Systems Analysis and Design for a Successful Distance Education Program Implementation

by James F. Stenerson
James Stenerson is the University Director of Educational Media at Pace University
in Pleasantville, NY . He is also a Doctoral Student of Information Studies at Long Island University (Jstenerson@fsmail.pace.edu).

ABSTRACT

Many traditional colleges and universities have been forced to embrace distance education as a result of the changing demographics of the student population. Part of the change is the student's access to efficient and relevant information. In turn, they are requiring educational institutions to apply efficient information access to academic programs and courses. The information technology exists for this application providing for computer-based instruction or asynchronous learning networks. These provisions are creating the "virtual campus". Many institutions have overlooked, or are not aware of, the dimensions of this new classroom. The asynchronous environment raises a number of concerns for institutions, the most essential aspect being the support of the distant student. This support raises new challenges in meeting the fundamental requirement of any higher education institution - providing skills to students so that they can process information, address its relevance and acquire knowledge. It is essential for institutions to develop a system analysis and design so that distance education can be incorporated into its overall educational system. There have been a number of system models developed to support distance education, however, since each institution has a unique culture and special needs, a unique system designs must be developed that is tailored for the institution. This paper will offer a prototype of a general system model for application.

1. INTRODUCTION

Distance education has been in existence for approximately one hundred years. Since its inception, distance education has acquired a dubious reputation, establishing a conflict with many traditional colleges and universities. Over the past ten years, distance education has challenged historical perceptions and has started climbing the Ivy Tower. According to the U.S. Department of Education (1997), as of September 1995, one third of colleges and universities were offering distance courses and another twenty-five percent were planning to implement distance courses within three years. One-half of the institutions were providing courses to students at home. Breaking down the barriers occurred with the onset of advanced information technology, especially with the introduction of computer-based instruction. The changing demographics of the student population accelerated the attitudinal change of distance education. One of the challenges since the inception of distance education, has been the continuous change in information technology

and its ability to adapt to those changes. Another challenge has been using the technology to enhance the educational process for the distant student. There is no sign of the change abating!

1.1 Generations of Distance Education

Since its beginning, the basic notion of distance education has been the separation of the instructor and the student. When the first distance program started, the most prevalent form of instruction was the correspondence course. There has been a drastic change in the concept of distance education, forcing institutions of all kinds to deal with the issues.

D. R. Garrison proposed three generations of distance education based on the technological changes that have occurred in the field. The first generation was based on the printed word and delivered by mail. The second generation was ushered in with the advancement of broadcast media, primarily in the form of television but also radio. The third generation of distance education occurred with the advent of computers and their use to deliver instruction materials (Chou and Sun 1996). As the third generation permeates the remote delivery of instruction, students are coming to expect institutions to deliver courses "on-line". Digital information will allow for a new generation of distance education that will lead to the virtual campus.

1.2 Definitions and Terminology

Distance Education. The terms "distance education" and "distance learning" have been interchanged for years and, in principal, have the same meaning and goals. There is a continuing discussion on which term should be used with the pedagogical arguments centering in on the words "learning" and "education". Education incorporates a systematic approach to learning, including the institution and the creation of a collaborative learning environment. Since I will be focusing on the need to develop a distance system the term preferred, and used, will be distance education.

The definition that best describes distance education comes from the book Distance Education: A Systems View (1996). Michael G. Moore and Greg Kearsley write:

Distance education is planned learning that normally occurs in a different place from teaching and as a result requires special techniques of course design, special instructional techniques, special methods of communication by electronic and other technology, as well as special organizational and administrative arrangements. (P.2)

Computer-Mediated Communications and Computer-Based Instruction. Realizing that distance education has entered into a third generation, it becomes obvious that the emergence of advanced information technology is shaping the future and offers the means to create computer networks that become the communication channel for delivering instruction. Two terms that are used when discussing

computer networks in distance education are computer-mediated communications and computer-based instruction. *Computer-mediated communications* is a generic term that represents the ability of people to communicate with one another through the use of computers and networks. The most popular forms of computer-mediated communications are e-mail, computer conferencing, bulletin boards, and discussion lists. A derivative of this technology and technique is *computer-based instruction*. The uniqueness of computer-based instruction is its capability to have a student communicate and exchange information with computer networks, creating a learning environment. Just two of the many forms of computer-based instruction involve hypertext and hypermedia. Many of the pedagogical issues that arise in computer-mediated communications also occur in computer-based instruction along with its own set of issues. Research has been conducted for thirty years concerning computers, learning and instruction with results showing its success. Instruction has moved from learning from media to learning with media (Hannafin et al.1996; Romiszowski and Mason 1996).

Asynchronous Learning. An asynchronous learning network is a form of computer-based instruction, taking place without the confinements of location and time. The central focus of an asynchronous learning network according to Hiltz and Wellman (1997) is a "teaching and learning environment … designed for anytime/anyplace use through computer networks." (P.16)

Levels of Institutional Involvement. Many colleges and universities are just starting out with distance education and it is necessary to identify different levels of involvement an institution may have. Four levels of distance education can exist. They include Distance Learning Programs, Distance Learning Units, Distance Learning Institution and Distance Learning Consortia. At the program level, distance education is usually carried out by a select few who are working on their own and have no system resources. The unit level is a self-contained unit within a conventional institution where there are dedicated resources and the potential exists for the design of a system. The institution and consortia levels represent a complete and dedicated institutional "system" for the delivery of distance education (Moore and Kearsley 1996). I will be addressing the need for system analysis and design for the Distance Education Programs and Units. I have limited the scope because of the challenges of incorporating a distance program or unit into a "traditional" higher educational system.

Virtual Campus. "Virtual university" and "virtual campus" are two terms that have been mentioned in distance education theory due mostly to the incorporation of asynchronous learning networks. A misconception exists when these terms are used and it centers on the possibility of institutions dissolving into cyberspace. This is unlikely! The term virtual is used in recognition of the asynchronous population and the distributed learning process. The traditional model of knowledge delivery has changed and will continue to do so. Institutions will have to support the "distributed learning communities" but also maintain a level of traditional interaction providing the sense of an academic community (Talley 1997). I will use the term virtual campus in recognition of the importance and multi-dimension of a college or university community. It is not my intent to propose the elimination of the physical community.

1.3 Distance Education's Current Challenge

Despite its growing popularity and success, distance education still faces the stigmas that were given it when its primary mode of instruction was correspondence courses. There is still an immense leap for distance education to make, bringing it into the mainstream of higher education, but higher education is at a "crossroads" where fundamental principles are being reanalyzed due, in part, to the advancements in educational technology (Olcott 1997). The technology has changed but the central issues and concerns of distance education especially in the area of superficial interpretation of course material, motivational and learning experiences and low retention rate remain (Abrami and Burns 1996). Another of the major negative issues associated with a distance program that still lingers, is the elimination of face-to-face interaction among the students and instructors, causing the elimination of networking and socialization (Moller and Draper 1996).

Information technology offers distance education the opportunity to break loose of the century-old misconceptions. Higher Education is now challenged to finally eradicate the misconceptions by incorporating and providing high quality distance courses and to do so in an asynchronous environment. As asynchronous learning networks become more prevalent, it is imperative that a system analysis and design be instituted by colleges and universities to identify the full impact of this mode of learning on both the student and the institution. By accomplishing the analysis and design, the end result will be the incorporation of a distance program into the overall educational system and, more importantly, into the institutional system. The future for distance education is dependent on systems management (Moore 1993).

Another reason systems analysis and design is mandated results from all the new distance initiatives that are undertaken with little focus or sharing of direction, especially in the area of computer-mediated communications (Holden and Wedman 1993). There is no clear consensus on the impact, or the coordination of the process for the institution. Computer-based instruction has increased the need for efficient information flow establishing a whole new set of challenges and objectives.

2. SYSTEM THEORY AND DISTANCE EDUCATION

2.1 Models of Interaction

When investigating the various elements of support for distance programs or units and the need to have inclusion between the student, instructor and institution, there have been various models offered all stressing the need for interaction. The necessary interaction has been broken down to learner-content, learner-instructor, learner-learner and learner-interface. Learner-content stresses the concern for the student to intellectually "connect" with the content that is delivered. Learner-instructor centers on the necessity to have the instructor succeed at intellectually motivating and stimulating the student by using unique but effective pedagogical models. Learner-learner reinforces the importance of the distant student not feeling isolated but belonging to a "class" where peer support exists (McIsaac and Gunawardens 1996; Hillman, Willis and Gunawardens 1994).

With computer technology changing aspects of distance education, especially with computer-based instruction and asynchronous learning networks, a new interaction model was developed that analyzed the relationship between learner-interface; the ability of the student to "communicate with the technology". It has been clearly proven that if the student does not have ready access to or is not

proficient with the technology there will be a negative impact on the learning process (Hillman, Willis and Gunawardens 1994).

With the emergence of the virtual campus caused by the increased incorporation of asynchronous learning networks, there is a need to propose a new interaction paradigm: learner-institution. Educating in an asynchronous environment, the students must be connected to the institution. The institution's culture and support services must be identifiable and provided, allowing for a collaborative learning environment. This happens to be a current topic of debate with little research and uniformity on how it is to be accomplished. This topic of support services will be addressed later.

2.2 Systems Models

Over the past twenty years, there have been proposals for the inclusion and design of a distance education system into the educational process. Different models of a distance system are discussed in Borje Holmberg's book Theory and Practice of Distance Education (1995). He illustrates different system designs by Renee Erdos, Tony Wright and one model that appeared in an Alberta publication. The essential components of any distance system, as recommended by Holmberg, center around: student learning, course planning and development, instructive communications, student counseling, administration of the course, creating an organizational structure, and evaluation. In analyzing these system designs and the principal elements they incorporate, it becomes evident that they do not fully address the recent developments of the third generation of distant education. In particular, the importance and the impact of computer-based instruction and the asynchronous learning networks are not addressed.

Michael G. Moore (1993) illustrates a distance education system, which stresses a "network of knowledge sources, processors, managers, communication media and learners". One source of knowledge would be the institution, while the structure of knowledge includes instructional design and course development. The media include all forms of possible communications including computers with a facilitator of interaction being the instructor. These essential parts are interrelated and the sum of the parts adds up to total the whole. In analyzing this system model, there is the critical observation that the structure of knowledge (instructional design and course development) precludes the media of communication. In reality, the mode of communications has to be determined and then the instructional design tailored to the selected mode. There is, also, the sensitive issue that the source of knowledge is the institution, and the instructor is the facilitator. There must be some clarification on this point since the instructor will always be the specific source of knowledge.

2.3 Customizing and Designing a Distance Education System

Recognizing the diversity of support levels that an institution is challenged to provide the distant students there is the need for each institution to examine its commitment to distance programs or units with the implementation of a system design. The design will enable the institution to achieve its highest goal, which is the successful transfer of knowledge to the distant student. In analyzing and designing a distance education system the institutions must reflect on the philosophical dimensions of systems. The philosophical

aspects address two key components of general systems theory: the "how" (epistemology) and the "what" (ontology). How does a college or university know what kind of an institution it is? What kind of society does an institution serve?
(Banathy 1996) These are just two of the many questions that must be debated when designing a distance education system.

C. West Churchman. There are many writings on the subject of systems analysis and design that collectively offer important insight to the understanding of what a system is and the various components that make a system effective. When researching general systems theory and its relationship to educational institutions one model stood out from the others. It was developed by C. West Churchman. He addresses general systems theory but also include systems design, educational technology, information flow and the social implications of systems. In his book, The Design of Inquiring Systems (1971), Churchman outlines the necessary conditions that must exist for something (S) to be established as a system. They are:

1. S is teleological
2. S has a measure of performance
3. There exists a client whose interests (values) are served by S in such a manner that the higher the measure of performance, the better the interests are served, and more generally, the client is the standard of the measure of performance.
4. S has teleological components, which coproduce the measure of performance of S.
5. S has an environment (defined either teleologically or ateleologically), which also coproduces the measure of performance of S.
6. There exists a decision-maker who - via his resources - can produce changes in the performance of S 's components and hence changes in the measure of performance of S.
7. There exists a designer, who conceptualizes the nature of S in such a manner that the designer's concepts potentially produce actions in decision maker, and hence changes the measure of S 's components, and hence changes in measure of performance of S.
8. The designer's intention is to change S so as to maximize S 's value to the client.
9. S is "stable" with respect to the designer, in the sense that there is a built-in guarantee that the designer's intention is ultimately realizable.(P. 43)

Churchman (1971) goes on to explain each of the conditions and applies his eight points to the running of a college. (The ninth point is assumed if the previous eight have been achieved.) A summary of his example include ;

1. To explain teleology (purposefulness) he mentions that a college has a set of goals.
2. The college's measure of performance is enrollment management.
3. The client is the student.
4. The college has a number of components including academic and administrative.
5. The environmental forces that may constrain or assure the goals include legal and budgetary policies.
6. Decision-makers include faculty and administrators.
7. The designer could be planning committees that produce mission statements or objectives for the college.
8. The planning committees could recommend program changes or develop new initiatives.

Churchman concludes this illustration by admitting that there may be criticism when applying systems theory to a college, but many of the overseers and accrediting bodies expect such a system to be in place.

There may be some question with the ninth point in this example since colleges and universities can not assume there will be stability and "built-in guarantees" with the intentions of the change and having the change initiatives realized. This potential problem is reflective of the institution's culture, which will be addressed later.

2.4 Need for System Design

Churchman's general systems theory is offered in conjunction with the previously mentioned interaction levels and the system proposal by Moore (1993) and the models discussed by Holmberg (1995) in the attempt to offer a broad but complete analysis of the need to institute a distance education system. If we accept the earlier premise of distance education entering into its third generation based on enhanced information technology then a number of unique issues and circumstances come about due to each institution's capability to create an asynchronous environment. If the asynchronous environment is applied to Churchman's model, then the challenge facing higher education with distance programs or units is the teleological condition of creating a "virtual campus". The virtual environment is attainable and its existence will not dissipate because of the enhancements to computers and communications creating an entire new way of interacting (Dede 1996). Recognition of these new techniques and their purpose, while identifying the necessary components to create a successful system, are essential.

If a successful system is designed to support the virtual campus, then the students will have the perception of being a part of an institution process leading to confirmation of studies that show learning styles in a virtual environment to be as good as those in a regular classroom. Course materials are mastered, satisfaction levels are high and the feeling of "group learning" is achieved (Hiltz and Wellman 1997).

3 IMPLEMENTING A DESIGN

Where does a college or university begin when designing a system? The system analysis aspect is the logical beginning. It is this aspect, and not the application of the system design, that becomes the focus for the remainder of this paper. The application can be easily achieved if a complete and honest analysis is achieved.

There are certain ambient factors that have to be analyzed by each institution as they prepare to undertake a systems design. This process lays the foundation for a comprehensive distance education system with the end result being the instruments needed to meet Churchman's conditions.

3.1 Institution's Culture

The first factor to be addressed is the institution's culture and determining whether it is conducive towards distance education. In order for the virtual campus to exist, there needs to be a self-study completed within the institution examining its willingness to embrace change and how to manage that change. The two most important forces that set the mold for an institution's culture are the administration and faculty. These two forces must be in agreement and supportive of any distance initiative that is undertaken. Donald J Olcott, Jr.(1997) illustrates this concern and stresses the need to preserve the ideal "educational process". The major areas of concern are the role of the faculty and their perception of distance programs, and to what extent the administration is supportive of the faculty. There needs to be a clear understanding of how the distance process will cause change especially with instructional paradigms, pedagogical issues and the essential need for skills development. Issues concerning faculty compensation, teaching load, intellectual property and formal recognition (i.e.: promotion and tenure) must also be addressed. These concerns can only be successfully addressed if there is unanimity in the support and commitment amongst the administration.

On the part of the faculty, there must be recognition that the role of the teacher changes when dealing with distant students. The faculty member is no longer in centralized control of the instructional process. The administration must support the transformation of the teacher-learner paradigms. Olcott (1996) goes on to develop a framework for the change that must occur for distance education to be successfully integrated into the institution. Throughout his entire process of change the faculty are central. It then becomes essential that the institution express a mission that allows for the inclusion of distance education and supports the resources that are necessary for acceptance.

Another important factor effecting the institution's culture is its willingness to accept the reality that an information revolution is occurring causing a whole new dimension to distance education. This revolution entails a shift from the student not being able to get enough information to having too much information. Learning structures must be developed to filter information and to process it into personal knowledge (Dede 1996). In the virtual campus the learning environment will have the students entering a global information infrastructure and they will need the skills to determine what is relevant. Peter Lyman (1996) stated that there must be a focus on "more efficient means to create, store and manage information" which changes the social dynamics of how "knowledge is created, taught and learned"(P. 371). Access to information becomes an economic factor for the institution. The amount of information can be limited by the economic commitment that the institution is willing to invest (Walster 1996).

The most sensitive cultural change caused by the revolution is the focus of the institution's mission from teacher-centered to student-centered. This entails the acceptance that the instructor is no longer the only channel of knowledge in a class of passive learners. Instead, the students are active "apprenticeships" with the instructor guiding the students in acquiring knowledge with "diverse and rapidly changing content". The new pedagogical issues of distributed learning concern the ability of students to individualize the instructional process because of the amount of information available in computer-based learning (Locatis and Weisberg 1997).

3.2 Student Demographics

The second ambient factor to be analyzed for a successful system design refers back to the stigmas that were mentioned earlier: superficial learning, motivational experience, low retention rate and the lack of face-to-face interaction. These issues are of valid concern, but the technology can overcome the concerns. The issues cannot be the driving forces as to whether or not an institution will initiate distance education. Institutions must come to terms with the changing demographics of the student population and make certain this is the driving force in designing a system for distance units and programs. According to the U. S. Department of Education (1997) there were over 750,000 people who participated in distance courses offered by higher educational institutions in 1995. The demand will continue to increase. Initially, distance programs were established and most successful in the rural areas. Today institutions in densely populated, urban areas are offering distance courses. This is due in large part to the changing student body and, more importantly, to the changing work environment. There is, now more than ever, the need to address a large population of adults who are seeking retraining, and re-certification, thus causing the opportunity for continuous learning. Since individual lifestyles have changed, the traditional modes of learning are not conducive to this population. Time, financial resources and geographic issues all factor into the demand for distance learning (Aspen Institute 1996).

In combination with changing lifestyles, there is also the continued advancement of information technology. By the year 2000, there will be increasing amounts of enhanced technology at home allowing the distant student even more independence from the classroom. This concept can even be extended to all stages of a person's life, not just adult or college. Institutions must face this reality and become providers to meet the needs of individuals and society (Bates 1995). Currently, there is also a demand for distance programs by special populations. An example that best illustrates this would be the disabled who are homebound and the new possibilities for learning that the enhanced technologies of electronic text, digital audio, and integrated workstations are providing (Vincent 1995). The potential for meeting individual needs for the disabled will only increase in the coming years. Not to provide for this population would be against any institution's mission.

If institutions do not understand the dynamics of the demographic and that student preference drive the need for change in educational provisions (Burt 1996), then institutions will be losing out on a vast and expanding distant population.

3.3 Institutional Support

Technical Support and Access . The third ambient factor that must be incorporated into the system design is a commitment to a network of support to create a virtual campus. Many institutions do not anticipate the commitment to planning and resources that are needed to make this endeavor a true success. Institutions can not abandon the distant student! There must be resources not only to provide the software and at times the hardware but also the training. Assumptions cannot be made that the distant student possesses the necessary skills required to survive in a virtual classroom. An institution never assumes that the traditional students do not require the basic presentation, communications and intellectual skills. Likewise, the distance education system should never make assumptions on the technical skills of their students. Support must be provided and the most successful avenues have been: call-in help desks, structured and evaluated workbooks, and informed technical tutor support (Rowley 1997). To provide this support, an institution has to allocate resources and factor in the wide range of requests and training while keeping in mind the time elements that the requests may arrive and the need to keep the services up and running twenty-four hours a day. There is a direct relationship between support and

instructional effectiveness (Moore 1996).

Another critical aspect to be considered by institutions is the issue of access. To offer distance education and to believe that there is a "technocentric utopianism" is naïve. Institutions must factor into their distance education system the reality that not all students will have equal access to information technology. Is it the responsibility of a college or university to provide this access? If the institution is committed to a distance program, then they have an intrinsic responsibility to address the issue of equality to access (Davison 1996).

If colleges and universities offer technical support and access to the distant learner then the institution is training the student to meet the challenges of gathering and managing information from the "global infrastructure". Today's job market requires individuals to handle and process remote information sources and to disseminate it to various work groups (Dede 1996).

Student Service Support. Along with technical support, the virtual campus must provide the traditional student services that are offered on campus. When investigating a needs analysis there is no difference between the distant student and the student on campus. The questions remain the same. Who are your students? What are their needs? How will you meet and manage those needs? The services are wide ranging and include counseling, tutoring, offering study skills, peer group support, career guidance, academic advisement, registration and bookstore. (Before questioning the omission of the library please note that it will be addressed in the next section of the paper.) Though there has been little research in this area (Robinson 1995) the responsibilities are evident. In many cases the support interaction between the student and the institution are developed on an individual basis and little common expertise exist.

As institutions investigate ways of providing for the distant learner, it becomes important for the support service units to reinvent themselves and have the courage to go up against standard practice. Admittedly, the bottom line will be additional costs. Certain services can best be handled by providing off-campus part-time support, especially with counseling and tutoring. Certifying the part-time assistance becomes an issue for the institution, but the basic approach to this would be the staff development of regional part-time staff (Tait 1995). Key stages of interaction with the distant student have been documented. They include interaction before the course begins, at the beginning of the course, the first weeks, mid semester, the final weeks and after the course has ended. The interaction provides for continuous feedback and a sense of "connection". The feedback provided could eliminate or at least abate many of the concerns causing a true sense of distance (Lewis 1995).

As institutions, individually or collectively, address the question of supporting students, there are basic services that must be established to avoid disaster. Registration, bursar and financial aid procedures must be established. Nontraditional time elements on semesters must be allowed, payment options must be in place. Colleges and universities must maintain communications with federal and local Departments of Education acquiring up-to-date information on financial aid for the asynchronous student. Academic bookstores need to be reengineered to process phone orders enabling delivery of books and materials in a timely fashion. Affiliations with various institutions or employment headquarters may have to be established allowing access to certain course materials and exam administration. It is doubtful that a universal systems approach to student service support will be established since each institution will have different challenges and barriers to overcome. Existing student service systems have to be incorporated and modified into the distance education system design.

3.4 Library Support

It has been the primary challenge of distance education programs and units to provide current, relevant information for the distant students. The access to this information has to be "transparent" (McGreal 1995). Prior to the realization or, even the concept, of distance education and asynchronous learning networks the library was seen as the owner of the essential process to store and to disseminate knowledge and information as it relates to the instructional process.

As institutions face the challenge of distance education, libraries find themselves playing a pivotal but ever changing role - providing relevant information to a population that may never set foot into the library building!

Ever since the advent of automation, libraries have been faced with "technostress". This stress is not caused by technological ignorance but by the rate of change. The ultimate goal is to maintain a tolerable level of stress and stay one step ahead of the new technology (Hickey 1992). With the emergence of distance programs, libraries will see no relief from this dilemma.

How will libraries cope? By looking ahead and seeing what will be needed to support not only an asynchronous population but also the traditional student. Predictions have been made with libraries playing an important role in the organization, integrity and assurance of Internet information and resources. This is especially relevant with the emergence of Internet 2, database interface design, electronic publishing, and creating and maintaining electronic textbooks. The latter two provide new and additional responsibilities in the areas of intellectual property rights, digital information managers, information literacy coaches, and knowledge managers. There must be a renewed structure to professional education. The librarians can no longer be insular in their approach and must be ahead on the issues of technology and knowledge management (Jones 1997). Along with distance education, the trends of a virtual library have been advancing for decades brought on by the automation of many of the library services. This was precipitated by the demand for efficient and faster information caused by the emergence of enhanced information technology (Rodrigues 1996).

Most accrediting associations for colleges and universities throughout the United States have set forth principals stipulating the importance of library access and support in any distance education system. The distant student is no different from the student on campus with their needs from the library - they ask the same questions and have the same needs requiring the same resources and of course wanting the same quality of service. According to Helena Rodrigues (1996) the current trends in supporting the distant student are:

· "Region"-wide borrowers' cards enabling the student to go to different libraries but having the same rights and privileges.
· Consortia membership between academic libraries allowing for access to shared catalogs and databases and the ability to request online interlibrary materials.
· Toll-free telephone numbers providing and encouraging direct communications between the distant student and the library.
· "Fax" capabilities for the timely document delivery of various resources to the distant student.
· Local area networks and wide area networks provide the distant student the capabilities of using multiple databases and online public access catalog.

· The Internet provides a huge database of reference materials and capabilities to communicate with people sharing the same research. It also enables the students to perform research at other libraries and institutions. There are also thousands of reference books providing a path to knowledge.

There is no denying that there are many issues to be addressed, especially with web- based resources and their validity. This is an emerging avenue of information and as it matures there will be mechanisms in place to define the areas of acceptance. Multimedia will also be a major part of the resources provided by libraries to the distant student.

The library has a tradition of being the headquarters for active learning on campus and this tradition must continue when dealing with distant students. In fact, libraries have been responding to the need of any time and any place research for decades. This started with circulating and photocopying library materials. As the digital age approaches, libraries will have to continue with their intuitive nature to provide materials at the student's individual location. One potential delivery system is file transfer protocol. There will be barriers to the development of a virtual library and the effectiveness of the service especially in the area of ergonomics with on-screen reading of materials, the question of copyright and Fair Use, and the most important issue - the economics of material transfer and user training (Dewald and St.Clair 1997).

Frank D'Andraia (1997) writes, "the challenge for academic libraries is to remain relevant in an information business that threatens to bypass them. Distance education has become an important market for the growing commerce of electronic information, and the libraries need to tailor more services for this expanding market in which information has become a commodity" (P. 37). He goes on to mention the cost of such a service and recommends new alliances with other libraries and for-profit information vendors in order to reduce costs and allow for expansion.

It will be the library, more than any other support system at an institution that the distant student will turn for success with the learning outcomes in an asynchronous-learning network.

4 CONCLUSION

C. West Churchman (1996) reported that the classic philosophical discussion concerning educational systems was the debate between those who believed the emphasis was on the parts of the whole educational system vs. those who believed the emphasis needed to be on the whole so as to better understand the parts of the educational system. For those who advocate the parts, it becomes essential that a series of steps be taken to improve certain aspects of the system: better teacher-student relations, better teacher training, better students. Each of these aspects is dealt with in its own light. For those who advocate the whole, there is the need to know whether the system is acheiving its stated goals. They question the need to improve a certain aspect if the goals are not being met system wide. The need is to revamp the process. Churchman wrote, "this debate is about costs entailed in any plan of developing educational systems". Emphasizing "the parts must pay the cost of failing to consider the whole" and emphasizing "the whole must pay the cost of failing to get down to the real depth with respects to the parts" (P. 40). The central argument that this debate raises is the basic design issue for any of the parts and that is its benefits to the whole and its cost.

There may be some criticism with raising the financial issue in the conclusion. The reason I do so is because it justifies the importance

of establishing an analysis and design for any distance education program or unit in a traditional institution. Each college or university is an educational system in its own right. To begin investigating a distance initiative, institutions must apply systems theories. Not to do so could be disaster both financially and, more importantly, academically. There are numerous "real" costs to distance education that many institutions do not fully realize before launching a distance program or unit, yet, other institutions realize the cost and drag their feet in starting off causing them to loose out on an expanding population.

In developing a system design for distance education, there will be assurance that the program or unit maintains the institutional integrity and incorporates its mission into that of the institution's. E. Swanson (1994) proposed a tenth condition to Churchman's system design - a critical observer. The role of the critical observer would be to oversee the distance initiative and maintain professional scrutiny over its design. The observer would certify the incorporation of existing systems especially those mentioned earlier: technical support, student services, and library support. The critical observer would also play a role with anticipating the changing demographics and the challenges faced with the institution's culture.

Churchman (1996) wrote that the trouble in a competitive market required a wide and accurate dissemination of information. The challenge for higher education has always been disseminating information and converting it to knowledge. This has not changed nor will it.

References

Abrami, Philip C. and Eva Mary Burns. 1996. *"Computer-Supported Collaborative Learning and Distance Education."* The American Journal of Distance Education 10, no. 2:37-42.

Aspen Institute Forum on Communications and Society. 1996. *Creating a Learning Society: Initiatives for Education and Technology, rapporteurs: Amy Garmer and Charles Firestone.* Washington, DC: The Aspen Institute.

Banathy, Bela H. 1996. *"Systems Inquiry and Its Application in Education."* Chap. 3 in Handbook of Research for Educational Communications and Technology, edited by David H. Jonassen. New York: Macmillian.

Bates, A.W. 1995. Technology, *Open Learning and Distance Education.* New York: Routledge.

Burt, Gordon. 1996. *"Quality Provision for Students: The Implications of Social Choice Theory."* The American Journal of Distance Education, 10, no. 1:37-49.

Chou, Chien and Chuen-Tsai Sun. 1996. "*Constructing a Cooperative Distance Learning System: The CORAL Experience.*" ETR&D 44, no. 4:71-84.

Churchman, C. West. 1971. *The Design of Inquiring Systems: Basic Concepts of Systems and Organization.* New York: Basic Books.

_____. 1996. *"On the Design of Educational Systems."* In Classic Writings on Instructional Technology, edited by Donald Ely and Tjeerd Plomp (Englewood, Colorado: Libraries Unlimited). First Published in Audio Visual Instruction 10 (1965): 361-365.

D'Andraia, Frank. 1997. *"The Politics and Economics of Distance Education."* In Libraries and Other Academic Support Services for Distance Learning, edited by Carolyn Snyder and James Fox. Greenwich, Ct.: JAI Press.

Davison, T. 1996. *"Distance Learning and Information Technology: Problems and Solutions in Balancing Caring, Access and Success for Students."* Distance Education 17, no. 1:145-158.

Dede, Chris. 1996. *"The Evolution of Distance Education: Emerging Technologies and Distributed Learning."* The American Journal of Distance Education 10, no. 2:4-36.

Dewald, Nancy and Gloriana St. Clair. 1997. *"Active and Collaborative Learning in Online Courses: Penn State's Vision,"* Libraries and Other Academic Support Services for Distance Learning, edited by Carolyn Snyder and James Fox. Greenwich, Ct.: JAI Press.

Hannafin, Michael J. and others. 1996. *"Research on and Research with Emerging Technologies."* Chap. 12 in Handbook of Research for Educational Communications and Technology edited by David H. Jonassen. New York: Macmillian.

Hickey, Kate D. 1992. *"Technostress in Libraries and Media Centers."* Tech Trends, 37, no. 2:17-20.

Hillman, Daniel; Debrorah Willis; and Charlotte N. Gunawardens. 1994. *"Learner-Interface Interaction in Distance Education: An Extension of Contemporary Models and Strategies for Practitioners."* The American Journal of Distance Education 8, no. 2:30-42.

Hiltz, Starr Roxanne and Barry Wellman. 1997. *"Asynchronous Learning Networks as a Virtual Classroom."* Communications of the ACM 40, no. 9:14-19.

Holden, Michael and John Wedman. 1993. *"Future Issues of Computer-Mediated Communications: The Results of a Delphi Study."* ETR&D 41, no. 4:5-24.

Holmberg, Borje. 1995. *Theory and Practice of Distant Education*. 2nd edition, New York: Routledge.

Jones, Rebecca. 1997. *"New Technologies Demand New Roles: 'Resistance Is Futile.'"* Computers in Libraries, 17, no. 7:32-38.

Lewis, Laurie, Debbie Alexander, and Elizabeth Farris See U. S. Department of Education.

Lewis, Roger. 1995. *"Support for the In-Company Learner,"* Chap. 23 in Open and Distance Learning Today, edited by Fred Lockwood. New York: Routledge.

Locatis, Craig and Michael Weisberg. 1997. *"Distributed Learning and the Internet."* Contemporary Education, 68, no. 2:100-03.

Lyman, Peter. 1996. *"Access Is the Killer Application."* The Journal of Academic Librarianship, edited by Charles Lowry, 22, no. 5:371-75.

McGreal, Rory. 1995. *"A Heterogeneous Distributed Database System for Distance Education Networks."* The American Journal of Distance Education, 9, no. 1:27-43.

McIsaac, Marina Stock and Charlotte N. Gunawardens. 1996. *"Distance Education."* Chap. 13 in Handbook of Research for Educational Communications and Technology, edited by David H. Jonassen. New York: Macmillian.

Moller, Leslie and Darryl Draper. 1996. *"Examining the Viability of Distance Education as an Instructional Approach."* The Journal of Continuing Higher Education 44, no. 4:12-21.

Moore, Michael G. 1993. *"Is Teaching Like Flying? A Total Systems View of Distance Education."* The American Journal of Distance Education, 7, no. 1:1-10.

_____. 1996. *"Tips for the Manager Setting Up a Distance Education Program."* The American Journal of Distance Education, 10, no. 1:1-5.

Moore, Michael G. and Greg Kearsley. 1996. *Distance Education: A Systems View.* New York: Wadsworth Publishing.

Olcott, Jr., Donald J. 1996. *"Aligning Distance Education Practice and Academic Policy: A Framework for Institutional Change."* Continuing Higher Education Review, 60, no. 2:27-41.

_____. 1997. "Renewing the Vision: Past Perspectives and Future Imperatives for Distance Education." The Journal of Continuing Higher Education, 45, no. 3:2-13.

Robinson, Bernadette. 1995. *"Research and Pragmatism in Learner Support."* Chap. 21 in Open and Distance Learning Today, edited by Fred Lockwood. New York: Routledge.

Rodrigues, Helena. 1996. *"The Role of the Library in Distance Education."* Microcomputers for Information Management: Global Internetworking for Libraries, 13, no. 1:21-29.

Romiszowski Alexander J., and Robin Mason. 1996. *"Computer- Mediated Communications."* Chap. 14 in Handbook of Research for Educational Communications and Technology edited by David H. Jonassen. New York: Macmillian.

Rowley, Jennifer. 1997. *"Open Learning and IT Skills Acquisition in Higher Education."* British Journal of Educational Technology, 28, no. 1:64-65.

Swanson, E. Burton. 1994. *"Churchman's Theory of Design Integrity."* Interfaces, 24, no. 4:54-59.

Tait, Alan. 1995. *"Student Support in Open and Distance Learning."* Chap. 22 in Open and Distance Learning Today, edited by Fred Lockwood. New York: Routledge.

Talley, Sue. 1997. *"EdTech Does It Online at Pepperdine University."* T.H.E. Journal, 24, no. 5:69-71.

U. S. Department of Education. National Center for Educational Statistics. October, 1997. *Distance Education in Higher Education Institutions,* by Laurie Lewis, Debbie Alexander, and Elizabeth Farris. Washington, D.C.

Vincent, Tom. 1995. *"Information Technology and Disabled Students."* Chap. 9 in Open and Distance Learning Today, edited by Fred Lockwood. New York: Routledge.

Walster, Dian. 1996. *"Technologies for Information Access in Library and Information Centers."* Chap. 25 in Handbook of Research for Educational Communications and Technology edited by David H. Jonassen. New York: Macmillian.
