14 Distributed Research and Scientific Creativity: Accessible Data for the Social Sciences

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Abstract

This chapter explores the feasibility of creating a web-based data integration and delivery system that relies on the distributed expertise and creativity of the system’s users to develop new knowledge. We use the experience of the interdisciplinary team in Spatial Structures in the Social Sciences (S4) at Brown University for illustration. We have created several research tools that facilitate and support new and creative research enterprises. These include internet mapping systems to explore Hurricane Katrina, community-level census data, public school segregation and testing outcomes, and nursing home services. All of these systems have certain features in common. 1) Unlike GIS archives, they provide GIS functionality on web browsers, so that users are required to have minimal software expertise. 2) Unlike static maps that are designed to support specific conclusions, they leave it to users to find new spatial patterns in the data. 3) By juxtaposing a limited set of variables in the same site, these tools invite users to explore a specific range of questions that reflect intellectual issues being pursued by the creators. In projects like those discussed in this chapter we count on the expertise of social scientists from a range of disciplines who can take advantage of the freedom to explore and use data related to their individual needs, but who do not need to be GIS experts to do so. New and exciting opportunities present themselves as the field of cartography embraces the Internet.

14.1 Introduction

Internet mapping serves many user communities. In the interests of commerce, information storage and retrieval, research, communication, and education, web-based mapping sites have proliferated on the Internet. From the perspective of research on the web that involves geographic information the use and implementation of web-based spatial information retrieval, representation, and analysis poses some specific issues and tasks for the map system developer. Our interests here will focus on Internet mapping for research purposes. This includes but is not limited to research
teams with members distributed geographically that need a common place to store data, perform analysis, create maps, and interact with one another. It also extends to researchers who are interested in establishing Internet mapping systems that can be used by the public, including other researchers in their field and policy-makers, to investigate topics related to the general focus of the mapping system in question.

There are many Internet mapping sites; however, research-based sites tend to differ from others in important ways. The USGS supports the National Map (nationalmap.gov) which is arguably the largest online mapping venture available. It offers many layers, viewable and downloadable (customized topographic maps). Other sites have focused on specific users, such as residents of an urban center that might be interested in the planning process and accessing information about their city (Andrienko, Andrienko, Voss, & Carter, 1999). Not unlike public health applications of Internet mapping, our use of the Internet tends to focus on a subset of all spatial research or science questions (Richards, Croner, Rushton, Brown, & Fowler, 1999). Research sites need to do more than just serve up maps. They must necessarily be selective, focusing on specific research questions, inasmuch as this is true research mapping sites tend to be smaller and more efficient than larger data access sites (although they can also rely on less powerful server hardware and software, potentially decreasing efficiency). Their format must draw attention to the purpose of the site and provide tools for research. In addition to supporting research with the site and related spatial and non-spatial data, research-based Internet mapping sites might provide targeted summaries, reports, and analysis, which can communicate certain results that the research team feels are germane. Research mapping sites should include a communication and public impact mandate as a critical component of research in the dissemination of results. Internet mapping sites are unique venues for communication that can shorten the time it takes to make others aware of important findings. Communication, in turn, increases networking between research team members and other researchers which can positively affect the direction of everyone’s research. Networking is an important tool for leveraging the strengths of the research community; involving outside scientists, policy makers, educators, and others can move a research program in new, exciting, and useful directions.

Incorporating innovative web-based mapping systems for research involves a relatively large leap of faith on the part of the lead researcher or research team. In some ways it will only work with certain philosophies of, or perspectives on, the research process. These perspectives don’t have to permeate all research an individual conducts but the public aspect of communicating over the web (even for a closed system open to limited users) and the extent to which a researcher must share data and ideas does run counter to traditional science and research. The Internet offers diverse users immediate access to information and data, which runs counter to certain aspects of the research process. Traditional research practices