Cultivating Spatial Intelligence

JOHN P. WILSON  
Spatial Sciences Institute  
University of Southern California  
E-mail: jpwilson@usc.edu

My everyday work and thoughts on the topic of this specialist meeting are guided by three fundamental arguments (or truths as I like to think of them). The first is the notion that spatial is cross-cutting and that the work of many scholars in the sciences, social sciences and the humanities as well as the professional schools would benefit from various forms of spatial analysis, modeling and visualization. This is, of course, partly borne out by the spatial turn that has swept across these fields in recent decades (e.g., Casey 1997, Gieryn 2000, Ethington 2007, Scholten et al. 2009, Newcombe 2010).

The second is the notion that fundamental advances in geographic information science drive technological innovation (i.e., the development and distribution of open source and proprietary tools), that these cutting-edge geospatial technologies, in turn, can help to promote scientific discovery across the academy and by doing so, identify gaps and weaknesses in our spatial analytic and visualization approaches that geographic information science should tackle in the years ahead. The spatial university is then one that is completely involved and immersed in every facet of this cycle notwithstanding the fact that much of the technology innovation occurs outside of the academy. The key markers for such an institution will include a strong geographic information science teaching and research enterprise, numerous collaborations with open source and proprietary software developers, and a large and varied geospatial infrastructure to promote and support multi-disciplinary use of spatial analysis, modeling and visualization in research, service, and teaching across the academy.

The third of these arguments focuses on the unique character of the spatial sciences and the need to cover both fundamental science and practical skills in our teaching programs. This can be viewed as a strength (for example, our students find jobs upon graduation) or a weakness (with perhaps the most common being the claim that we teach our students to navigate software without providing the critical thinking skills to use these tools appropriately) and the goal therefore must be to build learning environments that support fundamental science (i.e., the spatial concepts and methods that facilitate spatial analysis, modeling and visualization) and the various ways that individual software tools can be used to produce certain outcomes. In addition, I believe that these environments will work best if they cover the entire geospatial workflow (from spatial data acquisition to analysis and visualization and the communication of the results with various audiences) and if they support multiple entry and exit points to accommodate students with varied interests and goals.

Given this background, I think that the immediate challenge is to find ways to build academic programs on individual campuses that both mirror and celebrate these fundamental truths. The best “spatial” universities in 2025 will need to provide multiple gateways that
promote spatial thinking (i.e., competency) and lead to a series of more sophisticated learning opportunities that will inevitably span many disciplines and application domains. These pathways will almost certainly incorporate a strong geographic information science presence in geography or some other department but the present-day character of our universities and the journey traversed by myself and others over the past quarter century suggests this is the easy part! The more difficult tasks have to do with first, the initial entry points that build spatial competency and may or may not lead to the aforementioned geographic information science programs and second, how geographic information science might be deployed to support creative spatial thinking across the whole university.

I think everyone attending this meeting probably agrees that the gateways should focus on freshman and sophomores and that they might take one or more of several forms. One answer is to include a “Spatial” requirement in General Education Programs and indeed, several participants in a recent blog hosted by Esri argued that not much progress could be made to create truly “spatial” universities without the inclusion of this element. Others, including some of the participants attending this meeting, have taken a slightly less ambitious approach and created spatially-inspired General Education classes that fall into some established rubric (i.e., under the Science & Technology banner, as I have done at USC) and attract 100-200 student every time they are offered. The problem here is one of reach and scalability since this approach is never likely to engage a large fraction of the student body. A third approach and one that we are about to roll out involves a series of two-unit courses that focus on specific disciplines and application domains (i.e., GIS & Diplomacy, GIS & Health, GIS for Design, GIS for Business, etc.), utilize the technology of choice among today’s students (i.e., mobile phones and tablets), and push geographic information technologies ahead of the underlying science as a way to get more students engaged in thinking spatially about questions and topics that interest them.

This last approach can then be bundled as part of a broader initiative to build from a broad base to multiple pathways that span many schools and departments (and thereby, to help achieve the second of the two goals noted above). These collaborations must involve more than the sharing of hardware and software and the format cannot one in which multiple departments offer what is essentially the same introductory course (as often happens now) since this is a waste of resources (and over the longer term, a wasted opportunity). The goal must be to capture and use some of these savings to establish and sustain more meaningful research, service, and teaching collaborations across the affected schools and departments. This is perhaps the hardest task of all because there often will be budget and personnel implications that follow from the pursuit of this kind of strategy. The challenge then is to build an inclusive framework and to organize it in such a way that all of the participants get some benefit from the university's spatial enterprise that is more or less commensurate with their contribution.

References Cited