

LITRE Report

Summary of 2005 LITRE Grant
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My 2005 LITRE project focused on developing ARCHAEinteractive, a web-based archive for teaching both upper-division and lower-division archaeology courses (see www.ncsu.edu/project/archae). Working with staff from the Distance Education and Learning Technology group, the goal was 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.

During Spring term 2005, the framework for ARCHAEinteractive was built and two modules developed for my *Environmental Archaeology* course. These modules included one entitled “Radiocarbon Dating” and the other “Environmental and Cultural Changes at the Grand Cay Site”, both of which guided students through different problem solving exercises. As students progressed through each module, they were confronted with a variety of maps, photographs, survey and excavation data, interactive timelines, film clips, and other archaeological resources specifically developed to analyze specific methodological or theoretical issues. Some of the topics approached included: 1) learning how to examine and calibrate radiocarbon dates; 2) interpreting maps and ancient artifacts; 3) analyzing archaeologically recovered information; 4) projecting outcomes of past social behavior; and 5) suggesting reasons for why particular scenarios occurred.

According to student assessment surveys, these modules had significant learning impacts. For example, in Module 1 (Radiocarbon Dating), students were asked questions regarding the organization and structure of the module, whether it was interesting and/or piqued their interest in the topic, and whether the technology was helpful and appropriate for accomplishing the task. As noted from the survey (see Appendix A), students were overwhelmingly positive about this module and based on the results, felt that the technology was appropriate, helpful, and enhanced their knowledge of the software and topic.

More detailed responses from students (see Appendices B and C) also indicate that overall, they felt that the “web-based structure made it easier to access and understand”, “made ... abstract concepts more intelligible”, and “enabled [them] to greatly understand interrelationships between climatic variations and human interaction, as well as a better understanding of the overall impact of humans on environmental changes.”

By attacking specific case studies and different methodological and theoretical issues in the course modules I helped to develop, students received in a real sense “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 my Environmental Archaeology course has had several immediate impacts – students gained a greater appreciation for learning archaeology and world prehistory and were introduced to a package of skills necessary for analyzing and interpreting archaeological data. There are also good prospects for achieving my longer-term goals of facilitating greater student-instructor interaction and a transition from the standard lecture format common for these types of classes to ones that also include interactive, data-oriented, inquiry-based learning to help foster curiosity and critical thinking.

Overall, the main objective of ARCHAInteractive is to aid in the discovery and understanding of 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?). Overall, the first stages of ARCHAInteractive, supported by funds from LITRE, has been a major step in making my courses more interactive and interesting using advanced web-based technologies and facilitated the learning process for students by giving them a broader understanding of how archaeologists decipher and interpret information in a logical and critical way.

APPENDIX A: Student Responses for Module 1 (Radiocarbon Dating) in ANT 495 *Environmental Archaeology*, Spring 2005.

SurveyBuilder Survey Results

Results for Survey Module 1 Survey: Radiocarbon (14C) Dating

Survey URL: <http://www.cals.ncsu.edu/surveybuilder/Form.cfm?testID=1480>

Questions and responses (11 submissions by 11 users)

| | | |
|----|---|--|
| 1. | What is your classification? View individual answers | Multiple Choice 11 responses |
| | Freshman | 0 0.00% |
| | Sophomore | 3 27.27% |
| | Junior | 3 27.27% |
| | Senior | 5 45.45% |
| | Graduate Student | 0 0.00% |
| | Other: Please Explain | 0 0.00% |
| 2. | In which of the following course(s) are you currently enrolled? View individual answers | All That Apply 11 responses |
| | Environmental Archaeology | 11 100.00% |
| | Island Archaeology | 0 0.00% |
| | Intro to Prehistory | 0 0.00% |
| | None of the above | 0 0.00% |

Please answer the following questions by indicating your level of agreement:

(Instruction)

Learning Impact

(Question Set)

| | | |
|----|---|---|
| 3. | The module was informative and interesting. View individual answers | Likert Scale (Multiple Choice) 11 responses |
| | Strongly Agree | 7 63.64% |
| | Agree | 4 36.36% |
| | Neutral | 0 0.00% |
| | Disagree | 0 0.00% |
| | Strongly Disagree | 0 0.00% |

| | | |
|----|--|--|
| 4. | <p>The module was well organized and structured. View individual answers</p> <p>Strongly Agree Agree Neutral Disagree Strongly Disagree</p> | <p>Likert Scale (Multiple Choice) 11 responses</p> <p>3 27.27% 6 54.55% 2 18.18% 0 0.00% 0 0.00%</p> |
| 5. | <p>The data were useful for answering the question(s). View individual answers</p> <p>Strongly Agree Agree Neutral Disagree Strongly Disagree</p> | <p>Likert Scale (Multiple Choice) 11 responses</p> <p>4 36.36% 5 45.45% 2 18.18% 0 0.00% 0 0.00%</p> |
| 6. | <p>The module piqued my interest in the topic. View individual answers</p> <p>Strongly Agree Agree Neutral Disagree Strongly Disagree</p> | <p>Likert Scale (Multiple Choice) 11 responses</p> <p>4 36.36% 3 27.27% 3 27.27% 1 9.09% 0 0.00%</p> |
| 7. | <p>The module's format (e.g. web-based) helped in the learning of the topic(s). View individual answers</p> <p>Strongly Agree Agree Neutral Disagree Strongly Disagree</p> | <p>Likert Scale (Multiple Choice) 11 responses</p> <p>5 45.45% 4 36.36% 1 9.09% 1 9.09% 0 0.00%</p> |
| 8. | <p>The technology was appropriate (e.g. visual aids). View individual answers</p> <p>Strongly Agree Agree Neutral Disagree Strongly Disagree</p> | <p>Likert Scale (Multiple Choice) 11 responses</p> <p>6 54.55% 3 27.27% 2 18.18% 0 0.00% 0 0.00%</p> |

| | | |
|-----|--|--|
| 9. | My overall experience was enhanced as a result of the module's technological design. View individual answers | Likert Scale (Multiple Choice) 11 responses |
| | Strongly Agree | 5 45.45% |
| | Agree | 5 45.45% |
| | Neutral | 0 0.00% |
| | Disagree | 1 9.09% |
| | Strongly Disagree | 0 0.00% |
| 10. | 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. View individual answers | Likert Scale (Multiple Choice) 11 responses |
| | Strongly Agree | 6 54.55% |
| | Agree | 4 36.36% |
| | Neutral | 1 9.09% |
| | Disagree | 0 0.00% |
| | Strongly Disagree | 0 0.00% |
| 11. | The instructor was helpful when I had questions. View individual answers | Likert Scale (Multiple Choice) 11 responses |
| | Strongly Agree | 8 72.73% |
| | Agree | 2 18.18% |
| | Neutral | 1 9.09% |
| | Disagree | 0 0.00% |
| | Strongly Disagree | 0 0.00% |
| 12. | I am more knowledgeable about the topic(s). View individual answers | Likert Scale (Multiple Choice) 11 responses |
| | Strongly Agree | 7 63.64% |
| | Agree | 4 36.36% |
| | Neutral | 0 0.00% |
| | Disagree | 0 0.00% |
| | Strongly Disagree | 0 0.00% |
| 13. | I am comfortable using the software (if applicable). View individual answers | Likert Scale (Multiple Choice) 11 responses |
| | Strongly Agree | 6 54.55% |
| | Agree | 4 36.36% |
| | Neutral | 0 0.00% |
| | Disagree | 0 0.00% |
| | Strongly Disagree | 1 9.09% |

SurveyBuilder Survey Results

Results for Survey In-Depth Survey: Radiocarbon (14C) Dating

Survey URL: <http://www.cals.ncsu.edu/surveybuilder/Form.cfm?testID=1481> (

Questions and responses (4 submissions by 4 users)

1. **In what ways did the module help you become aware of the interactions between human groups and their environments?** Text Answer
4 responses
[View individual answers](#)

This module helped me notice how much of an impact a marine diet has on dating human bone. In order to correctly date the bone, one would have to know the percent of the group's diet that is marine. This puts a numerical value on how much they relied on the coastal and marine environment.

It enabled me to greatly understand interrelationships between climatic variations and human interaction, as well as, a better understanding of the overall impact of humans on environmental changes.

The module presented variations in the generation of radiocarbon dates based on specific changes to environment, processing, etc.

it really did not made be aware of humans and their evironments because I already knew the interactions existed in the world.
2. **In what ways did the module help you understand the issues archaeologists confront when trying to examine different data sources?** Text Answer
4 responses
[View individual answers](#)

This module showed that dating is a very particular calculation. It was interesting to notice how the results can be skewed by marine resevoir effects.

It helped me to realize just how convoluted the field can be with contamination problems, differential layers, etc.

The module illustrated the fact that archaeologists obtain data from various sources.

It help me understand that there is some guess work involved in achaeologists work and that no date is absolutely correct like some stats in other fields of study. It just allowed you go through the critical thinking process and make the best decessions and concusions on the data.
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 figure out solutions for the proposed questions?** Text Answer
4 responses
[View individual answers](#)

Once we were shown how to complete the module, it was relatively easy to figure out and answer the questions. The marine resevoir site was easy to understand and display the local variations. The graphs helped show comparisons between terrestrial and marine samples of human bone.

All aspects of the module helped reinforce the general idea of what we were attempting to learn.

Having the calib program online was particuarly helpful.

All of the technological aspects were helpful in all phases of the project but I did not think the resourvour affects part of the project could need some work on to better display the project.

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?** Text Answer
4 responses
[View individual answers](#)
I think it is fine the way it is.
It would have obviously helped if I were actually exposed to a site, but the web-based module was fairly comprehensive and enlightening within its own right.
The web-based structure made it easier to access and understand.
I would stick to the web base structure and design in the project because learning these things in a lecture would not get your thinking patterns in the process and therefore not really have a hands on approach to the subject. The improvement I would make is maybe have a samples set of data that could be used as a walk through for the whole class.
5. **Was the module overly difficult, too easy, or adequate for learning the assigned topics?** Text Answer
4 responses
[View individual answers](#)
I believe it was adequate considering comparisons needed to be made for the sites and contextual information.
I thought it was pretty well formed and understandable.
The module was adequate for learning the assigned topics.
The module was adequate for the beginning and learning how to input the data into the various programs.
6. **In what ways did the module improve your understanding of archaeology?** Text Answer
4 responses
[View individual answers](#)
It helped me realize the type of work done after being in the field. I still find it interesting.
It ultimately mademore abstract concepts more intelligible.
The module demonstrated the kind of issues that an archaeologist must consider in the analysis of data.
It made realize that achaeologists have to well skilled in other fields and make the best logical conclusions about their research when reporting dates.
7. **What did you enjoy *most* about the module?** Text Answer
4 responses
[View individual answers](#)
Learning how to calibrate was interesting.
I enjoyed incorporating the learned material into a proactive simulation.
The use of multiple dating programs,
na
8. **What did you enjoy *least* about the module?** Text Answer
3 responses
[View individual answers](#)
If I had to do it again, I would use oxcal instead of calib. Calib was easier to enter the data, but oxcal would have cut the time it took to change dating options and make graphs.
It was somewhat time consuming.
I felt that given more time to write up the project it would have made it a little bit easier for me.

9. **Would you recommend this module be used again in future classes?** Text Answer
4 responses
[View individual answers](#)

Yes

Yes.

I would recommend it.

Yes, because it gives you a hands on approach to the material and not bore you death in lecture going over technical terms.

10. **Any further comments you would like to add?** Text Answer
3 responses
[View individual answers](#)

NO.

The oxCal program corrupted the word files into which the oxcal graphs were inserted.
Just wish I had a little more time to work on the project that is all.

APPENDIX C: Student Assessment Responses for Module 2 (Grand Cay) in ANT 495 *Environmental Archaeology*, Spring 2005.

| What is your classification? | In which of the following course(s) are you currently enrolled? | The module was informative and interesting. | The module was well organized and structured. | The data were useful for answering the question(s). | The module piqued my interest in the topic. |
|------------------------------|---|---|---|---|---|
| Senior | Environmental Archaeology | Strongly Agree | Agree | Strongly Agree | Agree |
| Senior | Environmental Archaeology | Strongly Agree | Agree | Agree | Agree |
| Senior | Environmental Archaeology | Strongly Agree | Strongly Agree | Strongly Agree | Strongly Agree |
| Junior | Environmental Archaeology | Strongly Agree | Strongly Agree | Strongly Agree | Strongly Agree |
| Sophomore | Environmental Archaeology | Agree | Strongly Agree | Strongly Agree | Agree |
| Senior | Environmental Archaeology | Agree | Agree | Agree | Agree |
| Junior | Environmental Archaeology | Agree | Agree | Agree | Agree |
| Sophomore | Environmental Archaeology | Agree | Strongly Agree | Neutral | Agree |

| What is your classification? | The module's format (e.g. web-based) helped in the learning of the topic(s). | The technology was appropriate (e.g. visual aids). | My overall experience was enhanced as a result of the module's technological design. | 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. | The instructor was helpful when I had questions. |
|------------------------------|--|--|--|--|--|
| Senior | Strongly Agree | Agree | Strongly Agree | Strongly Agree | Strongly Agree |
| Senior | Strongly Agree | Strongly Agree | Agree | Agree | Agree |
| Senior | Strongly Agree | Strongly Agree | Strongly Agree | Strongly Agree | Strongly Agree |
| Junior | Strongly Agree | Strongly Agree | Strongly Agree | Strongly Agree | Strongly Agree |
| Sophomore | Strongly Agree | Strongly Agree | Agree | Strongly Agree | Strongly Agree |
| Senior | Agree | Agree | Agree | Agree | Strongly Agree |
| Junior | Strongly Agree | Strongly Agree | Agree | Agree | Agree |
| Sophomore | Strongly Agree | Strongly Agree | Strongly Agree | Strongly Agree | Agree |

| What is your classification? | I am more knowledgeable about the topic(s). | I am comfortable using the software (if applicable). |
|------------------------------|---|--|
| Senior | Agree | Strongly Agree |
| Senior | Agree | Agree |
| Senior | Strongly Agree | Strongly Agree |
| Junior | Strongly Agree | Strongly Agree |
| Sophomore | Agree | Agree |
| Senior | Agree | Strongly Agree |
| Junior | Agree | Agree |
| Sophomore | Agree | Neutral |