

Society for American Archaeology (SSA) 71st Annual Meeting
San Juan, Puerto Rico
26-30 April 2006

SPACE-sponsored session on

Integrating Geospatial Perspectives and Education in Archaeology

Session Abstract

Many scholars, professionals, and students have begun to employ geospatial analysis in their research; however, the teaching of geospatial thinking is still in its formative stages. Archaeologists deal with information that is inherently spatial in nature; thus, archaeology provides an ideal setting to develop spatial thinking. This symposium focuses on geospatially related topics including instructional tools, spatial methodologies, and teaching philosophies as they relate to integrating geospatial perspectives in archaeology and the broader discipline of anthropology. The session's goals and objectives were developed, in part, from collaborative efforts with the Center for Spatially Integrated Social Science (CSISS) SPACE Program.

Symposium Participants and Abstracts of Presentations

Theoretical Considerations

Spatial Thinking and Technologies in the Undergraduate Social Science Classroom

Stacy Rebich, Fiona Goodchild, and Don Janelle
Department of Geography
University of California, Santa Barbara

Spatial thinking and analysis have greatly enhanced social science research throughout the past century, but explicit practice of spatial thinking in undergraduate social science courses is still quite rare. New computer technology to handle spatial information offers exciting opportunities; recently discussed at NSF-sponsored SPACE workshops on spatial thinking in undergraduate education. We will discuss insights and strategies that emerged from these workshops in the context of the literature on spatial thinking in education and contemporary cognitive and learning theories. We will also include practical suggestions about pedagogic approaches and assessment strategies that are proving successful in enhancing social science education.

Using Cultural Resource Information System Geospatial Data in Scholarly Research and Public Education

Karyn DeDufour (Archeological Records Management Section, N.M. Historic Preservation Division) and Jeremy Kulisheck (Detail Project Archeologist, Gila National Forest)

Cultural resource information systems (CRIS's) provide critical access to archaeological data generated by compliance and management oriented field research. At present however, CRIS data has remained underutilized in academic scholarship and public education products. Linking CRIS information to geospatial data can facilitate data generation for academic study, provide avenues for creating new problem-oriented datasets, and allow for the development of visual and interactive public education products for states and regions.

Developing Spatial Thinking in Archaeology through GeoScience

Veronica Arias, Heather Richards, and Judith van der Elst (Department of Anthropology, University of New Mexico)

Given that natural and cultural phenomenon take place in space, spatial thinking is essential to analyze relationships and solve real-world problems. Archaeologists deal with information that is inherently spatial in nature; thus, archaeology provides an ideal setting to develop spatial thinking. Geospatial technologies such as Geographic Information Systems (GIS) and Remote Sensing provide tools that are well suited to address archaeological questions. However, we recognize the limitations of these

technologies and emphasize the need for educational strategies and an Anthropology Curriculum that focus on spatial reasoning skills and assessment that prepare students as critical thinkers and users of GeoScience.

The Student Perspective on Geospatial Education

David Plaza and Mona Angel (Department of Anthropology), University of New Mexico

This paper describes a student perspective on integrating geospatial perspectives in archaeological courses. The University of New Mexico's undergraduate course, Geospatial Analysis in Archaeology, serves as the case study. This course offered experiential learning via a project-based approach that specifically focused on spatial thinking and spatial analytical tools and real-world applications. In addition, extra curricular events provided interaction with professional archaeologists to discuss the value of geospatial analysis. We have continued our efforts on the projects begun in this course as independent studies; the results of which, we will present.

Practical Applications

GIS and Spatial Statistical Tools for Archaeological Work

Joe D. Francis and Antoni Magri (Cornell University)

Archaeologists often use a combination of survey and site catchment analysis in planning, conducting, and managing excavations. Recently, archaeologists are seeing the utility of employing a GIS to increase the efficiency and accuracy of their work; a companion set of procedures, spatial statistics, appear to be scarcely employed. Hindering the adoption of GIS/spatial statistics in teaching and fieldwork is the lack of examples illustrating the utility of GIS/spatial statistics compared to traditional methods. This presentation will illustrate the effectiveness of geostatistical analysis procedures (variograms and kriging) and point pattern analysis (spatial clustering) in site selection and future excavation strategies.

1GIS, Faunal Remains, and Public Archaeology in the Gulf Of Maine

Matthew Bampton, Nathan Hamilton, and Rosemary Mosher
(Department of Geography-Anthropology), University of Southern Maine

Prehistoric subsistence patterns for Casco Bay and the Gulf of Maine are examined with GIS for public outreach and cultural heritage reconstruction and preservation. The 5000-year faunal record for Casco Bay is supplemented with select published sites in the Gulf of Maine to illustrate time transgressive and geographic patterns of species usage. Numerous stratified sites in conjunction with radiometric assay and diagnostic artifacts aid in chronometric refinement. The presentation also examines palaeodemographics of codfish as well as creating time specific diversity terrains. This project focuses on the rich and diverse maritime character of a complex and dynamic coastal setting.

Eco's Eye: Semiotic Approaches to Designing a New Computer Application for Visualization of Spatially Distributed Archaeological Data

Kevin Schwarz (ASC Group, Inc.) and Jerry Mount (University of Iowa)

Jacques Bertin's semiotics of graphics posits a model of human communication of graphic information. Using this model of communication with signs, we identify Bertin's visual variables as a basis for the visualization of spatially distributed archeological data. The visual variables are used in the design of a Flash animation application. This is an open source internet-based analysis tool to explore spatial statistical patterning of surface-collected artifact data from a multi-component prehistoric site in Ohio. Data visualization aids in understanding complex palimpsests of spatially distributed artifacts is an activity that can improve archaeological research and education.

Representing Maya Architecture: Techniques for Research and Education

Jennifer Ahlfeldt (Department of Art & Art History), University of New Mexico
Heather Richards (Department of Anthropology), University of New Mexico
Laura Ackley (University of California, Berkeley)

Educators, professionals, and other scholars use many, varied media to portray Maya Architecture. Traditional methods of representation typically include text, drawings, and photographs, which serve as efficient teaching tools; however, often deprive students and researchers of a sense of space. Static, sculpted 3D models provide a sense of mass and space, yet create a top-down, external perspective that lacks a sense of place. Virtual 3D models, in contrast, facilitate experiential learning via virtual exploration and alternative perspectives. These multi-media integrated within an internet-based database of the architecture of the Ancient Americas serve as an invaluable tool for research and education.

Mindscales and Virtual Ecosystems

Maurizio Forte

CNR-ITABC, Istituto per le Tecnologie Applicate ai Beni Culturali, Rome

The Virtual Heritage Lab of CNR has conducted several multidisciplinary projects aimed to reconstruct archaeological landscapes using digital technologies in such places as Peru, Syria, Ethiopia, and Italy. The main focus of these projects is to reconstruct spatial relations of the landscape using spatial anthropology and cybernetics, supported by digital immersive technologies. The theory of mindscape shows that virtual reality is a key factor for the reconstruction of ancient mental maps because it involves the way we, as humans, perceive information through time. The process of re-creating virtual and mind landscapes, educates students and scholars on many, varied levels.

Positive side-effects of the implementation of GIS on heritage management in developing countries

Rolf Schütt

Architect - World Heritage Consultant

Santa Cruz - Bolivia

Geographical information systems (GIS) are technologies unquestionably advantageous for resource management. Given that three quarters of the world's population live in developing countries, recent interest has focused on the benefits of GIS in resource management in such countries. However, the implementation of new technologies in developing countries faces additional challenges. Establishing computer-aided information systems demands a clear vision and setting up a registry of resources with a GIS involves a careful assessment of needs and expectations. This paper suggests how existing management strategies can be adapted to the local work environment, especially in the example of heritage protection in Bolivia.

Nasca archaeology in 3D: Interdisciplinary research and education in Palpa on the south coast of Peru

Karsten Lambers (German Archaeological Institute, KAAK Bonn)

Geospatial methods are a core element of the research undertaken since 1997 by the Swiss-German Nasca-Palpa Archaeological Project. The Nasca geoglyphs near Palpa have been recorded using aerial photogrammetry. 3D scanning and geophysical prospection have allowed us to detect, document and classify stone buildings, ceramic sherds, and subsurface archaeological remains. The resulting data, which are currently being analyzed in a GIS, have greatly enriched our vision of Palpa's prehispanic history. In this paper, I will talk about our research and how we link it to education at universities in Peru, Switzerland, and Germany through courses and practical training of students.

Learning and Teaching: Using a Public Planning Process as a Teaching Tool

Sarah Schlanger (Associate State Archaeologist, El Camino Real and Old Spanish NHT Team Leader, New Mexico Bureau of Land Management)

The Old Spanish Trail, a 19th century trade route between colonial settlements in New Mexico and California, has been called the longest, crookedest, most ornery pack trail in the United States. GIS-based interactive "publications" are being used to introduce the trail to the public, to engage the public in planning for trail development, and to develop alternatives for managing and protecting trail resources. Among the chief challenges are: 1) presenting trail resource data along a 2,700-mile corridor; 2) evaluating proposed route alternatives in the absence of physical trail traces; and 3) protecting trail resource data and discouraging trail "prospecting."

Session Discussant

Stacy Rebich
Department of Geography
University of California, Santa Barbara