Achieving Interdisciplinary Impact: Clearing the Hurdles to Mesolore's Cross-Campus Adoption

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Mesolore: Exploring Mesoamerican Cultures, a set of multimedia course materials on Mesoamerica for undergraduates, began as an idea to tackle a bias in the teaching of linguistics, its dominant focus on verbal communication, but it quickly grew into a project for developing a model for interdisciplinary teaching and learning. Today, in 2004, after six years of research and development mixed with two years of classroom testing, it has evolved into a dissemination challenge. This chapter will describe the interdisciplinary approach taken by the Mesolore Project during its development and dissemination and the interdisciplinary methods by which it hopes to clear the hurdles that are in the way to broad, cross-campus adoption.

An Interdisciplinary Plan

If visual as well as verbal communication were central to the study and teaching of linguistics, would students gain a more comprehensive view of human communication and, thereby, deepen their learning experience of human interaction? For the Mesolore staff and advisors eight years ago, the answer was "yes," and so the Mesolore Project took root in an intellectual environment that placed the study of language in a context that bridged the visual with the verbal, science with the humanities, and the biological sciences with the social sciences. In other words, from the beginning, Mesolore's approach was going to be as "truly" interdisciplinary as intellectually possible and as time and money allowed. When completed in 2001, Mesolore linked together the methods, theories, and data of anthropology, archeology, biology, geography, history, linguistics, mathematics, literature, and the arts. In addition, it addressed issues put forward by feminist theory, multiculturalism, and bilingualism on the politics of equality and diversity.

The intellectual merits of "truly" interdisciplinary approaches to science are numerous and well established. The most salient of these merits is that students can learn what a discipline is and what disciplinary understanding entails, and they can learn the advantages of drawing upon multiple disciplines—their particular types of inquiry and content domains—to solve complex problems, theoretical or applied. The fact is that no one discipline can offer all the perspectives needed to make sense of the issues that concern us today. As Jaishree Odin put it, "It is not information in itself that is meaningful in [the computer] age, but how it is connected to other pieces of information" (Odin, 1997).

Although Mesolore is about Mesoamerica, learning interdisciplinarity from Mesolore's content can result in the application of complex inquiry and critical thinking to larger, non-Mesoamerican contexts. A student in a linguistics class, using Mesolore for an activity, can learn that understanding the vigessimal system of counting in twenties aids investigations of not only Mesoamerican cosmology, but the origins of writing and (in some cases) its relationship to gesture, and that knowing the nutritive value of locusts enhances the understanding of Mesoamerican codices as well as contemporary public health research for developing nations. In sum, Mesolore can teach a student that disciplines are closer in practice than campus infrastructure or lingering prejudices suggest.

A second merit of interdisciplinary education is that interdisciplinary teaching tends to be student centered. Unfortunately, whereas there is no shortage of educators who believe that an interdisciplinary approach to learning

offers greater opportunities for students to understand issues and solve problems than any one discipline, there is a shortage of professors who practice the belief in their teaching, creating, perhaps, the greatest hurdle to Mesolore's adoption.

A third merit of the broadly interdisciplinary approach taken by Mesolore is its potential to attract women and minorities to the sciences because the approach adopts the politics of inclusion. When gender studies, cultural studies, Latino and Native American studies, and language studies (as well as multiple languages) are included in the "truly" interdisciplinary, there is greater opportunity to attract those students who otherwise feel excluded from scientific thinking, many of whom are women and minorities. In terms of gender, Mesolore's design balances the representation of women and men scholars and addresses gender issues throughout, integrating, rather than isolating, gender as a variable in the study of human behavior. Mesolore is directed by gender studies and incorporates not only women scholars, but gendered analysis throughout its materials. One-half the discussants, lecturers, and portraits on Mesolore are by women; one of the debates is centered on gender; and the laboratories and tutorials also address gender issues.

Mesolore's Modular Design

Choosing Mesoamerican writing systems as the case study for the proof-of-concept led to a series of central questions that had an impact on Mesolore's final content and technical design.

First, how effective is writing that makes prominent use of "pictures"? Should we continue to categorize pictorial writing exclusively in evolutionary terms as preceding ideographic, syllabic, and alphabetic systems, or would it be more useful to consider a collaborative model wherein various systems of writing worked together? How, and in what social and spatial contexts, was Mesoamerican writing used? What can be learned about human communication by studying Mesoamerican writing systems? What can be learned about people, history, and culture? Can these writing systems reveal to us information on health, nutrition, social organization, gender diversification, and so on?

Second, how might bridges be built between ancient texts and contemporary contexts? Third, what is the most effective way to build a tool that would help explore these issues in a comprehensive, interdisciplinary context?

Mesolore draws upon many Mesoamerican cultural traditions but uses as a central case study three primary documents of the Mixtec people (Codices Nuttall and Selden and the Alvarado Vocabulary) in an effort to shed new light on the study of human communication and culture (Figure 1). It complements other multimedia research tools on Mesoamerica that focus on Maya or Aztec archeological sites, Maya hieroglyphs, epigraphy, and/or tourism.

Mesolore's design is modular, with each module responding to the questions, "What makes up a memorable classroom and learning experience? How shall modules be designed so they can be easily incorporated into a classroom assignment, lecture, discussion?"

Central to Mesolore are three laboratories, two of which open onto three-dimensional, interactive spaces where Mesoamerican writing can be viewed and studied in its original spatial settings (Figure 2). These two primary source "laboratories" present two Mixtec codices, the Selden and the Nuttall, separated by about 100 years and by the Spanish "encounter." The third is an alphabetic text, the *Alvarado Vocabulary,* a 600-page, 16th-century Mixtec-Spanish dictionary with scans of all the original folios as well as transcribed text. Whereas research in these laboratories is entirely open-ended, supporting materials or "modules" include 1) 80 published scholarly articles; 2) four debate topics that provide position statements by scholars and pro-

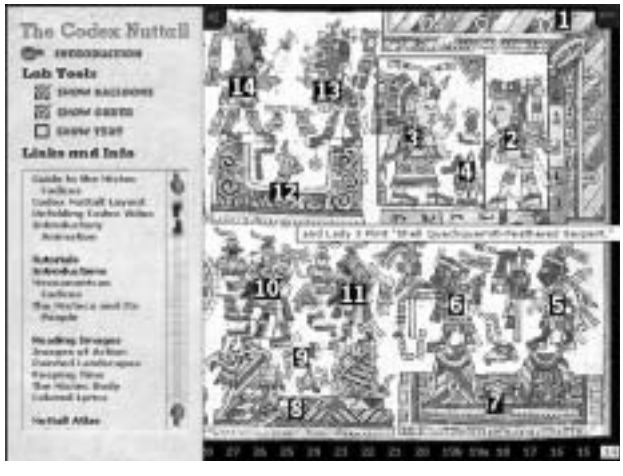

Figure 1. Codex Nuttall.

Figure 2. Introductory screen of Mesolore.

fessionals on Mesoamerican historiography, gender, indigenous rights, and cultural property; 3) illustrated narrations and images by 10 scholars or "mentors" on their lives and current research; 4) 10 tutorials on Mesoamerican history, culture, and codices; 5) three 20-minute introductory lectures by professors, including one who is Mixtec and who lectures in Mixtec; and 6) a virtual atlas of Mesoamerica.

Laboratories

There are three primary source laboratories, two based on Mixtec codices (books) and one based on an alphabetic Mixtec-Spanish vocabulary (all from the Mixteca region of Mesoamerica, located in the modern state of Oaxaca, Mexico). Laboratories are open-ended, interactive research centers for exploration and experimentation in Mesoamerican writing within an interdisciplinary context. All three laboratories present an "archive" of primary textual and iconographic sources; in addition, two of them contextualize these sources in "virtual" three-dimensional spaces. The content development of the Mixtec laboratories was completed in August 1997. The laboratories were redesigned in 1998–1999 in response to student/teacher evaluations.

Tutorials

Tutorials walk the user through broad introductory topics. They are linked to scholarly articles and portraits that present particular subjects in greater detail. Among the tutorials are introductions to Mesolore and its holdings, to space and writing in Mesoamerica, to the histories of the Mixtec people, and to interpreting the codices found inside the laboratories.

Lectures

Three 20-minute introductory lectures (Introduction to Mesoamerica, Introduction to the Mixteca, and Introduction to Mesoamerican Mathematics) bridge these ancient texts to contemporary contexts. All three are in English and Spanish. Part of one is also in Mixtec. Lecturers were chosen for their distinguished careers in these areas and their reputations as good and dynamic teachers. They were also chosen for their ethnic and intellectual diversity. David Carrasco is Latino and a historian of religion, Anthony Aveni is Caucasian and is an astronomer, Gabina Aurora Perez Jimenez is a Mixtec Indian and a linguist, and Maarten Jansen is a Dutch archeologist at the University of Leiden, Holland.

Mentors

There are 10 portraits of scholars who discuss their own research and how they became interested in Mesoamerican studies. These portraits are spoken in the scholars' native language (Spanish or English). Subtitles and transcripts are available for both English and Spanish versions. These scholars were selected according to criteria that aimed not for comprehensiveness but for broad representation of the kinds of work done within Mesoamerican studies. Scholars portrayed represent the fields of biology, botany, archeology, anthropology, linguistics, art history, and history. Because the portraits are designed to introduce the student to the lives of scholars in the field—to hear their voices, see their faces, visualize their research sites—they are intended to provide a type of "electronic mentoring."

Library

The library has two sections: an introductory library of 10 articles and an advanced library of 80 published articles. Permission to reproduce the copyrighted materials has been secured from copyright holders according to standards and precedents set by copyright holders and Brown University. Many of the articles come from out-of-print and/or rare journals and books that most libraries do not carry; others are from more readily available sources.

Debates

Debates are sites for the discussion of controversial topics. Each discussion topic consists of several position statements (audio files) that are linked to articles in the library. There are four topics: historiography, gender, indigenous rights, and cultural property. They are narrated by the scholars in the native language, with transcripts offered in Spanish and English.

In sum, Mesolore's scholarship presents new ways of viewing, studying, teaching, and conducting research on writing, history, communication, and culture. These "new ways" include 1) the situating of visual and textual materials in a virtual replication of their original three-dimensional contexts; 2) a contextualization of visual and textual materials in a larger framework of human communication and interaction, which focuses on both the iconographic and verbal aspects of the materials (a focus achieved by stressing the integration of glyphic writing and pictorial writing with iconography and performance); 3) the addition of "performance" and "poetics" to a line of inquiry that is generally centered around the traditional interpretive topics of "who, what, when, and where" (additions emphasized in tutorials, laboratory spatial design, and choice of library articles); 4) the inclusion of overlooked Mixtec materials into Mesoamerican Studies; and, finally, 5) the broad interdisciplinary approach.

The multiple levels of interaction with pictorial and alphabetic writing offered by Mesolore are not limited to issues of linguistics and language history. Students and researchers are exposed to and able to pursue research on a wide range of topics, ranging from gender to ecology, subsistence to native attire, landscape to ritual, timekeeping to medicine, and even to comparisons with contemporary systems of visual communication. Mesolore's supplementary modules (e.g., the mentors, debates, lectures, tutorials, and online library) promote inquiry into these areas. Thus, whereas the primary-document laboratories encourage inquiry and curiosity at many levels of user interest and knowledge, they do not provide ready-made answers or fixed programs for research. For these reasons, Dr. Jeffrey Lesser (currently at Emory, formerly at Connecticut College) said the following about Mesolore's course enhancement capabilities: "Mesolore not only helped my students understand social relations in the pre- and post-colonial period, it opened their eyes to how history is produced, both today and in the past. I have used Mesolore with both high school and college students, and in every case, it brought a rare level of intellectual excitement to the classroom."

Dissemination: Two Hurdles

A strategy for disseminating Mesolore across campus began at the beginning of content development. The multidisciplinary content makes possible, at least in theory, multidisciplinary adoption. The design of modules makes possible the book-marking and isolating of parts of the program for individual classroom lectures and discussions. The multicultural, bilingual, and gender-conscious approach makes possible the inclusion of diverse learning communities—at the very least Spanish speakers and women. The humanities content mixed with the science content makes possible the attraction of humanities-oriented students to the sciences. And, finally, the web-based platform makes access easy, so long as there is a computer and an Internet connection.

Nevertheless, disseminating Mesolore is a huge challenge mainly because of two large hurdles. First, although interdisciplinary scholarships occur more and more, teaching interdisciplinarily does not. Second, multimedia still frightens away many professors, especially social science professors, who have a fear of technology in the classroom if not of technology in the office and a fear of the nonlinearity of multimedia. Multimediated, technologically interactive teaching still remains a brave new world.

To most professors for whom Mesolore could be useful, the hurdles are psychological. These professors may conduct interdisciplinary research but do not think to teach that way. They may use the Internet daily, but they do not think to use it in the classroom. Books seem easier than either CDs or the Internet. Their organization is understandable. Many professors consider books more scholarly than either of the other sources. They are familiar, peer reviewed, and generally published by a university press. The bookstore orders them; students read them. There's no technology, down networks, software conflicts to resolve, hardware to fix, windows to open, and options to select—only chapters to read.

Clearing the Hurdles

The strategy for overcoming the hurdles to broad-based classroom adoption appears to be threefold. First, a user's guide will be written that will offer ideas for creative classroom applications of Mesolore's modules. Second, faculty development workshops will be held at national meetings to provide an opportunity for faculty interested in enhancing their teaching with multimedia to learn about new technologies and new pedagogies in a small, hands-on context. Third, Mesolore will be uploaded to the Internet.

The user's guide will emphasize creative classroom adoption and will consist of activities using Mesolore in anthropology, archeology, geography, history, linguistics, and foreign language (Spanish) classrooms. These creative applications will be written by current faculty users of Mesolore and by future users and will be tested in classrooms for feedback from students and professors. The user's guide will promote student-centered learning by designing activities that draw upon critical thinking, primary research, interdisciplinary resources, and active learning to enhance problem-solving.

In conjunction with developing a user's guide, faculty development workshops will be held with faculty at five professional meetings for three consecutive years. More contributions to the user's guide will result from these workshops.

New Directions for Mesolore After DUE: High School Math and Science?

Although Mesolore is designed for undergraduate students in traditional (campus-based) and virtual (distance, home, or workplace) settings, there is one other important audience the project plans to approach: high school teachers and students. Drawing on the interdisciplinary assets of Mesolore, the project aims to test a hypothesis that a culturally oriented approach to math and science can raise interest and performance levels in "average" ninth grade high school students of math and science. The study will begin with a three-year pilot study to generate preliminary results.

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