Master of Science in Technology Via Distance Learning: Distance Learning Leaders, Benchmarks and Policies

Dr. James R. Gray, Professor of Technology
Mr. Guy Clemmer, Research Associate

Department of Technology
Northern Kentucky University
Highland Heights, Kentucky

Abstract

The paper presents research into the key characteristics of Distance Learning. The researchers were interested in how corporations and educational institutions design, develop, and implement learning programs via Web based technology. Program elements identified as key characteristics critical to the success of a Web based curriculum are presented. Areas such as E-learning Methodology and Technology, Models and Tactics, and Policies and Procedures are addresses.

The supporting research was conducted throughout the 2000/2001 academic year. The review process included both corporate and university sources. The resulting research report supported the design and development of a Web based Master of Science in Technology (MST) degree, which is currently being implemented in the Department of Technology at Northern Kentucky University. The structure and method of Internet delivery of the MST degree reflects the findings of this research.

Introduction

Today's technological developments, including personal computers and the Internet, have resulted in dramatic changes in the way people learn. Within the traditional classroom-based education and training environment, available technologies such as personal computers and the Internet are being used to enhance the learning experience. Outside of the classroom, these technologies provide opportunity for education and training to occur over large distances at the convenience of the end user (not time-dependent). These technologies also allow education and training to be interactive and selectable based on the immediate needs of the learner.

This type of education and training is often called distance education or "e-learning" as it utilizes a wide array of applications and processes mediated by electronic technologies that are widely available today. Examples of these technologies include personal computers and software, computer and web-based training, email and Internet, and audio and video teleconferencing. These technologies may be used to supplant or enhance traditional classroom-based education and training techniques.

Many corporations and educational institutions are taking advantage of these new technologies. Many find that by using an e-learning or distance education component in their education or training environment, they can provide more educational content to a larger audience at a lower cost than traditional classroom-based education.

In an effort to determine the methodology and technologies used in today's e-learning environment, a research study was initiated to determine the state-of-the-art in interactive training and development (including leaders, benchmarks and policies) and provide information which may be used in implementation of an e-learning environment. This paper documents the results of the research study.

Definition

Many sources vary in their definition and interpretation of the meaning of distance education or e-learning. In a glossary of e-learning terms provided on The American Society for Training and Development (ASTD) website, e-learning is defined as:

> A wide set of applications and processes such as Web-based learning, computer-based learning, virtual classrooms, and digital collaboration. It includes the delivery of content via Internet, intranet/extranet (LAN/WAN), audio and videotape, satellite broadcast, interactive TV, and CD-ROM.

In E-learning Across the Enterprise: The Benchmarking Study of Best Practices by Brandon Hall, and Jacques LeCavalier (2000, p. 3), e-learning is defined as:

♦ Technology-enabled learning performed outside of the classroom. (Though classroom training is very much part of a very powerful emerging learning model which integrates internet-enabled learning with traditional approaches.)
♦ Internet-enabling other parts of the learning process, such as learning management, assessment, and so on.

Both definitions are based on the premise that electronic technologies form the backbone of the e-learning environment. The technologies available are numerous and may be selected based upon factors such as funds available for implementation, time available for implementation or technological capabilities of the end-users. The selection of technologies to be utilized must be consistent with the ultimate goals of the e-learning system as defined by the implementing organization and must not overshadow the information that is intended for transfer to the learner.

E-learning Technologies

E-learning technologies can range from basic utilities such as telephone conferencing and voicemail, to high-tech activities such as synchronous learning facilitated through the Internet or satellite systems. E-learning technologies can be utilized independently or in conjunction with each other to enhance the learning environment.

E-learning Technologies: Audio and Video-Based Technology

One of the most cost effective technologies available for e-learning implementation involves telephone technology. Telephone technology may be used alone or in conjunction with more advanced technologies to communicate in an e-learning environment. Examples of telephone technology applications include audio conferencing, fax and/or voicemail.

Audio conferencing is typically implemented utilizing individual telephones or speakerphones. Audio conferencing allows large connections of parties, each provided with a synchronous communication connection to interface with one another. Advantages of audio conferencing include relatively low cost of required equipment and the wide availability of telephone connections throughout the world.

One specific disadvantage of audio conferencing may be the lack of ability to portray physical information such as graphs, charts and diagrams. This may be overcome by utilizing video technology, such as ITV (two-way audio and two-way video), to provide asynchronous or synchronous communication between the learners and the source. Courses may be taped and presented to the learners at various venues and times, resulting in an effective method of information transfer. Full utilization of video technology would involve live transmission of video and audio from the instructing location with capability to provide return video and audio, in a real-time fashion from each of the learner's locations.

Another component of audio technology is voicemail. Voicemail may be used independently to communicate between students or between the instructor and students. Voicemail is more effective when used in conjunction with other electronic technologies.

E-learning Technologies: Computer-Based Technology

With the continued improvement and availability of personal computers and their associated peripherals, computer technology has become the standard for an e-learning implementation. The basis of this technology is the personal computer with peripherals such as CD-ROMs, modems, and applications such as electronic mail (e-mail) and Internet capability.

CD-ROMs are utilized in a Computer-Based Training (CBT) environment. Course information is provided to the learner via the CD-ROM for independent use at the learner's discretion and convenience. Packaged course content is widely available from numerous commercial sources and university collaborations that utilize CD-ROM technology.

Modems and connection to the Internet greatly increase the communication process during e-learning. E-mail provides written communication between students and facilitators, albeit in an asynchronous fashion. Other forms of asynchronous learning may include Web-based training (WBT) applications such as videotaped courses and streamed audio/video presentations. These applications would be available to a large number of students each accessing the data at their convenience.

Perhaps the pinnacle of WBT would be synchronous learning, which allows real-time learning and communication among all parties involved. This type of e-learning may be accomplished via telephone technology, Internet, satellite or a combination of these technologies. Advantages of this type of learning are numerous and include the ability to view information and hear dialog simultaneously, to communicate in real-time with all participants, and the ability to customize content at the instructor's discretion.

In <u>Distance Learning: An Introduction</u> (2000) by the Lucent Technologies Center for Excellence in Distance Learning, several examples of technology utilization in corporate and educational e-learning are described, including training via compressed video, satellite telecourses and fiber optic networks. This information is included in Appendix A.

Although technology is an important aspect of the e-learning implementation, it should not be the only factor considered during an e-learning implementation. The methodology by which the implementation is planned, communicated, designed, utilized and reviewed are additional important factors to be accounted for. In <u>Virtual Instruction: Issues and Insights from and International Perspective</u> (1999), Feyten and Nutta state that:

> Selection of the technology and the manner in which it is used is critical to realizing the potential benefits. Technology is not a solution unto itself. Know what goals are to be accomplished and then seek the technology to best deliver these goal (p. 52).

E-learning Methodology

Brandon Hall and Jacques LeCavalier (2000) have colabretated to perform an extensive research study to identify best practices used by leaders in e-learning. This research study included surveys of 5,000 industry professionals in the search for "world-class" examples of e-learning within organizations. Based on the results of the survey and information obtained from industry publications and other forms of communication, 11 organizations were identified as having significant and exemplary e-learning implementation stories. These organizations include international representatives from the technology, professional services, transportation, manufacturing and government/military arenas. From these organizations, Hall and LeCavalier attempted to extract a summary of best practices, strategies and experiences for inclusion in their report.

Other sources of information regarding e-learning included the Lucent Technologies Center for Excellence in Distance Learning (CEDL) which maintains extensive information on e-learning at their website (<u>www.lucent.com/cedl)</u>. Information was also obtained from The MASIE Center (<u>www.techlearn.com</u>) which identifies itself as " The Technology and Learning Think Tank." A report entitled <u>Quality on the Line: Benchmarks for Success in Internet-Based Education</u> (2000) was found to contain thoughts that complemented and added to the ideas presented by Hall and LeCavalier. An excerpt of benchmarks from this report is included as Appendix B.

Utilizing the report <u>E-learning Across the Enterprise: The Benchmarking Study of Best Practices</u> (2000) as a baseline, three top-level categories are provided for discussion of e-learning methodologies. They are:

- ♦ Impact and Leadership
- ♦ Tactics, Models, Content and Tools

♦ Issues: Staffing, Information Technology and Management.

Each top-level category has been broken down into sub-topics and additional information obtained from alternate sources added for completeness.

Impact and Leadership: Planning and Strategy Development

The first portion of impact and leadership deals with planning an e-learning or distance education implementation. As stated in their benchmarking study, "best practice organizations invest significantly in planning and strategy development" (Hall & LeCavalier, 2000, p. 21). Although planning is identified as significant, the study indicated that a single plan does not exist across the leaders identified. However, each organization identified sustainability of the project as a significant concern.

In Distance Learning – An Introduction, the idea of careful planning is echoed by the comment that "the design of a distance learning system or network should be the result of a careful planning process that evaluates the learning needs and objectives of the organization" (Yoakam & Chute, 2000, p. 8).

Another key ingredient in the success of an e-learning implementation is involving the right people in the implementation. In 10 Tips for Implementing a Distance Learning Program, the authors recommend that "before implementation begins, set up a cross-functional team made up of trainers, instructional designers, telecommunications staff, and end-users" (Chute& Bivens, 2000, p.). Involvement of appropriate organizations and personnel right from the start ensures that their issues and needs are addressed during the planning process, in addition to gaining their support for completion of the task. Input should also be solicited from those directly involved with the needs of the target learners (e.g. managers, teachers). Information from this published article is included as Appendix C.

Those involved in the implementation should collaborate to generate and implement procedures for addressing the implementation processes, initial and ongoing support and evaluation of results. Subjects identified for these procedures and plans include, but are not limited to:

♦ A timeline for implementation, continuous improvement and evaluation
♦ Evaluation and selection of courses
♦ Support for both faculty and students
♦ Orientation to e-learning for both faculty and students
♦ Quality standards of the systems, software and equipment utilized in the e-learning environment
♦ Integrity, validity and security of information

Potential implementers are advised to utilize simple technologies and designs in the early stages of the process. This reduces the risk of technical problems inherent in system implementation and adjusts the users to the systems being utilized. Recommendations for small, independent projects to demonstrate success and gain support is also included. The implementation must gain acceptance from all involved persons, including those funding the implementation, those facilitating it and those directly involved as learners.

One respondent included in the study by Hall and LeCavalier (2000) recommends "focus first on key learner needs which can be addressed relatively quickly, and plan to enhance (your) portal every 60 to 90 days" (p. 21). This advice results in meeting immediate needs as soon as possible while building confidence and acceptance of the implementation with facilitators, students and the funding organization.

Implementers must also anticipate the impact and consequences of the proposed e-learning environment. Implementing an e-learning environment into a reluctant community may result in lack of acceptance by both facilitators and students, resulting in failure of the implementation.

Perhaps the best summary for caution in e-learning implementation is provided in <u>Virtual Instruction: Issues and Insights from an International Perspective</u>, in which the authors (Feyten & Nutta, 1999) state:

> It is important to realize that any educational innovation can lead to more pitfalls than benefits unless those involved in implementing it have a grasp of the complete picture and act accordingly. Progress in one dimension might have unanticipated negative consequences in another (p. 37).

Impact and Leadership: Executive Level Involvement

Involvement and support from the highest levels of management is paramount to success of the e-learning implementation. Executives must "buy in" to the entire project and be actively involved throughout each stage of the process, including planning, performance and periodic review. As with any implementation, involvement in the entire process allows people to provide their input, creating a feeling of ownership of the project.

Besides executive involvement in the planning, performance and review processes, allowing interested executives the opportunity to design or instruct topics of interest may enhance executive involvement. Utilizing their expertise in a particular subject area and incorporating them into the instruction process creates additional feelings of "ownership" and may increase support for the entire e-learning implementation.

Hall and LeCavalier (2000, p. 28) also suggest that a "Learning Council" for strategic development be instituted. This "Learning Council" would be comprised of executives ultimately responsible for the e-learning implementation. Involvement of executives with this important function can help to maintain interest at a high level within the organization.

Impact and Leadership: Communication

The final portion of the Impact and Leadership area consists of communication. "Best practice organizations are persistent in the use of a variety of communication and change management vehicles, along with targeted and compelling messages, to inform, educate and motivate line managers, instructors, employees and other e-learning stakeholders" (Hall & LeCavalier, 2000, p. 36).

It was also determined that persistence, consistency and frequency of communications efforts are critical to the success of the e-learning implementation. As with many efforts, people must be continually informed about what is occurring and why. Communication must be directed both internally (within the implementing and receiving organizations) and externally (within the community at large) to be truly effective. Persistent and frequent communication

may also help to overcome the "Here's my cup, fill it" (Hall & LeCavalier, 2000, p. 36) mentality by fostering self-driven learning.

Finally, numerous sources utilized in preparation of this report cited that a highly reliable, working system designed to be as failsafe as possible is the best selling point to potential and current users. A system that is difficult to use or is often non-functional may "turn-off" users, resulting in a reluctant audience, no matter the amount of communication detailing the benefits of the system. To enhance system reliability, equipment should be chosen based not only on performance or cost, but also on compatibility with other systems and the ability to successfully upgrade as the requirements and technology evolve.

Tactics, Models, Content and Tools: Process Steps

Another portion of the implementation strategy involves the tactics, models, content and tools utilized in the implementation. Briefly stated, this encompasses the specifics of technology usage within the e-learning environment. The options in technology and the numerous sources for course content which are available today provide unprecedented choices to the implementers; however, these should not be the driving factors in the e-learning implementation.

Hall and LeCavalier (2000) state that the implementation should be conducted "one step at a time" (p. 42). Feyten and Nutta (1999) stress that the implementing organization should "understand the underlying educational theory, understand how learner/teacher roles are defined by that theory, and ensure that the theory is not in contradiction with the overarching goals or vision of the educational experience that is intended" (p. 49).

During the planning process, guidelines regarding minimum standards should be used for course development, design and delivery. This provides a consistency of presentation, which can result in greater acceptance of the system by the end users.

Initially, the e-learning content may include online course availability, online course catalogs and the blending of classroom and online activities. Users can investigate available subjects through the catalogues and courses to determine the applicability and utility of the program to their personal interest. By blending classroom and online activities, users can become accustomed to the e-learning environment and its advantages, while maintaining the familiarity and face-to-face contact that traditional classroom activities provide.

With regard to technology utilized in the e-learning environment, it is learning outcomes that should determine the technology to be used to deliver course content. Technology alone should not drive implementation, neither should it be an object of consideration by the student. If the overall goal of the implementation is overshadowed by the technology utilized, the maximum impact of the implementation will not be achieved.

In continuance of this theme, Lucent Technologies CEDL stresses to keep the technology transparent. The implementation should strive to focus around course content, not the method of delivery utilized. Participants and instructors should be comfortable with the technology early in the process and should maintain sufficient skills for effective use of the selected e-learning media. If the technology utilized is a distraction or if the end user is not familiar or confident in utilization of these technologies, the resulting educational experience may be diminished.

Tactics, Models, Content and Tools: Construction Decisions

Construction of the e-leaning environment consists of the decision to build vs. buy. Options for the implementers may include utilizing packaged courseware available from numerous sources, utilizing developers to generate custom material or development of material internal to the organization implementing the e-learning environment. The decision on which to use must be made using a clear set of guidelines developed during the planning process. Factors to be utilized in the decision-making process should include content of proposed courses, target audience evaluation, and availability of resources within the implementing organization (including those for implementation, support, maintenance, upgrade and facilitating or instruction). Also to be considered are possible strategic factors such as partnerships with other organizations with similar requirements, partnerships with course providers, and other incentives for collaboration which may apply to the implementation.

In regard to partnerships with course providers, several sources recommend forming partnerships with content providers such as NETg, SmartForce, SkillSoft or DigitalThink. Utilization of existing systems for distance learning is also encouraged. Such existing systems include:

- ♦ Satellite Education Resources Consortium (SERC) which offers mathematics, science and foreign language classes to secondary schools
- ♦ Kentucky Educational Television (KET) which was established in 1988 and has installed downlinks at every school in the state at a cost of $11.5 million (Moore & Kearsley, 1996, p. 53)
- ♦ Kentucky Virtual University (KYVU) which provides college degree courses and professional training online

Tactics, Models, Content and Tools: Instructional Design and Blended Instruction

Instructional Design (ISD) may be defined as organization, structure and presentation of information with the goal to make the learning process as simple as possible for the student. ISD techniques may assume many forms; however, the consensus appears to be "keep it simple."

ISD basics should include streamlining the design and development process to provide the maximum learning result for the minimum amount of investment. Designers should consider utilizing the most effective and economical learning design for a particular content and audience. Feyten and Nutta (1999) state that the design should provide access to "high quality, nutritious, customized learning experiences" (p. 41). Lucent Technologies CEDL (2000) states that "close attention to ISD issues will contribute significantly to program success" and lists potential ISD design concerns as:

- ♦ Media selection
- ♦ Course reconfiguration
- ♦ Site coordination

♦ Establishment of procedures for out-of-class communication between instructor and learners

Additional information is included as Appendix D.

Again, caution must be applied in this area not to overshadow the learning experience with the technology used in the implementation. Well-designed information is more effective than interaction-rich training. However maximum use of quality interactive media may be used where applicable to the subject matter and target audience.

Blended instruction incorporates the use of available e-learning technologies along with a human component (the instructor). Media and technologies have greater impact when combined with a human element to deliver a message (Hall & LeCavalier, 2000, p. 55). In fact, many sources include interaction among participants as a highly important element of the learning process. Student interaction with faculty and other students is essential (via face-to-face, email or voicemail). Feedback to student assignments and questions is also highly important and should be provided in a timely fashion.

Proper and complete training of the instructors is the final recommendation made with regard to design and instruction. Instructors must be confident both in the material being presented to the target audience and the methods by which they are delivered. Instructors should be versed in distance learning presentation skills. Numerous training workshops and other opportunities are available to assist in the preparation of instructors and are highly recommended for those intending to instruct or facilitate distance education courses.

Tactics, Models, Content and Tools: Competency Management

Hall and LeCavalier (2000) define competency management as " individualized, Web-enabled curriculum maps or learning profiles based on job analyses" (p. 66). These maps or profiles allow the learner to select and proceed toward an educational path by placing the responsibility of learning in the student's hands. In lieu of pre-determined, static requirements, students would be allowed the opportunity to choose their path of study.

As with traditional methods of education, rewards may be incorporated within the learning process. One thought regarding rewards is to motivate the student through relevance to personal activities or goals. The more applicable or interesting the subject matter is to the target audience, the greater the chance for positive response and success by the students.

Tactics, Models, Content and Tools: Learning Management Systems

The final portion of the Tactics, Models, Content and Tools area consists of Learning Management Systems. The American Society for Training and Development (ASTD) website provides the following definition of a Learning Management System (LMS):

Infrastructure platform through which learning content is delivered and managed. A combination of software tools perform a variety of functions related to online and offline training administration and performance management.

A LMS can be administered internally by the responsible organization or can be administered externally through commercially means. Hall and LeCavalier (2000) stated that key success factors when using commercial LMS include clear identification of business and technical requirements, compatibility with existing Information Technology (IT) standards/systems, demonstrated usability and customer service (p. 72).

Issues: Information Technology

Hall and Cavalier (2000) provide advice that "best practice organizations see strong partnerships and alliances with external suppliers as critical to their success" (p. 85). Working alone or only within an organization requires significant investment in time and funds, whereas partnerships and alliances increase availability of course materials and reduce implementation time. Strong alliance with IT organizations also increases the opportunity for success of the implementation. The responsible IT organizations must provide a centralized system to perform construction of any systems required by the implementation, maintenance of the infrastructure and performance of upgrades and other required support. IT also has a key role to ensure that:

- ♦ A media rich environment is a capability
- ♦ Collaborative activity is enabled
- ♦ Access and management are secure for all parties involved

Research indicates that utilization of standards and ensuring consistency in application of standards is highly important to maintain structure of the implemented system. Again, it is noted that reliable equipment is identified as essential to program success and acceptance by the end users.

Issues: Staffing and Measurement

Management of the implemented system must include ensuring adequate staffing to provide support to the IT infrastructure for maintenance and required upgrades of the system, support to both instructors and students involved in the e-learning environment, and performance of periodic review of the entire e-learning system.

Periodic review is required to ensure that all aspects of the implementation are meeting the standards and goals identified during the planning process. Periodic review may include, but is not limited to:

- ♦ Content of the information being presented by the system
- ♦ Format of the information being presented
- ♦ Technology utilized in the presentation
- ♦ Results of feedback supplied by both teachers and students involved in the e-learning environment

Periodic review must be performed thoroughly, applying specific standards while utilizing various processes of evaluation. Utilization of multiple processes ensures reliability of the evaluation and review process. The results of the review must be evaluated to determine if the current system provides the utility and appropriateness, which is intended by the

implementers. If not, modifications should be made in an effort to accomplish the required outcome.

Current Models and Policies in Education

In an effort to tie together the technology and benchmark issues presented herein, research was performed to find examples of e-learning models at work in education. Documentation lists several educational institutions as leaders in the distance learning field including Pennsylvania State University, Vanderbilt University, Columbia University and Indiana University. Specific attention was paid to information regarding models and policies for implementation, how the system was administered and any results.

Models and Policies: Morehead State University

Morehead State University (MSU) in Morehead, Kentucky, publishes a wealth of distance learning information on their website ([www.morehead-st.edu/units/distance)](www.morehead-st.edu/units/distance). MSU proudly states that they will offer 77 distance learning courses for the Spring 2001 term. Forty-three courses will be delivered via ITV (two-way audio and two-way video), and 34 courses are offered online (Internet). An online newsletter, The Informer, provides current news relating to distance learning at MSU.

The MSU website defines distance learning as "a teaching and learning process in which the majority of instruction occurs when the learner and instructor are not in the same place, is delivered synchronously and asynchronously through the use of contemporary techniques." The contemporary techniques include the ITV system and the Internet-based. The ITV system utilizes the Kentucky Telelinking Network (KTLN) as the method of communication. This synchronous e-learning system utilizes a T-1 line for speed. Internet instruction is offered through Blackboard, most of which appears to be asynchronous-based.

MSU is explicit in including a relationship between distance learning and the university mission. Faculty course information policies are provided in addition to distance learning guidelines for both ITV and online course delivery. At the MSU website, the distance learning guidelines for ITV and online course delivery are student-driven and echo some constants from the benchmarking section. The distance learning guidelines for both ITV and Online (Internet) course delivery at MSU are listed below.

Distance Learning Guidelines for ITV Course Delivery

♦ Learners should know the course goals, objectives and intended learning outcomes.
♦ Learners should be prepared to participate in class discussions. Ensure students state their name and location at all sites when joining the discussion or asking a question.
♦ Learners should be seated together so the camera can focus on them.
♦ Learners should be aware of the classroom microphones and the transmission of audio at all times.
♦ Learners should acquire a web-based e-mail account to ensure they could send and receive attachments. This also provides another communication link between them and the instructor.

- ♦ Learners should be acquainted with the classroom technology and the courseware they will be using.
- ♦ Learners should make proper arrangements to acquire a videotape copy of missed classes.
- ♦ Learners should ensure that their names are on all assignments and class work.
- ♦ Learners should be aware that technology failure does occur and not to panic. They should work with the site facilitator to carry out the designed instructional back-up plan.

Distance Learning Guidelines for Online Course Delivery

- ♦ Learners should know the course goals, objectives and intended learning outcomes.
- ♦ All learners must be currently enrolled/admitted at Morehead State University and all tuition and fees paid.
- ♦ Learners are required to have basic computer and navigational skills.
- ♦ Learners should ensure they have access to a computer that meets the technology requirements for the course. This information is provided on the Morehead State's Distance Learning Home Web Site at http://www.moreheadstate.edu/units/distance
- ♦ Learners should be referred to the Distance Learning Home Web Site for correct procedures on technology requirements, instructor contact information, academic dishonesty policy and contract, text book ordering information, technical and courseware support, and help desk information.
- ♦ Learners should be aware that technology failure does occur and not to panic. They should refer to the instructional back-up plan.
- ♦ Learners should be advised that most Internet connection problems are resolved within 15 minutes and to try gaining access later.

Note. From "Distance Learning" by MSU, 2000. Available: http://www.morehead-st.edu/units/distance/distance_learning_student_guid.html.

A comprehensive Distance Learning Policy Manual has been published and is available for public review on MSU's website (http://www.morehead-st.edu/units/distance/policies.html). This policy manual includes three goals (each with several objectives) with respect to their distance learning program. The policy manual then continues to address each goal with an assessment plan which includes, among other tasks, analysis of retention rate and surveys to determine satisfaction of students and employers of students regarding the distance learning program.

The plan also discusses collaboration with other accredited institutions to improve distance learning offerings. It identifies a five-day, six-hour-per-day, hands-on Distance Learning Faculty Training/Workshop which includes as topics for discussion:

- ♦ An introduction/history of distance education
- ♦ Various delivery methods through various technologies
- ♦ Understanding and utilizing copyright policies, issues and the law
- ♦ Course instructional design

- ♦ Practice in best methodologies and pedagogy
- ♦ Library and educational resources and metadata
- ♦ Aspects of presentation time
- ♦ CourseInfo software

The plan continues to address student support services, staffing and physical resources, financial resources and the distance learning education support organizational chart. Overall, the MSU Distance Learning Policy Manual appears to be a comprehensive guide to the university's distance learning process, with many parallels to the e-learning methodology presented earlier.

In reviewing this policy manual, there are many parallels that can be drawn to the methodology discussed earlier in this report. Collaboration, faculty training, and review and measurement are benchmarks exhibited by the organizations identified. Use of documented policies, identification of learner goals, and provisions for student support are other reoccurring themes. Each of these benchmarks or themes is addressed directly within the MSU Distance Learning Policy Manual.

Models and Policies: Pennsylvania State University

Innovations in Distance Education (IDE) was established at Penn State University in 1995 and consisted of an alliance of members from Penn State, Lincoln, and Cheyney Universities. This alliance resulted in generation of initiatives to help universities realize their goals with respect to distance education.

The set of initiatives documented in An Emerging Set of Guiding Principles and Practices for the Design and Development of Distance Education (1998) relates primarily to faculty involved in distance education. The faculty initiatives were developed to "create new teaching and learning approaches, and empower faculty to become leaders in the effective use of distance education" (p. 2). The faculty initiatives are tempered by the statement by the authors that:

> It will be evident that this set of guiding principles and practices is not limited to distance education methodologies or technologies. Many of the principles apply to face-to-face interactions as well. They reflect the premise that "good teaching is good teaching" regardless of the media used (IDE, 1998, p. 5).

The faculty initiatives generated by the alliance are separated into five major components, each containing specific principles to be utilized in distance education. It is evident that in both the major components and specific principles, there are obvious consistencies with the information presented previously in the methodology section of this report, in addition to that being reflected in the policies and procedures provided by Morehead State University. Important similarities from each of the five major components included in the IDE report are presented as:

- ♦ Learning Goals and Content Preparation
  - • Learning goals should be defined as part of the instructional design plan
- ♦ Interactions

- Effective learning environments should provide frequent and meaningful interactions among learners, between learners and instructional materials, and between learners and the instructor
♦ Assessment and Measurement
- Distance learners should be given ample opportunities and accessible methods for providing feedback regarding the instructional design of the distance education program
♦ Instructional Media and tools
- The selection and use of instructional media and tools should be based upon their ability to support the predetermined learning goals and objectives of the learning process
- The selection of instructional media and tools should reflect a thorough analysis and understanding of the "added value" of the technology
- Users of a distance learning system should be adequately prepared and supported in order to maximize the capabilities of instructional media and tools
- Contingency strategies should be planned to provide a quick recovery from technology-related interruptions when the instructional design model relies on electronic technology for delivery
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♦ Learner Services and Support
- A comprehensive system of technical support services should be in place to ensure the effective use of technologies in distance education programming for learners, instructors, and staff
- Regular feedback mechanisms should be designed and implemented to assess the successes and failures of the various support services created for the distance education system

Note. From "An Emerging Set of Guiding Principles and Practices for the Design and Development of Distance Education" by IDE, 2000. Available: http://www.outreach.psu.edu/de/ide.

Models and Policies: Additional Sources

Additional information regarding models and policies is available from Susan McIntyre and Robert Hollon, both of the University of Wisconsin – Eau Claire and from Joan Laughlin of the University of Nebraska – Lincoln. Again, similar ideas are presented which represent issues covered previously in this report.

In An Effective Model for Creating Virtual Learning Technology Communities (1998), the necessity for support services is identified. The lack of coordination across involved parties and poor communication between those involved results in duplication of efforts, limits use of technological resources, and inhibits progress toward the ultimate goal. These issues were discussed previously, in regard to having the right persons involved from the start of the implementation, creating a feeling of "ownership", and providing persistent and targeted communication to all those involved.

Joan Laughlin, in <u>Model for Distance Learning using Advanced Information Infrastructures</u> (2000), provides another comment that relates to methodology previously discussed. Ms. Laughlin stresses a focus on development of "content rich" distance learning subjects and processes, in lieu of focusing on the technology used for delivery. This theme has been documented earlier, with the idea that the technology should be "transparent" and that the technology used in the distance learning environment should not overshadow the learning experience.

<u>Conclusion</u>

This research report has provided information regarding leaders, benchmarks and policies with respect to technology and methodology employed in distance education. The benchmarks and policies include several reoccurring themes defining best practices in distance education. Important reoccurring themes include, but are not limited to:

- ♦ A detailed planning process with identified goals, faculty requirements and learner requirements
- ♦ Collaboration of all involved parties in the implementation
- ♦ Persistent communications, both internal and external
- ♦ Partnerships with providers and utilization of existing systems
- ♦ Transparent technology, "content rich" information, a highly reliable system and procedures to minimize the effects of system failure
- ♦ Ability for interaction between students and instructors
- ♦ Sufficient IT support for infrastructure development, system maintenance and upgrades, and ongoing student/instructor support
- ♦ Periodic review of system including student and instructor feedback to determine relevance to program goals and recommend improvements or changes to effectively accomplish the goals

Potential distance education/e-learning implementers may choose to utilize these (and other) best practices and policies in their system. By their use, it is hoped that the ultimate goal of effectively transferring knowledge and information to the learner using today's learning technologies may be accomplished to the satisfaction of all those involved.

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BIOGRAPHICAL SKETCHES OF PROJECT DIRECTOR AND KEY PERSONNEL

Dr. Gray is a Professor of Technology in the Department of Technology. He is a graduate of Western Kentucky University and holds an earned doctorate degree from West Virginia University. Dr. Gray has over 20 years of experience in industrial education and training. Dr. Gray has consulted with numerous companies like Mazak Machine Tools, Clarion Manufacturing Corporation of America, and Sachs Auto of America. His training with industry focuses upon industrial automation, productivity management, and quality assurance.

Appendix A

From the research abstract: "Distance Learning: An Introduction" by Michael Yoakam,, Indiana University Center for Excellence in Education and Alan G. Chute, Ph.D. , AT&T (Lucent Technologies) Center for Excellence in Distance Learning (CEDL)

Insurance Company Training Via Compressed Video

Metropolitan Live has a great need to keep employees up to date in operations of their computer systems. Until 1991, they would send trainers to their computer centers around the country. Now they use multipoint video conferencing. Originating from their offices in New York or from the computer training center, they deliver training programs to employees at multiple locations simultaneously. Last year, Met Life offered over sixty video conference based training programs.

Metropolitan Life uses two-way compressed video at 112 Kbps to deliver video programs over the AT&T digital network. Multiple site connections are made using the AT&T bridging services.

Government Agencies Training With Satellite Telecourses

Faced with reduction in personnel and funding brought about by the downsizing, the U.S. Federal Government and the Department of Defense have embraced distance learning as an important strategy to satisfy their training needs as well as the added retraining requirements brought about by downsizing.

An inter-service network called Defense Commercial Telecommunications Network (DCTN) provides satellite delivered courses from broadcast studios to hundreds of downlink sites across the country. By delivering education and training courses the DCTN network has offered the military services a cost effective way to distribute training in all 50 states. DOD has increased productivity through reduced travel time, distribution of time-sensitive information, and simultaneous communication with immediate feedback.

Within the Federal Government, the Federal Aviation Administration (FAA), the U.S. Department of Energy (DOE), and the U.S. Environmental Protection Agency (EPA) among others have initiated aggressive distance learning programs by constructing similar satellite network systems as the DCTN under the Federal Telecommunications System 2000 (FTS 2000) contract.

The DCTN and FTS 2000 networks, operated by AT&T, include broadcast and receiver earth stations, coders and decoders, satellite transponder time, and network management. These network services also provide voice and data services to users for integrated distance learning applications.

Higher Education Courses using Compressed Video

The Collaboration for Interactive Visual Distance Learning (CIVDL) is a unique collaboration of businesses and universities that have used distance learning technology to create a "virtual campus." CIVDL offers high-level technical instruction and advanced-degree programs directly into the workplace from such educational institutions as Boston University, Columbia University, Howard University, MIT, Penn State, Rensellaer Polytechnic Institute, and Stanford University.

As a result of this partnering, the universities are able to broaden their distance learning markets, develop university/industry relationships for faculty and on-campus learners, and raise revenue for academic programs and research. Current industry partners in the CIVDL group include AT&T, 3M, United Technologies Corporation, and PictureTel.

The CIVDL courses use roll-about videoconference systems that enable two-way interaction with cameras, microphones, monitors, and a video CODEC at each site. The classrooms are connected to the AT&T dial-up, switched digital telephone network. Connections can be either point-to-point, or multipoint, and are made by simply dialing the appropriate telephone numbers. Video compression allows effective two-way video at 112 Kbps for less per minute than the cost of a cellular phone call.

The CIVDL collaboration has developed a catalog of more than 50 graduate engineering courses and an ongoing Distinguished Lecture Series.

Elementary/Secondary Fiber Optic Video Network

In northeastern Wisconsin, a group of seven school districts, called the Embarrass River Valley Instructional Network Group (ERVING), is using a network of fiber optic circuits and interactive video classrooms for distance learning. This network allows the schools to pool instructional resources to offer expanded curriculum for learners, staff development programs for instructors, and adult education opportunities for community members.

Each classroom on the network is equipped with cameras, monitors, microphone systems, VCR's, phone and fax machines. The fiber optic network uses AT&T 45 Mbps technology to deliver television quality video and CD quality audio. All sites can originate and receive programs. The instructor uses a control panel to operate all of the equipment without the need for extensive technical staff support.

Educational Neighborhoods Via Satellite

The launch of AT&T's new Telstar 4 family of satellites marks the beginning of the Educational Neighborhood in the sky. Today, Telstar 401 delivers information and lifelong learning opportunities to schools, universities, businesses, and other learning centers across the nation, enabling many learning service providers to reach hundreds of thousands of students.

The Public Broadcasting Service (PBS) offers nationwide educational programs such as PBS MATHLINE and the Adult Learning Satellite Service (ALSS), which offers undergraduate level courses and resources programming to over 2,000 colleges, universities, hospitals and other organizations equipped with satellite-receive capabilities throughout the country. The Business Channel, as service of PBS' ALSS, offers specialized training and resource programming to our nation's small and mid-sized businesses, large corporations, and continuing education and business institutes of colleges and universities.

The National Technological University (NTU) provides lifelong learning for engineering professionals. NTU provides more than 27,000 annual programming hours of advanced engineering degree programs. NTU's courses originate from more than 40 major higher education institutions.

Appendix B

From the published report: "Quality on the Line: Benchmarks for Success in Internet-Based Distance Education" by The Institute for Higher Education Policy available from The Institute for Higher Education Policy

- ♦ **Benchmarks for Success**
  - Includes 24 benchmarks essential to ensure quality in Internet-based distance education (Part I below)
  - Includes 13 benchmarks deemed not essential (Part II below)

- ♦ Part I: Includes 24 benchmarks essential to ensure quality in Internet-based distance education
  - Institutional Support Benchmarks
  - Course Development Benchmarks
  - Teaching/Learning Benchmarks
  - Course Structure Benchmarks
  - Student Support Benchmarks
  - Faculty Support Benchmarks
  - Evaluation and Assessment Benchmarks
- ♦ Institutional Support Benchmarks
  - A documented technology plan is in place and operational that includes electronic security measures (i.e., password protection, encryption, back-up systems) to ensure both quality standards and the integrity and validity of information.
  - The reliability of the technology delivery system is as failsafe as possible.
  - A centralized system provides support for building and maintaining the distance education infrastructure.
- ♦ Course Development Benchmarks
  - Guidelines regarding minimum standards are used for course development, design, and delivery, while learning outcomes (not the availability of existing technology) determine the technology being used to deliver course content.
  - Instructional materials are reviewed periodically to ensure they meet program standards.

- Courses are designed to require students to engage themselves in analysis, synthesis, and evaluation as part of their course and program requirements.
♦ Teaching/Learning Benchmarks
  - Student interaction with faculty and other students is an essential characteristic and is facilitated through a variety of ways, including voice-mail and/or e-mail.
  - Feedback to student assignments and questions is constructive and provided in a timely manner.
  - Students are instructed in the proper methods of effective research, including assessment of the validity of resources.
♦ Course Structure Benchmarks
  - Before starting an online program, students are advised about the program to determine (1) if they possess the self-motivation and commitment to learn at a distance and (2) if they have access to the minimal technology required by the course design.
  - Students are provided with supplemental course information that outlines course objectives, concepts, and ideas, and learning outcomes for each course are summarized in a clearly written, straightforward statement.
  - Students have access to sufficient library resources that may include a "virtual library" accessible through the World Wide Web.
  - Faculty and students agree upon expectations regarding times for student assignment completion and faculty response.
♦ Student Support Benchmarks
  - Students receive information about programs, including admission requirements, tuition and fees, books and supplies, technical and proctoring requirements, and student support services.
  - Students are provided with hands-on training and information to aid them in securing material through electronic databases, interlibrary loans, government archives, news services, and other sources.
  - Throughout the duration of the course/program, students have access to technical assistance, including detailed instructions regarding the electronic media used, practice sessions prior to the beginning of the course, and convenient access to technical support staff.
  - Questions directed to student service personnel are answered accurately and quickly, with a structured system in place to address student complaints.
♦ Faculty Support Benchmarks
  - Technical assistance in course development is available to faculty, who are encouraged to use it.
  - Faculty members are assisted in the transition from classroom teaching on online instruction and are assessed during the process.
  - Instructor training and assistance, including peer mentoring, continues through the progression of the online course.
  - Faculty members are provided with written resources to deal with issues arising from student use of electronically-accessed data.
♦ Evaluation and Assessment Benchmarks
  - The program's educational effectiveness and teaching/learning process is assessed through an evaluation process that uses several methods and applies specific standards.

- Data on enrollment, cost, and successful/innovative uses of technology are used to evaluate program effectiveness.
- Intended learning outcomes are reviewed regularly to ensure clarity, utility and appropriateness.

Appendix C

From the published article: "10 Tips for Implementing a Distance Learning Program" by Alan G. Chute and Herbert L. Bivens for Lucent Technologies Center for Excellence in Distance Learning (CEDL)

Successful distance learning implementation of interactive video distance learning requires innovative technology, but also the creative energy of human instructors. Here are 10 ways to make the transition smoother:

1. **Look to distance learning as a way to revitalize and innovate your existing training program.** Distance learning technology allows you to explore new visual and audio media to enhance learning. For example, multimedia and the World Wide Web can be easily incorporated to stimulate and reinforce your learning goals.
2. **Start using a multi-level evaluations approach.** (e.g., student satisfaction, learning transfer, improved job performance, financial impact). Multi-level evaluation is a fundamental part of distance learning. In addition to examining how employees react to the program, evaluate how the distance learning program is impacting actual job performance, through follow-up surveys, etc.
3. **Keep the technology transparent.** Discussions at the end of a distance learning program should center around course content rather than the technology used for delivery. Make sure the participants are comfortable with the technology early in the program so they can concentrate on the learning process.
4. **Market your distance learning program internally and externally.** Tell people within your business unit about the achievements you've made with distance learning, then spread the news to other business units via internal newsletters, word-of-mouth, or other communications vehicles.
5. **Determine your needs up front.** Before implementation begins, set up a cross-functional team made up of trainers, instructional designers, telecommunications staff, and end-users. Identify in advance any concerns or needs related to the training process or technology and resolve them prior to delivering the first distance learning program.
6. **Use on-site coordination.** Provide an on-site coordinator at each remote location. The remote coordinator should be skilled in using the technology and setting up advance testing of all equipment. Other responsibilities can include distribution of course materials, greeting participants as they arrive, and providing a contact number in case any problems occur.
7. **Obtain local field manager commitment.** Prior to delivering distance learning program to remote sites, get commitment from the local field manager and the on-site coordinator that the room will be reserved for the length of the session. Also, make sure the participants will not be interrupted by their regular job responsibilities during the training program.

8. **Make sure instructors are well trained.** Provide thorough training for instructors in distance learning presentation skills. Take advantage of training workshops. As instructors become experience, they will be able to assist new trainers with their distance delivery.

9. **Design programs for distance learning.** Plan carefully when designing a distance learning program. A good balance of human interaction and use of the technical "props" will enhance the learning experience. Charts, graphs, role-playing, case studies, brainstorming, and question-and-answer sessions stimulate the learning process and encourage better participation and learning recall.

10. **Use reliable equipment and attend distance learning seminars.** Dependable equipment ensures the most successful distance learning experience, so be sure to purchase your technology from an established vendor.

Appendix D

From the research abstract: "Factors in the Success of Distance Education Programs" by Melody M. Thompson of The American Center for the Study of Distance Education at the Pennsylvania State University available from Lucent Technologies Center for Excellence in Distance Learning (CEDL)

Successful distance education programs depend on attention to factors ranging from large policy issues to classroom-specific concerns. Because these programs are multi-dimensional and dynamic, detailed planning, consistent monitoring, thorough evaluation, and reflective revision are necessary at both general and specific levels to ensure program effectiveness.

♦ At the institutional level:
- Assess and manage the readiness of the organization for change
- Ensure all stakeholders that distance education has full support of the leadership, or program success will be jeopardized.
- Strategically implement procedures for
  - Evaluating and selecting courses for distance delivery
  - Providing student and faculty support
  - Including orientations to distance teaching and learning
  - Securing accreditation for distance programs
  - Managing inter-institutional partnerships
- Establish a system of investment to fund necessary technological infrastructure and provide support for program development

♦ At the program development level:
- Planners must
  - Determine what needs the program is to address
  - Analyze audience variables (background, age, experience, motivation)
  - Determine how instruction can result in performance improvement
  - Establish procedures for program implementation and evaluation
- For interactive media based programs, skilled site facilitators may be necessary for their contributions to recruitment, retention, and motivation
- Include provisions in plans for appropriate training of facilitators

- ♦ Achievement of program goals is more likely if planners develop:
  - A long-range timeline
  - A framework (incorporating learner, process, structure, and access variables) to analyze barriers and suggest solutions

- ♦ Instructional Design (ISD):
  - Close attention to ISD issues will contribute significantly to program success
  - Several design concerns are
    - Media selection
    - Course reconfiguration
    - Site coordination
    - Establishment of procedures for out-of-class communication between instructor and learners

- ♦ In teleconferencing contexts:
  - Developing strategies for reducing the psychological distance and increasing interaction between participants are of major importance.
  - Interaction must be specifically planned for by
    - Utilizing appropriate support materials
    - Incorporating participant "immediacy behaviors" that foster a sense of closeness
    - Including activities that encourage or require participants to interact regularly and significantly
  - Promoting the incorporation of computer conferencing (CC) into course designs to support interaction, which
    - Facilitates routine interactions
    - Provides an opportunity for developing a sense of community among participants
  - Along with learner-instructor, learner-content and learner-learner interactions, consideration must be given to development in learners of the skills necessary for a type of interaction unique to distance education (learner-interface or learner-technology interactions)

- ♦ Teachers can ensure success by:
  - Carefully planning
  - Thoroughly reviewing and practicing distance delivery behaviors and techniques (in teleconferenced classes)
  - "Humanizing instruction" by
    - Using locally relevant examples
    - Supplying instructor and student pictures to all sites
    - Addressing students by name
    - Displaying an obvious interest in student concerns and progress

- ♦ Final factor:
  - Thorough evaluation at all levels of the process must be performed

- Gathering quantitative and qualitative information from administrators, instructors, site coordinators, students, and technical support people to be used as the basis of review and reflection aimed at maintaining and improving the quality of programs

♦ Part II: Includes 13 benchmarks deemed **not** essential to ensure quality in Internet-based distance education
  - Institutional Support Benchmarks (not essential)
  - Course Development Benchmarks (not essential)
  - Teaching/Learning Benchmarks (not essential)
  - Course Structure Benchmarks (not essential)
♦ Institutional Support Benchmarks
  (not essential)
  - Faculty are provided professional incentives for innovative practices to encourage development of distance learning courses.
  - There are institutional rewards for the effective teaching of distance learning courses.
♦ Course Development Benchmarks
  (not essential)
  - During course development the various learning styles of students are considered.
  - Assessment instruments are used to ascertain the specific learning styles of students, which then determine the type of course delivery.
  - Courses are designed with a consistent structure, easily discernable to students of varying learning styles.
♦ Course Development Benchmarks
  (not essential)
  - Course design is managed by teams comprised of faculty, content experts, instructional designers, technical experts, and evaluation personnel.
  - Distance learning course development must be approved through a broad peer review process.
♦ Teaching/Learning Benchmarks
  (not essential)
  - Courses are designed to require students to work in groups utilizing problem-solving activities in order to develop topic understanding.
  - Course materials promote collaboration among students.
  - Courses are separated into self-contained segments (modules) that can be used to assess student mastery before moving forward in the course or program.
  - The modules/segments are of varying lengths determined by the complexity of learning outcomes.
♦ Course Structure Benchmarks
  (not essential)
  - Specific expectations are set for students with respect to a minimum amount of time per week for study and homework assignments.
  - Faculty are required to grade and return all assignments within a certain time period.