

2005-2007 LITRE Grant Proposal

1. Project Title:

Integrating Archaeology and Inquiry-Based Learning: Developing Computer-Based Modules for ANT 253 (Introduction to Prehistory)

2. Project Coordinator:

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3. Other Participants:

none

4. College or Unit:

CHASS

5. Department:

Sociology & Anthropology

6. Project Description:

The project will focus on continuing to develop computer-based modules for teaching archaeology. The goal is to construct inquiry-based assignments that complement lecture and in-class discussion to help students learn about world civilizations and the theories and methods archaeologists use in their research.

To accomplish this goal, my newly developed course entitled "Introduction to Prehistory" (ANT 253) will be used as a foundation for building and testing two interactive web-based assignments to accompany ones I recently developed for another class (ANT 495 - "Environmental Archaeology") with help from LITRE in 2004-05. These modules will primarily be comprised of web pages designed using Macromedia Dreamweaver and Flash software which will guide students through different problem solving exercises. Other software packages such as CALIB 4.4 (radiocarbon date calibration) and external datasets (e.g., Marine Reservoir Correction Database - <http://www.qub.ac.uk/arcpal/marine/>) will also be included to help me continue developing an online teaching resource called "ARCHAEinteractive" (www.ncsu.edu/project/archae).

Students will progress through each module and be confronted with a variety of maps, survey and excavation data, and other resources for analyzing a

specific archaeological scenario. These modules will involve examining a host of issues in archaeology and include 1) interpreting maps and ancient artifacts; 2) analyzing archaeologically recovered information; 3) projecting outcomes of past social behavior; and 4) suggesting reasons for why particular scenarios occurred.

As can be seen in my previous LITRE initiative, one of the first developments for these modules was an assignment I devised called "Radiocarbon Dating". In this assignment, students learned how radiocarbon dating worked through lecture and discussion in the classroom, and were then given a dataset of radiocarbon assays. Students were asked to visit several web sites to properly analyze and calibrate these samples. Using this format of teaching, which utilized in-class instruction along with an interactive web-based interface, students were able to better grasp the complexities of radiocarbon dating and its applications to archaeology (please see written comments and survey data from exit interviews from last year's report).

In the second module, students were presented with a host of different data sources including photographs, an interactive timeline, and descriptions of an archaeological site called "Grand Cay". They were asked a question regarding how the site had changed over time due to cultural processes and modern development, and then had to answer several questions in written form that related to what site occupants were doing over a period of several thousand years, how changes in subsistence reflected cultural behaviors or climatic changes, and if the artifacts found were associated with different types of capturing techniques. For instance, could ground stones found in archaeological deposits at the site been used as fishing weights for nets? If so, are the fish species found at the site commonly caught with nets and thus, are these two lines of evidence interrelated? The goal was to get students to link different sources of information and devise explanatory models for understanding past human behavior.

As the exit surveys for these modules from Spring 2005 reveal, both assignments were extremely successful in increasing student interest in the subjects and facilitated the learning experience. In fact, "Environmental Archaeology" was the highest rated course in the Department of Sociology & Anthropology last term, receiving 4.91 out of 5.0 in student satisfaction overall. I have no reservations in saying that these excellent evaluations were in large part made possible by the LITRE grant I was awarded last year. The 2005-06 proposal will build on last year's successful effort to help make "ARCHAEinteractive" an important resource for students with a variety of interests.

In sum, the proposed project will expand on these and other archaeologically significant questions which pertain to how humans interacted with their environments and how advances in technology can illuminate our discovery of ancient cultures. The new modules to be developed will consist of the following:

Module I: Reconstructing the Living Quarters of an Ancient Pueblo

7. Project Objectives:

The ultimate goal of this project is to fuel student interest in archaeology at NCSU by helping undergraduates discover the techniques and theories that archaeologists use for understanding the past. To aid in this endeavor, I will be using an approach that requires students to ask questions, investigate solutions, create new knowledge as they gather information, discuss their discoveries and experiences, and reflect on how their new-found knowledge can deepen appreciation for how societies developed through time.

I have reviewed many of the online course examples from the Multimedia Educational Resource for Learning and Online Teaching (MERLOT) project and found several useful and interesting examples of how anthropology can be taught interactively. However, there are no examples that explicitly address how archaeologists investigate sites, collect information, and interpret the data. There is a great need to provide students with a guide to using basic archaeological methods such as radiocarbon dating and apply them to real or hypothetical situations so that both the benefits and limitations of these techniques can be better understood.

By attacking specific case studies and different methodological and theoretical issues in course modules I propose, students will in a real sense receive "hands-on" experience using archaeological data and computerized techniques to discover how people lived (e.g., settlement patterns, house construction), what they ate (e.g., combining tools with paleoenvironmental data such as pollen), why trade and exchange systems played such an important role in the sociopolitical development of human societies, and how these and many other facets of human cultural behavior changed worldwide.

The integration of these course modules into archaeology courses will have both immediate and long-term impacts. They will result in anthropology majors gaining a greater appreciation for learning archaeology and world prehistory and introduce them to a package of skills necessary for analyzing and interpreting archaeological data. The long-term impact is a facilitation of greater student-instructor interaction and a transition from the standard lecture format common for these types of classes at most universities to one that also includes interactive, data-oriented inquiry-based learning to help foster curiosity and critical thinking.

8. Estimated number of students affected:

In preparation for teaching "Introduction to Prehistory", I have limited one section of the class to an enrollment of 25 students and reserved a CHASS computer lab for the proposed course module instruction. However, the plan eventually is to construct a wide variety of different modules that can be used for this class (typically with an enrollment of 150-200 students each year), "Island Archaeology" (enrollment range 25-50/year), and several others that I am now planning to teach in subsequent years (e.g., "Caribbean Archaeology",

9. Outcomes of the Project:

In this course students will, through the use of these new interactive web-based modules:

- learn how archaeologists study and reconstruct past environments using an interactive web-based format;
- learn how past human remains help to understand past cultural behaviors (e.g., using faunal assemblages to decipher dietary preferences);
- identify the techniques used to analyze the impacts of humans on the environment; and
- examine how humans interact with plants and animals (e.g., the development of agriculture);
- study the consequences of population increase, the rise of social complexity, and what this means for future generations.

Overall, the main outcome, following LITRE's goals, will be students having a newfound ability for discovering and understanding how different cultures around the world operated and evolved by: 1) asking specific questions about how past societies functioned (e.g., how did early cities manage waste?); 2) linking the data with a particular site or environmental context; 3) using a set of real or hypothetical archaeological data; and 4) developing models to test whether certain variables are responsible for particular outcomes (e.g., was drought a major factor in the collapse of the Mayan civilization?).

10. Project impact on NCSU:

The mission of the department of Sociology and Anthropology at NCSU is to conduct research, teaching, and outreach to help individuals, groups, and organizations in North Carolina, the region, the nation, and other countries to better understand society and culture.

A major component of this mission, and the only one which uses data recovered from buried contexts to elucidate past human behavior, is archaeology. Archaeology is truly an exciting and dynamic field of study and based on increased enrollments over the past several years, it is steadily gaining a broader interest at the university. Because archaeology crosses numerous disciplines, students who go on to become professional archaeologists must be competent in a number of different scholarly fields including biology, geology, cartography, geography, chemistry, history, and soil science. Thus, the anthropology program has set out a number of major objectives for comprehensively training our students. These include:

1. providing instruction to enable students to understand the interrelationships among the social, cultural, and biological bases of human behavior.

2. helping students achieve competence in understanding, critically assessing, and using major anthropological concepts.

3. introducing students to the various theoretical perspectives of anthropology and to encourage an appreciation for the historical development of the discipline as a social science.

4. equipping students with a knowledge of research methods appropriate to anthropology.

5. encouraging students to understand and appreciate cultural differences through knowledge of major forms of social organization from a cross-cultural perspective.

The course modules developed as part of this project will not only fulfill the above objectives for anthropology students at NCSU and broaden interest in learning archaeology, but show how the study of archaeology can complement research done in other departments within the university. In this respect, students who are interested in learning about the past, but are majoring in other fields, can apply the knowledge they have learned from "Introduction to Prehistory" and other archaeology courses to various undergraduate majors within the university. For example, students in the Earth Sciences whose focus is geology can utilize their knowledge of mineralogy and geochemistry to address archaeological questions related to the sourcing of stone artifacts and ceramics. The ability of geological specialists to discover where artifacts came from (e.g., obsidian collected from a specific geological event hundreds of miles away and used by a culture locally for making arrowheads) helps to decipher patterns of human movement across both land and sea and whether they fit into of an exchange system between or within different cultural groups.

The result of using these newly developed computer-based modules as part of an inquiry-based approach to archaeology will ultimately lead to a research-based education for students who can then advance their training by participating in archaeological field schools and/or laboratory work. Archaeology students will eventually go from working with these modules in the classroom using a question-solution-knowledge application-reflection approach, and apply this information to field research projects where actual artifactual and faunal materials are used to answer critical questions about the past. Overall, this project will contribute to the desires of both CHASS and NCSU to move away from an exclusively lecture based format of classroom instruction to one that incorporates an inquiry-guided approach for analyzing data and incorporating scholarly research into undergraduate studies.

The program objectives of anthropology are in concert with the College's mission. Each of the five above mentioned objectives "advances...knowledge in our discipline". The major anthropological concepts and research methods found in objectives 2, 4, and 5 respectively, will enable students to understand and deal with "the human condition and problems facing our communities, the nation, and the world". By emphasizing an appreciation for cultural differences (objective 5), the archaeology component of our anthropology degrees will

"develop future leaders and global citizens with a commitment to service and engagement" in a host of different academic arenas.

11. Project Assessment Plan:

Assessment of the project will be done through anonymously submitted online surveys, student self-assessments, and portfolios of course module assignments. For example, students will be required at the end of each module to answer in an exit interview whether: 1) the assignment was overly difficult or easy; 2) sufficient data and instructions were provided to satisfactorily complete the tasks; 3) the knowledge gained from the exercise piqued their curiosity and gave them a new and interesting way of looking at archaeological data; and 4) the module provided them with information that was useful and applicable across disciplines. Responses from these online assessments can then be used to reformulate the modules, if necessary, so that they are truly providing a means for students to investigate and solve archaeological questions using the available data. Below is a suggested means for assessing student progress and completion of the course modules.

DATA FOR ASSESSING PROGRAM OUTCOMES

Sources of Data

Exit interview question

Instructor survey of student abilities

Portfolios of student work

- Selected exams or other assignments from all 400-level courses
- Selected assignments for Environmental Archaeology

Student self-assessments

- Ten-to-fifteen minute in-class exercise in which students are asked to identify and explain two major theoretical perspectives in archaeology.
- Ten-to-fifteen minute in-class exercise in which students are asked to identify and explain two major archaeological research methods.

OBJECTIVES AND STUDENT LEARNING OUTCOMES

1. Students will be able to explain the interrelationships among the social, cultural, biological, and environmental bases of human behavior.

- Exit interview questions to be added to the existing instrument:

1) "In what ways did the Module help you become aware of the interactions between human groups and their environments?"

2. Students will be able to examine data sources and apply major archaeological concepts:

a. to demonstrate that majors can define major archaeological concepts in

such a way that shows a firm grasp of the concepts.

- Instructor survey of student abilities
- Exit interview question to be added to the existing instrument:

1) "In what ways did the Module help you understand how archaeologists examine different data sources?"

b. to demonstrate that majors can apply archaeological concepts to specific situations showing that they are able to (1) describe the concepts to organize and make sense of what they find in specific situations and (2) identify specific situations to exemplify and amplify major archaeological concepts.

- Instructor survey of student abilities
- Portfolio of selected exams or other assignments from all 400-level courses

3. Students will be able to analyze various theoretical perspectives in archaeology and formulate an appreciation for the historical development of the discipline as a social science.

a. to demonstrate that majors understand the major theoretical perspectives of archaeology.

- Portfolio of selected assignments from "Introduction to Prehistory".
- Student self-assessment: ten-to-fifteen minute in-class exercise in which students are asked to identify and comment on two major theoretical perspectives in archaeology.

b. to demonstrate that majors can appreciate the contribution of the major theoretical and methodological perspectives to the development of archaeology as a discipline

- Portfolio of course modules for "Introduction to Prehistory".

4. Students will be able to select and assemble specific research methods appropriate to different archaeological questions.

a. to demonstrate that majors can identify, define, and give examples of various methods used in archaeological research of past societies.

- Student self-assessment: ten-to-fifteen minute in-class exercise in which students are asked to identify and comment on two major archaeological research methods.

- Exit interview question to be added to the existing instrument:

1) "In what ways did the web-based structure for the Module enable you to better understand archaeology from an environmental perspective?"

2) "In what ways were the technological aspects of the Module helpful or unhelpful? For example, did the use of visual aids, web-based datasets, and

maps help you to figure out solutions for the proposed questions?"

b. to demonstrate that majors can recognize and interpret research methodology in archaeological literature.

- Portfolio of selected assignments from "Introduction to Prehistory" and other 400 level courses in archaeology.

5. Students will be able to compare, design, and apply the skills learned from the course to gain an appreciation for cultural differences through knowledge of major forms of social organization from an archaeological perspective.

- Instructor survey of student abilities

SCORING RUBRIC

During the Fall 2004 term, I participated in the Campus Writing and Speaking Program's Faculty Seminar. As part of the seminar, I devised an example of a scoring rubric that could be used for course modules and exams for "Introduction to Prehistory". The rubric is a combination of a general impressions assessment and a category-based assessment.

1) General Impressions Assessment (exams and modules)

Aspects of the former will allow me to ensure that there is a high level of consistency between answers given in the exams and modules and that certain criteria are followed which represent different levels of performance or quality. A formal descriptive guide will be provided to the students prior to beginning the exercise and be devised similar to the following:

Exceptional: The work goes well beyond the task assigned. The final report is truly impressive, complete, and well-thought out. The scientific analysis is well motivated and is clearly supported by the data presented. Extensions or provocative new ideas are included. Reference material, where used, is extensive and appropriate.

Strong: The work in the final report fully engages the major scientific principles embodied in the topic. The material is complete and presented clearly. Data are sound and are well chosen or presented to convey information. The scientific analysis makes good use of the data presented. The report demonstrates a clear understanding of the fundamental issues of the topic(s) being explored. Reference material is appropriate for the topic being discussed.

Additional Categories: Average, Weak, Poor

2) Category-Based Assessment (modules only)

The modules are fairly complex assignments with many different facets of analysis, a categorical guide is also needed in which I can weight categories in terms of importance and create scales for grading such as "organization",

"analysis", etc. One of the goals of these modules is to get students to approach archaeological questions from many different angles. Datasets that students are provided with in the modules can help to answer both specific and general questions, but their interpretations may differ depending on a host of factors.

Course Module I (50 points total)

1. Report organization (15 points)

- a. clear, logical organization with smooth transitions
- b. good development and explanation of points
- c. conclusion which emphasizes points and clinches arguments
- d. overall validity of argument

2. Analysis (25 points)

- a. all data are considered and evaluated
- b. appropriate analytical techniques are used
- c. data are thoughtfully connected and examined
- d. conclusions are adequately explained

3. Spelling and Grammar (10 points)

- a. report is edited with consistency and accuracy
- b. for every 3 major spelling or grammatical errors, 1 point will be deducted.

EXIT INTERVIEWS

Exit interviews for each module will probably include both online and written (handout) versions. Examples of exit interview questions are provided below.

1) Online Exit Interviews

Please answer the following:

- 5 = strongly agree
4 = agree
3 = neutral
2 = disagree
1 = strongly disagree

Year in School Gr Sr Jr So Fr

Major (dropdown list of all majors)

1. The module was informative and interesting.

5 4 3 2 1

2. The module was well organized and structured.

5 4 3 2 1

3. The data was useful for answering the question(s).

5 4 3 2 1

4. The module piqued my interest in the topic(s).

5 4 3 2 1

5. The module's format (e.g., web-based) helped in learning the topic(s).

5 4 3 2 1

6. The technology was appropriate (e.g., visual aids)

5 4 3 2 1

7. My overall experience was enhanced as a result of the module's technological design.

5 4 3 2 1

8. The technology used in the class (e.g., web-based interaction) improved and enhanced my learning experience more than if I had not used it.

5 4 3 2 1

9. The instructor was helpful when I had questions.

5 4 3 2 1

10. I am more knowledgeable about the topic(s).

5 4 3 2 1

11. I am comfortable using the software (if applicable).

5 4 3 2 1

1) Written Exit Interviews (this could also possibly be online)

Your instructor is interested in identifying ways to improve the learning environment at NC State. Please respond to each of the following questions with honesty and candor. Your feedback is greatly appreciated.

1) In what ways did the module help you become aware of the interactions between human groups and their environments?

2) In what ways did the module help you understand the issues archaeologists confront when trying to examine different data sources?

3) In what ways were the technological aspects of the module helpful or unhelpful? For example, did the use of visual aids, web-based datasets, and maps help you to figure out solutions for the proposed questions?

4) How would you improve the structure and/or design of the module? Would your learning of the topic(s) have been easier, harder, or the same if it were done using a format that did not involve web-based resources?

5) Was the module overly difficult, too easy, or adequate for learning the

assigned topics?

6) In what ways did the module improve your understanding of archaeology?

7) What did you enjoy most about the module?

8) What did you enjoy least about the module?

9) Would you recommend that this module be used again in future classes?

10) Any further comments you would like to add?

PROGRAM ASSESSMENT CYCLES

Frequency of data to be gathered: Data related to one or more outcomes will be collected each semester.

Timetable for data to be analyzed: Data collected each semester will be analyzed by the end of the following semester.

12. Staffing and Support:

Funds will be partly used for EPA (Fitzpatrick) who will oversee the project and develop modules proposed above.

13. Financial Support Requested:

EPA salary total: \$3,900.00

SPA salary total:

Other salary:

Equipment: \$1,100.00

Cost associated with assessment:

Other financial support requested:

Total Funds requested: \$5,000.00

Additional Explanation of how funds will be used:

Equipment to be purchased will include several digital image databases and animal skeletal remains to use in the classroom in conjunction with Modules I and II.

14. Funding Breakdown:

Total funding requested for fiscal year 2005-2006: \$5,000.00

Total funding requested for fiscal year 2006-2007:

15. Staff Support and/or Technical Support Requested:

In addition to the financial support requested above, I would like to ask for 80 hours of technical staff support from Faculty Development Services (Learning Technology Service/DELTA). Members of this group were pivotal in helping me create and design "ARCHAEinteractive" and the modules contained within. Their assistance with this project would add consistency to the web-design and

allow me to maintain the strong relationship I have developed with members of this group.

16. Timetable for Implementation:

Phase I (January 2006 – February 2006): Construction of two course modules for "Introduction to Prehistory".

Phase II (March – April 2006): Implementation of newly created course modules.

Phase III (April – May 2006): Comprehensive assessment of course module instruction.

*Note: After completion of the grant, I will revise the newly developed modules and use these as a foundation for building additional assignments for Introduction to Prehistory and other courses to be taught during the 2006-07 academic year (e.g., "Island Archaeology", "Fundamentals of Archaeological Research").

17. Human Subjects Protection:

If your proposal project involves research using human subjects, you will need approval from the Institutional Review Board for the Protection of Human Subjects in Research (IRB) prior to final approval. IRB information is available at <http://www.ncsu.edu/sparcs/irb>



18. Proposal Release:

By submitting this proposal the applicant grants the LITRE Advisory Board permission to make this proposal available as an example for future grant applicants. All personal information will be removed if this proposal is used as an example.

