

Education-Communications Event Report

Name: GeoTech Colorado 2004:
International GIS Institute
for Educators

Participant and Author of Report:
Joseph Kerski, Geographer, USGS

Dates: 21-25 June 2004

Location: Denver, Colorado
Emily Griffith Opportunity School

Executive Summary

The USGS and the Colorado Geographic Alliance at the University of Denver co-sponsored five days of intensive GIS training for 32 educators representing 6 different states and 2 countries, from Grade 5 to university level. The educators came from Canada, California, Ohio, Colorado, Illinois, Tennessee, Wisconsin, and Utah.

The institute included hands-on spatial analysis using ArcView 3.3 and 8.3 GIS software by ESRI, as well as a field component physical and cultural geography using a tree inventory and mapping exercise and GPS receivers. The institute also included field trips to the USGS Rocky Mountain Mapping Center and Core Research Center, Green Mountain, Dinosaur Ridge, Red Rocks Park, and the Colorado School of Mines Experimental Mine.

GIS proved once again to be an excellent tool to integrate curricular areas and educational levels while providing inquiry-based, problem-based learning while exploring real-world data with an exploratory tool. The evaluations received from the participants clearly showed the value of networking in a hands-on institute such

as this, and opened many doors for future collaborations.

Acknowledgements

I cannot thank my co-instructors enough for their excellence in conducting this institute: Amanda Gierow (Educator), Matt Shetzer (Emily Griffith Opportunity School), Phil Pendorf (Arvada High School), and Steve Wanner (Boulder High School). I believe they are some of the best people in this field, passionate about what they do, and committed to quality education. I very much enjoyed teaching with them and I believe a large part of the positive response from the participants came from this excellent working relationship that we have cultivated for years.

I thank Kirsten Kahn, Mark Montgomery, Maria Alvarado, and Samantha Ertenberg of the Colorado Geographic Alliance at the University of Denver for their financial and logistics support of this institute. I thank GITA and URISA for providing scholarships that helped some teachers to attend the institute. I thank USGS personnel Tom Michalski for the Core Research Center tour and Steve Reiter for the GPS units.



Location of Institute: Emily Griffith Opportunity School, Denver, www.egos-school.com. The school is the oldest adult vocational/technical school in the United States and enrolls between 14,000 and 15,000 students each year. Individualized hands-on instruction

prepares students for jobs in GIS, accounting, medicine, and over 55 other careers or trades. The school began a GIS certificate program in 2003 and Matt Shetzer and I taught the first courses.

I also appreciated our guest appearances during the week: Cobi Chaney and Marsha Celeste from Emily Griffith Opportunity School, Robb Menzies from Denver Public Schools, John Wyckoff from the University of Colorado-Denver, and Esther Worker from ESRI. We all appreciated the resources from ESRI.



The instructional team—Joseph Kerski, Matt Shetzer, Steve Wanner, Amanda Gierow, Phil Pendorf, together with Esther Worker from ESRI.

Most of all, I thank the participants for sharing a week of their summer with us. It was a privilege working with educators from such a variety of geographic areas, curricular areas, educational levels taught, and backgrounds. We also had a GIS technician and a graduate student in the course. Without the excellence of the participants, the institute would not have been a success.

We provided a variety of instructional methods in the institute—individual hands-on work, discussion, presentations, and instructor-led hands-

on work. Over 90% of the workshop was hands-on field and laboratory work.



One of the two computer labs at the school that we used for the institute. In one room was the “thorough investigations” group, and in another was the “special topics” group. Participants switched back and forth between the two rooms during the week. Each day, we held at least one activity with both groups combined.



Science teacher analyzing earthquake distribution around the world using GIS.



Matt Shetzer helps a workshop participant. We had a participant-facilitator ratio of 6 to 1.



One of the GIS In education posters that I created for the institute.

The co-instructors and I have been planning this event for one year. Together with the University of Denver, we took care of the logistics, recruiting and marketing, data, lessons, resources, agenda, finances, and all other aspects required for a successful institute of this size. The time spent was worthwhile. It was a distinct pleasure working as a team over the past year on

this project. I have already followed up with the participants in a supportive role, and planned several workshops in the future with some of the participants, particularly since GIS requires a long-term commitment and networks.

The resources were some of the best we have ever assembled for any institute in terms of quantity and quality of materials, including books, maps, software, data, posters, teachers packets, lessons, information sheets, and other resources. Each participant gathered a whole box of materials. We created a notebook containing lessons, information, tips, and other resources for each participant. We also created a custom CD-ROM for each participant, containing information sheets, utilities (such as the Minnesota Garmin DNR Utility to download GPS points into a PC), spatial data, images, and lessons.



Preparing materials before the participants arrived.

The workshop content included lessons on loading GPS coordinates in GIS, downloading and using USGS digital elevation models, neighborhood and world demographics, climate, earthquakes, hurricanes, tornadoes, fire tower siting, watersheds, site location for rare plant study, and more. We used a combination of lessons that I wrote, that Phil wrote, that Steve wrote, and from the ESRI Press books *Mapping Our World* and *Community Geography*.



Reading evaluations at the end of each day. We adjusted the next day's schedule of activities according to the comments received.

Field Work

As in past institutes, the incorporation of scientific field work and GIS was an important component. This time, we began with a geocaching lesson that Phil and I had prepared for the teachers, and followed it up with a 1-2-Tree tree mapping lesson developed by Lyn Malone, educator from Rhode Island. Some participants mapped statues, the homeless, and other phenomena at Civic Center Park.



Location of field exercise—Civic Center Park, Denver.



Ohio educators find the first geocache—the Mile High Marker on the State Capitol Steps.



Some of the participants under the Colorado State Capitol dome before the One-Two-Tree exercise. We uploaded the attribute and coordinate information into the GIS during the afternoon following the field experience.



Robb Menzies, GIS Coordinator for Denver Public Schools, discusses his work and greets the participants.



Emily Griffith Opportunity School Assistant Dean Marsha Celeste welcomes the participants to the school. She and Cobi Chaney, the IT Dean, have been instrumental in bringing GIS to the school, and we thank them for hosting the location of this institute.

Participants gather outside the USGS Rock Core Research Center.



Tom Michalski, left, explains the Core Research Center's mission and many wonderful stories about the value of rock and mineral exploration at the USGS.



Esther Worker from ESRI Denver brought books to give away and to sell, and discussed future ways of learning more about GIS.



Participants tour the USGS Distribution Facility at the Rocky Mountain Mapping Center.

Field Trips



There was a great deal of interest in examining the USGS thematic maps!



Atop Green Mountain on the next part of our field trip. I thank Valerie Walker, Jefferson County Earth Science teacher, and others for sharing their knowledge with us during the field trip.



Hiking up the Green Mountain conglomerate! Other field trips included Dinosaur Ridge, Red Rocks Park, and the Colorado School of Mines experimental mine.

Summary

Hosting a GIS institute is interdisciplinary, multi-grade-level, involving multiple organizations, and is an excellent example of a long-term effort that is destined to bring about fundamental changes in the school curriculum. It has more to do with systemic change and networking than strictly with the use of inquiry-based tools such as GIS.

Once again, the overwhelmingly positive feedback from the 32 participants confirmed that this type of educational

outreach is a good opportunity for the USGS, to work with educators at a value-added level. Teachers will be working with USGS and other spatial data for these GIS-based activities that they incorporate into their curricula, and recognize that we do provide training that is relevant to their needs. We're still learning, and there were no doubt things that we could have done better, but conducting an institute like this is an excellent way to keep on the path to improvement!

The institute also provided us another opportunity to work with the Colorado Geographic Alliance and the University of Denver. We have worked with the alliance (and other alliances, and with National Geographic) for more than a decade. When we work with a group in a long-term relationship, I firmly believe this brings us more benefit than a one-time presentation, particularly in the case of providing educators the opportunity to use and apply our digital data.

Institute Information

GeoTech Colorado 2004

What is it?

Have you always wanted to integrate real-world spatial data (e.g. hazards, population, and aerial photographs) in a problem-solving, standards-based environment? Using Geographic Information Systems (GIS) in your classroom allows you and your students to investigate current and historical issues such as these. You can use GIS to explore the interactions of the natural, cultural, and physical environment. Explore GIS in a one-week institute FOR teachers BY teachers at GeoTech Colorado 2004.

Who is sponsoring the event?

Colorado Geographic Alliance,
University of Denver, and the US
Geological Survey.

Who is it for?

All Grade 5 through university level Geography, Science, Mathematics, History, Environmental Studies, and Language Arts educators who seek to use computer maps, databases, satellite imagery, and aerial photographs to engage students in exciting, standards-based, real-world investigations of phenomena and issues concerning our planet Earth.

Two computer labs will support intermediate and beginning strands, so that the institute will be valuable (1) if you have never used GIS or (2) if you have used GIS in the past and are seeking to develop your own lessons.

Where is it being held?

Emily Griffith Opportunity School - 1250 Welton Street - Denver, Colorado 80204, Room 115C (on the ground floor).

<http://www.egos-school.com>

Emily Griffith Opportunity School is located across the street from the Colorado Convention Center, Downtown Denver.

Area attractions: The school is 3 blocks from 16th Street Pedestrian Mall, 4 blocks from the Denver Public Library, 4 blocks from the Colorado History Museum and the Denver Art Museum, and 3 blocks from the Colorado State Capitol Building.

When is it being held?

Monday-Friday 21-25 June 2004,
8:00am - 4:30pm

What are your costs?

\$100.

Note that we have scholarships available, thanks to GITA and URISA.

Participants are responsible for any transportation and lodging. Lodging information:

<http://www.hotelsofcolorado.com/>

The closest hotel to the school is:

Holiday Inn
1450 Glenarm Place
DENVER, CO 80202
Toll-Free: 800-423-5128
Tel: 1-303-5731450
Fax: 1-303-5721113
<http://www.ichotelsgroup.com/h/d/hi/1/en/hd/dendt?irs=null>

What will you receive?

- (1) 40 hours of hands-on GIS training and field work.
- (2) Teacher manual with ready-to-use lessons easily applied to content standards.
- (3) CD of spatial data and guidelines for use in the classroom.
- (4) Maps, books, information flyers, and posters.
- (5) Step-by-Step GIS-based lessons in history, geography, mathematics, language arts, environmental studies, and earth science.
- (6) Guidelines on using spatial data
- (7) Free parking, but the spaces are limited, and we encourage you to carpool.
- (8) You will become a part of a network of teachers with similar vision and interests.
- (9) Optional 5 credits from University of Denver

We will hold a follow-up session for local teachers during Fall 2004.

What is GIS?

GIS is a system designed for storing, updating, analyzing, displaying, and manipulating information about places on the planet, otherwise known as spatial data. Geographic inquiry is encouraged by investigating, arranging, and displaying data about places in a variety of ways with maps, images, aerial photographs, 3D models of the landscape, charts, and databases.

What will we do in the workshop?

Hands-on investigation of the following issues and topics, from local to global scale! Population, watersheds, landforms, climate, retail site location, school bus routing, landfills, wildfires, historical population change, coastal erosion, the Titanic, urban landscapes, and more.

Activities will include but not be limited to the following:

- Collecting attributes and points using GPS receivers and mapping them on aerial photographs in a GIS
- Analyzing the relationship between earthquakes, plate boundaries, countries, and cities
- Examining the historical and political reasons for the newly established border between Yemen and Saudi Arabia
- Investigating the relationship between climate and vegetation
- Locating an Internet Cafe in a metropolitan area
- Examining population change from 1900 to 2000 across the United States
- Investigating the best location for a fire or cell phone tower
- Discussing curricular issues of integrating GIS in the classroom
- Examining watersheds and flash floods along the Front Range

--Using resources for educators who incorporate GIS (listservs, web sites, data, other teachers, other training opportunities, conferences).

How is GIS being used in the classroom?

Working with the Colorado Division of Wildlife, high school freshmen conducted public surveys and open houses and used GIS to draft a comprehensive wildlife area management plan, including presenting their final recommendations to the Wildlife Commission.

Rhode Island students studied the economic impact of rivers in their communities.

In North Dakota, high school students helped local state parks use GIS to study and manage their resources. Middle school students mapped out alternative sites for a local landfill and ways to monitor its operation.

Vermont middle school students used GIS technology, science journals, and photos to determine the origin of a local pond and its ecological relationship to the community.

What are your prerequisites?

No previous GIS experience is necessary, but participants should be mouse-literate and have computer experience.

Who are Your Instructors?

Amanda Gierow

Amanda Gierow has over a decade of experience in the GIS industry, conducting dozens of educational workshops for a wide variety of users, both adult and secondary. She has worked with GIS beginning in 1994 at

the Dayton Hudson Corporation, owner of Target Stores. After completing a Masters in Geography and a secondary teaching certification from the University of Texas in 1998, she turned her interests towards GIS and geography education. Since 1998 she has been teaching GIS in both secondary classrooms and private companies. This year she has conducted workshops and classes for teachers, district users, and students in Denver Public Schools. Amanda is an ESRI certified instructor.

Phil Pendorf

Philip Pendorf has been teaching Advanced Geography at Arvada High School since 1985 and has fully integrated GIS into his classroom. He has been providing GIS in-services for teachers this past year for Jefferson County Public Schools. Philip has 29 years experience in the classroom.

Dr. Joseph Kerski

Joseph Kerski serves as education outreach geographer at the US Geological Survey in Denver, Colorado and also an instructor at Emily Griffith Opportunity School, local community colleges and the University of Denver. He has been using GIS since 1985, and conducts over 30 educational workshops and presentations each year with K-12 teachers on the integration of geographic, geologic, hydrographic, and other digital data into the curriculum. He holds a Ph.D. in geography with an emphasis on GIS and geography education.

Steve Wanner

Steve Wanner has taught geography at the middle school and high school level for 33 years. He has been involved with numerous grants, initiatives, and training events involving GIS since the mid 1990s, and has successfully

incorporated GIS in the geography curriculum. He has developed lessons that help students investigate population and flood hazards in their community as well as regional units on Africa.

How Can I Register?

*** Space will be allocated on a first-come, first-served basis. A \$25 is required. We encourage you to register as soon as possible.

Request a registration form by contacting Colorado Geographic Alliance Program Manger at 303-871-7443 or coga-ctir@du.edu. Or visit the website at du.edu/coga and click on "Professional Development".

For technical questions and details, contact Joseph Kerski at 303-202-4315 or jjkerski@usgs.gov



Downtown Denver from Green Mountain, 22 June 2004.

End of report