Building Support Systems for Spatial Literacy

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This statement is informed by experiences, which over time have broadened my outlook on the role of spatial reasoning and analysis across the academy. These include:

- research on career specialization within Geography, exposing literatures on innovation and socialization processes across a range of disciplines;
- involvement with the Center for Spatially Integrated Social Science (CSISS) and its role in the national dissemination of spatial analytic perspectives in the social sciences;
- development of web resources to access teaching materials about the nature and uses of spatial concepts across STEM disciplines; and
- trans-disciplinary initiatives to highlight the value of spatial perspectives for research and education at the university level.

These experiences are described briefly in succeeding paragraphs, each followed by a position statement about the potentials and possible strategies for introducing spatial thinking across the college curriculum at individual institutions and for education at the national level.

A spatial perspective on knowledge specialization

The figure on the left (below) depicts the natural or administrative view of knowledge in which individual scholars seldom step outside the formalized boundaries of disciplinary departments, journals, and academic societies. In contrast, a more pragmatic view (on the right) is one where the intellectual cores of disciplines shift within the space of knowledge through time and individual career paths move freely in response to innovations and opportunities (Goodchild & Janelle, 1988).

Position 1. A trans-disciplinary specialization on the spatialization of knowledge and spatial thinking accords with a pragmatic perspective, drawing on expertise from a multitude of disciplines that contribute to and benefit from spatial methodologies for description, expression, explanation, and prediction. But there is a need to capitalize on the growing interest in spatial perspectives for research with: (a) educational initiatives that nurture spatial literacy and
capabilities for spatial thinking, and (b) supportive infrastructure to promote spatial perspectives in career development.

Dissemination of spatial analytic thinking
The Center for Spatially Integrated Social Science (CSISS), with NSF funding, had as its fundamental mission the provision of infrastructure to support geographically informed spatial analysis across the full range of social sciences at the national level (Janelle & Goodchild 2009). CSISS played a pivotal role in the national dissemination of spatial analytic perspectives in the social sciences. It offered weeklong training programs to more than 1,000 early career professors, PhD candidates, and Post-doctoral researchers, developed tools for exploratory spatial data analysis (GeoDa), published examples of best practice (Goodchild & Janelle 2004), and built a website in support of these initiatives.

Position 2. Documenting the need to enhance spatial literacy is a core undertaking that could justify a national effort, similar in scope to CSISS and the Spatial Intelligence and Learning Center (SILC), to provide essential training and resources for instructors to promote informed applications of spatial reasoning and uses of spatial methodologies. In the interest of transdisciplinarity, examples should reflect humanistic understanding, artistic expression, scientific rigor, social relevance, and open access.

The nature of spatial concepts and their uses
TeachSpatial was supported by spatial@ucsb and NSF to develop web access to teaching materials about the diverse nature and uses of spatial concepts across STEM disciplines. In 2012, http://teachspatial.org became an official site within the National Science Digital Library, providing access to nearly 3,000 teaching and learning resources that feature applications of spatial concepts in several science, technology, engineering, and math disciplines.

Position 3. Drawing on the resources and expertise of TeachSpatial, the Spatial Intelligence and Learning Center (SILC), the GeoDa Center, and other initiatives that promote spatial thinking, it should be possible and beneficial to develop prototype syllabi and related teaching resources for general education and for advanced studies.

Recognizing the trans-disciplinary value of spatial thinking in the college curriculum
Since 2007, the Center for Spatial Studies has promoted the idea that UCSB is Spatial. A ThinkSpatial seminar series has featured more than 60 noontime presentations by scholars from more than a dozen disciplines; an undergraduate Minor in Spatial Studies was introduced in 2011, offering students customized advisory support in selecting from more than a hundred courses from 26 disciplines; and a one-unit Freshman Seminar on Thinking Spatially in the Arts and Sciences was initiated for fall 2012, with presentations by professors from seven disciplines.

Position 4. Sustained initiatives in support of cross-disciplinary research and teaching enhance opportunities within institutions for collaborations in more ambitious undertakings. Thus, at UCSB, ThinkSpatial seminars built recognition about the role of spatial reasoning across the academy and contributed support for introducing a Minor in Spatial Studies. A centralized web resource to document such examples would be a valuable way to share experiences across institutions of
higher learning. Harvard University, Free University of Amsterdam, and the University Redlands come to mind as offering alternative exemplary strategies.

References

Web links to Resources Mentioned:
Center for Spatially Integrated Social Science, http://csiss.org
The UCSB Center for Spatial Studies, http://spatial.ucsb.edu
TeachSpatial resources on spatial concepts, http://teachspatial.org
GeoDa, http://geodacenter.asu.edu
The Spatial Intelligence and Learning Center, www.spatiallearning.org