Abstract

Although distance education has been around for decades, for many, it is just now becoming a serious alternative to the traditional college/university approach to education. Due to the rapid improvements in technology, and the present changes in the student population, more and more institutions of higher learning are considering implementing a distance education program. This article discusses the distance learning program that at the University of Colorado at Colorado Springs. The program has just finished its first year, and there have been successes and failures. Both will be discussed, with some suggestions for existing distance education programs and for those institutions thinking about implementing a distance education curriculum. A variety of distance programs will be discussed and a model of course effectiveness presented for testing in the distance education environment. We learned that there are many challenges to implementing such a program and technology is just one of many.

Keywords: distance education program, implementation, distance education curricula

1. Introduction

1.1 Defining ‘distance education’

According to Martin and Samels [17], distance education is one of the least understood areas of technological change in higher education today. The variety of enabling technologies, the rapidly changing student demographics, the constant demand for better educated students, and the lack of more universally accepted definitions and learning models have all created a wealth of opportunities in this field. One of the more major problems is finding an accepted definition for ‘distance education’. For some, [13], [26], [1] distance education takes place whenever the instructor and student are physically distant from each other. Others [1] add the stipulation that distance education (as opposed to distance learning) should also include the influence of an educational organization, the use of educational media such as print and two-way communication between the students and teacher(s). Many simply use the phrase distance education as an umbrella to describe a methodology for providing a means of transferring a known skill or knowledge deficiency between separate (geographically or in time) students and instructors [19], [20], [27], [28].

This creates some challenges for researchers and educators in this field. When deciding how to develop a distance education program, many look at what their options are in terms of available technology first, then define the mission and the scope of the program. While technology is certainly an important component, other factors to consider include funding, the potential student population, the class size(s), the geographical area covered, the available instructors and support staff, the mission of the university or institution, whether synchronous or asynchronous communication will be used, the courses to be taught, the scope of the program, and various accrediting agencies under which the university or institution operates. These factors will all affect the definition of a distance education program.

The definition of distance education for our distance MBA program is broadly defined, in that we define distance education as an enabling program, such that students who can not be in one place for a 16 week period (or whatever time frame is required) can take courses via some appropriate technological methodology. The definition becomes more focused for our program in that the student/instructor communication is largely asynchronous, with synchronous communication occurring primarily in one-to-one telephone discussions. While our information systems course also utilized chat rooms and synchronous communication for both student-student and student-instructor collaboration, most other courses did not. Therefore, we view distance education as an enabling, or outreach type of program. Students who can attend courses on campus are not allowed to enroll in our distance education program.
1.2 The program at the University of Colorado at Colorado Springs

Our program consists of 14 courses leading to a general MBA degree. The program is directed toward students who do not reside in the Colorado Springs area (students in the area are required to take the courses at the University). The program has been established in partnership with Jones InterCable Corporation, a company that distributes cable programs nationwide, with a total distribution of 34 million homes. The University is in charge of developing the curriculum, developing the courses, teaching the courses, and handling student records. Jones is responsible for distributing the course materials, airing the lectures, and promoting the program.

Program development began in 1995, and the first courses were taught in the Fall of 1996. There are over 200 students enrolled in the curriculum at this time. The majority of the students are spread throughout the United States, but there are students from Canada and Europe as well. The advertising has been focused on the U.S. and is just now starting to become more global in reach.

The majority of the courses use one-way video (or videotapes) for each class segment, with electronic mail and listserver communication between student and faculty. However, not every class has a video component. Prior to the start of each course, students are sent a study guide and all required texts, and use the course syllabus to keep up with the assignments. Jones InterCable delivers the video portion of the class at the same time each week. Those students who can not get the video feeds from Jones are sent videotapes of each class in advance.

The I.S. course replaced the asynchronous communication medium with a synchronous communication methodology. All students were required to use AmericaOnline for the duration of the course. AmericaOnline was chosen because of its popularity, its ability to support chat rooms, and its high degree of file transmission support (other internet providers have similar capabilities). The instructors did not receive any compensation from AmericaOnline. The students in the I.S. course were given a choice of fifteen different two-hour time blocks, and were asked to list their top three choices. The two-hour time slots represented the times when the students could interact with other students and the instructors in a chat room using AmericaOnline. Amazingly, only two time slots were needed to cover each student’s first or second choice (7am-9am Tuesday morning, and 7pm-9pm Wednesday night). There were students from each time zone in the U.S. participating in this course.

The average cost of developing and delivering each course is approximately $75,000. The development costs include compensation for the course developer, video production costs, and administration costs. The tuition for each 3-hour course is approximately $650. Throughout the remainder of this paper, we will use the distance education program at the University of Colorado at Colorado Springs for examples and insights.

1.3 Viability of distance education programs

As we learn more about the different learning styles of students, we are finding that the traditional Socratic methods of teaching are inadequate. Many instructors are turning to technology to help supplement their teaching. As the demographics of the typical college student population change, we are looking at different ways of providing education for them. Roughly one quarter of the enrollment at U.S. colleges and universities is comprised of part-time students [15]. Twigg [24] states that we are redefining what students are learning and how they are learning. She also points out that as working adults students will be far more discriminating ‘consumers of education services’. They will not settle for what is available from the faculty at the local university or college. In addition, these students are much more computer literate, and have had a broader exposure to the capabilities of all modes of communication. These students have learning habits that are different from those of the traditional on-campus students. Twigg goes on to point out that as learning is not confined to the classroom, the distance education concept fits in well with what is happening in the real world. Learning occurs at work, at home, and during travel, and the education process needs to provide adequate support to leverage this.

Approximately one-fourth of the higher education institutions in the U.S. are a part of the United States Distance Learning Association, an organization comprised of over 1500 organizations [17]. Many universities and organizations have already developed distance education programs, or are presently considering such programs. Distance learning has been used in higher education to provide business courses since the early 1970s. However, concerns about educational and training costs, access to educational opportunities for site-bound students, and the rapid development of video conferencing technology have greatly spurred the development of distance learning for both business and higher education [16]. Right now, it is apparent that there is a demand for a distance education MBA program and that it is possible to provide a quality MBA distance education program.

1.4 Target Audience

1.4.1 Student population. Twenty-four percent of the enrollment at U.S. colleges and universities is comprised of part-time students [15]. Of this group, the successful distance learning student is over 26 years of age, highly motivated, goal oriented, and unable to attend the traditional classroom setting [16]. Initially, our program was designed to support students who were in the military, and students who were working for high tech firms. Both of these student groups are
typically transferred every few years, and are constantly losing course credits every time they transfer to the local college/university wherever they end up. Our distance program allows these student groups to continue their education from anywhere in the world, and does not penalize them when they are transferred. Most of our students come from the business sector, and we have not seen a lot of students from the government sector. However, this could be due to the fact that the program is advertised most heavily in the business sector.

1.4.2 Student capabilities. Our two major concerns were whether students would be able to afford the curriculum and whether they would be able to excel in this type of learning environment. At the community college level, student performance in telecourses was equal to, and in many cases, superior to the performance of students taking classes in the same discipline in the traditional classroom mode [14]. We have found mixed results, although our sample size is currently too small to report statistically significant results. Some students have failed a course, while others have handed in work whose quality is commensurate with that of the best students we have had in the campus program. We are currently working to determine the cause(s) of student failures in the distance program.

In terms of the financial concerns, graduates, or working students are more apt to have their tuition funded, at least to some degree, than are non-working students. For this target audience group, the cost of the program is less of an issue than for the traditional, non-working student. For a technical course, $650 per course for a multi-million dollar corporation is extremely small, and tuition in our program could probably be doubled without losing students from the corporate sector. Tuition has not been a problem with any of the students who have enrolled in our distance learning courses.

2. Distance Learning Program Development

Our curriculum has been designed to offer students all of the courses required to obtain a general MBA degree. This curriculum design is consistent with Baird and Monson [1] and Zigerell [29], who state that the distance course offerings should be well planned. In their distance education program, the University of Wisconsin employs advisory committees to help assess student needs prior to course development. We did not employ an advisory committee but instead opted to provide an MBA program that mirrored the one we provide on-campus. The challenge here is to ensure that there are sufficient resources (i.e. Ph.D. level instructors) in reserve to teach courses in the distance learning program. Most accrediting bodies do not require Ph.D. level instructors for every undergraduate and it is easier to find instructors for undergraduate distance education courses than for graduate distance learning courses.

2.1 Model Phases

Here is one model for describing distance learning program development activities. This model is loosely structured around the phases in a technology acceptance model such the Organization and Information Technology Design Model by Cash and McLeod [4]. We will discuss each of the phases below.

---

**Figure 1. Distance Learning Program Model**

(Shepherd and Amoroso)

2.2 Phase 1: Visioning

The first phase is initiated by a decision to invest in the distance learning curriculum. These projects are often characterized by uncertainty in the magnitude of the investments required and the benefits to be delivered. Pilot projects are often developed that help reduce the uncertainty and to access the degree of organizational changes and skill development that will be required. Some of the themes that emerged in distance education programs were identical to those frequently reported in traditional classroom settings [18]. In addition, it is important to make sure that the vision of the university supports traditional and non-traditional students’ educational goals.

Gary Miller, assistant vice president for continuing and distance education at Pennsylvania State University, cautions institutions against letting the available technology define the distance education policy. He urges institutions to keep their core values and mission statement at the heart of any distance education program, and to let the mission statement determine the type of technology used in the distance education program [17]. While this is good in theory, we have found that few programs have lived up to it. It is more common to start with whatever existing technology allows
and grow the program to eventually fit with the university or institution’s mission. That is the approach we took with our program. We utilize one-way video in an asynchronous approach to teaching. Many public institutions are concerned with reaching everyone in their state or providing the best education of all the institutions in their state. This is probably because they are funded on the state level. But this is where distance education can confound the vision statement. Technology now allows institutions to reach anyone in the world, and may require the institutions to modify their vision.

This raises some questions. Should local students be allowed to participate in the distance education program as opposed to attending classes onsite? Our program does not allow local students to transfer between the onsite and the distance education curriculum. Should the vision focus on the state level, or the national/world level? This issue could potentially divide a college or campus. If this is the case, it might be better to create a separate unit for the distance education program, and not affiliate it with any one particular college. Our program does not seem to be causing any such division, and has remained under the College of Business.

2.3 Phase 2: Funding

Funding is a major hurdle for many educational institutions. Finding a benefactor is one of the most difficult phases of the developing program. Without funding, of course, there will be no program. Funding can come from the government sector, although there are few research grants that are large enough. The major benefit is that the educational institution can retain the full tuition for each course in the program.

An alternate source of funding is the private sector, which is where we obtained funding for our program. There are a few additional challenges to be worked out with a private sector partner. One challenge is that we have to share the student tuition. Another challenge is to make sure you both agree on who is in charge of the program. Institutions of higher learning are in the business of producing quality students, and do this by providing a quality program. This usually means limiting the number of students in each course or section. However, a private sector partner is in the business of producing a profit. This means stuffing as many students in each section as possible. Since this is a distance program, the constraint of classroom size goes away, and it is possible to put hundreds or thousands of students in each course or section.

AACSB imposes some barriers on admitting students, such as requiring prerequisites and making sure certain faculty/student ratios are met. However the private sector partner may not recognize these constraints for what they are (attempts to ensure quality) and may want every student who applies to be admitted. It is suggested that in time, the educational institution plan on weaning itself off a benefactor, and becoming self-sufficient. This requires a five or ten year plan. This should reduce the potential arguments over quantity of students versus quality of program.

2.4 Phase 3: Developing

The third phase involves developing the curriculum. This will depend upon the vision developed in phase 1, the available instructors, the available support staff, and the available technologies. It is important to ensure that all faculty have sufficient input into the curriculum, even those who are not likely to participate in the program. If the full faculty are not involved, there is a risk of rift between faculty and many may not participate in the program. This could be a problem later on should there be a need for additional faculty resources as the program grows.

Projects that reach this stage often need a great degree of change in terms of their scope and desired deliverables. For distance learning programs, tied predominantly to technologies, specific technologies need to be decided upon, learned, and invested in. The initial distance learning curriculum is agreed upon by the faculty in conjunction with decisions about the technologies to be used after agreeing upon a clear vision. In this phase, the project has progressed significantly to where structure is in place, roles and skills required of each person for development of courses have been outlined, and the results will be more predictable. The development of the distance program is not a one-time static project. As with traditional curricula, courses change and constantly need to be upgraded. The curricula should be developed with resources in mind to upgrade courses as necessary.

2.4.1. Accreditation. Distance education delivery systems present a challenge for the different accrediting agencies on all fronts. Even the basic site visit will need to be modified. It is possible for some (or all!) of the professors associated with a distance education curriculum to be off campus. The students certainly are. It is possible to lose AACSB accreditation by not following their guidelines and procedures in the distance education curriculum. AACSB usually only accredits only one MBA program per institution. It is not simply a matter of saying that the distance MBA is a second MBA program. In an accrediting agency’s eyes, the distance program is just an extension of the existing onsite program and must adhere to all of the rules and regulations thereof. However AACSB does encourage educational institutions to develop alternative instructional methods and is more lenient towards institutions that are developing programs such as distance education.

Steven Crow [5] suggests the following list of ‘good practices’ that should be adopted by institutions with distance education programs:

1. The institution’s distance delivery programs have a clearly defined purpose congruent with the institutional mission and purposes.
2. The institution admits to its distance delivery programs students
who meet the institutional admission requirements but who also have the
capability to succeed in the distance delivery environment.
3. The institution’s financial documents (e.g., audits and budgets)
show sufficient financial capacity and commitment to support the distance
delivery programs. That support includes appropriate administration for
the program as well as development programs for faculty and others
providing support services.
4. The faculty provide appropriate oversight for all distance delivery
of education, assuring both the rigor of the curriculum and the quality of
instruction.
5. The institution provides access to the learning and support services
necessary for the distant-learning student to succeed.
6. The institution evaluates its distance delivery programs on a
regular and systematic basis and makes the changes necessary to improve
their quality.
7. The institution assures that its distance delivery programs facilitate
appropriate student-faculty and student-student interaction.
8. The program delivered through distance delivery has a coherence
and comprehensiveness comparable to the program offered on the home
campus.
9. The expected learning outcomes for courses and programs offered
through distance delivery are the same as those used for compatible
courses and programs on the home campus.
10. The institution’s system of distance delivery includes appropriate
back-up systems to compensate for short-run technological difficulties.

2.4.2. Variables to be Considered. When designing a
curriculum for distance learning programs, we found several
models to be useful in comprehensively examining each
aspect of the curriculum. We have found that many
administrators have not paid attention to the variables critical
for the success of distance learning programs. Further, many
of the programs have been implemented using a
bootstrapping approach to developing the curricula, a
learning as you go approach. This approach was not
considered to be very effective in developing new curricula
in distance learning [29].

A model of distance learning components using a Keiretsu
structure is presented in Figure 2, which has horizontal and
vertical components of the model [8]. These components
may be used to form combinations, integrating features of
both. There are two types of elements with the model:
Personal Elements and Institutional Elements. These
elements, when combined with program concerns provide a
comprehensive look at distance learning development
variables that must be considered.

Personal elements are those that are of concern to
individuals participating in the development process of
distance learning courses. Individuals include faculty,
administrators, instructional designers, and technology
experts. It was found that the individuals involved have a
need for a high degree of collaboration, take responsibility
for the project’s success, agree to open communication, and
display mutual trust and respect for the institution in the
development process.

Institutional elements are those variables that are of
importance to the organizations that are participating in
developing the distance learning curriculum. Two institutions
that will most likely be involved in developing the distance
learning program are the university and a funding sponsor. In
our case, we partnered with Jones InterCable as a funding
sponsor, thereby involving two institutions in decisions
related to curriculum development. It was found that

institutions involved in developing a distance learning
program need to have constructive agreements with each
other, stated and agreed upon goals, shared resources and
risks, flexibility in development schedules, and demonstrated
improved learning benefits as a result of the program.

2.4.3. Interaction of Variables. The model involves an
interaction of personal elements interacting with the
“concerns” of putting together the distance learning
curriculum. For example, in order to attract a faculty member
to develop a distance learning course, he or she must be paid
a stipend high enough to interest him or her, otherwise the
development effort will not occur. The interaction of
concerns revolves around technology issues, fiscal issues, or
basic issues. Different arrows can be drawn to different
concerns depending on the interaction level.

Technological concerns involve issues of standardization
and equipment obsolescence, training with emerging distance
learning technologies, and challenges with getting
individuals and institutions to agree on which technologies
are most important. With our program, it was a challenge to
move the institution to an electronic mail platform where
distance learning students would submit assignments as
attachments. Similarly faculty had to “gear up” to using a
new email system to receive student assignments. Fiscal
concerns take into account the budget for the distance
learning program, cost of equipment, transport of materials,
staffing costs, and system reliability for managing student
assignment interactions. Basic concerns involve access to the
program, the degree of human contact and interaction
required, and the quality level necessary to effectively deliver
an accredited distance learning program.

![Figure 2. Distance Learning Curriculum Components](Eidgahy and Shearman, 1984)
2.5 Phase 4: Delivering

In this phase, the courses have been developed, budgets have been spent, and developed courses are placed online. The distance learning program is embraced throughout the institutions involved and the focus is on delivering and teaching the developed courses. As time passes, new technologies continue to emerge that offer the university the opportunity to either move into new application areas or to redevelop old courses.

The method(s) of course delivery are fairly dependent on the technology, but as previously stated, should drive the choice of technology. Institutions are concerned with keeping costs down, without sacrificing quality. In general, the ‘richer’ technologies (two-way full motion video, one-way video, phone conferencing) will be more expensive to utilize than the simpler technologies (email, listserver, internet, or fax). Part of the additional expense comes from the fact that new infrastructures need to be installed in institutions to support them, whereas most institutions already have an installed base to support email, phone, and internet communication. The cost to add one additional remote site to a list server is small (possibly free), while the cost to transmit a synchronous video session to that same remote site could run between one to several dollars per minute. Granted, the video session is probably going to provide a much richer interchange, but it will be more expensive.

Johnson and Silvernail [11] present a model of course effectiveness as evaluated by distance learning students. The dependent variable in their model was the end-of-course evaluation. We have developed a model of distance learning course effectiveness by modifying the Johnson and Silvernail model. Our model of effectiveness of distance learning impacts accommodates a variety of variables found in the literature regarding effectiveness in delivering distance learning courses. The dependent variable is 'quality of course'. Presented below in Figure 3, this model takes into account individual learning variables that are both within the control of the student and those external to his or her control. Most of the courses in our curriculum used an asynchronous listserv methodology. Students kept up by following the syllabus, and posted questions to the listserv, or emailed questions directly to the instructors. The instructors kept up with the listserv, and posted answers to those questions, as well as common email questions, back on the listserv. Students handed in assignments electronically, or via fax or regular U.S. postal service mail. Prior to the first class, students received the text(s), study materials, syllabus, and all pertinent information concerning the utilization of the technology for their course.

Feedback from students is helpful in maintaining a quality course. Satisfaction with the course delivery and effectiveness of the course for student learning are what we consider to be important indicators of the success of our program. One could also argue that number of students would be an important indicator of the success of our program. But we feel that by keeping the quality and effectiveness high, without hurting satisfaction with course delivery, we will be able to continually increase student enrollment. Again, our goal is not to be the biggest distance education program.

3. Staffing

The rapid change in the capabilities of technology in this field have put a severe strain on distance education instructors to keep up [1]. This requires increased support staff to aid the instructors. Our program does not provide monies for instructor development and increased staff for instructor support, although we would argue that it is necessary. The amount and expertise of staff support depends on the type of course, the type(s) of student assignments, and the number of assignments. A course with multiple choice quizzes requires far less support than one with weekly case write-ups. Our MIS course required the students to turn in case write-ups on a weekly basis, and between the two of us we were hard pressed to get everything (meaningfully) graded within the week. This lack of adequate staff support has proven to be a hindrance for getting other professors to agree to teach courses in this program.

Thach and Murphy [23] discuss hiring the appropriate
staff personnel in order to build core competencies. They stated that the core competencies of any high quality distance learning program must involve communication type skills and organization type skills. The following model in Figure 4 illustrates the roles of key staff members, including faculty, that are needed in order to have a high quality distance learning program. The key personnel roles that need to be in place to achieve the core competencies of the program must include professor, technology expert, instructional designer, and administrator. Secondary roles that are also important may include site facilitator, support staff, television technicians, graphic designer, librarian, editors, and evaluation specialist. We will discuss the two most prominent position types in this paper, namely the role of the instructors and administrators.

3.1 Administration Skills Required

Administrators need a variety of distance learning skills to effectively manage distance learning programs. The model outlines several key sets of skills that are required including planning skills, organization skills, knowledge of distance learning programs and how they work most effectively, and then basic technology skills and technology access knowledge. Interestingly, we found in the research that most administrators have one or more of the needed skills, but not all of the above. This lack of knowledge could create many problems when interacting with faculty and other important personnel in the distance learning-staffing loop. In our own program many of our administrators lacked a knowledge of how specific technologies can aid instructors in designing and delivering the course materials effectively.

In this section, we will focus on two of the most prominently discussed problems administrators face, namely selecting distance learning students in the initial phases of delivering a course and distribution of classroom materials.

3.1.1. Selecting Distance Learning Students. McHenry and Bozik state that it is important to carefully select distance learning students [18]. They suggested that some students expressed frustration over the mix of other students in a class when they were required to work in groups. This then reflected poorly on the university offering the program. In the start-up phase, they suggest controlling who is eligible for taking distance learning courses looking for mature and self-motivated students. Course enrollment should be limited to no more than 25 per faculty member so that appropriate personalized attention may be given to each distance learning student. However, we found that administrators have the same degree of concern over the student-instructor ratios.

3.1.2. Distribution of Classroom Materials. The distribution of classroom materials is important as preplanning classes affords problems with distance learning curricula to surface before classes are taught. In distance learning courses, some of the bulky materials will need to be mailed to students and lead time for distribution needs to be taken into account. Small handouts can be attached to electronic mail messages so that students can download them. Home pages on the internet can be used by students to access problem solutions and classroom discussion files.

3.2 Teaching Skills Required

Distance teaching requires a different skill set than the traditional classroom teaching. McHenry and Bozik [18] point out that teaching in distance learning programs requires an initial effort to gear up. Many of the problems teachers have encountered involve new technologies and policies of the sponsoring university or institution. Some of the key skillset issues professors must deal with involve: (1) lost interaction, (2) depersonalization of the class setting, (3) distribution of class materials, and (4) student use of technology.

In this section, we will focus on the issues of lost interaction and depersonalization of the class setting since the other issues are addressed elsewhere in this paper.

3.2.1. Lost Interaction. Lost interaction naturally occurs within distance learning courses due to the lack of richness that results using technologies to interact rather than the richer face-to-face communications. McHenry and Bozik [18] posit that faculty should conduct some rigorous synchronous scheduling of classes in order to avoid a great deal of lost interaction. Chat rooms can be effective tools enabling students to get together to discuss classroom material or cases on their own. They found that professor introductions of all students are helpful.
3.2.2. Depersonalization of the Class Setting. The issue of whether to run synchronous “chat” sessions or a completely asynchronous class is dependent upon the technology available and the commitment of the administration to deliver a high quality product. Berge [2] draws a concrete analogy between running synchronous chat sessions and computer conferencing. There are a number of pedagogical recommendations regarding how to conduct successful chat sessions for a distance learning class. First, have clear objectives so that students believe that time is well spent [3]. Second, remain flexible because of the individuality of the learners, courses need to remain flexible and the teacher needs to support this [6]. Third, encourage participation by using this technology in a variety of ways such as small group discussion, debates, polling activities, and one-on-one messages [2], [7]. Fourth, be non-authoritarian [10], [12]. Fifth, be objective and expect less, such as two or three well-articulated points and, don’t rely off online materials by summarizing the assigned readings online. Design the discussion for private conversations so that questions can be answered outside of the chat but in real time [2]. Find unifying threads so that the faculty can weave several strands of conversation into a summarization that may prompt people to pursue the topic further [12]. Use simple assignments to be completed in groups. Make the material relevant by developing questions and activities for learners that relate to the students’ experiences, present conflicting opinions and invite visiting experts to join the conversation with students asking questions of the visitor [9].

4. Technology

The technology component of a distance education program affects the cost of implementing the program, the type of teaching methods that can be employed, the type of instructor(s) needed to teach the course, the cost to the student, and it can affect how well students can learn in the program. While it should not be the driver for the program, technology will have a great impact on the program.

4.1 Instructors’ Technology Requirements

At a minimum, the instructor needs some means to communicate with the students, both for dissemination of information (lecture, tests, answers to questions) and for student input (questions, feedback, and submission of tests and student assignments). Simplex, half-duplex, or full-duplex technologies will all accomplish this, however there are differing degrees of quality to each. For example, some courses such as many graduate and some upper level undergraduate courses are best taught in seminar type course settings, and full-duplex may be required.

From here, more sophisticated technology can be used to improve the type and quality of student feedback, student testing, instructional delivery, and ability to cater to more diverse student learning styles. Implementing a web page using CGI script will allow students to take tests on-line, with immediate grading upon completion. Addendums to lecture notes can also be posted on a web page, making it possible to answer student questions in real-time, with less cost to the student. And the use of two-way, full motion video can be used in a synchronous lecture environment to provide a richer classroom experience for students.

The available technology, the fit between technology and type of course, and the delivery method all have some degree of affect on the instructor’s technology requirements. As our program is primarily asynchronous, we only required students to have internet access and email. Therefore, the instructors required compatible technology. Communication was via phone, email, and a listserver. Although most of our faculty were comfortable with these technologies, some were using them for the first time as a communication media for teaching. While we did not have any type of formal faculty training program concerning how to develop slides, increase student participation, develop study groups, etc., those of us who were proficient with these technologies held informal training sessions. However, participation was less than 50%, and some type of formal faculty training could have helped improve the overall program. But that problem seems to be the trend, as 64% of the ‘teleteachers’ surveyed had not received any training prior to teaching their first distance education course [25]. Baird and Monson [1] advocate such a program, and offer advice on the above topics. The message here is to make sure funds are allocated for faculty/staff training, and not just for the procurement of technology for the delivery system.

Our program uses a very basic level of technology: email, internet, and telephone. While we do utilize one-way video, it is primarily for information dissemination. As previously mentioned, this low level of technology presents little barrier to current (and potential) students in our program. Most of our students are very familiar with these technologies, and are not burdened by any learning curve during the first few weeks of class. However, more advanced utilization of synchronous technologies could pose problems for both faculty and students and require substantial learning. Our current level of technology does limit our delivery method options. We are not able to have a traditional ‘in-class’ discussion, and therefore need to put more emphasis on providing assignments that are conducive to group learning approaches.

4.2 Student Requirements for Technology

Student requirements are very similar to those of instructors. Students will require technology that allows them to communicate with the instructors and turn in/receive
assignments. From here, more sophisticated technology can be used to improve student-to-student communication, allowing students to interact in groups. Software like Microsoft Exchange, First Class, and the IRC chat capabilities of AmericaOnline, Prodigy, and CompuServe provide these capabilities. In our curriculum, students were not required to adhere to any hardware platforms. Their only requirements were to have internet access, and some email provider (usually accommodated by the internet provider).

While full motion video is a nice technology for instructors to utilize, it requires that the student have a compatible technology at their location. And their location may change several times throughout the course. While the cost of video conferencing equipment is coming down, it is still prohibitively excessive for most students. The main point here is to keep the required technology requirements to a minimum, while still providing adequate support for the type of course you are teaching. With this in mind, we required our students to have internet access, and to use AmericaOnline as their internet provider. We did not require a certain hardware platform, nor did we require students to use a certain word processor or spreadsheet. The cost of using AmericaOnline was $10/month (although the first month was free) if the student had internet access. This is not meant to be an endorsement for AOL. CompuServe, Prodigy, or any of a host of other internet providers would do as well. The benefit of using AOL is that students can seamlessly attach their files to mail messages and easily send their work to the professors (and each other). The professors can download the files with one mouse click, and if the professors’ computer was properly configured the appropriate software package would open up the file.

All students be taught how to use the technology [18]. Remote learning students can express frustration when they cannot use the technology appropriately. We need to determine how technology influences communication apprehension and whether students who are uncomfortable with technology are discouraged from interacting. Or can technology actually encourage apprehensive students to be more expressive since they are not communicating in a face-to-face environment?

It is important that students understand that distance education is not meant to replace existing on-site program(s) or course(s), but rather it is a way of ‘enabling’ institutions to offer the knowledge to those who would otherwise not be able to obtain it. For many first time distance learning students courses may feel cold and nothing at all like their previous college experience(s). There are no football games, pep rallies, or student lounges in the virtual environment. Managing those initial student expectations during the first lecture will help students settle into the distance education process. Institutions that are contemplating starting a distance education program will need to look hard at making sure their technology can support the types of courses and the lecture styles necessary for their curriculum.

4.3 Synchronous vs. Asynchronous Issues

This model, by Schiller, Ostwald, and Chen [22], looks at the importance of synchronous “tutorials” in the learning process where students in distance learning courses have problems to solve as part of their course work. Specifically, the “learning unit” or classroom video is used as the predominant piece of the distance learning classroom. The model is presented in Figure 5. Note that the synchronous

![Figure 5. Model of Student Learning](adapted from: Schiller, Ostwald, and Chen, 1994)

teletutorials occur twice in this model of interaction, once near the beginning of the problem solving cycle and once after feedback and assessment are made. Berge [2] states that although learners don’t absolutely need face-to-face interaction, where technology can enable it, synchronous communication can be a useful tool. One major benefit of synchronous communication is its ability to support learner-centered and collaborative learning. Real-time feedback allows students to ask questions that are fresh in their minds, and to communicate with each other, not just the instructor.

5. Future Research

In this paper we have addressed many of the issues associated with developing a distance learning curriculum. We have tried to discuss the pros and cons with our program as compared to other programs found in the literature. We have addressed such issues as quality of program quality versus quantity of students, staffing concerns, vision statements, accreditation issues, technology implications, and the ability to procure funding. Each of these plays an important role in a distance education program through all four phases: vision, funding, developing and delivering. To help ensure success, all four phases must be tightly linked.

The future holds several challenges for our program. Perhaps the biggest challenge is to become more self-
sufficient in terms of course delivery and administration. While we do have a financial obligation to our sponsor, controlling our own program will better enable us to ensure the quality of the program remains high. In this regard, our goal is to move towards a more synchronous teaching environment.

In terms of research, we are working on developing better instruments to measure the amount of learning going on with our distance education students. We are also collecting data so that we can test our model of determining course quality.

6. References


[22] Schiller, Oswald, and Chen, “Implementing a Problem-Based, Distance Education Undergraduate Course in Construction Management,” Distance Education, v. 15, n. 2, pp. 300-317, 1994.


