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Distance Learning and Digital Libraries: Two Sides of a Single Coin

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Experience teaching a graduate class in Old Catalan language and literature from UC Berkeley to UC Irvine and UC San Diego, Fall semester 1995, demonstrates that such an approach can lower the per-pupil cost of teaching exotic foreign languages as well as make instruction in those languages more widely available. The class would not have been possible without being able to use the World Wide Web to replace, at least partially, some of the traditional functions of both the library reserve system and the course reader. However, it would be prohibitively expensive to replicate the model used, because of the amount of staff time necessary to develop the Web site as well as to digitize materials for it. The only reasonable option is to develop tools that will allow faculty members to provide such materials themselves.

Distance learning requires digital library support. Recent experience with a distance learning class has convinced me of that simple fact. This past semester (Fall 1995) I taught a graduate introduction to medieval Catalan language and literature. Catalan is the language spoken in Northeast Spain (including Barcelona and Valencia) and the Balearic Islands. The medieval literature dates from the 13th to the 15th centuries and includes some of the greatest writers in medieval Europe. The poet Ausias March is the best poet of the 15th century, anywhere; the chivalric romance, *Tirant lo Blanc* (*Tirant the White*), was translated into English some years ago and became a supermarket bestseller (Martorell & de Galba, 1985).

The course had four students at the University of California (UC), Berkeley, two at UC Santa Barbara (UCSB), and one at UC Irvine (UCI) (the first time a multi-point distance learning course originated from the Berkeley campus). While medieval Catalan might appear rather esoteric and the number of students relatively small, in fact the course was set up as a pilot to solve a serious problem in this era of budget constraints: How can we afford to offer lesser-taught foreign languages, which generally have very low enrollments on a given

campus and require fairly specialized and therefore expensive instructors? Such courses are needed to prepare students, both undergraduate and graduate, in many fields, particularly humanities and social sciences (e.g., for field work in foreign countries). One solution is to use distance learning in order to pool the students from the various campuses, thus decreasing the per-pupil cost and allowing specialized resources to be shared.

Technologies Used

The structure of the class remained as it was when I taught it as a traditional class at Berkeley: A 3-hour session once a week. Class meetings were held in the various distance learning facilities on the three campuses using the voice-switched Rembrandt II two-way compressed videoconferencing system from Compression Labs, Inc. (San Jose, CA). In addition there was an associated channel for freeze-frame graphics from an electronic overhead projector (Elmo) or computer screen. The signal was sent to the facilities of the Office of the President of the UC system in Oakland and thence distributed to the other campuses over leased T1 lines (1.45 megabits/second), although the bandwidth for the class was usually run at $\frac{1}{4}$ of a T1 line, equivalent to about 6 ISDN lines.

The bandwidth for the video representation was adequate, but the "back channel" line could handle only static graphic images so that it was impossible to scroll down a computer screen, for example, although a screen dump could be displayed. Use of the overhead projector for previously prepared materials worked very well; however, any kind of ad hoc elaboration still requires a blackboard, preferably electronic. The distance learning classroom at Berkeley is a state-of-the-art facility, while those at Santa Barbara and Irvine appear not to have reached the same level of sophistication, thus limiting the capabilities of the entire system to a least common denominator. Students at UCSB and UCI were not able to see both the instructor and the materials presented—com-

puter screen or electronic overhead projector—simultaneously, as the Berkeley students could; instead they had to switch back and forth between the two.

In addition to the distance learning classroom itself, two other technologies were also used:

- (1) An e-mail reflector group for the class. All messages sent to it were automatically redirected to all students in the class.
- (2) A World Wide Web (WWW) home page (URL: <http://www.lib.berkeley.edu/~catalan>) which contained the materials usually provided in a paper course reader: Purpose of the course, methodology, grading standards, syllabus, reserve list, bibliography, weekly reading assignments, and background materials. The major innovation was that the background materials contained not only digitized images of medieval manuscripts but also hypertext links to other relevant web sites in the U.S. as well as in Spain, thus offering access to a wealth of material that students would never see otherwise.

Difficulties: Administrative and Technical

While the class was remarkably successful in achieving its basic goals, there were administrative and technical difficulties. With regard to administration, the first problem encountered remains the hardest to resolve: The discrepancy between Berkeley's semester system and the other campuses' quarter system. Because Berkeley starts fall semester a full month before the other campuses, students were forced either to forego part of their summer plans or watch the first three classes on videotape. Arrangements for the granting of course credit were also clumsy; and reservation of the videoconferencing facilities had to occur outside of the normal classroom reservation process. The latter problems presumably will be corrected as distance education becomes more closely integrated into the normal running of the institution, but the quarter/semester conflict must be resolved. Otherwise distance learning cannot offer a viable alternative to campus-based instruction in the UC system.

Technical difficulties and constraints ranged from the fundamental to the trivial. Early on, we dropped the idea of true electronic reserves (even page images) primarily for technical reasons. My relatively modest reserve list (40 items) was far too large for The Library to make available digitally. Moreover, current WWW browsers like Netscape are inadequate for serious work in many disciplines, since the Hypertext Markup Language (HTML) does not yet support the character sets needed for phonetic or scientific notation except as digitized and therefore unsearchable page images. One may hope that HTML will converge rapidly with SGML (Standard Generalized Markup Language), which has already solved virtually all of the character representation problems mentioned, as well as many others. While machine-readable text, because of its search capabilities, is the

ideal for instructional materials, at least in the near term digital page images provide a reasonable alternative, especially for any discipline which needs such elements as special character sets, images, graphs, and tables.

Computer support problems also appeared: We were not able to find suitable UNIX X-Windows sites at Irvine and Santa Barbara until almost the end of the semester. They were needed to allow students access to the Dynatext database of digitized leaves of medieval Catalan manuscripts held at Berkeley's Bancroft Library, a total of almost 1,000 images used by students as the basis for transcriptions of medieval Catalan texts. While promising, the Dynatext version currently available is not yet adequate for instruction. For example, it allows zooming, which is necessary to see the fine detail on a manuscript, but not image processing; moreover, it does not protect the original image file from deliberate or accidental modification by the user. Finally, the network connections required a great deal of nursing. At one point, we lost UC Santa Barbara for 2 weeks and had to resort to videotape sent by regular mail.

Preparing this class was not inexpensive, and therein lies the major problem. Leaving aside the creation of the Dynatext database (funded by a \$5,000 grant from Berkeley's Gaspar de Portolà Catalonian Studies Program), the cost of library staff time in developing the digitized instructional materials was substantial; yet without such staff help it would have been impossible to teach the class. Design and implementation of the WWW home page took about 40 hours of staff time. Beyond that, one library staff member devoted between 10 and 15 hours a week to preparing class materials, while two others put in a total of about 25 hours proof-reading HTML-marked up documents. Thus, not counting my own time (between 5 and 6 hours a week to convert handwritten notes into a form suitable for digital presentation) and that of the students (some 25–50 hours for transcription and proof-reading), library staff contributed, very roughly, some 150 hours of staff time into this one course. However, these materials can be used for other courses in years to come; moreover, they are permanently available as a Web site for students and teachers elsewhere in the U.S. as well as abroad (although statistics do not indicate much use to date).

Conclusions

This class, taught to students at two other campuses, would have been impossible without electronic surrogates for traditional paper-based class handouts or course readers. Distance education without a digital library is not possible. However, there is still a long way to go before digitally-supported distance education is feasible for most faculty members. Few institutions can afford to provide the level of staff support that I received in teaching my Old Catalan class. Instead of providing such services directly, libraries, in collaboration with other part-

ners like computer centers and instructional technology programs, must begin to provide the tools that faculty members and students need in order to create these resources themselves.

We shall probably have to depend on the commercial marketplace to create most of these tools because no library or computer center has the financial resources necessary to do so, just as we had to wait for the commercial marketplace to provide us with satisfactory word processing and spreadsheet programs. This process is already beginning as software developers create tools that take advantage of expertise already possessed by many faculty members (e.g., automated conversion of word processing files to HTML). Faculty members must also have ready access to the necessary hardware (e.g., high-quality scanners), as well as the capability of loading the resulting images or machine-readable texts into WWW home pages. Now most network administrators are reluctant to grant the required access to servers. *This technology will affect only the margins—the early innovators—until an instructor can sit down the evening before a class and put together all the materials needed for that class. Right now this is only a pipe dream.*

It seems clear to this survivor of the digital wars that libraries that want to be involved in distance learning have but two choices, one of which is no choice at all. They can attempt to continue with their traditional role as intermediaries between the user and information resources, although instead of finding that information in existing sources and passing it on, they will now take it directly from its creator—the faculty member—and put it on the WWW for his or her students. To provide such mediation will require prohibitive amounts of staff time.

The alternative is to eliminate the middleman by providing the software, hardware, and training necessary so that the instructor can develop his or her own course materials in a timely and efficient manner. Libraries should thus focus on acquiring or creating the necessary tools and training faculty and students in their use. A digital “priesthood of all believers” must replace the librarian’s priestly functions as intermediary in a radical recasting of traditional librarianship.

References

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