Electronic Course Delivery in Higher Education: Promise and Challenge

By John W. Sinn

Philosophical, political, quality, learning, and instructional challenges are being encountered as higher education institutions respond to pressures and enticements of the World Wide Web and the Internet. My involvement with electronic instruction, almost from the infancy of that process, provides a basis for my views on these challenges. I discuss these under four headings: In Higher Education, Teachers and Learners, Gifts of Electronic Instruction—A Review, and Ensuring Quality.

In Higher Education

Institutional policy, systems, and infrastructure developed over the years to support ongoing programs must change. Not only must traditional efforts be continued, but electronic instruction should be facilitated, governed, and integrated. In doing so, most ongoing activities exemplified by staff meetings, registration, bursar billings, or the bookstore will need to be changed as will virtually every activity of institutional life.

As the reach of instruction is extended outside the university walls, standards, systems, and policies will not only become linked via electronic means but will accommodate new modes of delivery. The university may also find that in order to deliver its instruction beyond its walls, it must understand and work within state, national, and even international laws. New issues of ownership and copyright and security of courses will require more and different sorts of attention and expertise in the new environment (Perley & Tanguay, 1999).

State Governing or Coordinating Boards

As with individual institutions, the state legislators and public higher education governing or controlling boards must consider their policies and attitudes of support or nonsupport for credit and courses offered out of state and the country by constituent universities. Such developments have implications for partnerships between institutions that are distant from one another, which may require state and possibly national government approval.

Many states support their higher education system on some sort of formula system that results in a subsidy to institutions. Electronic instruction introduces issues that need to be carefully and thoroughly investigated, understood, and planned for. There may be a danger in applying a formula used for traditional instruction to support electronic instruction. The flexibility of electronic instruction goes beyond consideration of changes within existing institutions. For example, implications for course loads, up or down, and how to address these in the electronic environment, along with many other questions about the role of faculty, must be assessed in various models. State governing agencies must give heed to the notion that new types of institutions and even entirely new state or proprietary university systems may be on the horizon. These may be based on paradigm shifts influenced by electronic instruction and yield, for example, creative ventures such as transfer credits among two- and four-year institutions, as well as high schools. Since electronic

delivery "levels the playing field," in a geographic sense, playing in each other's "back yard," consortial arrangements among different institutions across regional, state, and even national boundaries become physically possible. One example of such an arrangement is the Indiana State University Technology Management Ph.D. Consortium. Involving several universities in various states, the consortium is primarily electronically delivered to focus on several specializations, including the quality systems specialization which the author has been engaged with (Sinn, 2002b).

The Individual University or College

Primarily residential campuses must become concerned with electronic courses, and their institutional mission should address non-traditional electronic delivery issues. The advent of electronic courses delivered anywhere poses serious questions about how to deal with and enable youth to mature and develop the social and intellectual skills that the undergraduate colleges have been providing. Thus, goals of institutions must continue to focus on attracting the best and brightest faculty and students, but also enable them to engage via electronic or traditional methods. The two approaches should not be considered exclusive of one another. On the other hand, blending them into a cohesive, effective university experience may not be a trivial matter. One approach for this is offered in learning communities for our future, both physical and electronic in nature.

Capital Resources

Another consequence of the electronic revolution is determining the flow of resources to affect the best use of bricks and mortar and the electronic infrastructure. Questions about whether buildings and, perhaps more important, the types of buildings that will be needed to support instruction in the future must be addressed.

In this regard, infrastructure shifts must be better anticipated, and future planning must enable rapid implementation and a speed-up of project implementation in order to accommodate the changes that will continue to happen quickly in electronic communications. Thus, institutional planners must acknowledge that technology for electronic delivery will increasingly drive the process. Daniel (1997) noted this situation when he said:

> We are engaged in a battle. The world's universities are in a crisis, assailed by challenges of access, cost, and flexibility. The United States has the world's strongest university system, and the world looks to it for leadership. Yet your system is wedded to teaching technologies that make it difficult for you to successfully respond to the crisis. (p. 17)

Daniel advocated a technology strategy to provide access and flexibility, but at the same time assure integrity in systems.

Hardware/Software

Hardware and software must be in place and configured to seamlessly enroll students in and start up an entire course via the Web. This process should be enabled from any location, without need to be on campus and without major intervention or inconvenience to student or faculty. Because of the importance of supporting courses, institutions need to ensure that servers for that purpose are separate from servers devoted to other administrative and e-mail uses. Doing so recognizes the "bread and butter" nature and appropriate stature of electronic teaching and learning.

Innovative models must be developed that offer faculty incentives to seek out and use new hardware and software delivery systems. Costs, convenience, conformity, and allowance for future change of hard and software must be balanced in light of higher education's limited resources. Economies may be realized in shifts from bricks and mortar to virtual systems and merging traditional institutions and functions to reduce duplication. Other economies may be realized in leasing laptop systems rather than outright purchase and maintaining traditional labs with desktop technology. Costs of providing current desktop technologies per user must be determined and desktop setups reduced, enabling funds to be rolled over toward laptops. Doing this successfully will add flexibility inherent in laptops over the time and place-centered desktops (Waggoner, Sinn, Kennedy, Zargari, Corbett, 1997).

Teachers and Learners

Changes that may be observed in the university are primarily found in redefined roles in teaching and learning. These are reflected in changes in the "presence" of faculty that may occur through real physical presence or through a virtual or electronic presence. Students may become more self-reliant and autonomous, acquire knowledge differently, and be accountable in different ways. Course flexibility and configuration changes occur, and means of student, faculty, and course assessment become different.

Redefined Roles—Faculty as Instructors

Physical presence no longer means a professor standing in front of students to lecture or conduct other traditional classroom activities. The professor's electronic presence is defined and accomplished by the use of various media such as digital documents, chats or video, or camera projection with audio.

Traditional teaching requires a physical presence and direct emotional involvement, whereas electronic delivery provides a detachment in discreet ways. Lectures, exams, structured meetings in one location, and other methods are basic traditions that we have come to accept as the "way things are to be done." We are reminded that in a number of instances the traditional lecture was suggested as being one of the worst methods, despite the reality that most of us have relied heavily on this approach.

Electronic courses demand structure. Although planning and structure have been expected for teaching of traditional courses, it is possible to do a traditional lecture ill prepared and meandering, and even sometimes appear to be well prepared. Electronic instruction demands articulated and integrated preparation. The instructor's presence is in fact the electronic configuration, and it is possible that in such courses the instructor will be able to work at home or in an office rather than in a classroom populated with students, each at his or her desk. Thus the instructor's role becomes redefined. Faculty must organize and facilitate highly structured and orchestrated systems. They must rethink the entire teaching and learning processes. Focus moves from the teacher as a lecturer at the center of attention to that of a facilitator and course designer, almost entirely focused on electronically delivered content and process.

Everything must be digitized or accessible via the Web, and what was done verbally and physically now must be formatted for students to download or interact with in some structured electronic manner. The goal is to have everything navigable in a fairly seamless and articulated manner by disciplined, computer literate learners. This is not a simple matter, and it may be resisted by faculty who dislike writing or who may not wish to carefully think through the design or redesign of a course.

Redefined Roles—Students as Autonomous Learners

Students become knowledge navigators, independently engaged, knowing when and how to "pick up the ball and run with it." Traditions such as skipping classes, whiling away hours trivially, or using courses as social entrees do not apply in the electronic venue where students must navigate well-designed courses. Rather, they must be highly disciplined, focused, and goal oriented, able to work independently and in sometimes ambiguous and nebulous ways. Persons having difficulty working independently, or having a low tolerance for reading carefully and following structured, comprehensive instructions, may have difficulty in this intellectual environment. Properly designed electronic courses may cause those who really do not wish to be engaged intellectually to indicate dissatisfaction with the electronic environment, perhaps due to not being "spoon fed" as they may have been in the traditional classroom. On the other hand, highly motivated, computer literate learners can readily excel in the electronic environment.

Knowledge Acquisition

In Web courses, information and experience as content and process can be posted to provide a portfolio record of progress. Chat transcripts can be recorded and posted, along with conversations in e-mail. Disciplined growth of knowledge actually unfolds in courses, with powerful opportunities to assess teaching and learning, seamlessly documented as portfolios. As students do their work, it becomes streamed

together, step-by-step, to clearly show how the thought and intellectual process is formulated. While some may be uncomfortable with how "raw" this is, it cannot be denied that this "electronic dialogue" is the bottom line on when and how knowledge is grown.

Accountability and Assessment of Students, Faculty, and Courses

Traditional accountability systems are less applicable because students do not expect to take "pop quizzes." Attendance taking is automated, and information is manipulated rapidly. Postings can be lost, and savvy computer users may be capable of "borrowing" materials not meant for them; thus, plagiarizing is a possibility. These can be defended against, as in traditional teaching, if the electronic course and systems of delivery are well thought out and changed periodically to correspond to learners' needs and to technologies of delivery. Examinations and tests are dramatically different from the traditional classroom setting as is the entire system of accountability and assessment of the learner and the course. Nontraditional forms of documentation for assessment will become increasingly called upon for accountability of teams and individuals in courses as we diminish traditional forms of test taking based on traditional physical presence. For example, a team of students focused on a project may compile a portfolio of responses to address a technical problem at an industrial firm. The portfolio can document their progress, replacing traditional examinations.

Electronic courses can be rigorous, well designed, and structured. Robust team projects, with reality-based professional requirements, are very achievable in Web-based systems, perhaps even better configured in this way than in traditional courses. Engaging persons external to the academy can be achieved with use of a password. This enables projects and work where the world truly "becomes the lab." Quality is readily measurable due primarily to the highly documented nature of the course in portfolio ways addressed and accessible as presented above. Further underpinnings and illustrations of innovative quality applications in nontraditional lab environments were provided by Olson and Sinn (1999) and Shipman and Sinn (1997). It is suggested that the assessment of courses and instructional quality must become increasingly tied to the "deliverables" produced by students, illustrative of the capacity of the faculty to facilitate and empower emerging student talents, regardless of level, but particularly at the university. This also serves as an excellent illustration to demonstrate that the role of faculty, students, and the entire university is changing as a function of electronic design and delivery of courses.

Gifts of Electronic Instruction—A Review

Electronic delivery brings substantial flexibility and agility to courses that are virtually impossible in other instructional means. No longer do individuals need to be on campus or at the same location. People can be "hooked up" at home, work, virtually anywhere. Class meetings are more flexible in time, space, and location, but if included in a course, electronic chats require a common time and "room location" analogous to traditional time and place of traditional courses. All individuals involved will need properly configured computer systems, with laptops providing the greatest flexibility and agility. Classrooms and their buildings as we know them will decreasingly be required, which will cause serious challenges to institutional planners and administrators. Just as business and industry work innovatively, professional and general university preparation will be increasingly electronic, responding to customer demands for flexible, rapid-moving information.

Electronic delivery may actually enhance teaching and learning, and perhaps the basic criteria for electronic instruction should be how it will improve instructional effectiveness. With electronic instruction and learning, (a) teachers and learners should be better organized and more efficient; (b) teachers and learners should be more dynamic, flexible, and agile; and (c) quality assessment should be enhanced and evidenced more readily. The overall positive effects of electronic delivery may have a significant influence on the evolution of the discipline of technology (Sinn, 1998a).

Systems to connect and encourage research initiatives for "growing knowledge" electroni-

cally with our broader communities and customers as part of the academy must be explored. We must better analyze and identify learning attributes assumed prevalent in various levels and types of learners, relationship of maturity, and so on. If we can better understand learners' attributes or behaviors (Sinn 1997, 1998b) and electronic systems' attributes, perhaps we can better match the two with resultant improvement. Faculty and students may wish to be able to select courses and approaches to instruction as they discern what best suits their attributes and behaviors, disallowing those they may wish to avoid. All should be involved, required to experience change, gaining preparation electronically for the future, perhaps transparent, like any other instructional approach (Sinn, 2000).

Ensuring Quality

Assessment and evaluation are important as we determine value added or detracted by technology. Technology can provide opportunities to evaluate and assess traditional and electronic courses and systems. If infrastructure is in place, coursework built as portfolios can be communicated for accreditation, course evaluation by students and faculty, comparisons of electronic and traditional (same) courses, among others. It is possible to accredit, assess, and evaluate from a distance, rather than being on campus, if all are properly configured. As one important example, library resources provide significant institutional questions. Assuring that students have access to quality information beyond (but including) the Internet is key. Facilitating traditional print information available on campus for distance constituents fairly and equitably, engaging students and faculty in evaluating and using information from all sources, is the challenge.

Quality Systems

The existence of a quality system assures quality in electronic delivery. This necessitates a paradigm shift of significant proportions, beyond accreditation and assessment. But, if done properly, the quality system can address essential accreditation and assessment issues, and help build a robust environment for electronic delivery. A viable quality system will recognize the importance of faculty advising, student organization professional involvement, advisory committees, portfolios, alumni surveys, cooperative education experiences, senior projects, and other internal and external mechanisms for assuring quality curriculum, all electronically (Sinn, 2002a).

Do we understand the European Union's role in the International Standards Organization (ISO) global drive for quality standards? What promise do the ISO quality drive (Lamprect, 1992) globally, the Baldridge National Quality Award in America (National Institute of Standards and Technology, 2000), and other traditional quality issues such as Deming principles hold? A university-wide quality system can be the basis from which accreditation and assessment are conducted, all based on emerging standards and guidelines within the ISO context (American Society for Quality, 2000). The challenge may be to practice the Deming principle of placing responsibility for quality at the lowest level possible—in our environment faculty—to provide mechanisms for assessment and accreditation. As a quality system, this is a major paradigm shift that must occur organizationally in order to be competitive in the future. Quality systems must be at the curriculum and course level to achieve goals inherent in assessment and accreditation. Faculty must mesh directly with point of contact connected to our key customer, the student, in the quality system. Recent winners of the first Baldridge awards given in education underscore the depth and importance of the development of quality systems in education at all levels (Daniels, 2002).

Electronic accreditation is being developed by the Council for Higher Education Accreditation (CHEA) with the Western Governors University (WGU), designed to be used and tested at various institutions. Standards may be the same for all institutions, electronic and traditional, and they must be applied uniformly to all (CHEA, 1999). Additional insights were offered by Crow (1999) in an article in the Chronicle of Higher Education. While we may be vague on what the portfolio can do for the overall process, understanding quality suggests a very clear documentation role. Electronic portfolio documentation, driven curricularly by faculty, coupled with data collection, is a key mechanism required for quality, particularly for accreditation and assessment.

The Future

The primary recommendation is to pursue ongoing development of infrastructure and quality electronic delivery of courses. Fundamentally about change, the question is how to equip faculty, students, and staff to work electronically in a high quality manner. We must collectively re-think policy and standards for global quality systems and standards based on ISO and Baldridge quality criteria, as related to electronic delivery of courses. We must also acknowledge that this can greatly benefit our students, particularly by focusing on broad total quality systems institutionally, and link assessment, portfolios, and actual course evaluation and improvement through this quality system.

As a fundamental principle of quality, it is critical that we maintain courses similar to current departmental functions, placing ultimate responsibility for quality where it has always been, and should be, with faculty. This must occur simultaneously while the traditional department and faculty role will change dramatically, along with all that the university is about in the context of process, becoming increasingly electronic as well. Amidst all of the changes, the easy reaction of some may be to seize control of courses from faculty when, in fact, the technology and systems can and must facilitate empowerment.

In all that we do we must strive to improve hardware and software systems, relative to traditional systems, particularly courses and basic services. Technology improperly used can facilitate the addage "garbage in-garbage out," but it also offers many opportunities for improvement if we choose to develop infrastructure carefully and in detailed ways. This ought not be viewed as a trivial or simple task of implementation only, but must be carefully matched alongside faculty perceptions of what is critical to enhanced delivery of teaching and learning, particularly in a process context.

We must better anticipate and plan for change relating to electronic delivery. If we make substantial changes in one area, we will see implications for other areas of our work and environment, and better strategic planning linking all aspects of our work and environment must be accounted for. As the customer base gradually shifts from being physical and present to electronic and virtual, the need for enhanced planning systems will be increasingly critical. This must begin with changes in how states perceive their role in the educational process, and consortial connections in broader infrastructure, globally, to take better advantage of collective resources and "best practices" at the local level.

As part of the change process, we must intentionally build increasingly robust models to optimize all that we are about via technologies of course delivery, relating how we work, growing human capital and knowledge, ongoing improvement systems to solve technical problems, and embracing classrooms well beyond traditional brick and mortar precepts and traditions. This must also include designing, structuring, and administering objective tests and experiments, as assessments, of both electronic and traditional teaching and learning scenarios to assist all in better understanding where and how to use all systems for best advantage.

Finally, changes should be done to improve all that we do, not simply for the sake of change. The immediate electronic delivery opportunities that beckon must be pursued, but only with careful and prudent consideration. This challenges us to objectively use our knowledge and experience to assess potential electronic delivery changes as positive and value adding. Change must occur, based on substantive evidence evolutionarily pointing toward improvements. Conventional wisdom suggests that electronic delivery, while not applicable to all we do, must be pursued for our future, but primarily based on evidence of improvement.

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