Innovations in Distance Learning Program Development and Delivery

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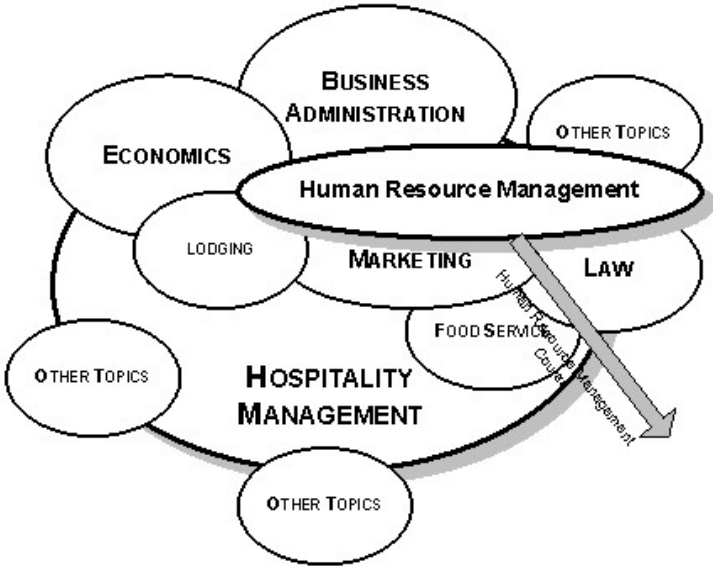
Delivering high-quality instruction requires innovation in program development and delivery. This article examines the use of merging technologies in the delivery of learner-based instruction, the development of collaborative teaching environments that maximize the efforts of faculty content experts, and the implementation of databases to manage electronic course materials at two large public universities. It also identifies effective strategies to develop more holistic teaching-learning communities and efforts to document learning outcomes using alternative forms of assessment.

Many universities are challenged to provide greater access to educational opportunities within the context of flat or declining appropriations and revenues for higher education. In Texas, these demands have been articulated by the "Closing the Gaps" study by the Coordinating Board that indicates that 500,000 additional students must be recruited and admitted by 2015 for the state to maintain its competitive economic position relative to other large states (Texas Higher Education Coordinating Board, 2002). Furthermore, insuring that these additional students have the best possible opportunity to succeed will require institutions to develop processes leading to quality assurance. This essay presents two innovative models for program development that achieve the delivery of quality instruction using collaboration to achieve efficiencies.

Innovations in Program Development and Delivery

With over 12,500 annual enrollments and a growth rate of over 40% in the last two years, the University of Houston's Outreach/Distance Education program is among the largest in the nation. To keep pace with this demand, UH has embarked on a pilot program to develop a database-models for course design and delivery that will facilitate the creation of higher-quality teaching and learning environments through collaborative efforts among faculty content experts in various disciplines. Similar in approach to MERLOT, this model leads to the creation of discrete learning objects developed by faculty and delivered by various forms of technology (WebCT, video, audio, CD-ROM's, PDF's, etc.). These learning objects are then managed within a database and can be customized, updated, revised and included in courses from various colleges that require that particular learning object. The resulting courses integrate content from UH's leading experts in their respective fields and can easily be re-purposed and re-packaged for different purposes and audiences (see Figure A).

Figure A. Learning Object Managent



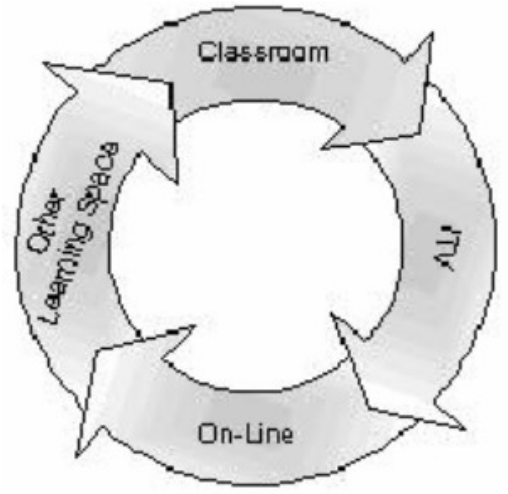
Also responding to the changing landscape of higher education, Texas A&M University and Texas Tech University developed and delivered the first doctoral degree in agricultural education offered entirely at a distance. The program is referred to as Doc-at-a-Distance (D@D). D@D is an Ed.D. program that provides: specialized curriculum designed for agricultural professionals in Texas; high quality learning environment that encourages discovery, integration, and application; expertise from two nationally recognized universities in agricultural education; skills necessary for agricultural professionals to advance in their current positions; degree awarded jointly from both institutions; and opportunity to further professional preparation while continuing your career. The first D@D course was initially delivered synchronously and supported with web course tools, using the Trans Texas Video Conferencing Network (TTVN), to 11 sites. Subsequently courses are being offered using a variety of synchronous and asynchronous methods and techniques.

Merging Technologies to Deliver Instruction

Web-supported instruction is becoming more commonplace in today's colleges and universities (Lindner, Dooley, & Murphy, 2001). Distance education continues to expand because of growth of the Internet, increased capability and flexibility of web-based tools, increased proficiency in basic Internet skills, and shrinking barriers with respect to accessing and using the Internet (Lindner, 1999). Distance education methods include those that permit any education received by a student to occur when the teacher and the student are separated by location and/or time. Distance education relies on the students' abilities to be self-directed and internally motivated. This type of education is particularly appealing to students whose lifestyle (time and distance constraints) does not allow them to take advantage of traditional classroom methods. To optimize methods of delivering instructional programs, a need exists to examine continually technologically mediated delivery strategies (Murphy & Karasek, 1999); Which is to say, how can teaching be improved through the use of technology (Means, 1994)? Web course tools (e.g., static and dynamic Web pages, threaded discussion groups, email, chat, instant messaging, streaming media/video, animations, application sharing, IP audio/video conferencing) are being adopted and used increasingly by teachers to optimize delivery of instructional material (Olliges, Wernet, & Delicath, 1999). Web-based instruction can be classified into one of three categories: Developed, dependent, or supported (Murphy & Karasek, 1999).

The overall instructional design process can be viewed as a continuum where the teaching and learning process is constantly evaluated and improved using experiences gained in developing and delivering instruction. The application of learning tools and technologies is not a linear process, but in fact, a circular one. As can be seen from the above diagram, traditional learning has been delivered in a classroom setting assisted by certain technology: first with chalk and blackboards, whiteboards with markers, overhead projectors and similar assistive tools. A second stage of "distance learning" took place in a television studio of sorts with several learners, usually in grouped settings, or "remote sites." The learning technology, however, remained essentially the same with the exception of delivery by closed circuit television. An extension of the ITV model came from broadcast television (or distribution by video tape) and support to an asynchronous learning environment by using some form of computer-supported telecommunications. As web-based and other computer-supported learning tools became available, they have been adapted to the distance learning processes, and have resulted in the development of learning delivered fully online, without the intervention of traditional classroom or television technology (Figure B).

Figure B. Instructional Design Process



Often overlooked is the fact that the technology movement from classroom to online delivery does not move only in one direction. In practice, teachers and learners have moved to adapt and use the technology of distance learning back in to a traditional classroom, or a traditional classroom as it has evolved to embrace technology. This portends fundamental changes in site-based learning and could presage a future evolution of different hybrid learning spaces and the real possibility of new forms of learning delivery, with great implications regarding course design, content examination, and instructional design.

Managing Electronic Course Materials

In distance education courses managing electronic course materials, student participation, student achievement, and course evaluations can be problematic. For example, in a recent undergraduate course taught at Texas A&M University, students assessed and used the web course tools over 2,450 times, student read over 1,300 articles, and posted over 125 comments. This experience is not uncommon in web-based courses. Fortunately, Web course tools, such as WebCT™ and Blackboard™ have built in features that facilitate management of course materials, student access, and student achievement. With Web course tools, students are able to access grades and determine their progress in the course; access and print course materials; and create an interactive online learning environment between and among students and instructor through email, threaded discussion, online testing, and study guides.

Similarly, the University of Houston database-model deconstructs individual programs and courses to identify components necessary for the creation of effective teaching and learning communities. Each learning object or module is identified and the necessary content, technology, communication and assessment tools required to effectively deliver and measure instruction are entered into a database. Each module represents a self-contained unit that should become a seamless part of a learning package. Modules may focus on a particular narrow area within the province of a faculty member subject matter expert, or could interface with and call upon modules from other areas or disciplines in a nonlinear manner. A typical module might contain the information elements shown in Table 1.

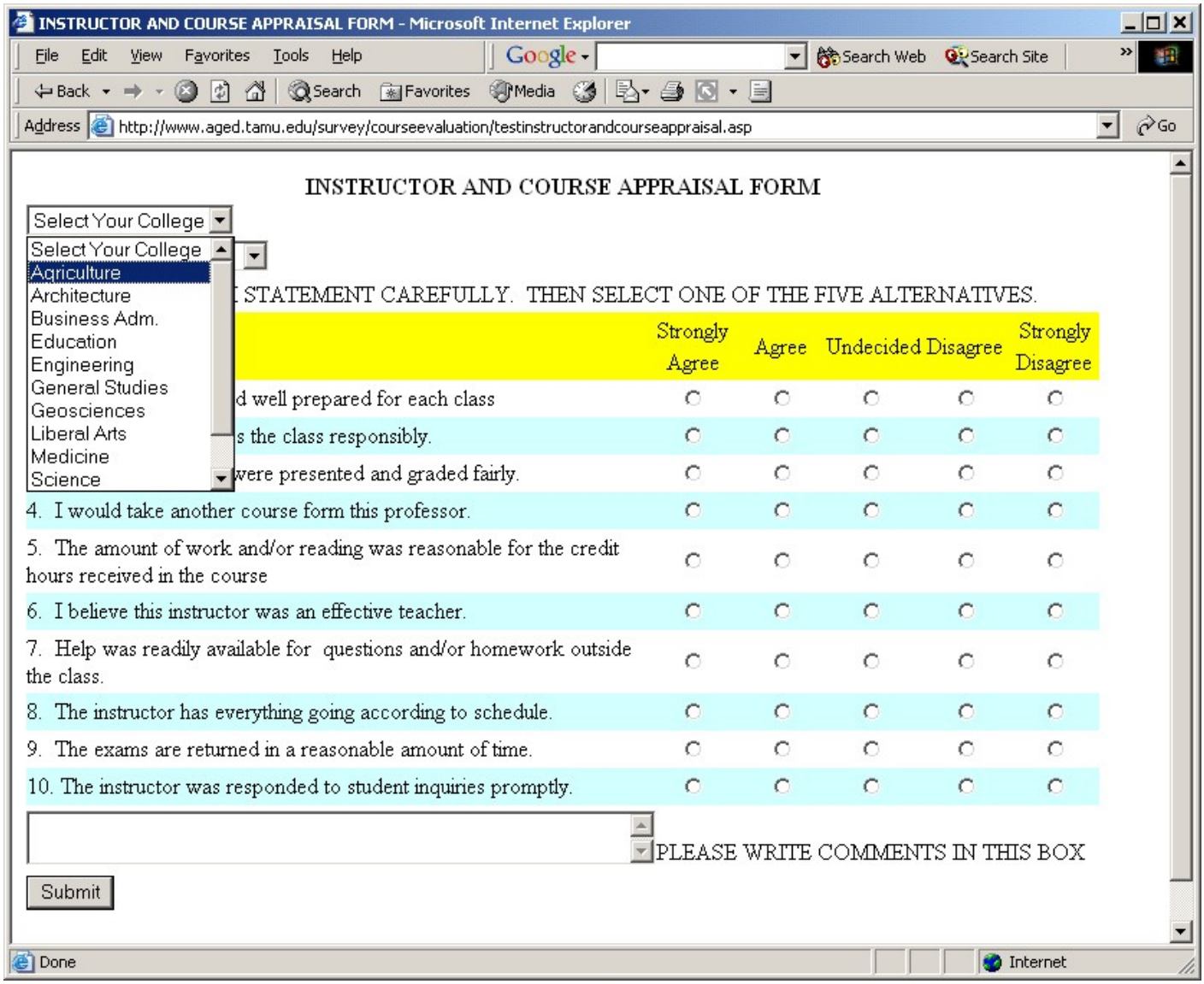
Table 1. Information elements in a typical module

	Item	Description
0	Subject area	
1	**Class:** No.	
2	Class Title	
3	Introduction	
4	**Module:** ID	
5	Module Title	
6	Introduction	
7	Objectives	
8	Class Preparation	
9	Assignments	
10	Content delivery	
11	Lecture	
12	PowerPoint	
13	Text	
14	Acrobat	
15	Audio	
16	Video	
17	Case	

18	Links	
19	Textbook	
20	Hyperlinks	
21	Web links	
22	Diagrams	
23	Picture, etc	

Evaluating the effectiveness of instruction and the course can also be accomplished using Web course tools. The need to ensure anonymous evaluations has led institutions to use online instruments that write to a password protected database that is only accessible to those responsible for collecting and reporting such data. This method of evaluation can easily and efficiently collate, aggregate and manage large datasets. One such instrument being tested at Texas A&M is shown below (see Figure C).

Figure C. Sample Course Evaluation Tool at Texas A&M



Effective Strategies to Develop Teaching-Learning Communities

Developing and delivering courses, curricula, and programs at a distance requires faculties and administrators to consider many factors including how to overcome barriers to effective and efficient implementation of distance education courses, curricula, and programs. Moore (2001) noted that to be successful in delivering online courses, faculty must: allow student to student interaction with minimal faculty intervention; engage students in regular assignments in order to monitor progress and intervene when needed; provide specialized attention to students with low levels of self-directedness; and help students become more self-directed. Students in distance education courses and programs often feel

isolated and apprehensive. This may be due to lack of student to student and student to faculty contact (Muilenburg & Berge, 2001). Recent studies on retention have indicated that creating satisfying and rewarding social experiences may be as important to retention as academic and intellectual factors (Nora and Cabrera, 1996). D@D has attempted to address the relationship issues and concerns noted above by establishing protocols and procedures for building, maintaining, and evaluating student to student and student to faculty relationships (Shinn, 2002). Specifically, the program attempts to: provide timely and appropriate interaction between students and faculty, and among students; provide appropriate training in methods and technologies for interaction for faculty who teach and for students who learn at a distance; encourage interactive teaching and learning that fosters critical dialogue, integrative learning, mentoring, cooperative peer learning, and group out-of-class activities; use e-mail or Web-based sites to inform students about opportunities for interaction in person-to-person or in distance settings; and monitor synchronous and asynchronous interactions between faculty and students to assess the total duration and system of engagement.

The database-model at University of Houston integrates communication tools in the course/program developmental process. Instructional designers are assigned to work with faculty to develop an instructional plan that addresses the need for faculty-student and peer-to-peer interaction. Decisions regarding the nature and type of communication required and the technology that will be used to facilitate interaction are made jointly by faculty and the instructional designer based on the complexity of the course, the maturity and experience of the target student population, and the likely value-added of each communication opportunity. In addition, a customized, animated online tutorial is available for all students using WebCT to train them in the use of chat rooms, discussion boards, and the exchange of course materials/assignments using the drop box. An online tutorial is provided to faculty with an emphasis on pedagogical issues associated with the development and delivery of distance learning courses/programs. The entire faculty development model at UH is further supported by a team of almost 30 graduate technology assistants (GTA's) trained by central support staff in Educational Technology and Outreach and a competitive grant program that funds over $600,000 in distance learning course/program development each year.

Cohorts or Open Enrollment

The D@D has developed and implemented a cohort framework for students to work within. A cohort can be defined as a group of people sharing a commonality. The program called for subgroups or additional cohorts of three to six students based on location. The intent of the overall cohort and geographical cohorts were to create opportunities for increased student to student and student to faculty interactions. Cooperative learning models such as cohort groups can increase student to student and student to faculty interactions (Kochery, 1997). Such interaction may result in increased retention rates and provide a mechanism for helping distance education students deal with isolation issues associated with being time and place bound (Boyle & Boice, 1998; Dorn & Papalewis, 1997).

While some programs at University of Houston use the cohort model, the primary need of the institution is to develop courses/programs that provide greater access in an anywhere, anytime format to reach the widest possible audience. The database model lends it to creating maximum flexibility for faculty and students and can be easily modified and revised to meet the needs of lifelong learners. One of the collateral benefits of the database model is the ease with which these learning objects can be repurposed and repackaged to address the needs for continuing education, especially those identified by the university's corporate partners.

Alternate forms of assessment

Determining, measuring and verifying competencies needed by students to complete the stated objectives of a course are difficult but necessary tasks. Teachers are continuously seeking appropriate techniques to document student growth and learning during a course.
Assessment of outcomes is essential, though it is also important to understand the point from which the learner is coming. This can call for the development of tools for pre-assessing learner levels of understanding as a general baseline of knowledge, or as a baseline for approaching various learning modules or topics. In one experimental approach at the University of Houston, a class was offered during one semester in three different sections, each section being taught by using a different delivery method: traditional classroom format; Instructional Television (ITV), and fully online. To establish a baseline, and to ensure that each group had a similar starting point, a pre-assessment test was administered to each learner. During the semester, progress tests were used, and a common final examination. A statistical analysis of both the preliminary examination, and the final examination results showed no significant difference in learning among the three learning approaches. The study also analyzed information from each student regarding their comfort level with the technology used in their learning mode and the degree to which they were comfortable with the modality and whether they were able to establish a sense of belonging to the class in which they were participating. Chernish and McNeil, 2000)
One method for addressing the learning assessment problem is to develop and use competency-based and behaviorally anchored rating scales to measure growth. Behavioral anchors are defined as characteristics of core competencies associated with the mastery of content. Competency-based behavioral anchors are defined as performance capabilities needed to demonstrate knowledge, skill, and ability (competency) acquisition. Competency-based behavioral anchors require considerable time and effort to develop, however, they provide more accurate judgments than item-based scales (Buford & Lindner, 2002). Further, such anchors provide trainers and other expert raters with behavioral information useful in providing assessments and feedback to learners. Such information can help learners understand their unique

bundles of competencies and increase satisfaction, motivation, learning, and ultimately success in a course (Drawbaugh, 1972). Competency-based feedback based on behaviors can provide a foundation for individual learning plans. Behavioral anchors can also be used to describe minimally acceptable knowledge, skills, and abilities on identified core competencies, thus, giving teachers tools and information needed to improve curricula, training materials, evaluation processes, and instructional delivery methods. Figure D below shows and example of competency-based behavioral anchors used in a graduate course, Advanced Methods of Distance Education, at Texas A&M University.

Conclusions

An innovation is defined as "an idea, practice, or object that is perceived as new by an individual or other unit of adoption" (Rogers, 1995, p. 11). Whether you are making decisions about use of database management tools, merging technological tools, communication tools to develop teaching-learning communities, or learning outcome/assessment tools, we hope that our "toolkit" can provide innovative approaches in distance learning program development and delivery.

Figure D. From "Competency-Based Behavioral Anchors", by K. E. Dooley, and J. R. Lindner, 2001, Journal of Agricultural Education, 43(1), p. 29. Used with permission of the author.

Core Competency	**Level**	Competency-Based Behavioral Anchors
Adult Learning Theory	**2** **4** **6**	Show someone how to do a literature review on student-centered learning Present a short workshop on the theory of andragogy Develop and deliver a student-centered training program that incorporates adult learner characteristics and student learning styles
Technological Knowledge	**2** **4** **6**	Show someone how to log onto a computer and search the Internet Show someone how to access and use Web course tools Show someone how to design and execute a Web-delivered course using Web course tools
Instructional Design	**2** **4** **6**	Use an ice-breaker or opening to gain attention Prepare a lesson plan Write measurable instructional objectives for a curricula that provides for student-centered learning
Communication Skills	**2** **4** **6**	Facilitate a videoconference Create virtual teams for discussion threads Design appropriate synchronous and asynchronous communications methods for delivering course materials at a distance
Graphic Design	**2** **4** **6**	Rely on technical experts to develop multimedia Show someone how to develop a PowerPoint presentation with graphics Show someone how to use animation, video streaming, and text to effectively deliver content
Administrative Issues	**2** **4** **6**	Rely on technical experts for scheduling and copyright clearance Identify and use available support services to plan and organize a course Determine fiscal, human, and technical needs to plan and implement a curricula entirely at a distance

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