**TRIP REPORT AND RECOMMENDATIONS**

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| Attendee's Name: | Joseph Kerski Title: Cartographer, PM |
| Location: | California State University - San Bernardino CA |
| Other USGS Attendees: | Christy Talbot, Beth Gorman - USGS NMD - Menlo Park CA |
| Trip Date(s): | 16-20 July 2000 |
| Purpose of Travel: | **International Conference on GIS In Education** |
| | Conduct 2 presentations, and assist in operating USGS exhibit at conference. |

**Summary:**

The International Conference on GIS in Education was sponsored by California State University-San Bernardino and ESRI, held on the University's campus on 16-20 July 2000. The conference was endorsed by the AAG, California Geographic Alliance, California State University GIS, NCGE, and the UCGIS (University Consortium for Geographic Information Science). The conference brought together approximately 275 educators from K-12 schools, community colleges, universities, local, state, and federal government agencies, and science centers for the purpose of sharing research and pedagogical issues associated with teaching and learning about geographic information sciences. Attendees represented 8 countries and 40 US states.

Charlie Fitzpatrick of the ESRI education team led a discussion on "GIS Tomorrow." GIS is successful in projects because it integrates data, in organizations because it shares information. Mr Fitzpatrick presented about the new ArcGIS technology, a common interface and development platform that incorporates both ArcInfo and ArcView 8.1. For more information, see my report on the ESRI User Conference. Break-out sessions for libraries, K-12 education, and higher education followed.

Michael Phoenix, ESRI's university relations coordinator, led the university break-out session. He stressed the need for diversity in GIS education. GIS education is highly in demand. There are 500,000 estimated business users of GIS software, and 50,000 of those use GIS full time. The industry is growing at 15% per year. Undergraduates with at least 1 GIS course are demanded at a rate of 70,000 per year, with 7,500 demanded with significant GIS training. Twenty percent of the 50,000 full time GIS professionals seek a certificate or degree. The supply of GIS education is increasing to the point where there are now 50,000 course-persons per year; one third of which are delivered in community colleges. ESRI is serving 20,000 persons per year in instructor-led courses and 30,000 per year via the virtual campus online set of courses. There are 1,700 universities outside the USA with ESRI software. Within the USA, over 200 certificate programs are graduating 5,000 per year. Over 20 masters programs are graduating 200 students per year.


*Sunrise at the California State University-San Bernardino campus during the conference.*

The keynote speaker was Dr Barbara Buttenfield, my former advisor from the University of Colorado, concerning visual modeling and GIS education. Dr Buttenfield shared some innovative research projects that use GIS to visualize problems and issues in a new way, including a 1790-1990 population change animation by Jill Hallden of Michigan State University. Dr Buttenfield's shared her research on "mapping" the library catalog in a spatialization model with the University of Colorado, and the Alliance for Technological Learning in Society at http://stormking.colorado.edu/atlas. Education is communication, said Dr Buttenfield, and GIS education is a form of visual communication. Using visualization tools with questions and answers forms a rich educational conversation. Dr Buttenfield stated that the GIS community can learn from the immediate feedback and involvement that is present with such technology as video games.

Dr Mary Marlino, Director of the Digital Library for Earth Systems Education (DLESE) program center, University Corporation for Atmospheric Research in Boulder, conducted a presentation on DLESE. DLESE is being developed through an NSF-NASA partnership and will provide a portal to sponsored missions and facilities such as Earthscope, Digital Earth, and others. Partners include UCSB, San Diego Supercomputer Center, Univ of Colorado, NASA, IRIS, and Unidata. DLESE is being built to serve the earth system education community in a central facility that will provide access to high-quality education materials, access to data sets, and collaboration among the educational community. Information is available on http://www.dlese.org.

I conducted two presentations at the conference:

***The Implementation and Effectiveness of GIS in Secondary Education***

How and why do high school teachers use GIS, and what is the effectiveness of GIS on teaching and learning? This presentation analyzes a three-year study involving a survey to 1,520 teachers, experiments with groups of students using GIS-based and traditional lessons, and a case study of 200 students. Veteran science teachers are most likely to have implemented GIS. Attitudinal, social, and educational factors proved to be more important than technological factors. While the results of experiments were mixed, the case studies clearly found changes in the curriculum and

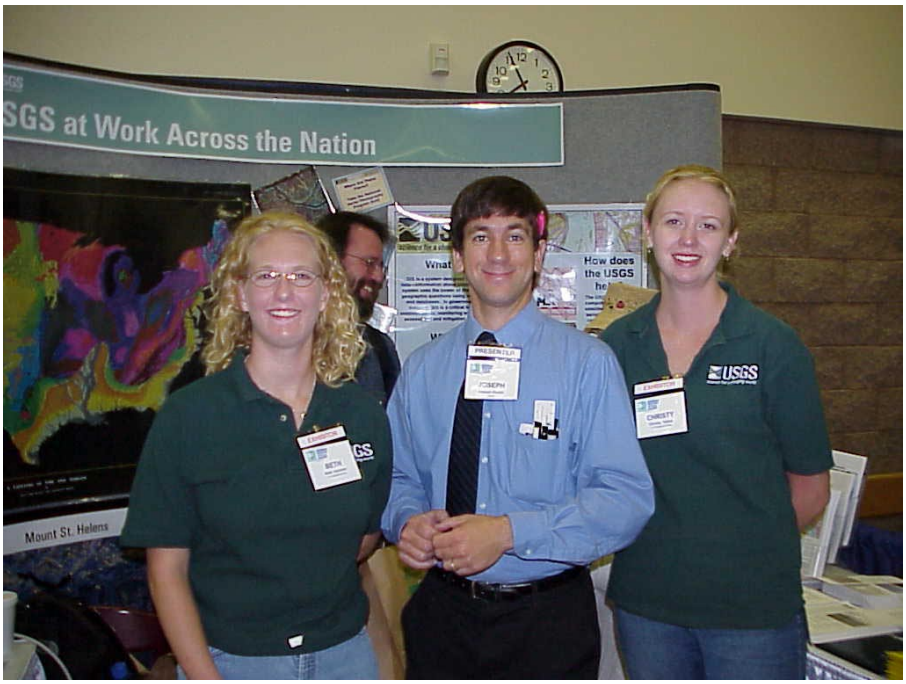
that GIS had a reformist, positive influence on learning and teaching.

***Free and Inexpensive USGS Data Sets for Use in GIS in the Classroom!***

Discover and explore data sets from the US Geological Survey, the nation's largest science agency. Find out how to obtain and use Digital Raster Graphics (scanned topographic maps), Digital Orthophotoquads (scanned aerial photographs), Digital Line Graphs (networks of roads, boundaries, rivers, contour lines, and more), Digital Elevation Models (3-D representations of the earth's surface), and Land Use / Land Cover information. Workshop participants will receive free samples of USGS digital data.

*Joseph Kerski conducts presentations about the implementation of GIS in education, and about the use of USGS data for teaching about GIS and teaching with GIS.*

I also assisted in the operation of the USGS exhibit at the conference, along with Beth Gorman and Christy Talbot, both of whom were very knowledgeable and enjoyable to work with. We featured descriptions of USGS geodata, digital data samples, examples of GIS-based lessons, formal scientific report samples, and a computer with digital data applications and an Internet connection to the USGS web pages. Our backdrop displayed a GIS in education poster, Mt St Helens Landsat image, and the Tapestry in Time map. Along with the ESRI exhibit, ours was extremely popular among the attendees. We brought just the correct amount and type of materials, and I was pleased that the new USGS GeoData publication was available for this conference.




*Beth Gorman, Joseph Kerski, and Christy Talbot staff the USGS exhibit.*


*Attendees at the conference visit USGS exhibit for digital data and publications about the availability and application of USGS digital data in education.*

***VISIT Program***

I attended a meeting of the VISIT board. I am on the board of this program, along with university professors, ESRI, and others; approximately 11 total. VISIT stands for the Virtual Immersion in

Science Inquiry for Teachers. VISIT is an Online Collaboratory for secondary school science teachers to participate in ongoing scientific investigations of contemporary problems in their localities through applying spatial analysis technologies. VISIT is a three-year project supported by a grant from the National Science Foundation Teacher Enhancement program. See http://www.emich.edu/visit/ for more information.

***Presentations Attended***

I attended presentations about the Nature Mapping Program, ArcView scripts, School Tools for ArcView, problem-based learning in GIS education, and the closing "town hall" session, which featured Dr Karen Kemp, Director of the International Masters Program in GIS at the University of Redlands. Dr Kemp led a discussion on issues related to GIS education, and continuing to build a community interested in this topic. I met Anthony de Souza, director of the board on earth sciences and resources, National Research Council. I believe Dr de Souza is the only geographer on the NRC, and it was a privilege to meet him. His group is preparing a report about the future of mapping and geographic science at the USGS, which I look forward to reading.

*I attended a field trip to the San Andreas Fault, which runs just north of the campus. In the photograph above, Ann Johnson, ESRI Community College Coordinator, leads field trip toward the shear zone of the San Andreas Fault. The Cal-State San Bernardino campus is in the distance.*


*It was 106 degrees during the week of the International Conference on GIS in Education! The college is quite active in teaching and training in geographic information sciences.*

***Recommendations***

1) The USGS needs to increase our involvement with GIS in education. This is a fantastic opportunity for our organization to provide leadership, connect with scientists, and connect with educators on an international scale from primary to university.

2) I would like to become involved in the NRC project "Thinking Spatially--GIS Across the K12 Curriculum" and recommend others to do the same.

3) I encourage others at the USGS to become involved in projects such as VISIT.

***Acknowledgements***

I thank Beth Gorman and Christy Talbot for their excellent work and positive attitude at this conference, and for Mara Tongue's contribution to the planning, and for the USGS RMMC for approving my attendance at this important event.

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