

**A Management Plan to Integrate Site Based Distance Learning into
the Institutions Comprising the Massachusetts Distance Education
Consortium**

Submitted to:

Gerry Burke
Director
Research Institute
Executive Office of Community Colleges

And

Members of the Massachusetts Distance Education Consortium
(Bunker Hill Community College, Middlesex Community College, North Shore Community College and
the University of Massachusetts at Lowell)

Prepared by:
Burck Smith

Candidate for Master of Public Policy
John F. Kennedy School of Government
Harvard University

Advisor: Professor Tom Kane
April 8, 1997

TABLE OF CONTENTS

EXECUTIVE SUMMARY.....	1
I. BACKGROUND	3
A. COMPETITION IN HIGHER EDUCATION	3
B. PRESSURES TO INCREASE PRODUCTIVITY	3
C. THE MASSACHUSETTS DISTANCE EDUCATION CONSORTIUM	4
II. INTEGRATING THE NETWORK.....	6
A. THE TECHNOLOGY INTEGRATION CYCLE	6
B. FACTORS AFFECTING THE TECHNOLOGY INTEGRATION CYCLE.....	7
<i>Demand for the Network</i>	7
<i>Integration of Service Delivery.....</i>	7
C. SUCCESS FACTORS FOR MANAGING DEMAND AND INTEGRATING SERVICE DELIVERY	9
<i>Faculty and Institutional Support</i>	9
<i>Creating and Managing Demand</i>	9
<i>Financial Processes.....</i>	10
D. SUMMARY	10
III. SUCCESS FACTORS.....	11
A. ENLISTING FACULTY AND INSTITUTIONAL SUPPORT	11
<i>Compensation</i>	11
<i>Faculty Assistance.....</i>	12
<i>Labor Relations.....</i>	13
B. CREATING AND MANAGING DEMAND	14
<i>Creating Demand</i>	14
<i>Managing Demand.....</i>	16
C. FINANCIAL PROCESSES.....	19
<i>Costs of Service Provision</i>	19
<i>Cost Recovery.....</i>	20
<i>Encouraging Integration.....</i>	22
IV. RECOMMENDATIONS	22
A. FACULTY SUPPORT	22
B. THE EARLY YEARS (LOW DEMAND, SHALLOW INTEGRATION).....	22
C. THE LATER YEARS (HIGH DEMAND, MEDIUM INTEGRATION)	23
VI. CONCLUSION	23

APPENDICES

APPENDIX A – SELECTED LIST OF DISTANCE EDUCATION CONSORTIA.....	25
APPENDIX B – COURSE PRICING MODEL	28
APPENDIX C – FACULTY COMPENSATION ELSEWHERE.....	30
APPENDIX D – EXCERPTS FROM TEACHER’S UNIONS	32
APPENDIX E – RENTING VIDEOCONFERENCE FACILITIES	35
APPENDIX F – PEAK LOAD PRICING.....	36
APPENDIX G -- MANAGEMENT BUDGETING SYSTEMS	38
BIBLIOGRAPHY AND INTERVIEWS.....	39

EXECUTIVE SUMMARY

BACKGROUND

Bunker Hill Community College, Middlesex Community College, North Shore Community College and the University of Massachusetts at Lowell have agreed to form a consortium to build an interactive video-conferencing network for site-based distance education delivery. All members of the Consortium will be able to broadcast to one or more of the participating institutions. Most institutions have made substantial capital investments in video-conferencing equipment and room restoration. The network has virtually unlimited transmission capacity. How can the member institutions integrate the technology to improve the quality, accessibility, variety and efficiency of higher education delivery?

THEORY

To achieve the increased productivity promised by new technologies, institutions must pass through a four stage cycle of integration that can take a few years or decades. These stages are:

- *Stage 1 – Experimentation;*
- *Stage 2 – Integration into Current Processes;*
- *Stage 3 – Process Change;*
- *Stage 4 – Re-engineered Organization.*

To recover technology investment costs, the institutions will need to cooperate and compete in new ways. Progress through the technology integration stages will be reflected in the level of:

- *Demand for the network; and*
- *Integration of the institutions' educational offerings.*

To stimulate demand and integrate educational offerings, the institutions must:

- *Enlist faculty support;*
- *Create and manage demand; and*
- *Develop new financial processes.*

RECOMMENDATIONS

To enlist Faculty Support the Consortium should:

- *Create a compensation plan that rewards faculty for using the network and increasing class size;*

- *Award faculty different per student rates depending upon the type of distance education class that is being taught;*
- *Ensure that faculty have access to technology training;*
- *Develop a system to deliver documents between sites;*
- *Require course administration from the institutions receiving distance education courses;*
- *Specify which courses are candidates for distance education to allay union opposition;*

To create and manage demand, the institutions should:

- *Target under-subscribed classes and “exclusive” programs for network broadcast;*
- *Explore alternative uses for the network such as renting video-conference facilities to non-affiliated organizations and businesses, or using the network as a supplementary educational aid;*
- *Standardize schedules of participating institutions;*
- *Negotiate an end to the 35 student limit on class size;*
- *Let individual institutions provide accreditation to their own students, regardless of where the course originates;*
- *Develop a priority list to be applied when courses are in conflict for class times.*

To develop new financial processes, the institutions should:

- *Share the costs of the network equally by the number of participating nodes;*
- *Share instructional costs to demonstrate efficiencies of the network;*
- *Allow institutions to charge students as they see fit;*
- *Charge departments by the hour for network and classroom use;*
- *Adopt “peak load” pricing to even demand out across the day;*
- *Consider new management budgeting practices to encourage productivity gains;*
- *Review usage patterns yearly to ensure that prices reflect “peak loads.”*

I. BACKGROUND

A. Competition In Higher Education

The advent of the Internet combined with existing communication technologies like video conferencing, broadcast television and conference calling is creating explosive growth in distance education. Both public and private educational institutions are developing distance education courses, joining with other educational institutions to share production capacity and enlarge the market for their educational offerings, and marketing to students beyond their geographic borders. Currently, approximately 2,000 fully accredited distance education programs exist.¹ A recent American Council of Education (ACE) survey identified at least 270 degree granting distance education programs affiliated with accredited colleges and universities.² Furthermore, consortia of educational institutions (see Appendix A) are quickly forming across state lines to better compete in the distance education market. College officials state that “the primary motivation for building a consortium is economic. Producing courses for television broadcast or for transmission over the Internet is expensive and institutions are looking for ways to share the costs... The failure of college officials to view education as a business will leave them unprepared to compete with for-profit companies.”³ Clearly, competition for community college students is growing, and it is not restricted to traditional geographic competitors. Successful responses to these competitive pressures will require increased integration of educational institutions to reap the increased variety, accessibility, quality and efficiency promised by distance education.

B. Pressures to Increase Productivity

Rapidly escalating college costs are causing the public and the government to take a hard look at higher education.

The real anger at higher education comes principally from the makers and shapers of public policy – governors, legislators, regulators, heads of public agencies, and surprisingly, an increasing number from the world of philanthropy. Certainly not all, but clearly too many, of those responsible for higher education’s funding believe that colleges and universities have become too isolated from the economic pressures that are forcing most other enterprises to rethink their purpose and mission.⁴

¹ Dixon, 1996, p.8.

² Dixon, 1996, p.8.

³ Chronicle of Higher Education, “Making Connections,” December 8, 1995, p. A23

⁴ Massey, 1996, p. 17.

In fiscal years 1989 through 1992, Massachusetts community college budgets were cut by nearly 35%. In response, rising student fees propelled Massachusetts community colleges to one of the most expensive community college systems in the country. Although recent allocations from the state have allowed community college budgets to return to pre-1989 levels, significant pressures remain to contain costs and hold or reduce current student charges. The integration of information technology into the service delivery process could be a driver of the kind of re-engineering that will allow community colleges to “do more with less.” However, “taking full advantage of information technology will require substantial restructuring. Experience from process re-engineering tells us that technology enables significant productivity gains, but does not guarantee them.”⁵

C. The Massachusetts Distance Education Consortium

Community colleges currently educate 138,000 Massachusetts students in programs ranging from remedial and technical education to customized corporate training. Community colleges pride themselves on providing affordable and convenient education. Indeed, the community college system educates the non-traditional students unserved by the conventional four year college system.

Although not yet officially christened, three Massachusetts community colleges and one four year college have agreed to form a consortium to build a network for distance education delivery. The member institutions are Bunker Hill Community College, Middlesex Community College, North Shore Community College and University of Massachusetts at Lowell (known as Lowell hereafter). Because some institutions maintain extension campuses, there are more distance education nodes than institutions. Although all Consortium members plan to have multiple nodes, Middlesex and North Shore will have two nodes by this Fall. Furthermore, the Consortium intends to expand its membership in the future. Already Northern Essex Community College has expressed its intentions to join the Consortium in the Fall. Network features are:

⁵ Massey, 1996, p. 24.

- *Two-way audio and video, closed circuit, real-time, multi-point, video conferencing network;*
- *Virtually unlimited network capacity. The number of courses that can be offered and received simultaneously is only limited by the number of “transmits” and “receives” purchased by each node;⁶*
- *Linkage to the Massachusetts Corporation for Educational Telecommunications (MCET) system which will allow the Consortium to broadcast and receive one way video and two way audio via satellite to non-member institutions;*

Such a network raises profound questions for the participating institutions. “Every issue of the Chronicle of Higher Education, and many of the Wall Street Journal, describes outreach innovations and instructional experiments that raise profound but inevitable questions about intellectual property rights, faculty workload, library configuration, compensation priorities, and definitions of residency.”⁷ In turn, these questions will affect the speed and effectiveness of new technology adoption.

⁶ Currently, the network is comprised of 16 channels, allowing 8 point to point classes at any one time. However, Nynex has agreed to upgrade the network to a virtually unlimited capacity network for free when the Consortium has enough members and demand. (From interview with Chuck Shairs).

⁷ Coopers & Lybrand, 1995, p. 40.

II. INTEGRATING THE NETWORK

A. *The Technology Integration Cycle*⁸

Research in corporations and non-profits about technology integration points to a four-stage cycle of integration which can take several years or a decade or more to complete.

The Technology Integration Cycle

Stage 1 – Experimentation: Some planning, investigation and experimentation. Recognition by some individuals that they can do some of their work better and faster if they use new technology. Recognition that the leading competition has already started to use technology.

Stage 2 – Integration into Current Processes: A few years of marked increase in planned capital investment for individual workers and surprising increases in operating expenses – with little reduction in other expenses. Additionally, there are unanticipated but significant delays in implementing some of the most “obvious” applications. The organization also slowly begins to accomplish some tasks never before attempted and experiences a modest gain in the scale or scope of new activities.

Stage 3 – Processes begin to Change: A few years of readjustment where costs and annual investments stabilize while capacity continues to grow and new functions are developed and implemented. Or, the organization rejects “automation” and leaves the business that was being automated.

Stage 4 – Organization is “Re-engineered”: Several years during which the organization achieves new levels of efficiency and effectiveness – but the organization is no longer really in quite the same “business” it was in the beginning. No one seriously considers abandoning the technology because it has become inconceivable to accomplish what is now being done without it.

Most colleges, universities, distance education consortia, and the members of the Consortium are in stages one and two. The mantra of technology management is that efficient use of new technologies requires the reform of existing processes.⁹

⁸ Green, Kenneth C., Steven W. Gilbert, “Great Expectations, Content, Communications, Productivity, and the Role of Information Technology in Higher Education,” *Change*, March/April 1995, p. 8

⁹ Applegate, Lynda M. et al., 1996.

“The successful integration of information technologies is almost always associated with significant *structural* change – the kind of change that educational institutions routinely resist. In contrast to the pace of corporate restructuring in the United States over the past five years, structural change in education occurs slowly, incrementally, and over a period of many years – decades... Yet given the pressures currently confronting educational institutions – for accountability, quality, cost control, productivity and organizational efficiency – colleges and universities may have arrived at the moment when they must shift to accommodate change, not just preservation. At that point they may become poised to reap the productivity gains – administrative and academic – on a scale that information technology has helped deliver in the corporate sector.”¹⁰

The challenge for the Consortium members is to move to stages three and four to reap the gains of technology integration.

B. Factors Affecting the Technology Integration Cycle

Demand for the Network

“Governing Board members, discontent with unstable fiscal conditions, and perennial requests for new construction are challenging administrators with questions based on utilization: Are all facilities at full utilization? What is being done to improve utilization? Can we convert any facilities to other uses for improved utilization?”¹¹

To maximize utilization of the network and the distance education classrooms, the institutions will need to create demand during low demand periods and manage demand during high demand periods. At low demand, each institution’s investment in equipment and network charges are not recovered. At high demand, these costs can be recovered if the investments are being used constantly.

Integration of Service Delivery

The mission statement of the network states that the network’s purpose is to “expand access, share resources, and improve educational delivery opportunities.”¹² Consortium members have specifically stated that the purpose of the network is to increase student access to a wider variety of educational offerings. By only offering those classes with low enrollments or those classes not offered at other institutions, the Consortium can utilize the network in such a manner. However, in the face of budgetary

¹⁰ Green, Kenneth C. & Steven W. Gilbert, “Great Expectations,” *Change*, March/April 1995, p. 8.

¹¹ Coopers & Lybrand, 1995, p. 238.

pressures and increased competition for students from distance education programs in other states, the Consortium may need to consider utilizing the network to take advantage of economies of scale achievable in larger class sizes. Furthermore, several studies, interviews and the course pricing model developed for the Consortium (see Appendix B) have shown that video conferencing is not a cost effective medium for a small number of students.¹³


The problems of integrating institutional course offerings is similar to the evolution of international trade and the creation of a global, integrated economy. In the international arena, each country could be said to produce roughly two classes of goods, those that they produce exclusively and those in which they compete. For instance, the climate of Mexico allows the growth and export of oranges and the cold waters of Finland provide cod fishing unavailable in Mexico. Clearly the orange and cod trade between both governments will help the other. However, both America and Japan compete to produce automobiles. Although Japan might produce better and cheaper automobiles, and the American consumer would prefer to purchase a better and cheaper automobile, political pressures conspire to prevent such purchases. Because “competitive” products are common to both countries, they are likely to affect more consumers, therefore, the benefits gained by sharing these products is likely to be larger than the benefits gained by sharing “exclusive” goods. As countries increase their trade, their economies become more integrated.

In distance learning, the colleges can be considered countries and their course offerings can be considered to be “exclusive” and “competitive” goods. Finally, as national economies or institutional curricula become even more integrated, industry specific government subsidies and regulatory barriers in international trade and state subsidies to specific institutions in distance education could affect the competitive balance. The evolution of trading relationships in the international arena moves from

¹² Minutes from Consortium Meeting 1/17/97

¹³ Dhanarajan et al., 1994, p. 19-29; Interview with Peg Donahue, Director, South Metropolitan Regional Higher Education Consortium. March 31, 1997.

“shallow,” to “medium” to “deep” integration.¹⁴ For the Consortium, shallow and medium integration issues are paramount. Deep integration issues are not likely to be important in the near term.

Competition and Integration			
			
	<i>Shallow Integration</i>	<i>Medium Integration</i>	<i>Deep Integration</i>
	<i>Yrs. 1-3</i>	<i>Yrs. 4-9</i>	<i>Yrs. 10 -</i>
Int'l Trade	Oranges from Mexico and cod from Finland	Japan and America allow each other to sell cars in each other's markets.	Japanese government subsidies to auto industry give its cars an unfair advantage.
Dist. Ed.	Manarin Chinese from Bunker Hill and Pre-Engineering from Lowell	Middlesex and North Shore share a Psychology 101 course.	Differential allocations from state government give one college an advantage over another.

If the Consortium wants to use the network to increase the integration of the Massachusetts Higher Education system, it will need to progress beyond shallow integration. Most established higher education consortia are still trying to figure out how to get to the point of medium integration.

C. *Success Factors for Managing Demand and Integrating Service Delivery*

Faculty and Institutional Support

By increasing the number of students taught and by changing the communications medium over which they teach, the network will cause faculty to alter their pedagogical practices. Because the faculty will be most dramatically affected by the technology, it is crucial to obtain their support. Issues such as class size, compensation, course development costs and professional development costs will all need to be addressed.

Creating and Managing Demand

¹⁴ Lawrence et al., 1996, p. 44 - 58.

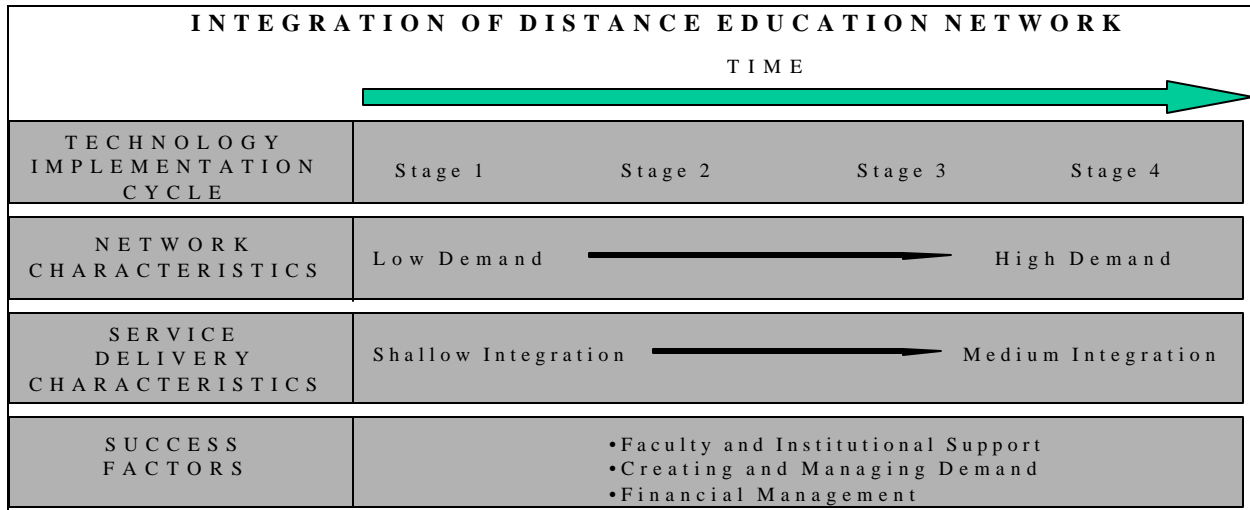
The network and video-conferencing equipment are only useful if faculty, students or others want and are able to use it. To recover the fixed costs of the video-conferencing equipment, line charges and technical assistance, the Consortium needs to ensure that the network is used as much as possible. Demand for distance education needs to be stimulated, then managed. Furthermore, the network could create substantial productivity gains which can be passed on to students, passed on to taxpayers or re-invested in the pedagogical process. Lower prices, higher quality education or lower taxes could further stimulate demand.

Financial Processes

The network will accrue certain communal costs and could gain revenues from greater course sharing. The Consortium will need to devise an equitable way to allocate costs and revenues. Furthermore, the costs and benefits of the technology need to be transparent to all to make a convincing case for increased or decreased use. Finally, if the institutions desire to reap the productivity gains promised in stages three and four of the technology integration cycle, the delivery of educational services will need to be significantly restructured. This could have profound, but unforeseen, effects on institutional financial practices.

D. Summary

To increase productivity, the Consortium must progress to stages three and four, otherwise their investment in distance education will not yield its anticipated benefits. To progress in the technology integration cycle, the demand for the network must grow and the educational offerings of the institutions must become more closely integrated. To accomplish this, the member institutions will need to enlist faculty support, create and manage demand, and develop new financial processes that will demonstrate and reap the productivity benefits of the new technology.



III. SUCCESS FACTORS

A. *Enlisting Faculty and Institutional Support*

Compensation

Teaching a course over a network instead of in a classroom requires institutions to reconsider their course development and faculty compensation practices. Because maintaining student interest and facilitating discussion are more difficult in a video-conference setting, course development for interactive distance education classes requires nearly twice as much faculty labor as the development of a traditional course.¹⁵ Where interactive class discussions are vital to the pedagogical value of the class, the marginal pedagogical cost of an additional student could be very high. Presumably, the professor's work would be more difficult, justifying increased compensation. Also, some classes will incur different costs with additional students. Those professors who teach classes with higher marginal pedagogical costs, like discussion classes, could receive a higher per student fee than those professors who teach classes with lower pedagogical costs, like lecture classes. Furthermore, faculty may utilize a variety of technologies to improve the educational value of the class. To promote course development and faculty use, institutions could (For a selected sample see Appendix C):

- *Offer a one time stipend for course development;*

- *Provide a per student fee to encourage faculty to use the network to reach greater numbers of students;*
- *Create different per student fees for different types of classes;*
- *Provide one time course load reductions when teaching over the network for the first time;*
- *Provide additional compensation depending upon the kind of and degree to which technology is integrated into the course.*

Individually, the institutions provide a variety of mechanisms to promote course development. For instance, professors are given a reduced course load in exchange for developing a new course at Lowell. At Middlesex, the departments provide mini-grants to teachers to develop new courses. In their pioneering efforts, Bunker Hill allowed faculty who taught over the network to have a one time decrease in their semester course load. Some examples from other consortia include an initial \$500 stipend that was given to instructors wishing to teach over the network.

Faculty Assistance

The integration of a new technology will clearly require that faculty learn to use it. Institutions with similar networks claim that assistance for faculty is critical to faculty acceptance. To assist faculty, the institutions can provide:

- *Training;*
- *Technical assistance;*
- *Document delivery between sites;*
- *Administrative support at the "far-end"*

Training -- Already the Consortium plans on utilizing some form of training. Through a corporate grant, Nynex provided training to a sampling of professors from all participating institutions. Furthermore, North Shore recently spent \$20,000 for one day of training for seven faculty members. Other

¹⁵ Bates, 1995, p. 39

suggestions include “certifying” a professor’s network competence to insure pedagogical quality. Training programs can be offered by individual institutions or under the umbrella of the Consortium. However, if institutions decide to provide training individually, a mechanism such as instructional cost sharing should be adopted to insure that these institutions are able to recover their training investment.

Technical Assistance -- Problems with the equipment are bound to arise. The faculty need to feel comfortable that someone can solve technical problems with the network or the equipment. Although estimates range widely, technical assistance costs about \$30 per hour per site.¹⁶

Document Delivery -- The sharing of syllabi, notes, tests and problems sets requires some method of document exchange. One consortium requires a fax machine and additional phone line to be installed in every class room.¹⁷ Others rely on the postal system, couriers, the Internet or a combination. Because it would be helpful to standardize document delivery practices across the member institutions, this is an issue that the Consortium should address. Equipment costs such as fax machines or computers should be borne by the institutions. Service costs such as fax charges or postal fees should be included in the cost of the instruction and shared by the broadcasting and receiving institutions.

Administrative Support at the “Far-End” --Finally, faculty need be confident that classroom administrative functions will be performed at the receiving site, or “far-end.” For instance, test proctoring and the collection and delivery of assignments needs to be conducted by someone at the receiving institution.

Labor Relations

The rapid rise of distance education is proving to be an explosive topic in higher education labor negotiations (See Appendix D for statements from teacher’s unions). From the perspective of the administrator, distance education looks like a way to decrease the number of faculty necessary to teach various courses without sacrificing pedagogical quality. From the faculty’s perspective, distance

¹⁶ Interview with Peg Donahue, South Metropolitan Regional Consortium, March 31, 1997.

education looks like a medium that will cause the quality of education to deteriorate while threatening their jobs. Furthermore, faculty claim that their increased course development and preparation efforts should be compensated appropriately. Finally, faculty are generally reluctant to adopt new teaching methods after having taught in a traditional setting.

Although the Consortium has explicitly stated that the network's purpose is not to increase class size in order to decrease administrative costs, it is likely that the Consortium will need to confront these issues in the future. Already the labor agreement reached between Massachusetts Regional Community Colleges and the Massachusetts Teachers' Association stipulates that no class may contain over 35 students and some may not contain more than 25. It is possible that this opposition can be mitigated by attractive compensation packages. Finally, if competition from educational institutions outside of the community college increases as expected, the Massachusetts Teacher's Association and the Consortium will be required to cooperate to compete effectively with other institutions. Furthermore, it should be noted that Lowell is not bound by the 35 student limit negotiated in the contract with the community colleges. Therefore, community colleges could enroll more students in a course taught from Lowell than they could in a course taught from another community college.

B. Creating and Managing Demand

Creating Demand

Targeting Candidates for Distance Education -- When there is little demand for the network, likely courses for broadcast are those that can take advantage of economies of scale without encountering significant resistance at other institutions. Such classes are either:

- *Under-subscribed; or*
- *Exclusive to one institution.*

¹⁷ Interview with Peg Donahue, South Metropolitan Regional Consortium, March 31, 1997.

For instance, Lowell and North Shore are discussing the provision of pre-engineering classes from Lowell to North Shore because North Shore does not offer such classes. Likewise, Lowell plans to use remedial courses provided by the community colleges for its students. The institutions may want to encourage professors of these courses or departments which have a high number of these courses to develop content for the network. The members could do this by targeting course development incentives to particular departments or classes.

Alternative Uses for the Network -- When demand is low, the institutions may want to consider alternative uses for the network. For instance, the network could be used to:

- *Supplement existing distance education courses or courses that are already taught at both institutions;*
- *Provide components of traditional courses across institutions;*
- *Lease video-conferencing time to businesses and other organizations (see Appendix E).*

For example, an existing distance education course could use the network to hold help sessions. Also, a course already offered at multiple institutions could use the network to broadcast material relevant to all classes. Finally, institutions can charge up to \$200 per hour for video conference use. Additional technical costs would depend upon whether the institution managed its own video-conferencing facilities or became a member of an existing network. Finally, the decision to lease video-conference space can be made individually by each institution.

Shallow Integration -- To create demand in the early stages of the network, the institutions must make it easy for students to take classes over the network. The Consortium should:

- *Standardize schedules among members;*
- *Accredit students at their college of registration when possible.*

Each school has conflicting schedules. For instance, Bunker Hill classes may start on the hour, but North Shore classes may start ten minutes after the hour. Also, vacation times may not match. In addition to causing scheduling conflicts for students, this will lead to inefficient use of each institution's investment as the classes will not flow across time slots. These conflicts should be resolved by administrative agreement.

If a student is matriculated at Bunker Hill Community College, but takes a course from Lowell, should the student receive credit from Bunker Hill or from Lowell? Rightfully, each school wants to maintain control over its admission's and administrative policies. If broadcasting schools, rather than receiving schools, grant credit for distance education courses, then a school's admissions policies and reputation are undermined. This is particularly relevant to Lowell. A credit from a four year institution carries more weight than a credit from a two year institution.

The network could be used to provide two types of courses; (1) those that are supplemental to the receiving school's curriculum or (2) a completely separate degree that is not offered by the receiving school.¹⁸ To minimize bureaucracy and to avoid undermining a school's admissions process, where a course from the broadcasting institution is supplemental to the receiving institution's curriculum, the receiving school should provide the accreditation. However, when the course is part of a degree program offered only by the broadcasting institution, the broadcasting institution should provide the accreditation and control admissions policies.

Managing Demand

As demand for the network grows within the member institutions, it will need to be managed, rather than created. Because the network has virtually unlimited capacity, the only factor that will limit the number of courses broadcast and received are the number of classrooms available for distance education. Because

¹⁸ For instance, in Maryland, Catonsville Community College is the only school in the state to offer mortuary science. Other network members allow students to take degree programs from Catonsville over the network. Interview with Aviva Adir, January 29, 1997.

the classrooms and equipment will be most cost effective if they are used constantly, the institutions should try to ensure that distance education classes are offered throughout the day. However, approximately 80% of all classes at all Consortium institutions are offered between 8:00 am and 1:00 pm, Monday through Friday. Assuming that demand for distance education increases, how does one determine which classes are offered in these popular time slots? More importantly, how do the institutions ensure that their equipment and classrooms are being utilized during the less popular time slots?

To manage demand, each institutions should consider:

- *“Peak Load” Pricing; and*
- *Priority Scheduling.*

Peak Load Pricing -- Used by electric utilities, “peak load” pricing charges different prices at different times of the day for the use of their transmission and generation capacity. Higher prices are charged during periods of high demand and lower prices are charged at periods of low demand. This has the effect of creating consistent demand throughout the day and maximizing the use of the video conferencing equipment and the network (See Appendix F). In addition, it makes users of a facility pay for the congestion costs that they impose on others. Furthermore, this will allow courses to “self-schedule,” limiting institutional or departmental conflict over popular class times. Across the country, many established distance education consortia are struggling with scheduling and demand issues. Thus far, no institution or consortium has initiated a peak load pricing system to reduce scheduling conflicts.

Implementing such a pricing scheme could have profound effects on the managerial budgeting practices of institutions. Currently, Bunker Hill and most other community colleges utilize a “line-item” internal budgeting system (See Appendix G). To fully implement peak load pricing, each department and administrative service would be considered a cost or revenue center. Departments would purchase facilities, such as classroom time, from the central administration. While it may seem a bit premature to suggest that the implementation of distance education will affect the internal budgeting of participating institutions, it may be necessary to consider such changes to maximize the use of the network and claim the productivity gains promised by new technologies. Furthermore, increased integration of institutions will lead to each institution being treated as revenue centers. The institutions will purchase some services from the Consortium, some services from the other institutions and provide some services itself. Finally, it is frequently noted that potential productivity gains enabled by technology can be one of the primary driver’s of university re-engineering.¹⁹

¹⁹ Coopers & Lybrand (1995), Massy (1996).

Priority Scheduling -- Some²⁰ consortia maintain scheduling committees who define a list of priorities for course offerings. For instance, a course for a degree program would take precedent over a non-degree course, or a course for credit takes precedence over a non-credit course. To encourage economies of scale, Consortium members may want to include class size as a priority category as well. Because a peak load pricing system will not solve all conflicts, such a priority list would be a helpful scheduling supplement. Finally, if internal reorganization is too ambitious or not feasible, peak load pricing could be used as a supplement to priority scheduling.

C. *Financial Processes*

Costs of Service Provision

There are three categories of costs related to delivering a course over the network. These are:

NETWORK Shared by all Consortium Members	INSTRUCTIONAL Shared by Participating Nodes in a Class	INSTITUTIONAL Assumed by Individual Institutions
Line Charges Consortium Administration	Faculty Document Delivery Course Development Cost of Additional Students Faculty Training	Video Conferencing Equipment Room Charges “Far-End” Support Technical Assistance Indirect Costs

Network Costs -- These are comprised of the monthly line charges and any administrative fees that accrue to the Consortium. Because the network provides virtually unlimited capacity and composes a relatively small part of the cost of course delivery, there is no need to assess a usage fee based on network charges. Each node should pay an equal share of the network costs.

Instructional Costs -- These include the cost of faculty, faculty training, course development, the charges associated with the delivery of documents such as postage or fax charges, and the “cost” of teaching to additional students. These costs should be divided by the total number of students, multiplied

²⁰ South Metropolitan Area Regional Consortium

by the number of students enrolled at each node, and paid to the broadcasting institution. While most instructional costs are easily determined, the per student teaching cost is more difficult to quantify. This cost could be considered the cost of pedagogical deterioration when an additional student is added to the class. Furthermore it is likely that the per student cost varies depending upon the class format. For instance, lecture courses will encounter fewer teaching costs than interactive discussion classes. Institutions might want to charge different per student fees depending upon the type of class. The per student fee will encourage professors to grow their classes, however a differential fee will capture the different costs of growing different types of classes.

Institutional Costs -- will include the equipment necessary to access the network, the investment needed to build a distance education class room, the cost of “far-end” support such as proctoring, and technical assistance. These charges can be allocated as the institution sees fit.

General Costs – All institutions incur indirect costs which currently run between 5 and 10% of direct costs. Also, the state subsidizes between 60 and 70% of all higher education expenditures. This is calculated as an additional revenue.

Cost Recovery

The course pricing model developed for the Consortium(see Appendix B) allocates costs according to the number of students participating in a course and the number of distance education classroom hours used by that course. The current numbers reflect educated estimates or are culled from existing distance education programs or the members of the Consortium. The model shows that network charges comprise less than 10% of the cost of any class. The remaining costs are composed of institutional and instructional costs. At the parameters established in Appendix B, it is clear that, to make the video conferencing network cost effective, institutions must:

- *Increase network usage; or*
- *Increase class size.*

Adding one student to one's own node causes an increase in returns that ranges from \$215 to \$246. Adding one student at another node causes an increase in returns that ranges from \$31 to \$63. Finally a one hour increase of network usage a week results in an increased return of \$164. (See Appendix B). Furthermore, the model also shows that, at the parameters currently set, if each institution has the same number of students, a course requires 40 students to break even.

Generally, community colleges are loathe to share any portion of the tuition received from one of their students with another college. In the early stages of network growth, imposing such tuition sharing plans might limit the support of prospective Consortium members. Furthermore, if an institution receives roughly the same number of courses that it broadcasts, then revenue sharing should not be an issue. Finally, if the number of courses broadcast or received is low, as it is likely to be in the start-up stages of the network, then cost sharing remains relatively inconsequential. However, as demonstrated by the course pricing model, the potential efficiencies of sharing instructional costs are enormous. Conceptually, the member institutions should "sell" courses to each other. Each institution then "resells" the course to its students.

- *To recover instructional costs, institutions participating in a particular course should share the instructional costs of that course according to the number of students enrolled at each node;*
- *To recover institutional and network costs, each institution should charge students as they deem appropriate.*

Because course offerings and student enrollment are likely to be low in the first year or two, institutions will want to maintain existing tuition schedules. Such an agreement will have the benefit of limiting bureaucratic hurdles and reducing the initial organizational impact of such a network. However, as the Consortium moves into technology integration stages three and four, these savings can be passed on to the student, the state, or re-invested in instruction.

Encouraging Integration

By allowing Consortium members to “buy” courses from other institutions and “resell” the courses to students, it will become evident that buying courses over the network could be more cost effective than providing the course themselves. Likewise, each institution might have particular courses for which they want to defray the cost. In this case, the institution might prefer to “sell” a course over the network. These savings will become particularly evident as institutions encounter certain curricular needs. In Louisiana, the sudden departure of a physics professor was the impetus for Louisiana State University at Alexandria to receive a high enrollment physics class over the network.²¹ Furthermore, by sharing the costs of a course, rather than attempting to share the revenues, the higher cost of a course from a four year institution can be incorporated into a cost sharing plan.

IV. Recommendations

A. *Faculty Support*

- *Create a compensation plan that rewards faculty for using the network and increasing class size;*
- *Award faculty different per student rates depending upon the type of distance education class that is being taught;*
- *Ensure that faculty have access to technology training. This can be administered by the Consortium or by the individual institutions;*
- *Develop a system to deliver documents between sites;*
- *Require “far-end” support for the delivery of distance education courses;*
- *Specify the course which are candidates for distance education to allay union opposition.*

B. *The Early Years (Low Demand, Shallow Integration)*

- *Share the costs of the network equally by the number of participating nodes;*

²¹ Interview with Theresa Seymour, Louisiana State University at Alexandria, March 31, 1997.

- *Target under-subscribed classes and “exclusive” programs for network broadcast;*
- *Explore alternative uses for the network such as renting video-conference facilities to non-affiliated organizations and business or using the network as a supplementary educational aid;*
- *Standardize schedules of participating institutions;*
- *For supplemental courses, let individual institutions provide accreditation to their own students, regardless of where the course originates;*
- *Share instructional costs to demonstrate efficiencies of the network.*

C. *The Later Years (High Demand, Medium Integration)*

- *Negotiate an end to the 35 student limit on class size;*
- *Charge departments by the hour for network and classroom use;.*
- *Adopt “peak load” pricing to spread out demand for distance education classrooms;*
- *Review usage patterns yearly to ensure that prices reflect “peak” loads;*
- *Develop a priority list to be applied when courses are in conflict for class times;*

VI. Conclusion

Structured appropriately, the network can increase access to higher education, increase the variety of offerings, improve the quality of offerings and decrease the costs. The Consortium has explicitly acknowledged the first three goals, but the fourth is likely to encounter institutional and faculty resistance. However, competition from public and private institutions, increasing costs of higher education, state budget cuts, and public opinion could combine to force Consortium members to consider using the network to decrease the costs of higher education. Currently, few distance education consortia have begun to offer “competitive” courses. “Colleges are interested primarily in sharing courses in less common foreign languages, advanced physics and other subjects that they do not now offer.”²² However, distance education offerings have grown rapidly and integration and consolidation of institutions is likely to continue. By enlisting faculty support, creating and managing demand, and

developing financial processes that allow institutions to take advantage of the efficiencies of distance education, the Consortium can utilize the full capacity of the network and integrate the offerings of the respective institutions. The evolution of this integration will propel the Consortium into the later stages of the technology integration cycle and raise the productivity of the respective institutions.

²² The Chronicle of Higher Education, "Making Connections," December 8, 1995, p. A23

APPENDIX A – SELECTED LIST OF DISTANCE EDUCATION CONSORTIA²³

The following consortia utilize a variety of technologies to share classes. All utilize video, although some use interactive video and some use broadcast video.

Western Governor's University – WGU is scheduled to launch in 1998 or 1999. WGU will offer credentials and degrees via a virtual university that crosses the boundaries of ten western states. The governors are hoping to create a system in which financial aid, course transferability, and tuition are equal for all residents, no matter where the instruction originates.

Southwest Center for Advanced Technological Education – This consortium comprises institutions in Texas, Oklahoma and New Mexico.

LionHawk – Penn State and the University of Iowa have agreed to allow students in Penn State's on-line associate degree program to enroll in Iowa's bachelor program in liberal studies.

Maine – Because of the difficult winters and dispersed population, the state decided to deliver all two year associate degrees using a system combining video, audio and data services delivered to students at learning sites or at home.

*Agricultural Satellite Corporation (AG*SAT)* – A four year old consortium of land-grant institutions, government, business and industry. The network is comprised of campuses and extension centers nationwide.

Community College Satellite Network (CCSN) – A member driven coalition of community colleges and educational affiliates since 1989. CCSN offers members discounts on teleconferences for faculty/staff development, lifelong learning, and continuing education, assistance in marketing, producing and coordinating teleconference productions and other services.

Mind Extension University – Provides fully accredited college and graduate courses and degree programs via cable television to approximately 25 million households. Professional development (certification or re-certification) is offered.

National Technological University – Founded in 1984 to serve the educational needs of highly mobile engineers, scientists and technical managers. NTU is a consortium of 45 leading engineering schools that provide graduate courses from their respective campuses via instructional television. The majority of NTU students are working professionals, sponsored by their own companies.

²³ Many of these listings can be found in Council of Chief State School Officers, 1995, p. 37 - 42.

*Baltimore Region Interactive Video Network*²⁴ – This is a network of five community colleges that use compressed video transferred over phone lines. Each site assumes the cost of its own service and maintenance. An activity fee is assessed at each institution. The costs of the network are assumed by the Consortium. For continuing education classes, the cost of the instructor is shared on a pro-rated basis depending upon the number of students enrolled at each site. Degree seeking classes are placed into three categories: 1) Equivalencies; 2) Non-equivalencies; and 3) Statewide programs. Equivalencies are courses that students take over the network where an equivalent course can be found at the institution in which they are enrolled. Credit is then given by the institution where the student accesses the course. No money passes between colleges. Non-equivalencies are courses where equivalents do not exist at the enrolled college. Students register at the broadcasting college and transfer credit back to the receiving college. Again, no money changes hands between colleges. Some programs are only offered by particular colleges. For instance, mortuary science is only offered at Catonsville Community College. To take such classes over the network, the student must enroll and pay tuition to the broadcasting college. The broadcasting college then gives 20% of the student's tuition to the receiving college.

The Network coordinator indicated that these arrangements work well now. However, there are some problems when a department at one college believes a comparable department at another institution is weak. The first department is hesitant to accept the "equivalency." Courses are scheduled according to agreements between institutions. So far, there have not been significant scheduling conflicts. The Network is also negotiating to link the network via satellite to other programs in the nation. For instance, Catonsville Community College is negotiating with the University of Indiana to receive courses in its PHD program in Parks and Recreation Management.

Although some teachers are provided specialized training, faculty do not receive additional compensation for distance education classes. Because Maryland community college professors are not unionized, this has not been an issue.

*The REACH Program in Western Texas*²⁵ – Although limited, three community colleges and the University of Texas Permian Basin are each offering two courses over a shared network this semester. This is only the second semester that these institutions have experimented with distance education. Currently, students register and pay tuition at the college where they receive the instruction. Agreements among institutions are on an ad-hoc basis.

*South Metropolitan Regional Higher Education Consortium (Illinois)*²⁶ – The Consortium operates a 27 site interactive distance education network. Members include main and satellite campuses of community colleges, private colleges, rural high schools and a hospital. Generally, colleges do not offer high subscription courses over the network. Also, there have been no usage abuses by institutions. All institutions pay a distance insensitive charge of \$500 per month to lease T-1 lines, and pay a common

²⁴ Interview with Aviva Adir, Network Coordinator, 1/29/97

²⁵ E-mail correspondence with Doug Hale, REACH Program Coordinator

²⁶ League for Innovation in the Community College, 1996, p.79; Interview with Peg Donahue, Director, March 31, 1997.

fee to the Consortium to pay for technical assistance. The biggest conflict is over network time. To resolve conflicts, the members created a programming committee which created a list of programming priorities during popular time slots. Generally, there is no tuition sharing. However, the instructional costs of a class are sometimes shared on a case by case basis. This is negotiated by the affected institutions. The Consortium and video conferencing equipment was funded by three \$15 million state grants. Some faculty are supportive, some are not. Some of the institutions are unionized, some are not. The Consortium estimated that using the network cost \$150 an hour which included the use of the room, technical assistance and line charges.

*Louisiana State University Consortium*²⁷ – LSU and four community colleges implemented a video-conferencing network two years ago. Some of the biggest problems encountered are the lack of a standardized schedule between the participating institutions, and the reluctance of the institutions to pay for line charges, faculty costs and proctoring costs. Also, the communication necessary between two campuses during the course has been greater than expected. The exchange of syllabi, tests, and problem sets is currently accomplished by fax and the postal service. Two community colleges, LSU at Alexandria and LSU at Eunice, have agreed to compensate the broadcasting institutions with 1/3 of all tuition revenue from a particular class. This is roughly the amount necessary to recover instructional costs. This is the first time that such a formula has been used, and it is unclear whether the rest of the system will adopt it. Because of its recent implementation, the network has not had significant congestion problems.

²⁷ Interview with Teresa Seymour, Coordinator, Alternative Educational Services, LSUA, April 1, 1997.

APPENDIX B – COURSE PRICING MODEL

APPENDIX C – FACULTY COMPENSATION ELSEWHERE²⁸

Although institutions of higher education utilize a variety of different mechanisms to compensate faculty for the increased work loads and to subsidize course development costs, there is not enough experience with distance education course development policy to indicate which policies are the most effective. Below are a sampling of the policies employed by schools around the country.

Oklahoma State University – At the College of Engineering, if a professor teaches to additional students over a network, the distance education students are considered another class and the professor is paid according to “overload”²⁹ rates. The overload rate, \$50 per semester credit hour per overload student, is then added to the professor’s salary. In addition, another \$50 per credit hour per overload student is awarded to that professor’s department. The dean of the department can distribute the windfall as he or she sees fit.

Southern Utah University – Teaching a distance education class is not considered to be an “overload” situation. However, to teach a distance education class, professors are required to produce an “extended syllabus” and have copyright issues resolved 45 days prior to the beginning of the class. For that effort the instructor receives \$200 per credit hour. Furthermore, faculty are awarded an additional \$100 per credit hour for “basic mediation” which they must complete prior to the broadcast of the course. Basic mediation includes three hours of training in the distance education classroom and a requirement to provide at least two examples of computer aided instruction. “Enhanced Mediation” is optional for faculty and adds another \$750 per credit hour to the pay structure. “Enhanced Mediation” requires faculty to put the extended syllabus on-line, establish an electronic discussion list, mediate at least 50% of the lectures and other activities to be determined by the faculty member.

The University of Maine, Presque Isle – Although Presque Isle does not treat distance education classes as overload or as an additional class, they do pay a percentage of the overload rate to distance education professors depending upon the enrollment in the class. The higher the enrollment in the course, the greater the faculty compensation. When Presque Isle could secure outside funding, teachers were given course development stipends and compensation. Utilization of specific media is not a determining factor in pay rates.

Chico State University, California – Teachers are paid a \$100 bonus for every enrolled student in the class once the class is over 25 students.

²⁸ Posting by Bill O’Neill at Southern Utah University on the American Association of Higher Education Distribution List, November 2, 1995

²⁹ “Overload” is when a professor teaches a class that is greater than the class size specified by the union or by institutional guidelines; or is it when a professor teaches more classes in a semester than he or she is required to teach.

Governor's State University, Illinois – Governor's State requires faculty to complete 30 units per year. Faculty developing distance education courses are given one time awards of 1.5 units to develop familiarity with the technology and 1.5 units to develop the course in distance education mode and 1.5 units for the first time teaching a course. After that, "a course is a course is a course." Governor's State also has an explicit royalty policy. Approximately 90% of the after marketing revenue generated by the distribution of the taped course is paid to the instructor.

Northeastern Illinois University – NIU offers a course release for the first semester that a distance education class is taught and gives the professor a one unit credit thereafter. When the course is taught three more times, then the credit units amass to a full class and the professor is eligible for another course load reduction. Because Northeastern has a unionized faculty, overload pay is guaranteed to professors once a class size exceeds 29. The professor receives this pay in addition to the bonuses mentioned above.

Eastern New Mexico University – Eastern New Mexico pays a flat rate of \$365 extra to the professor to teach a distance education class.

APPENDIX D – EXCERPTS FROM TEACHER’S UNIONS

A. *From the National Education Association (NEA)*³⁰

... The excitement about distance education raises some important questions... How do we preserve the learning community when learning is taking place off the campus? How do we maintain the student-to-student and faculty-to-student interaction that is so important to learning?

Intellectual Property -- As the financial stakes are raised, intellectual property rights and faculty rights increasingly become intertwined. Institutions that previously asserted no ownership claim to a scholarly book are rethinking their policies on intellectual property rights. While institutions consider distance, faculty ponder the implications for their intellectual property rights. What they see is a potential diminution of those rights -- and a devaluation of their skills. Their discomfort is exacerbated by the failure of current copyright law to address the issues raised by distance learning.

Quality Control -- Faculty members play major roles in the development of curriculum and setting standards for their particular disciplines. In the development of distance education courses, will faculty be a vital part of the decision-making on the content and quality of the courses?

Measuring the Benefits of Technology -- Better models for measuring the costs and benefits of technological instruction are needed. Institutions often underestimate the real costs of technology. What does it cost to support instruction in the classroom? What does it cost to maintain the equipment and to train people to use it? How soon does equipment become obsolete? There is still much to be learned about the costs and benefits associated with technology. Each institution must find the right balance in combining traditional practices and materials with new ones.

Contract Issues -- Distance education also means new union contract issues, such as evaluation, student contact, workload, and compensation. A review of the contracts on NEA's Higher Education Analysis System (HECAS) indicates this is an unsettled area of negotiations. Several agreements provide for the use of technology on a case-by-case basis until the parties have time to study the full impact of technological changes. Other contracts establish a labor-management committee and defer bargaining on the specifics until there is more information. Large numbers of contracts have clauses on intellectual property rights, both patents and/or copyrights, and an increasing number are dealing with distance education.

In most cases, faculty members cannot be forced to teach telecourses and the courses are not used to fill their regular teaching load. Some contracts limit telecourses to non-credit classes out of the mainstream curriculum. The rate of pay for these courses is often a lower rate, either the overload rate or part-time hourly rate. As the use of technology grows and telecourses become part of the regular

³⁰ National Education Association, URL: <http://www.nea.org/cet/>, March 29, 1997

course loads of faculty, compensation will become an issue. Another issue related to compensation is class size. There is no consistency between contracts on this issue. It is possible for enrollment in telecourses to be very large.

Student contact for off-campus telecourses is another issue. Students have access to faculty by phone, E-mail, or regular mail. In some cases, faculty members schedule review sessions for students throughout the semester.

Course Development -- Faculty need time to prepare to teach telecourses. One contract for a four-year campus provides for up to a year of preparation. It includes working with the media department to adapt lesson plans to telecourses, to become familiar with equipment, and to receive training. Another college gives faculty the option of enrolling in courses to obtain training in telecommunications. Others reduce course loads in order to prepare a televised course.

B. From the American Federation of Teachers³¹

Features and language from a model contract³² cited by the American Federation of Teachers:

Features of the contract, which runs through 1999:

- class size, class schedule, office hours, textbooks, evaluations shall be handled in the same manner as regular, traditional instruction;
- distance learning shall not result in the reduction in the number of full-time faculty;
- the college will arrange for and pay any costs associated with special training required for faculty;
- the college agrees not to videotape the courses. Should the faculty do so, the tapes, or intellectual property, belongs to the faculty member.

To see a copy of the exact language of the contract see below:

Section 3.16. Distance Learning and Telecommunications.

It is understood by both parties that the alternative instructional delivery system of distance learning and telecommunications is in an evolving mode. The parties agree that the following principles shall be observed until it is mutually agreed to modify them.

1. Course sections taught via the distance learning delivery method may be used by the faculty member to make baseload and/or to comprise overload.
2. The distance learning courses will be scheduled in a manner identical to that used for the discipline/program area.

³¹ From the October 1996 issue of On Campus, URL: <http://www.aft.org/higheduc.bac.htm>

³² Belleville Area College Federation of Teachers

3. The textbooks and learning materials for distance learning course sections shall be selected in the same manner as they are for traditional course sections.
4. Class size will be limited to maximum class limits as established for traditional courses.
5. Evaluations of faculty and administration observation shall occur only under the same circumstances and conditions as for traditional course sections.
6. There will be no reduction in the number of full-time faculty teaching positions as a result of distance learning classes being added to the class schedules.
7. The teaching responsibilities of the faculty as they relate to assignments, syllabi, papers and test shall be no different than those of the corresponding traditional course sections. Grades will be issued utilizing the normal college system and will be submitted to the Registrar's office following the usual procedures. The grading of assignments and tests shall be done by the assigned faculty in the normal manner.
8. The instructor shall conduct the normal office hours, both scheduled and unscheduled, to accommodate student needs. If it is deemed appropriate by the faculty member and if time is available, faculty may conduct meetings with students using the interactive video network.
9. If the faculty member requests to travel to one of the other receiving sites, and if this request is approved by the appropriate dean, the faculty member will receive travel reimbursement at the approved college rate.
10. The college shall arrange for and pay the costs of any special training required for faculty who teach distance learning course sections.
11. The instruction provided to distance learning classes is intended to be live and interactive.
12. The college administration agrees that it will not video tape or otherwise record the class sessions without the prior consent of the faculty member assigned to the course section. Such tapes shall be used only with the instructor's consent. The college agrees not to maintain a library of videotaped courses that could be used once the class has ended unless requested to do so by the faculty member. Any taped/recorded class sessions are the intellectual property of the instructor as defined in Article XVII of this Memorandum of Understanding.

Receiving of courses currently approved for Belleville Area Colleges from other originating institutions shall be done only after approval by the Dean and Department Head/Program Coordinator.

APPENDIX E – RENTING VIDEOCONFERENCE FACILITIES

If an institution decided to rent out its video conferencing facilities to other organizations, it could either buy the additional necessary equipment itself or enter into an existing video-conferencing network. Existing universities that manage such a system currently charge approximately as follows:³³

Use by affiliated institutions or agencies:	\$50 or less per hour
Use by non-affiliated not for profits:	\$100 - \$125 per hour
Use by for profits:	\$200 per hour

All charge an additional fee for the line charges. Some charge a special set-up fee for multi-point broadcasting. Some charge an additional fee for technical support. A quick survey of for-profit video-conference facilities³⁴ indicated that they charged anywhere between \$250 - \$300 an hour plus actual line charges.

Some companies³⁵ will incorporate video conference sites into their network. They claim to take responsibility for all of the scheduling, marketing and technical support. In exchange, revenues are shared between the video-conference sites and the managing company. One company estimated that such an arrangement could provide an institution with approximately 10 hours of use a month.

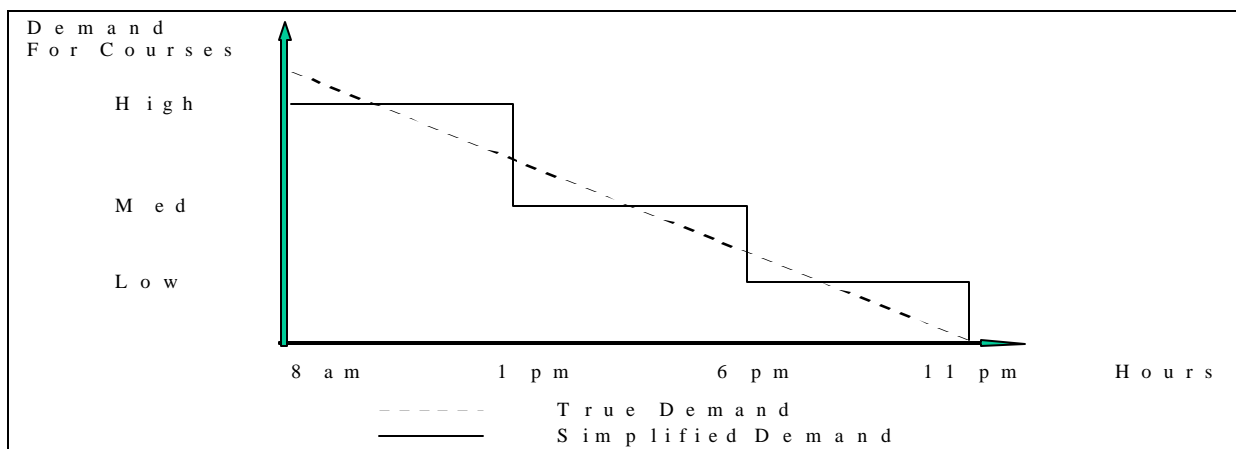
³³ From posting by Bill Demo from Tompkins Cortland Community College, New York to Distance Education On-Line Symposium (DEOS-L) listserv. March 28, 1997. This is a summary of the results to a question about video-conferencing rate structures that he posed to the list.

³⁴ Proximity Network, Affinity Videonet, Kinko's and Conferview. Proximity Video Conference services will pay the institution \$175 per hour for the use of its site. In turn, Proximity charges clients \$250 per hour.

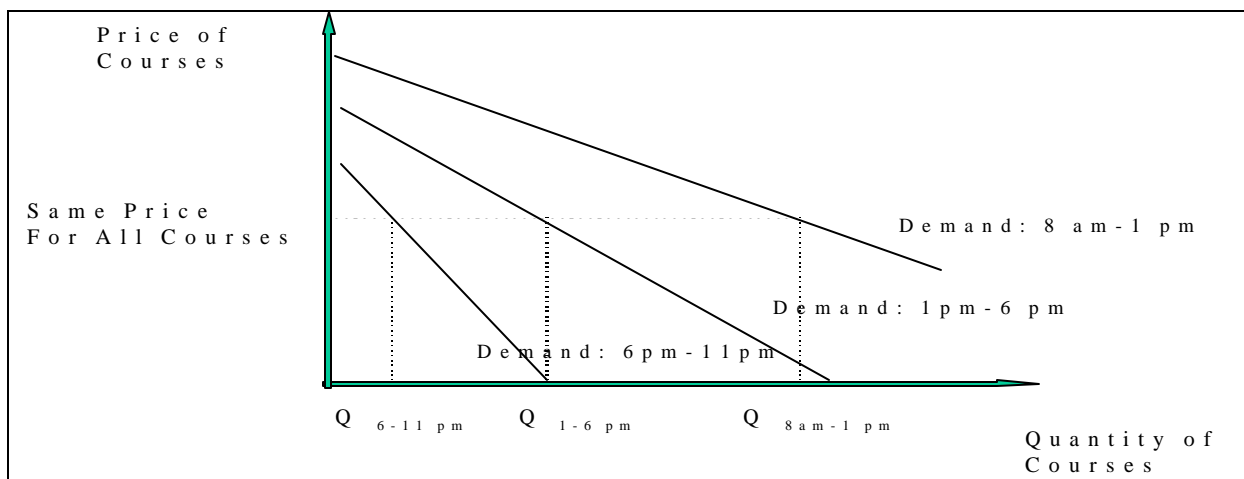
³⁵ Proximity Network, located in Vermont, 1-800-433 2900, URL: <http://www.proximity.com>

APPENDIX F – PEAK LOAD PRICING

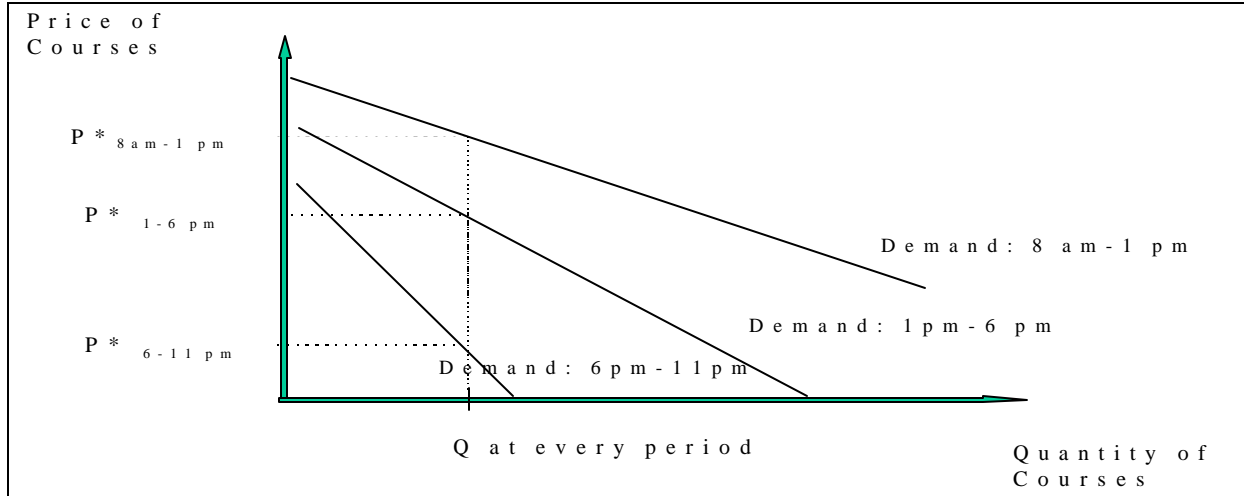
Because network capacity is virtually limitless, the bottleneck to distance education use is the use of the classroom. The institutions might want to consider a peak load pricing system to set prices that will create an even demand for courses throughout the day. A higher price reflects the opportunity cost imposed on another class by using a popular class-time and classroom. Ideal marginal cost pricing would set a different price for every level of demand. Obviously, this is too cumbersome to employ in the real world. To simplify, an institution can divide the day into several periods with different demands.



If the same price per course is offered, then the amount demanded will be different at different times. Therefore, the distance education classrooms will be over demanded in the morning and under-demanded in the afternoon and evening. This would create unfulfilled capacity.



However if prices are different at different times, then the demand for the classroom will be the same throughout the day. Ideally, the distance education classrooms will be used constantly throughout the day.



Determining the “right” price differential necessary to shift demand to another time period is an inexact science. It is likely to be a result of trial, error, and historical observation. However, the inexactness of the process does not detract from the concept’s applicability. After experimenting with different price differentials, the network can determine which is approximately correct.³⁶

³⁶ In economics, this price differential is known as “elasticity.” An institution is trying to find out how many dollars it will take for a department to switch its course time from one period to another. On the one hand, it is possible that departments believe that their students require a course to be offered at a certain time. It would take a substantial amount of money to cause them to switch class times. This is a low elasticity. On the other hand, student enrollment at community colleges has been demonstrated to be very responsive to price changes. This is high elasticity. A \$1000 difference in a public two year tuition is associated with a 19-29% difference in enrollment rates. For a 63 credit two year program, this amounts to a \$16 change per credit necessary to affect student enrollment. Kane, Thomas J., Rising Public College Tuition and College Entry: How Well Do Public Subsidies Promote Access to College?, National Bureau of Economic Research, Inc. Working Paper Series, 1995.

APPENDIX G -- MANAGEMENT BUDGETING SYSTEMS³⁷

As a university progresses in the technology integration cycle, it may want to restructure its administrative and budgeting processes to explicitly take advantage of the efficiencies provided by the new technology. For instance, to install cost and revenue accountability in the academic departments, each department could be treated as a separate revenue center. Revenue centers would be responsible for their enrollments and would “purchase” services and facilities from the Central Administration. In this way, strategies like peak load pricing could be incorporated into the university budgeting and administrative system. Furthermore, it would cause departments to pay close attention to the efficiencies generated by new technologies. General descriptions of varying budgeting methods are described below:

Line Item Budgeting -- A process of budgeting that is centrally controlled. Line items are usually considered on an incremental basis: that is, items proposed as additions (or deletions) are the only ones to be scrutinized. Limits of time and attention prevent the central authorities from continuously reviewing the on-going budget base. Centralized budgeting generally prohibits operating units from shifting funds among budget categories. Centralized resource allocation systems now are generally recognized to be less effective than ones in which goals are shared, operating units empowered to decide how best to attain the goals, and performance feedback maintained through after-the-fact accountability.

Performance Responsibility Budgeting – The central authority allocates funding to the operating units in blocks, which can be used as the unit head sees fit. The unit head must allocate resources to lower-level units, which eventually determine individual budget lines against which expenditures can be controlled. The rest of the system works the same as in line-item budgeting, the critical difference being that in performance responsibility budgeting, those closest to the production process make the eventual line item allocation decisions.

Revenue Responsibility Budgeting – The central authority allocates revenue lines instead of expenditure lines. Each operating unit is responsible for both its revenues and expenditures. Most revenues are allocated, with only a few truly unattributable lines. General revenues are used to fund central overheads and subventions.³⁸ The system extends the sensitivity to market forces down through the institution, since operating unit budgets depend on their ability to generate revenue. For example, enrollment shortfalls produce budget consequences, immediately and decisively, the only appeal route being through the difficult subvention route.

³⁷ Massey, 1995, p. 26 - 37.

³⁸ A subvention is where the central administration bails a department out when it encounters financial trouble.

BIBLIOGRAPHY AND INTERVIEWS

Applegate, Lynda, F. Warren McFarlan, James L. McKenney, Corporate Information Systems Management, (Boston, Irwin, 1996).

American Federation of Teachers (October 1996), "Contract Breaks More Ground On Distance Learning," Available: <http://www.aft.org/higheduc/bac.htm>.

Bates, Tony, Technology, Open Learning, and Distance Education, (New York, Routledge, 1995).

Coopers & Lybrand, Reinventing the University, Managing and Financing Institutions of Higher Education, (New York, John Wiley & Sons, 1995).

Clotfelter, Charles T. and Michael Rothschild, ed., Studies of Supply and Demand in Higher Education, (Chicago, University of Chicago Press, 1993).

Council of Chief State School Officers, United States Education and Instruction Through Telecommunications: Distance Learning for All Learners, (Washington, D.C., Council of Chief State School Officers, 1995).

DeLoughry, Thomas J., "Making Connections; Colleges Join Forces to Link Students and Teachers Via Distance Learning," The Chronicle of Higher Education, December 8, 1995, v42, n15, p. A21.

Dhanarajan, G, P.K. Ip, K.S. Yuen, C. Swales, ed., Economics of Distance Education: Recent Experiences, (Hong Kong, Open Learning Institute Press, 1994).

Dixon, Pam, Virtual College, (Princeton, New Jersey, Peterson's, 1996).

Ehrmann, Stephan C. "Asking the Right Questions, What Does Research Tell Us About Technology and Higher Learning?" Change, March/April 1995, p. 20 - 27.

Froke, Marlowe, "A Vision and Promise: Distance Education at Penn State Part 3 – Organization, Finance and Programming," Journal of Continuing Higher Education, v43, n1, p17-31, Winter 1995.

Gose, Ben, "Numbers Decline at Community Colleges, but Southeast Institutions See Growth," Chronicle of Higher Education, November 24, 1995, v42, n13, p.A28.

Green, Kenneth and Steven Gilbert, "Great Expectations: Content, Communications, Productivity and the Role of Information Technology in Higher Education," Change, March/April, p. 8 - 18.

Hedden, Carole, "Tough Times for Two Year Schools," American Demographics, July 1996, p.14.

Herzlinger, Regina and Denise Nitterhouse, Financial Accounting and Managerial Control for Non-Profit Organizations, (Cincinnati, South-Western Publishing Co., 1994)

Hoerack, Stephen ed., The Economics of American Universities, (Albany, State University of New York Press, 1990).

Kane, Thomas J., "Rising Public College Tuition and College Entry: How Well Do Public Subsidies Promote Access to College?" National Bureau of Economic Research Working Paper Series, No. 5164, 1995.

Lawrence, Robert, A Vision for the World Economy, (Washington, D.C., Brookings Institution, 1996).

Leslie, Larry and Paul Brinkman, The Economic Value of Higher Education, (New York: Macmillan Publishing Company, 1989).

Lever-Duffy, Judy, Randal A. Lemke and Larry Johnson, ed., Learning Without Limits: Model Distance Education Programs in Community Colleges, League for Innovation in the Community College, 1996.

Massy, William, ed., Resource Allocation in Higher Education, (Ann Arbor, University of Michigan, 1996).

Mitchell, Bridger M., Willard G. Manning Jr., Jan Paul Acton, Peak Load Pricing: European Lessons for U.S. Energy Policy, (Cambridge, Massachusetts, Rand, 1978).

Opitz, Margaret, "Interactive Distance Learning: Implications for the Classroom Teacher," The Clearing House, July/August 1996, v 69, no. 6 p. 325.

Randall, Bill and others, "A Marketing Approach to Distance Education Technology: Statewide Survey," Community College Review, v23, n4, p. 15-32, Spring 1996.

Rumble, Greville, The Management of Distance Learning Systems, Fundamentals of Educational Planning, (Paris: Unesco, International Institute for Educational Planning, 1992).

From Distance Education Online Symposium (DEOS-L). To retrieve archived postings send a command that says "INDEX DEOS-L" to LISTSERV@PSUVM.PSU.EDU:

- Phillips, Vicky, Faculty Compensation DE courses, February 4, 1997.
- Harper, Lin, Faculty Compensation DE courses, February 5, 1997.
- Berry, Waldo, Faculty Compensation DE courses, February 19, 1997.
- Demo, Bill, Videoconferencing Rate Structure, March 28, 1997.

Interviews

Personal and Telephone

- Adir, Aviva, Director, Baltimore Regional Interactive Video Network, January 29, 1997.
- Burke Gerry, Executive Office of Community Colleges, December 18, 1996.
- Donahue, Peg, Director, South Metropolitan Regional Consortium, March 30, 1997.
- Pearson, Don, University of Massachusetts at Lowell, March 25, 1997.
- Seymour, Theresa, Coordinator, Alternative Educational Services, Louisiana State University at Alexandria, March 31, 1997.
- Shairs, Chuck, Bunker Hill Community College, January 30, 1997.
- Warner, Jack, Vice Chancellor, Massachusetts Board of Higher Education, April 1, 1997.

Fax and E-Mail

- Alves, Lois, Dean, Middlesex Community College, March 28, 1997.
- Hammel, Dale, Massachusetts Board of Higher Education.
- Harper, Lin, Coordinator, Interactive Video Network, University of Southern Mississippi, January 22, 1997.
- Lucas, Mike, University of Massachusetts at Lowell, January 22, 1997.
- O'Neill, Bill, Director, Academic Grants and Telelearning, Southern Utah University, February 3, 1997.
- Rotundo, Mark, Bunker Hill Community College.
- Smith, Elaine, North Shore Community College, March 12, 1997.