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ABSTRACT

This paper describes the process involved in envisioning Delta State University (Mississippi) Division of Computer Information Systems/Office Administration's (CIS/OAD) long-range approach to addressing the university's identified curricular needs. The process included: examining of community needs, assessment of current resources, curriculum development, impediment appraisal, and program evaluation issues. Federal policy for universal access is examined as background information, a local Mississippi initiative in implementing technology preparation coursework is described, and an instructional technology study of 31 public school systems is summarized. The efforts of one small university in an economically depressed area at keeping pace with educational technology are detailed. (Contains five references.) (MAS)

Universal Access and Faculty Training: Keys to the Information Highway for a Small University

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Overview

In order to function in the global information age, today's students must gain exposure to the rapidly advancing technology that is ushering in the future. School systems everywhere have recognized the urgent need to be equipped with state-of-the-art technology and to increase emphasis on incorporating technology into the curriculum. However, programs to provide leadership and on-going training to most effectively use this technology are in short supply.

Imagine a 9th-grade language arts class in Atlanta, a 9th-grade English class in Paris, and a 9th grade English class in Moscow sharing thoughts about holidays in a story-writing contest. Imagine 10th graders from a dozen states across America comparing data about water samples they have collected in their locality. Imagine a 12th grader posing a complex question about business law and receiving a reply from five university professors. Think of these scenarios occurring within a 24-hour period for the price of a local phone call. If you are excited by these learning activities, then you are ready for the promise of computer-mediated communication (CMC) in the high school classroom. These and dozens of innovative, creative projects across the curriculum are taking place in a number of classes. For the price of a modem and the time to complete the paperwork for a free account in some states, teachers can achieve global connectivity for their students; and soon the power of fiber optics will upgrade these connections to interactive video mode.

Additionally, teachers can share ideas with their colleagues in other schools and stay in touch with fellow teachers they met at national conferences. Student teachers can network with their peers in other schools and access information at their college or university. The potential for professional support and collaboration in secondary education is extraordinary. Resource disparity between rich and poor schools can be alleviated to a large extent.

This, of course, is the visionary dream, and a dream that has come true in some schools and some school districts. The typical reality of telecommunications in the classroom, however, has often been a nightmare. A school that has one computer in the library, with a modem connected to a phone line, and teachers who give up after two or three unsuccessful attempts at network access will not be part of the dream. This is a typical example of the severe limitations that exist for realizing the potential of this technology. Two essential components of successful school-based CMC--connectivity and staff training--are often in short supply in the majority of middle- and high-school programs. This is especially true in schools attended by poor and disadvantaged students.

Federal Policy for Universal Access

The Clinton administration has formulated legislation to promote the advancement of a nationwide telecommunications and information infrastructure. The framework for this National Information Infrastructure (NII) initiative is a public/private partnership, wherein the federal government relies on the corporate sector to finance and build the infrastructure while the government provides incentives and ensures affordable access (Auletta, 1994).

The controversy surrounding this issue pits conservatives, who believe development decisions should be left to the marketplace which is smarter and more efficient than government, and liberals, who fear that a wholly commercial approach to information access would exclude those unable to afford it. The pro-government forces suggest the public library model as a standard for taxpayer subsidy of information, arguing that it is as much social as commercial (Auletta, 1994).

According to F.C.C. Chairman, Reed Hundt, 1995 will probably be the most important year in the history of American telecommunications (Auletta, 1995). The auction of wireless-spectrum licenses, the proposed telecommunications legislation, and the F.C.C.'s issuing of guidelines for high-definition television (HDTV) are three momentous events cited by Hundt.

Even with the political upheaval which placed the Republican leadership in the telecommunications driver's seat, certain guarantees proposed by the Clinton administration are still being considered essential. The new chairman of the Senate Commerce Committee, Larry Pressler (R-South Dakota), has circulated a draft blueprint of principles for new telecommunications legislation that requires government guarantees of "universal service." The proposal specifies the need for affordable access to advanced health care, education, and economic development. Although this language could have been drafted by activist democrats, according to Auletta (1995), a basic philosophical difference remains between "government as spectator and government as referee."

Another model is the widespread availability of basic telephone service at affordable rates, or "universal service," which has been the foundation of U.S. telecommunications policy for many years, and has helped provide opportunities for all people in the United States to communicate. The argument concludes that the full potential of the NII will not be realized unless all students who desire it have easy, affordable access to advanced communications and information services, regardless of disability, location, or parent's income.

Even if the federal government can assure universal access, the questions concerning implementation on the local level remain. How will the tough questions of "transparent" access be addressed? How will the connectivity problems be solved? Even if access to national educational services is subsidized, who will pay the hardware and software costs needed to connect to the national network? Who will provide the necessary secondary-teacher training?

Access or connectivity is the physical movement of information between computers over a communications channel. Since this channel is the major portion of the hardware involved in the data transfer, teacher awareness and understanding of networking is essential. Further, the complexity of hardware and software connectivity issues requires special expertise in the selection, installation, and maintenance of a network. Although educators involved in computer-mediated communication must rely on highly trained technicians to address the many esoteric connectivity issues, a basic knowledge of networking technology is essential for classroom teachers who want to expose students to the world of electronic information.

Investigation findings of hardware and software needs indicate that cost becomes a major factor. These costs increase even more when arrangements are made with commercial carriers, such as the telephone company. Dedicated phone lines are more expensive than regular connections. The opportunity for access to fiber optic cable is available in some cities, as well as some rural areas where the cable is being installed in anticipation of interactive cable TV. This type of service, which will allow for the best access, will be expensive.

With all this complexity and expense, the training issues become very challenging. Teachers must be trained on a working system in order to understand the full potential and, therefore, be motivated to persevere. Postsecondary educators are currently not preparing trainers to guide preservice and inservice secondary teachers, nor are they preparing teachers to administer complex networks. This knowledge cannot be gained from research alone; hands-on experience must be involved. This experience is not being provided; or if it is, it is a well-kept secret. A core curriculum in connectivity needs to be developed.

Local school districts need key players to provide the widespread coverage by implementing the "wired" school. This network includes academic and vocational classrooms, computer labs, faculty and administrative offices, and libraries. Access to the local network can be extended to anyone using a modem with a personal computer from home. Finally, a link is needed to the higher education facilities in the region, as well as online databases, and national and international research sites.

A Local Initiative

The American educational system is on the verge of a remarkable change. With the recent passage of the School-to-Work Opportunities Act and the Goals 2000: Education America Act, tech-prep educators will now have access to the necessary tools to prepare all students to be competitive in the workplace. Mississippi has begun to implement tech prep in phases throughout the state. A common strand in each tech-prep course is application of technology. As an integral component of Mississippi's tech prep implementation, and to ensure that students meet the objective of understanding and being able to effectively apply technology in the workplace, public school systems are resolving to design and establish state-of-the-art computer labs.

The Mississippi Delta has historically been identified as a region of wide-spread poverty in which resources are not fully developed to meet the challenges for the 21st Century. The recent inclusion of certain Delta areas as a federally designated empowerment zone will result in economic development that will generate an increased need for workers and educators with technological expertise.

In 1992, the Delta Area Association for the Improvement of Schools (DAAIS) conducted an Instructional Technology Study in the 31 public school systems which are located in Delta State University's (DSU) traditional service area. This study identified 177 buildings currently in use as schools. Building administrators plan implementation of instructional technology in the next few years and will need qualified personnel to support its use. Therefore, DSU's Division of Computer Information Systems/Office Administration (CIS/OAD) recognized a need to supplement their existing curricular offerings to include an instructional technology program that would prepare graduates to train current educators to use educational technology, and to directly support the curricular use of classroom educational technology. Additionally, graduates of such a program would have the necessary knowledge and expertise to plan and coordinate implementation and supervision of Tech-Prep labs.

Delta State University's CIS/OAD Division continually reviews its curriculum to ensure that it keeps pace with technological advances. Faculty conducting this review realized that the unique configuration of the CIS/OAD Division could allow the opportunities for collaborative, cross-discipline cooperation not ordinarily possible in traditional department/division structure. Therefore, they set out to develop a course of study which would provide school districts with personnel having the technical expertise outlined above.

Evolving an Instructional Technology Model

The focus of this paper will be to describe the process involved in envisioning its long-range approach to addressing the Delta's identified curricular needs. The process included: examination of community needs, assessment of current resources, curriculum development, impediment appraisal, and program evaluation issues. The final stage of this process was a proposed plan to develop a Master of Instructional Technology degree program which would enable students to gain expertise in selected areas of the emerging computer-based technologies.

Community Needs

The Delta Area Association for Improvement of Schools Instructional Technology Study (1992) recommends that on-going training in the use of hardware and software, as well as training for the integration of technology, be provided. Employment opportunities for graduates of an instructional technology program are strong, since the university's service area covers 31 public school systems with a total of 177 buildings.

Additionally, federal mandates to include technology education for K-12 and the generous state and federal funding for this type of education through the Tech Prep, School-to-Work, and Goals 2000: Educate America initiatives will generate a need for educators with expertise in the area of instructional technology. A pool of potential students for this proposed program exists, since teachers currently employed in the districts will need additional training to upgrade their knowledge and skill levels in order for them to assume the administrative and technical duties associated with today's highly technological instructional facilities. Projected enrollments were sufficient to anticipate full classes for at least five years.

Further, introduction of Internet to the Delta via DSU stimulated discussion among the Division of Computer Information Systems and Office Administration (CIS/OAD), the county library, and the local school district. From these talks, a pilot project to bring K-12 schools online and to provide training in effective Internet access and use was begun. A collaborative grant from the U. S. Department of Education was pursued to provide funding for this initiative.

Resource Assessment

Before undertaking such a project, the program designers thought it advisable to determine the resources currently available and additional resources which would be needed.

Available. Program designers determined whether courses for existing programs could be cross listed with the proposed program. Course offerings considered for the new degree included several which were already offered or planned at the graduate level, for example, Data Communications and Local Area Networks. Variations of technology resource planning, implementation, and management courses had been offered on an ad hoc basis in recent years. Moreover, several undergraduate courses included components which could be expanded into graduate-level offerings (e.g., Desktop Publishing included a multimedia component which could become Electronic Presentation).

Following the course overview, an evaluation of existing faculty resources was undertaken. Seven members of the CIS/OAD graduate faculty were involved in providing instruction in various areas of computer technology, including but not limited to those mentioned above.

Further, DSU's Office of Academic Computing had established, and coordinates, upgrades, and maintains, six instructional lab facilities. These labs provide a minimal basis for beginning an Instructional Technology program, but they more aptly demonstrate the Division's readiness and capability to implement the new technology necessary for the program. Examples of existing hardware included: one programming lab with a minicomputer server, one 30-station instructional lab, one 5-station (networked) desktop publishing/multimedia lab, and three general-purpose student-use/instructional labs. Available software included various application and programming packages.

Needed. In order to offer appropriate course work, such a degree program would require the addition of a full-time, doctoral-level faculty member holding a Ph.D. or Ed.D. in Instructional Technology. Since such programs are relatively new, a doctorally-qualified person from a related field who demonstrates extensive research or work-related experience in instructional technology might also be acceptable.

Further, extensive state-of-the-art hardware and software necessary to ensure students high-quality educational experiences would be needed for the new program. Tentative hardware requirements included one 16-station IBM-compatible instructional technology classroom and one instructional technology laboratory facility containing six high-end IBM-compatible and four high-end Macintosh stations. Tentative software requirements would include Authorware, Toolbook, Animator and Adobe

Photoshop for IBM hardware and Macromind Director, Sound Edit Pro, Fusion Recorder for Macintosh equipment, to name a few.

Curriculum Development

From research based on publication of Association of Educational Communications and Technology (1992?), the foci of the curricula at institutions offering Instructional Technology degree programs included the areas of Media Management, Telecommunications, Learning Theory, Instructional Design, Materials Production, Information Systems, and Librarianship. From this information, the designers determined that the areas of Information Systems, Telecommunications, Learning Theory, and Instructional Technology were most appropriate to complement existing and envisioned program offerings for their service area.

They then reviewed 50 listed university programs and constructed a matrix of course offerings within each program to determine areas of commonality. From this matrix review, they decided to include in the new program courses that covered such topics as telecommunications; multimedia; video and computer networking; planning, evaluation, and management of instructional technology; facility design; technology resource management; distance learning; fiber optics; and curriculum design. The plan was to develop these topics within the framework of an open-ended curriculum that would adapt to new technologies as they develop. Moreover, the Master of Science in Education Core requirements would provide the program with a strong pedagogical foundation.

Impediment Appraisal

Potential impediments to developing such a program are mainly internal and external turf issues, approval by state-level decision makers, and funding issues. For this program, stakeholders included: three university divisions/departments, two university schools, and the university as a whole; and two community agencies. Each stakeholder must be convinced of the value of the program to meet its own needs and interests. Further, even after all internal and external stakeholders come to terms, the project may be unacceptable to state-level decision makers.

A project of this scope requires funding in excess of that available through local, regional, and state sources. Designers must seek alternative federal and/or private funding sources. Perhaps the most difficult challenge is the collaborative effort necessary to achieve success in such a competitive funding market. Further, some areas of low socioeconomic development are excluded from seeking funding from sources which require the capability of the grantee to match funds awarded.

ProgramEvaluation

Evaluation is necessary to ensure a quality program of instruction. Programs are assessed by two types of evaluation--formative and summative.

Formative evaluation. In the developmental stage of a program, formative evaluation provides information to allow designers to revise and refine the program to meet specific needs, goals, and objectives. Activities involved in formative program evaluation may include advisory committee reviews, administrative/faculty reviews (including budget reviews), both student evaluations of the program and assessments of student performance within specific program courses, and instructor and peer reviews (Foran, Pucel, Fruehling, & Johnson, 1992). The formative evaluation activities selected for this program were advisory committee review and administrative/faculty review (including budget review).

Summative evaluation. Methods to determine whether the program has successfully met the goals set when it was begun must also be developed. After the program has been completed, the data are gathered to determine if intended results were achieved. Factors such as costs, image, lost opportunities, diagnostic information for improvement and graduate success should be considered (Foran, et al., 1992). The designers attempted to build in activities for data gathering and analysis to provide information pertinent for summative evaluation of this program. Research to locate/adapt an instrument to be used for summative evaluation is ongoing.

Summary

In today's highly volatile technological environment, how does a small university in an economically depressed area keep pace? This paper has detailed one university's effort to find the keys to the information highway and maintain a competitive technological stance.

Two essential components of successful school-based computer mediated communication--connectivity and staff training--are the focus of this discussion. First, access to the world-wide information network is discussed within the framework of government policy in regards to a nationwide telecommunications and information infrastructure. Second, an approach to developing a hands-on introductory training program for K-12 faculty is examined. A process to reach the implementation stage is presented.

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