

DEOSNEWS Vol. 7 No. 10, ISSN 1062-9416.

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EDITORIAL

The use of computer mediated communication (CMC) for delivery of instruction has become prevalent in higher education. While this medium provides a rich environment for communication between learner and instructor and among learners, the implementation of successful programs using CMC requires consideration of several issues: administration, instructional design, faculty and instruction, and student support.

This publication of DEOSNEWS offers the third in a series of articles on the use of computer mediated communications, based on presentations at the "Best Practices in Computer Conferencing in Distance Education" conference held at The Pennsylvania State University in February 1996. The goals of the conference were to identify and highlight exemplary practices of institutions of higher education that use computer conferencing to deliver courses. The first day of the conference showcased the successful use of computer-mediated instruction at four institutions: Thomas A. Edison College, Rochester Institute of Technology, The Open Learning Agency of Canada, and Houston Community College System. The second day of the conference was devoted to intensive discussions among participants and the representatives of each of the institutions on issues of administration, course development, faculty, and student support.

The complete conference report may be purchased from the American Center for the Study of Distance Education. It includes summaries of each of the

presentations of the four institutions, overviews of the conference discussion sessions, and highlights of the conference schedule. For more information, or to order, call the telephone numbers listed above or visit our Web site.

The article in this issue of DEOSNEWS summarizes the "Best Practices"= presentation by Roger L. Boston and Earl Johnson of Houston Community College System. See DEOSNEWS, Vol. 7 No. 6 and Vol. 7 No. 9 for the first two articles of this series.

HOUSTON COMMUNITY COLLEGE SYSTEM'S
"COLLEGE WITHOUT WALLS": AN APPROACH TO
COMPUTER-MEDIATED INSTRUCTION

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** NOTES **

1. Since this presentation was offered in February 1996, the functions of the "College Without Walls" have been assumed by the Southeast College, reducing the number of colleges in our system to five.
2. Earl Johnson, who co-authored this paper, died just before Roger Boston gave the presentation at the Penn State conference in 1996.
3. The text of this 1996 presentation has been updated to reflect our present situation eighteen months later, marking both steps backward and steps forward.

Roger Boston

Virtual Campus at <http://www.teched.org/campus.htm>

INTRODUCTION

The Houston Community College System (HCCS) in Texas has recently restructured, postured now as a single accredited institution with five separately operating colleges, each managed at the level of a President and collectively serving more than sixty thousand students. It ranks among the largest community college systems in the country, covering the Houston and Harris County area with 39 separate locations, including certain leased dual-use facilities shared with the Houston Independent School District, corporate facilities, and full service campus sites that we own.

The five colleges are arranged in four quadrants appropriately named Northeast, Northwest, Southeast, and Southwest college, with a fifth and somewhat unusual entity (Central College) which formerly housed the "College Without Walls," an entity that was charged with the non-traditional forms of instructional delivery: professional training and development, on-site seminars, seminars brought to the corporate site, distance education in all its forms, and other outreach programs that are not associated with a particular area of the city.

As we mark our silver anniversary, we are experiencing growing pains at HCCS, and under the challenge and pressures of balancing a limited financial resource against huge increases in demand for our services, we have moved toward restructuring, centralizing to fewer colleges and positioning more services at the system level. When few monies are

available for new campus properties, building renovations, and the trappings of a traditional house of instruction, we are forced to explore some of the newer delivery systems that can be cost effective alternatives.

Distance education has emerged as an attractive direction in which to grow, and as such is receiving a renewed scrutiny and higher levels of support than in previous years.

Paradoxically the College Without Walls has been DISSOLVED as an operating entity, its functions taken over by the five remaining colleges and its distance outreach now managed by the Southeast College as a systems function.

DISTANCE EDUCATION AT HCCS

As an arm of the Southeast College, our programs operate with a small administrative staff. In contrast to some distance education models such as Penn State, with its hundred-year tradition, we are a comparatively new, low-budget operation. We use a mix of delivery approaches to get the most from our limited funds.

We offer courses via the following delivery methods: telecourses, videocassette courses, print-based courses, and courses delivered via modem to remote computers. HCCS also hosts satellite delivered teleconferences, delivers programs via two-way interactive video from the desktop, and has offered credit course instruction both to and from remote locations via modem-television using ordinary telephone lines. We are especially excited about our move toward using the World Wide Web as a meeting place and delivery option for our credit courses. However, the bulk of what we do "at a distance" is relatively low-tech.

The resources of a dedicated cable channel are available for distributing

both course materials and educational programming of local interest. For years, we took advantage of a relationship with the local Public Broadcasting Service (PBS) affiliate for distributing our courses. A novel resource at our disposal is a uniquely equipped transportable classroom: a comfortably appointed 18-wheel vehicle which serves as an air-conditioned training site. It includes twenty networked multimedia computers with CD-ROM and sound, TV tuner cards, and switch able feeds from sources which include videotape, laser disk, and direct satellite feed. A six-foot steerable C and Ku band satellite dish accompanies this classroom on its travels. Many of the computers are equipped with modem and Internet access. We have two-way interactive compressed video capability for receiving live instruction from a remote site and for presentation to the individual workstations. The existence and use of this vehicle has helped us in analyzing our approach to delivering at a distance and in finding the right balance for our services, even though the day may come when we retire the vehicle and choose an all electronic approach.

One cooperative relationship worth mentioning is our participation in the Texas Gulf Coast Community College Consortium and the resultant ongoing collaborations in several areas. One area of great interest is the possibility of having participating colleges use our modem-delivery hardware for offering credit courses online. Another possibility is the use of our multiple World Wide Web servers with our growing knowledge about delivering instruction via the web. Our initial web server provided us with a head start into this new delivery mode, and our faculty and administration are realizing that the time is ripe for expansion in the new

delivery medium -- the web.

This is timed fortuitously for us all as the much disliked "1/3 rule", (which until recently has restricted Texas schools to offering only 1/3 of the credit needed to complete an Associate's degree via distance delivery) has been relaxed. With fewer constraints, we will see a rapid growth in demand for our services and are working diligently to ensure that we are able to meet the demands.

PROGRAM OFFERINGS

Our growth and the "mixed delivery" approach to reaching the distant student can be seen in our increased enrollment figures. Our distance education program is almost 13 years old. It started conservatively with a low budget and a few telecourses, grew steadily for three years, then began to move quickly. In 1994 we had a Fall enrollment of nearly 2,400 students, which represented a 42% increase over that same semester one year earlier. Of these students 57% were enrolled in video courses either via television or cassette, 13% were in computer-mediated courses through modems, and 30% were enrolled in print-based independent study courses. In 1995 we experienced growth in enrollment approaching 2,500 students at a distance with more than 600 of those online. Though still small in comparison to other programs, our growth patterns revealed that interest in distance courses was rising, particularly in computer-mediated delivery. We seemed to have reached the community and are being pummeled with requests for new courses, responding as best we can despite the limitations of our budgets and human resources. Unfortunately, our organizational changes have affected enrollments. We have approximately 2,200 students enrolled at a distance with approximately one

fourth in online courses -- still a considerable percentage. Caught in the crossfire of organizational change, we have "drifted" but are holding ground while developing technologies for the next phase of expansion.

COMPUTER MEDIATED INSTRUCTION:

COURSES VIA MODEM (and now Internet)

Employing the computer as a primary delivery engine has been a relatively new phenomena at HCCS, as well as all over the country. We use a 16-line multi-user bulletin board system (BBS) as our clearinghouse machine, which serves as the virtual presence for our physically dispersed learners. While most students live in the immediate area, there is no technical reason that they could not be served anywhere in the world from their homes or work sites. The hardware is simple, inexpensive, and reliable; the software is solid and rarely causes downtime; and our user interface is simple.

Our courses are offered simultaneously with the on-campus schedule, beginning and ending on the same dates. The courses are similar to the on-campus offerings, with the format adapted for distribution online. In the early days of the program, this arrangement gave us the opportunity to fine tune the courses, comparing them with their on-campus counter parts. We felt that it helped with the pacing to offer the courses in this manner.

We may be at a point now where we can revisit this notion and change our patterns.

Our system is organized around the concept of classrooms, which includes a common meeting area as a public forum. (In fact the terminology of our BBS uses "forums" to describe how the message and file areas are partitioned.)

Students log into a main menu and have the option of remaining in the public area to browse for files or exchange messages with others or going

directly to the classroom forum where the file and message areas are maintained. Access to the classroom is restricted to members of the class. The pattern of a typical online course for a seven-day period is as follows. At the beginning of a period a student will connect briefly to the system via modem, read and clear any outstanding e-mail, and then download the materials designated for the forthcoming seven days. This may be a few files or many files (sometimes hundreds in compressed form). Then the student will disconnect, freeing a line for someone else. While online, students may prefer browsing the public conference areas, accessing an online counselor or librarian, or interacting with a job placement staff person. They may choose to enter teleconference styled "chat areas" (some instructors actually meet their students at regular times for online group chats). Private chat connections are also possible as is a service for paging someone who is online during a login session.

**Observation: In our restructuring and with the dissolution of the "College Without Walls as a unit," at present we no longer have a counselor online for our distance students.

Students then proceed with their work off-line; they print the materials, decompress any tutorials or demonstration files, and go about the week's learning activities. They read through the instructor's printed commentary, re-read certain portions of the text, and then enter the activity for the week. At week's end students connect to our host machine to upload their work. During the week, there can be considerable amounts of online interaction (i.e., chat, teleconference exchanges) and more non-real time exchanges by e-mail, which has been the primary mode of exchange. Most

students choose an online course because they can't be at a particular place at a particular time to take the course, and they find this asynchronous form of communication to their liking.

After a seven-day period another period begins with new online materials, and the cycle repeats (16 times during a full semester and ten times for the summer format).

We have made the transition to the World Wide Web as a delivery vehicle and "meeting place," (discussed below), and have restructured our online access to include modem connections, outside connections via Internet, and "inside" connections via our wide area network from open labs on campus.

COURSES AND COURSE MATERIALS

More than two dozen online courses are currently being offered (Fall 1997). In addition we have several new courses in progress, which will be available during the next year. Courses are offered in the following areas: computer programming, computer-aided drafting, economics, English composition, technical writing, literature, fiction, and history. (A full course listing is available at our new web site at <http://www.distance.hccs.edu>.) We have moved beyond using the computer to merely "teach computer subjects." The greatest course growth is within other disciplines, particularly the English department.

In the early years of the program, the modem courses were created and taught by the early adopters -- persons from the computer science area -- and the course content was computer programming. Today, however, the computer programming courses are in the minority. This has been an exciting transition, discovering students that are no longer early adopters

registering for courses online. It has been a challenge for us to be thorough in our orientation sessions so that students can concentrate on the content of the courses and not be preoccupied with the technology of delivery. The following examples give a flavor of the variety of off-line activities which encompass the main part of the students' learning. The Economics course has used graphical presentations of supply and demand curves to let students actually "see" the effects of monetary or fiscal policy decisions that they might make in certain situations. Students interact with a program to help them through these learning steps. History students have participated in an interactive game in which they "live" American history through the lives of the characters in the game, making life decisions for these people at critical points in history and experiencing the consequences of their decisions (i.e., going off to war, being scalped, throwing tea overboard, etc.). Composition students do a great deal of writing off-line; they exchange and critique anonymous works, and engage in group discussions on points of style.

We are also using high-end multimedia components. We can add sound to our exchanges in the form of mini lectures and pep talks. These files are simply downloaded and played on the students' sound cards at home. An example of multimedia use is seen in the course "Data Communications and Networks." This course allows students to take excursions around the world via the Internet without actually connecting to the Internet. They participate by playing digital screen recordings of the actual Internet connect sessions, and they see, hear, and literally experience the same sensations as though they were online. The results are breathtaking and the

costs to produce these experiences are trivial. The instructor simply records, compresses the data, and sends it to the BBS as movies, which the students download, decompress and view.

Additionally, for more than a year, some instructors have offered "instant play" streaming audio lectures and long-playing movies, which before compression took up billions of bytes in raw form. This added dimension of sound, mixed with the white board features more commonly associated with live audiographics, and the recent addition of long compressed video clips, have carried our modem and web-delivered courses to a new level. It has stirred enormous interest among our students -- the "feel" of meeting in a common place, and in fact they are.

STUDENT SUPPORT SERVICES

In February of 1996 we reported the following:

"We believe that an online student should not feel shortchanged or second-class simply because he or she is not on campus, not able to see the flyers posted on the walls or to drop in to see someone in his/her office.

Therefore, our counseling staff can be reached online. They are available 24 hours a day, which has proven invaluable to our students. The staff informs students of upcoming activities and events, financial aid opportunities and deadlines, transfer and articulation information, and are there simply to answer questions. Our librarian is also available online 24 hours a day. We also have a job placement staff person online who is able to post openings that may apply to our students, answer and research their questions, offer advice, or guide them to counseling for career growth and planning. This service, which we continue to evaluate, is a direct result

of many student requests."

**Observation: Eighteen months later we have neither a counselor nor a librarian online to serve the students "on demand." When the College Without Walls was dissolved, some things obviously fell through the cracks, some by design. We are still working today to reverse this condition. The Student Services component will be receiving major new support in 1998.

ADMINISTRATIVE AND TECHNICAL SUPPORT

The addition of the modem delivery system to our Distance Education Portfolio has necessitated having some technical support: someone who is available around the clock to maintain the system online. Our success rate has been close to 99 percent for nearly two years, around the clock.

However, we "drop" the system every morning for virus checks and necessary technical support work, and we do system upgrades between semesters. This technical support requires the equivalent of one full-time person; however, the duties are actually shared by three people who have many other responsibilities.

During the orientations we use two part-time people for technical support.

The clerical responsibilities are absorbed by two full-time people and three part-time clerks who process the paperwork for all of the distance education registrations, not just the modem courses.

Faculty and Student Observations

Initially the faculty in our program were the 'early adopters' -- little motivation was needed to interest them in developing a course for delivery via modem. Now with many people eager to develop modem courses, we have implemented procedures to insure the quality of courseware in "finished"

form well in advance of the first day of class. We require content reviews by our program discipline committees and have developed training programs for first time instructors. In addition we now pay a one thousand dollar stipend as incentive for faculty to develop a course for modem delivery. Faculty have discovered great flexibility in their working hours and the locations from which they can work. While new faculty may be "overwhelmed" by the immediacy of a 24-hour, seven-day-a-week classroom connection and often report working harder than for an on-campus course, they do find a rhythm and timing that works for them. These modem instructors tend to return as distance instructors.

Our students generally self-select into distance courses. Our counseling personnel have been trained to steer likely candidates to distance courses when scheduling conflicts occur, and they are now comfortable in recommending courses via modem. Students see our courses as "equal" to on-campus courses in terms of the value of the learning experience and the credit given for the course of study.

The current students are no longer the 'early adopters.' Instead they are students who simply have access to a PC at home or at work. We have worked hard to provide a thorough orientation, allowing time and hands-on experience with modems and communications software for those persons who need it. Students are drawn to courses delivered via modem, in part because of their busy work and personal schedules, but no doubt in part because of all the media attention being given to telecommunications.

We are finding that these 'late adopters' have made their computer purchases recently and, consequently, their platforms are quite sophisticated, a

surprising number with sound and CD-ROM capabilities. The existence of such potent hardware in students' homes and offices challenges us to discover richer ways to present our materials and take advantage of the power already present on their desktop. It is a delicate tradeoff, considering that a small percentage of students may not be able to participate if we design courseware exclusively for heavy platforms.

Regarding student performance, we are discovering that the students who study online perform better than those who enroll on campus. Reasons for this certainly include the 24-hour connection to the instructor which can't be duplicated on campus, and the electronic links that allow student collaboration all through the week, independent of meeting in person.

Administration

Within the College Without Walls, which included Distance Learning as a sub-entity, it was possible for a distance course to be considered as a part of an instructor's full-time load, with instructors teaching a 100% distance course load during certain semesters.

At the other five colleges things are done differently. In fact the most prevalent situation is that faculty teach a distance course "as an overload," rather than part of a full-time load. The reason is that state reimbursement for contact hours will not accrue to the college whose instructor is teaching a course for another college. Therefore, we have a competitive environment which works against more instructors becoming part of the distance delivery movement. When a faculty member can only be paid from one thousand to twelve hundred dollars per course, and one thousand dollars for course development (both circumstances being volunteer and

part-time contributions), we are left with a situation that curtails the creative energies of many people who would like to join us but can't seem to break through the organizational hassles.

****Observation:** Eighteen months after the Penn State conference gathering, we are left with five different policies on faculty course load -- one for each of the remaining colleges.

In the opinion of this writer, Distance Education at HCCS is still seen as something of a stepchild, not quite an official campus. Having five traditional colleges competing with one non-traditional delivery system has created as many problems as it has solved. However, things may be changing. As our telecommunications long-range plan is implemented, in terms of local and wide area networking, the five colleges are now tempted to get involved in distance delivery via the new channels. We may soon see the day when a class at a distance is regarded as "just another class" in just another classroom. At that point there may be no need for the organizational unit (Distance Education Department). Until then we feel it necessary to provide a separate organization with the vision and technical abilities to make these distant connections work. Yet we have placed that organization within one of the five operating colleges.

WHERE DO WE GO FROM HERE?

In February of 1996 we reported:

"We intend to continue supporting the present hardware platform for delivering courses via modem and refine the "look and feel" of the menus and user interface. We will expand backup procedures to insure that we can continue the 24 hour support we have been providing and sustain

registrations of one to two thousand students per semester."

**Observation: We have done this.

A Push Toward Multimedia

We intend to migrate more of the modern courseware to the "multimedia" approach for an online exchange of materials via modem. We migrated from the Galaticom hardware with a late version of the Major BBS software to the multimode 'World Group' software with massive telecommunications extensions. These extensions widened access to courses via LAN, dialup modem, BBS, and the Internet. We experimented with other tools that complement the software and demonstrated prototypes of this new multimedia, multi-access credit course server in 1996.

There are now a dozen servers that influence the reach of distance education at HCCS, including CuSeeMe multi-point meeting software, Vfone broadcasting software, RealAudio/RealVideo streams, and a great many "unofficial" web servers in addition to the more "official" World Group system. Our future system will most likely be a distributed delivery system which will conform to a standard look and feel while leveling the workload across our wide area network.

We have also experimented with two-way interactive TV via modem. This was initially what might be called "reverse" distance education where students have been on campus but their instructor has been at a distance. Using a portable Sharevision PC 3000 desktop video system at the distant location, instruction is delivered to students in a classroom with similar equipment.

We have added components of live two-way synchronous exchange.

In the Spring of 1996, we began offering our first courses using the

Internet as the primary delivery method. With the available tools, courses can be made far richer visually with far less effort. We are also experimenting with the Real Audio Player and Encoder software, which gives us the capability to compress a second of clear audio into only 1K bytes. The appeal of the Real Audio Server is that a helper application can be configured for the student's web browser which can begin the audio stream only seconds after the mouse click, making audio on demand a reality. Voxware Audio is an equivalent product and in many ways superior. With its "serverless" format, it has been our workhorse to date for getting content audio to our students. For content video, we have been using VivoActive streaming serverless video for the web.

We have built considerable expertise in the area of real-time wide area broadcasting of live motion video with sound delivered directly to students' homes at _modem speeds_. The Vfone server arrangements can support 50 simultaneous modem connections with several frames/second plus clear audio and at the same time route clear Power Point slides directly to students' home PC's. Cybercasting of review sessions, counseling, and live classroom activities have become commonplace.

**Observation: Commonplace for _too few_ teachers, however. The majority of our online instructors are still using the multi-user BBS and have barely made use of the web.

The results of new and exciting investigations will be made available via our web server sometime next year.

CONCLUSIONS

The Houston Community College System has made a good beginning in delivering

courses via "online delivery." We have not done the best job of capitalizing on our promising start and seem to have drifted without a clear sense of where to go next as we move into our sixth year of continuous restructuring. Yet we do "make progress" and feel a great pride in what we have learned while working within our constraints.

We recognize our limited financial resources and have worked to refine our approaches to delivering instruction in new ways that complement the on-campus experience and help stretch our instructional budget. We are learning the value of consortial efforts and are working with our neighboring community colleges to share what we know in this area and to pool our intellectual talents.

With the prospects of global classrooms via the Internet and the multimedia experiences made possible by the infrastructure that we are assembling in our state, we experience the challenge and excitement of rethinking training as we approach the 21st century.

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