available on central servers have become a normal part of the Drexel experience. In recent years Drexel has regularly been identified as one of the "most wired" campuses in the country. With the rise of the Internet, the technology-based education techniques of the early PC era have quickly moved to the World Wide Web.

Since the start of the online MSIS several other online education efforts have started at Drexel. Each of these has been a college level initiative, and each has taken a somewhat different approach. Although there have been discussions among the groups involved, thus far there has not been an attempt to merge the various efforts. In part this reflects the difficulty of coordinating across organizational boundaries. But it also reflects some feeling that multiple approaches may be a good idea given the state and rapid pace of change in online education.

### **Students**

The students in the course are predominantly working professionals including software developers, system analysts, database administrators, and people working in other information technology jobs. Figure 1 contains a profile of the students in the course. In addition to having substantial work experience, about half of the students have a prior technical degree including computer science, information systems, and engineering.

Technical skill among the students varies considerably, but virtually all the students are familiar with PCs, typical desktop productivity applications (a.k.a. Microsoft Office), and email. On the other hand, very few of the students have any prior experience with online learning or other forms of distance education.

### **Enrollment**

Most classes in the traditional MSIS have a maximum size of 25 although a few of the core courses frequently are capped at 30 when demand is high. Advanced classes tend to be somewhat smaller, but average class size for the traditional MSIS is 21. The general approach for the online program is to use the same class size as for traditional classes. This means that the target maximum is about 25. Actual enrollments have varied and average class size is 22.

## **Method**

This section provides a brief overview of the technical infrastructure for the online program, the approach to delivering course content and evaluating students, and the process used to convert courses for delivery online.

### **Technology and Infrastructure**

The production environment for online degree delivery is a custom Lotus Notes application developed at Drexel. We have worked with other products including FirstClass, and LearningSpace, but not adopted them for production use. Given the growing number of commercial products, and rapid evolution of existing products we expect that at some point we are likely to switch to a commercial course management system to reduce technical support effort. This would be consistent with our general technical approach of using proven, commercially available products wherever we can.

Our assumption for students is that they have access to a medium configuration PC. Currently we would define that as at least a low end Pentium with 16 Mb of memory and a multi-gigabyte hard drive. Many students access the online environment by dial-up Internet connection and we assume a 28.8Kb or better modem.

The production servers for the online program are hosted by a commercial service. This service provides 24x7 support for the servers and technical support related to Lotus Notes for the students. The commercial service provides the primary access point for students and a secondary access point for faculty. Within the College we host servers used for development for primary access to the online environment for faculty and staff.

To match the typical client PC of the students, course materials generally consist of text and graphics. Thus far we have not used streaming media. However, since PC's capable of handling moderate levels of audio and video material have become commonplace in the last few years, we are planning to begin to expand our use of these technologies in the production courses.

### **Content delivery**

Our approach to online education emphasizes interaction among students and between students and the instructor. We combine this with a goal of providing as much flexibility in time and place of participation as we can. And, of course, we want to achieve these goals while maintaining the same quality educational experience as found in our traditional courses.

In the sections that follow, we describe various aspects of how we approach online courses. The discussion begins with a description of the online environment that is common to all our courses. This is followed by categorization of various elements used to deliver a course. Finally, the section ends with some discussion of assessment approach.

### **The Online Environment**

The online environment includes a student services area and areas for each course. All students have access to the student services area, but only students registered for a class

can access the course area. The sections below provide a brief description of the online facilities.

**Student Services** - These services provide some of the functions of the administrative offices and student union of a physical campus. The online facilities consist of both reference materials and interactive features. Among them are:

- **Administrative Reference Materials** - these include information about college administrative policies and procedures and course description material similar to that found in a course catalog.
- **Degree Program Reference Materials** - these provide a central location for general administrative announcements, answers to frequently asked questions about the online environment and administrative issues, and a set of personal profiles of students, faculty, and staff.
- **Student Lounge** - This area provides a forum for ad hoc discussions among students from all cohorts. Topics range from issues related to the ALN environment or course content to purely social exchanges such as movie and music reviews and discussions about the weather. Faculty can and often do participate in these discussions.

**Course Environment** - Over the time that we have been delivering courses online, our course environment has evolved. In general, we have been working with the following types of services and materials for a course:

- **Course Materials** - This area contains online versions of books, journal articles, the syllabus, and other supplemental material that students need for the course. Readings are available online for some courses.

In our initial ALN courses, we have made a consistent effort to provide all the course materials online whenever possible. While students find this convenient, a high percentage of them print most of the online materials and work with them from paper anyway. After observing this trend we have changed our approach and now work from printed matter for much of the reading material.

- **Class Discussion** - Class discussions are a key element of many of our courses even though, in this context, discussion takes place asynchronously. The class discussion area is a threaded discussion forum accessible to all participants of the class. The ability to interact regularly with both the instructor and other students is a one of the key aspects of our online approach that separate it from technologies like computer-based training (CBT) in which students work alone.
- **Group Discussion** - In addition to the class discussion area, we provide an area for assigned or ad hoc discussion by smaller groups. Any group within the class can create a threaded, private discussion area of their own. Most often these discussion areas are used to support team project work.
- **Assignment Submission** - Most assignments are submitted to a public area to which all students have access. Critique of assignments by the instructor and by

other students is often built-in as part of the learning experience. We have worked with versions of the online environment with more elaborate access control options for assignments. For example, under one approach, when students submit assignments, they are accessible to the instructor only. After all teams have made their submission, the instructor has the option of granting access to all the students. In general though, most instructors have opted for email submission when they want more control over access to assignments.

- **Email** - each person has a mailbox on the system. The importance of this feature has declined over the years, since most students have at least one Internet email account. However, having email within the ALN provides a uniform mechanism for person-to-person communication. This is useful for dealing with attachments since the problems that sometimes arise in sending files from one mail system to another can be eliminated. In addition, it allows for simple administration of a common address book.

This set of facilities seems to provide reasonable support for a variety of courses and also provide a common look and feel for the online environment that is common across courses. We discuss below how these facilities are applied in courses.

### **Example Course**

The course used as an example in this paper is an introductory graduate-level course in systems analysis that is the initial course in the MS in Information Systems. The course focuses on processes for system definition, modeling, and analysis, and the role of these activities in ensuring success in systems development. The course provides an introduction to modeling and analysis tools and techniques useful for leveraging software and information technologies to achieve organizational objectives. Students learn and practice modeling software systems with respect to functions, processes, and data. The modeling techniques employed in the course are common techniques of structured systems analysis.

### **Course structure**

Although the online course is asynchronous, it is not self-paced. Time constraints begin with the fact that the course runs on the normal term schedule, which at Drexel means a quarterly term with ten weeks of class plus an exam week. In addition, the online class is organized into activity windows. For our courses these time periods are typically one to two weeks, and in this course we use one week activity windows. Within each activity window students are expected to complete or participate in certain course activities. The course is asynchronous in that students control when they perform their work within each activity window. None of the activities require that the students participate at any fixed time.

The principal course activities for the systems analysis course are reading, discussion, “homework” assignments, and a test. Figure 2 provides a summary of these activities and shows the relative weight of each in determining a student’s final grade. The paragraphs that follow discuss each of these activities in some detail.

**Readings** - The basic readings in the course are the same as those in the traditional class. There is a textbook and a set of journal articles. The text covers all the general topics for the class and provides detailed explanation of the modeling techniques used. The journal articles provide additional depth on selected topics including business process reengineering and system engineering concepts.

We rely on paper copies of the basic reading materials for the course. Students purchase textbooks from the university bookstore, as any student would do. The only difference is that these students can make their purchases by phone and the bookstore will ship texts to them.

We have experimented with putting course reading material online. This can be complicated by copyright issues, although our situation is somewhat simplified by the fact that only students in the class have access to the course materials. Nonetheless, it is difficult at the moment to resolve copyright issues when materials are online.

More importantly we simply haven't found online materials to be that useful. We have had situations in which the course instructor authored the textbook or other course materials and so copyright issues were easy to address. In some of these cases we have posted journal articles and even entire textbooks online. Our observation has been that students tend to print the online version and read the paper copy. Given that, it is easier for all concerned to simply start with paper versions of the materials.

**Lectures** - Listening to lectures does not appear in the list of class activities in Figure 2. In the traditional class, there is a weekly three-hour class meeting that typically includes a lecture-style presentation by the instructor. An obvious question is how this is reflected in the online class. The replacement for lectures is not a single corresponding online activity, but parts of several different activities. Lecture notes, discussion, assignment feedback, and even private email all carry some of the material that might appear in a lecture in a traditional class. A key question, and one that has been the subject of many discussions among faculty involved with our online program, is how the sum of these parts compares to the whole package of information delivered in lectures.

This issue of delivery of lecture material is closely related to the shift in our online courses from teacher-centered courses to student-centered courses. With this approach the instructor serves more as coach to students and even fellow explorer with students rather than a font of knowledge separate from the students. This style of teaching requires more interactions that are informal and created in response to situations that arise with the class during the term.

Even for faculty members who are comfortable with a student-centered approach, this makes things more difficult online. Since this is a new delivery mode, it is natural to scrutinize and compare it with the traditional approach. Since the online delivery of course material is spread out more than in a lecture based course, it is harder to add up the various online activities and judge whether they are equivalent to the material delivered in lectures.

The issue we describe here has more to do with the style of the course than the online delivery mode. A face-to-face class that uses discussion and other interactive techniques is difficult to compare to a lecture class too.

**Lecture notes** - The most obvious replacement for traditional lectures is instructor-written lecture notes. However, an examination of these notes would quickly reveal that the notes are not just transcripts of lectures that might be given in a traditional class. Our experience has been that the lecture notes serve a variety of purposes. Key to understanding their use is that lecture notes are an area of the online environment to which only the instructor has access. This means that students know that any posting made to this area is from the instructor, and so they tend to follow these postings closely. In addition, there are usually only a few lecture notes posted in a given activity window. The combined effect of these two attributes means that lecture notes are very visible to the class.

For the systems analysis course and other online courses some of the distinct uses of lecture notes are:

- **Static content notes** – These are fixed writings that the instructor can prepare before the start of the term and use in subsequent terms. They are directly analogous to lectures delivered in a traditional class, but they often contain less material than would be covered in a lecture. For the systems analysis course, the text and articles provide the detailed static presentation of course content. The static lecture notes provide introductions to topics, summaries of important points, and detailed presentations of particular topics that the instructor knows students find troublesome, or for which the instructor finds the text coverage lacking.
- **Dynamic content notes** – These are lecture notes that the instructor writes during the term that address issues related to course content. One example is for an instructor to post her or his summary of a discussion as a lecture note. Over the period of an activity window a good discussion can generate dozens and dozens of postings. Some of those postings will contain important points, some minor points, and some will be off the topic or just plain wrong. A summary by the instructor can help students grasp and retain the best of the material. While the summary could be posted to the discussion area, posting it to the lecture notes makes it more visible and easier to find later when a student might be reviewing course material.
- **Dynamic course process notes** – These notes help the students deal with the process of the course. They are analogous to general instructions to the class given in a traditional course. They seem to be particularly useful in online courses since students are learning how to operate in an online environment. These notes might include comments on how discussion is proceeding, or operational issues related to a group project. The notes can also be used to provide words of encouragement through praise for the class as a group or comments about what the class has accomplished. The static counterpart to these notes includes the syllabus or other documents an instructor would prepare before

the term. There is a separate area in our online environment for the static course process material.

**Discussion** - The discussion area supports threaded, asynchronous discussions. We do not use any synchronous facilities such as chat rooms. The discussion is typically the most active part of our online courses and the grade for participation reflects this (30% of the final grade for the systems analysis course).

Discussion within an activity period typically centers on one or several discussion topics that the instructor provides for an activity window. However, students can post discussion issues too, and sometimes do. In the systems analysis course the instructor serves as discussion facilitator. In some of our other courses instructors have students facilitate the discussion. The role and effects of facilitation by the instructor or students are much the same as for discussions in traditional classes.

Our approach to discussion relies on having students with substantial work experience. We try to bring that experience into the discussion so that students will connect what they are learning with their own experience, and so that they can benefit from each other's experiences.

For the systems analysis course, most of the discussion falls into one of two categories. The simpler discussion relates to factual course material such as modeling techniques. Here the discussions tend to be requests for explanation or clarification of facts. The larger category of discussion (at least in terms of volume of postings) relates to areas which are more subjective, or more varied. Examples include the appropriate role for end users in system development, and discussions of how particular systems development issues appear in each student's own workplace.

**Assignments** - Assignments are much the same online as in a traditional class. For the systems analysis class these assignments are mostly modeling exercises in which students apply various techniques of structured systems analysis. Online assignments can be submitted to the instructor only or submitted so that they are accessible to everyone in the class.

The ability for students to easily see work of other students creates options in an online class that are difficult to arrange in a traditional class. Most instructors have had the experience of getting insights by looking at several answers to the same problem, but students seldom have this experience. In an online course, they can. For example, for some of the systems analysis modeling assignments, the assignment has two parts. First, each student does the assignment for herself or himself. Then, after submitting her or his own answer, the student reviews another student's answer and critiques it. This gives each student four perspectives on the assignment: their own, that of the student they critique, and that of the student that critiques them, and that of the instructor.

**Test** - Discussions of online courses often raise the question of how to control exams and tests. Although some online programs make use of remote volunteer proctors, we have not taken this approach. Rather, we use tests in the style of a "take-home" test in a traditional course. Students are allowed to use books, notes, and even the online material created during the course. The test for the systems analysis course includes short essay

questions on general aspects of systems analysis, and several analysis exercises built around a small case study problem.

## **Organization and Evolution**

Approaches to course development have varied considerably from course to course. Some courses have been converted by individual faculty members, others by small teams. For some conversions the primary contributor has been a full-time faculty member, for others an adjunct person has taken the lead.

Support for course development comes from faculty members who were early adopters, and from the staff supporting the online degree. The faculty members serve as mentors, discussing teaching approaches and sharing examples of various approaches. The staff introduce faculty members to the online environment, address procedural issues, create a standard shell version of the course, and perform system administration tasks related to the new course.

The systems analysis course was one of the first courses converted, and a pair of faculty members worked together to create the initial version. This effort was followed about a year later by a major overhaul to match an update of the traditional class. Only incremental changes have been made since then.

## **Results**

In preceding sections we have mentioned a variety of factors that characterize the Drexel online initiative including that:

- All activities of the degree are online and asynchronous
- The students are working professionals and part-time students
- Many of the online students are physically remote from campus

These factors have substantial impact on how courses are delivered and how students participate in the courses.

## **Participation and evaluation**

This section presents some summary data about the level of participation in the online courses, and student evaluation of the result. The introductory systems analysis course serves as an example for the data presented.

The level of student activity in online courses is substantial. Figure 3 shows some data on activity in three sections of the systems analysis course. These numbers capture only the public messages from these sections. Private communication including email, small group online discussions, and phone conversations are not included. The messages shown here are messages that all class participants need to address.

A quick review of the data shows that there is substantial variation among the sections. In part this is due to differing class sizes, but even the normalized Messages per Student data shows variation by a factor of about two. There are a variety of factors that seem to cause this variation. These sections each had different instructors with substantially

different styles. The number of discussion questions varied somewhat from class to class. Two of these sections had more than one instructor participate. Section A had a second instructor who participated in discussion for about half the term. Section B had a second instructor, but in that case the instructors divided the work rather than both participating at the same time. Section C had a single instructor. Finally, much like traditional classes, groups of online students tend to have distinct characteristics. Since students in the online program move through the curriculum in cohorts, we can see these characteristics in a series of courses. The cohort in section C has repeatedly shown itself to be very active in addition to being fairly big.

In spite of the variation in activity, all of these sections were well received by students. Figure 4 contains some data from post-course evaluations. The Overall Evaluation for the instructor and course shows the mean value for a ten point scale on which 1 is “Poor” and 10 is “Excellent”. We use identical questions for all courses we teach, both online and traditional. Our general experience is that marks of 8 or higher are outstanding. Marks of 6.5 to 8 are good to very good. It is interesting to note that there is not an obvious correlation between the students’ overall evaluation of the course and either the total volume of public messages or the volume of instructor postings.

The remainder of Figure 4 shows some facets of student perception of their online experience. The Trade-off section shows strong agreement regarding the greater convenience of online courses relative to traditional courses. On the other hand, students generally report that they have to work harder than they have in prior traditional courses.

Finally, the last section of Figure 4 addresses students’ assessment about their interaction with the instructor and other students. Students universally report that they are able to interact with both instructors and fellow students. Surprisingly, a substantial number also report that they actually think they interact more with the instructor than they would in a traditional class.

### **Observations on Teaching and Learning**

This section summarizes observations on some of the key issues that seem to affect outcome in our online courses.

**Collaboration** - As mentioned earlier, we do not structure our courses in a completely asynchronous fashion since that would limit collaborative learning. Without some synchronization students could become widely dispersed over the set of course activities.

Our approach is to include synchronization points but allow asynchronous activity between those points. This has the reverse effect of limiting self-pacing but enabling interaction. At a practical level, this means that each course product and activity has a schedule. A discussion topic is defined with an opening and closing date. Asynchronous discussion takes place within the discussion window. Similarly, team products have fixed due dates so that they can be made available for peer review and browsing.

This limited synchronization seems effective in helping to create a network of learners. Students report that they feel they are collaborating rather than competing with their fellow students. In addition, 93% report that they found it useful to see the ideas and assignments of other students.

**Encouraging Participation** - Getting the right level of participation from all students is difficult in an ALN class just as in a traditional class. It is more difficult online since someone who does not participate is not visibly present as they are in a classroom. There also seem to be additional inhibitors at work. In ALN classes 21% of the students felt more inhibited about participating in discussions than in traditional classes. Finally, the timing of online discussions requires participation that matches the pacing. An asynchronous comment and response cycle will often stretch over 2 - 3 days. With activity windows of 1 or 2 weeks, students need to participate early in the window to allow time for much meaningful exchange of ideas.

Fortunately, activities can be structured to require and pace participation. Defining fixed time windows for discussion and grading participation seem to be effective at soliciting at least some participation from all students. In addition, our instructors have found various guidelines useful in controlling pace. These guidelines include statements such as "each student should participate on at least 3 days of the week," or "every student should participate at least once in the first half of the week."

**Student Skills** - Successful student participation in an ALN class has some different requirements than a traditional class. First, the fact that most interactions for the course are in writing changes the emphasis on skills needed for successful completion. Poor writing skills are immediately apparent and can limit the effectiveness of participation. Similarly, some students for whom English is a second language seem to struggle with ALN courses.

One interesting comment from non-native speakers has been that they felt they could handle the writing requirement, but that the reading requirement was much more of a problem. These students indicate that writing in an asynchronous discussion was actually easier for them than participating in class discussions since they had time to think, and did not have pronunciation difficulties. On the other hand, they found it very difficult and time consuming to read and understand the items posted by their fellow students and the instructor. This may be because our discussions tend to be very conversational, and idioms, culture-specific references (such as sports analogies), and humor are common.

**Directions and Feedback** - The limited communication capacity of ALN reduces informal directions and feedback by the instructor. This seems to make remote students more comfortable with courses that have a clear and very detailed structure defined on day one of the course. Making additions or adjustments during the course is difficult to do without creating a lot of confusion among the students. The online students are also quite sensitive about getting prompt feedback. A feeling among the students that the instructor is not "paying enough attention" to them tends to raise questions right away.

**Instructor Persona** - To overcome the limited communication channel of online education instructors need to find ways to project themselves personally to the students. This seems to work best for instructors who are comfortable relating to students in an informal, collaborative way. The traditional "sage on the stage" lecture hall relationship does not seem to translate well to our style of online environment. The heart of this issue may be that the instructor must seem approachable to the students so that they are encouraged to participate in class activities.

The instructor's "network persona" is also important since students seem to follow the lead of the instructor in ALN activities much as they do in traditional classes. The network presence an instructor creates helps set the tone for ALN activities. This is especially important in discussions where the instructor can help to generate activity, or serve as moderator.

The potential impact of ALN on interaction with students can be surprising. In our ALN courses, 95% of the students felt that they had better access to the instructor, and 43% felt that they actually communicated with the instructor more than in a traditional class.

## Figures

<i>Characteristic</i>	
Average age	37
Average years work experience	14
Prior information technology degree (%)	
Yes	46
No	54

Figure 1. Student Profile (n=66)

<i>Activity</i>	<i>Comment</i>
Reading	Lecture notes, 13 Chapters of course text; 6 journal articles
Discussion	During 8 weeks; 30% of the grade
Assignments	During 8 weeks; 40% of the grade
Test	1 test; 30% of the grade

Figure 2. Summary of Course Activities

<i>Class Section</i>	<i>A</i>	<i>B</i>	<i>C</i>
Student Messages			
Discussion	602	314	1240
Assignment	117	75	523
Total	719	389	1763
Instructor Messages			
Discussion	243	90	121
Assignment	133	26	37
Total	376	116	158
Total messages	1095	505	1921
Class Size	18	13	31
Messages per Student	40	30	57

Figure 3. Public Messages in Three Class Sections

<i>Class Section</i>	<i>A</i>	<i>B</i>	<i>C</i>
Overall Evaluation			
Instructor	7.9	9.1	8.8
Class	7.0	8.5	9.0
Trade-offs (% agreeing)			
More Convenient	79	91	92
Worked Harder	43	73	62
Ability to Interact (% agreeing)			
With Instructor and Students	100	100	100
Communicated More	36	55	27

Figure 4. Sample Evaluation Data