

Strengthening Spatial Thinking at Smith Environmental Science and Policy Program

It is not surprising that most, if not all, of the strategic directions outlined in re-imagining a Liberal Arts Education require our commitment to support spatial and geographic literacy. Can our student's **purposefully engage society's challenges** with an extraordinarily limited understanding of the world as is continually demonstrated by national surveys? What is necessary to **deepen student's awareness and appreciation of other cultures and global issues** in a world where 75 percent of young Americans (18-24 year olds – recent graduates of our educational system) are unable to locate Israel on a map of the Middle East?¹ Is the **promotion and support of environmental sustainability** robust without also teaching our students how to evaluate the accuracy and reliability of spatial data and use those data in the construction and articulation of a line of reasoning? Are we limiting our advocacy **for promoting a culture of research, inquiry, and discovery** by not systematically teaching and training our students the tools and technologies that foster spatial thinking? Spatial literacy at one time was more highly regarded at Smith², but today spatial thinking is an undervalued and under instructed skill. Spatial literacy should be regarded as an **essential student capacity** necessary to, for example, navigate the international economy or understand the context for world events. Spatial thinking is integral to the work of scientists and engineers, but it is becoming more important to prepare our students for every day life in a **rapidly changing world**.

Visualization Studio

We propose the establishment of a Visualization Studio (VS) within the Spatial Analysis Lab (SAL) to promote spatial thinking across the college. The VS will require dedicated space built or retrofitted to accommodate specialized viewing environments that enhance understanding and recognition of spatial data patterns. It will include specialized projection systems like GeoWalls (see Figure 1) to enhance student abilities to comprehend three dimensional structures and surfaces, which are traditionally difficult to even visualize, let alone understand. The specialized equipment in the VS will create a discovery environment for entire classroom collaboration. Another piece of equipment would be a Virtual Globe Touch Table (see Figure 2) which recreates the traditional environment of standing around and exploring a map, but adds the power of modeling processes and visualizing them with a dynamic display.

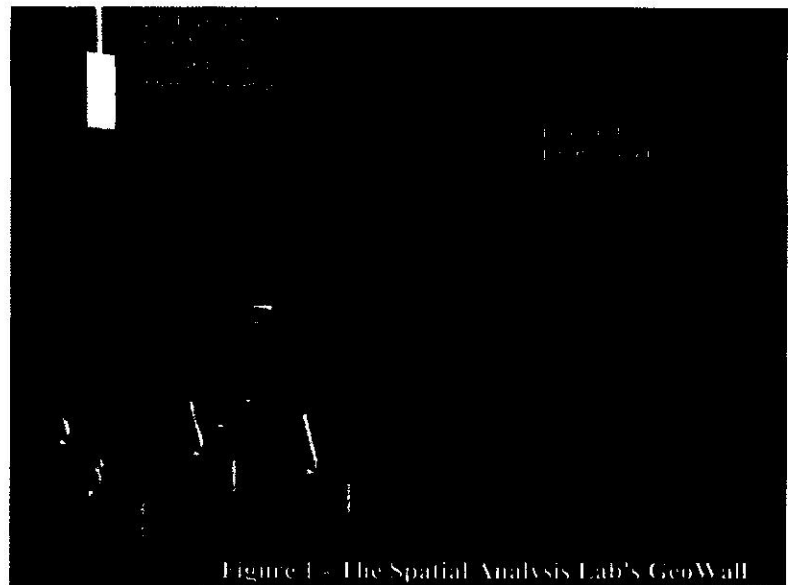


Figure 1 - The Spatial Analysis Lab's GeoWall

Innovation in computer science and the advent of virtual globes such as Google Earth and NASA's World Wind advance the support for spatial thinking and bring geospatial technology to greater numbers of students and faculty outside traditional domain areas of geography and geology. These advances require new skills and techniques that are necessary to communicate research results and the VS will provide the learning environment to develop and explore these skills. For



Figure 2

¹ National Geographic Society-Roper Survey, 2006

² Entrance examinations included geography as early as 1880 and there was once a Geology and Geography department (1927 – 1968)

example, students may work in teams to develop a model of sea level rise using a geographic information system. Then they can experiment with different “what if” scenarios and choose animation schemes and viewer perspectives to best communicate their analysis.

One need only watch a few minutes of Al Gore’s movie, “An Inconvenient Truth,” to realize the power of advanced visualization techniques to communicate complex scientific and social issues. It is even more apparent that geospatial technologies and spatial thinking are uniquely qualified to grasp these global issues and understand the consequences of our action or inaction. If Smith students are to play a role in shaping our fragile future, then they will need skills and knowledge acquired in the Visualization Studio and the Spatial Analysis Lab.

The proposal to build the VS grows out of our success in the Spatial Analysis Lab (see other SAL proposal) as well as the recognition of the importance of spatial literacy. Developing the VS would coordinate and build on initial investments made by the college to bring some of the newer visualization technologies to campus. Many of our students are characterized as part of the Millennial generation and they are confident in their use of technology and their abilities (Raines 2002). The VS will give them the challenging and creative environment they expect from Smith College.

The VS will offer inquiry based activities and offer tremendous opportunity for observation, understanding, and discovery. And, it is important to note that the proposed VS is not just for scientific data, but will support all types of data that can benefit from visualization technologies. All academic domains will be supported and the use of the technologies is only limited by one’s imagination.

Smith has an opportunity to build on its impressive track record for bringing geospatial technologies to students and faculty across the curriculum. Developing a Visualization Studio brings a systematic and rigorous approach to understanding and explaining complex data in a way that appeals to today’s students.

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References:

The National Geographic Roper Public Affairs 2006 Geographic Literacy Study

Raines, Claire. (2002) *Managing Millenials*. Excerpt from *Connecting Generations: The Sourcebook*, 2002 by Claire Raines Retrieved May 23, 2005 from <http://www.generationsatwork.com/articles/millenials.htm>