Educational Outreach Event Report

Name: Community Mapping Project - GIS Training for Educators

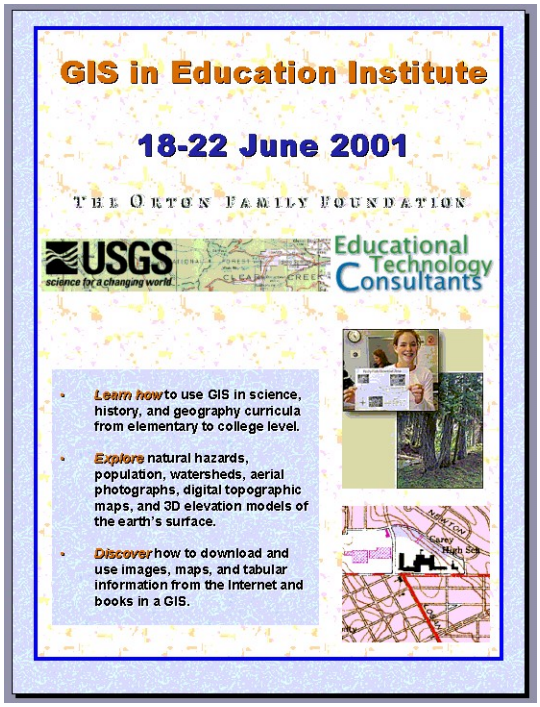
Participant and Author of Report:
Joseph Kerski, Geographer, USGS

Dates: 18-22 June 2001

Location:
Steamboat Springs, Colorado

Executive Summary:

The USGS and the Orton Foundation co-sponsored five days of intensive GIS training for 32 educators from 8 different states and 2 countries, from Grade 3 to university level. The represented states included Colorado, Wyoming, South Dakota, Wisconsin, Texas, Oklahoma, Kansas, and Washington; countries included the USA and the United Kingdom.



One of the flyers used to advertise the workshop.

This was aligned with a project of the Orton Institute entitled "This Land: Mapping Our Communities." This project encourages students to investigate key issues of society, economy, and ecology in the lives of their towns. GIS and GPS technology are important components of this project. Students work to create maps of their communities that provide new valuable information.

Connie Knapp of the Orton Foundation outside Steamboat Springs High School, where the institute was conducted. Ms. Knapp was the chief point of contact for the institute and her support was a key factor in its success.

The co-instructors, plus the Orton Institute, and I have been planning this event for one year. 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. It was a distinct pleasure working as a team over the past year on this project. It was also a pleasure to pick several of these educators up from the airport and host them in my home at the beginning and the end of the institute. We plan to follow up with the participants in future supportive roles, and in future institutes, particularly since GIS requires a long-term commitment and set of contacts.

My trip was funded by the Orton Foundation, an educational funding arm

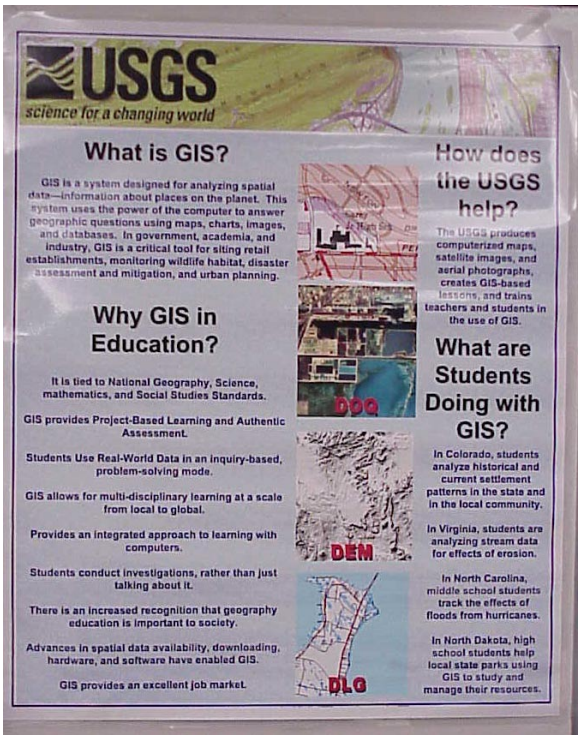
of the Orton Institute. Lyman Orton, proprietor of the Vermont Country Store (http://www.vermontcountrystore.com), supports the Orton Institute and the Orton Family Foundation (http://www.orton.org). The Orton Institute's goals are to develop and deliver innovative community land-use planning tools and processes, to promote citizen participation in community decision making, and to provide education, training and information resources to citizens, community leaders and professional planners to more effectively manage growth.

Appreciation plaque that I received from the Orton Institute.

I am working on formalizing a partnership between the USGS and the Orton Institute for the future. Others (such as BRD personnel) at the USGS are working with Orton on "CommunityViz", 3D software for visualizing community development projects. The organization includes knowledgeable scientific professionals supportive of the educational community, and are a true pleasure to work with.

The training I was involved in was associated with the Yampa Valley Legacy education Initiative (http://www.yvlei.org), a major place-based education facilitator in Steamboat Springs, Colorado. In Vermont, similar activities are occurring through the Vermont Institute of Natural Science (http://www.vinsweb.org).

We linked this project to current events, which is one of the goals in any institute. Routt County is the site of the "blowdown" that occurred in 1997, where over 20 square miles of trees were flattened by a tremendous windstorm. The resulting pine beetle problem and other land-based issues made for a series of lessons that illustrated the value of using local data sources and current events.



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

Joseph Kerski and Patrick Wiegand prepare the resource room for the participants.

The resource room was one 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 boxload of materials. We also created two custom CD-ROMs for the participants, containing information sheets, utilities (such as Waypoint to download Garmin GPS points into a PC), spatial data, images, and lessons.

Roger Palmer facilitating the institute in one of two computer labs at Steamboat Springs High School. We provided a "thorough investigations" and a "special topics" track to meet the needs of this diverse group.

Collecting water samples from the Yampa River, the major river of the region.

It was a privilege working with educators from such a variety of geographic areas, curricular areas, grade levels, and backgrounds. I also enjoyed working with Roger Palmer, Anita Brooks, and Dave Smith, who co-taught the institute with me.

We were pleased at the institute to have a visit from Tom Casadevall, USGS Central Region Director, and Susan Rhea from the Geologic Program's earthquake center. They stopped in while bicycling the "Ride the Rockies" route through the state. We were also privileged to have Glenn, a senior at the high school, for computer support, and Margaret, who works for the Orton Institute, who supported the institute in a myriad of ways.

Field Work

As in past institutes, the incorporation of scientific field work and GIS is an important component. This time, we collected approximately 12 variables from local lakes, springs, and streams, including dissolved oxygen, pH, temperature, copper, molybdenum, chlorine, hardness, and other factors. I learned a great deal from Roger Palmer, who has a master's degree in chemistry, and from others at the institute.

Paul Lander of the Boulder Water Board, one of the institute participants, checks a field meter for dissolved metals in a water sample.

Collecting field data from one of the rivers in Routt County, Colorado.

The Yampa Valley project focuses on students who live along the Yampa and upper Colorado rivers in northwest Colorado. The organizers believe that the truths revealed through careful study of one's own habitat are applicable to the entire planet, but more readily revealed close to home and in early life. This project emphasizes place-based education that focuses on the cultural and ecological heritage of the area. The projects are interactive, and take an interdisciplinary approach to studying the region, and will engage students in each of the five participating school districts in high visibility, community-based projects. The high caliber of these projects is evident on their website, http://www.communitymap.org.

The communities are learning laboratories for students. The organizers seek to get them involved in community, studying and working on real life projects, issues and problems, forging connections with people throughout the area influenced by the project. Projects and activities use the valley as a learning laboratory to help bring about a systemic change in schools, link schools with communities, and leave a lasting educational legacy for the future.

The Initiative is developed by students, teachers, and community members from each of the participating communities and are implemented in the five school districts of Hayden, Moffat, South Routt, Steamboat Springs and East Grand, as well as the independent schools that exist within these districts.

The field test sites for this institute were ideal, as the Yampa Valley abounds in diverse water sources, including rivers, lakes, one of the world's few lithium springs (above), and a sulphur spring.

Recording GPS coordinates that will be tied to images and chemistry data for each collected site.

At right, Dave Smith, one of the co-instructors of the institutes, a GIS trainer and instructor for business, government, and college and secondary students.

Inputting field data into computers for GIS-based analysis. We used ArcView and ArcVoyager GIS software for this institute, from ESRI, Inc.

Summary:

This project is interdisciplinary, multi-grade-level, involving multiple organizations, and is an excellent example of a long-term educational project 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. Many wrote on their daily evaluations (which I sent to the education team and others--see me if you are interested) that this was "the best institute I have ever attended." Teachers will be working with USGS 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.

It also provided a great opportunity to network with the Yampa Valley Educational Initiative and with the Orton Institute. Increased customer spatial awareness and training is essential for the future of all agencies such as the USGS, who rely on a geographically informed public and Congressional funding. 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.

Flyer for Institute

This flyer was handed out at conferences, posted to listserves, and directly emailed to hundreds of educators.

GEOGRAPHIC INFORMATION SYSTEMS (GIS) INSTITUTE FOR EDUCATORS

18-22 June 2001

SPONSORED BY
THE
Yampa Valley Community Mapping Program

A program of The Orton Institute & Yampa Valley Legacy Education Initiative

Use GIS to explore the interactions of the natural, cultural, and physical environment. Apply maps, charts, aerial photographs, databases, and images to analyze trends and plan for the future.

Discover how to implement GIS in your classroom utilizing comprehensive geography, science, and technology standards.

Trainers:

Anita Brooks
Joseph Kerski
Roger Palmer
Dave Smith

Who should attend?

All Grade 6-12 teachers and school technology coordinators who want to support students in exploring the world in a problem-solving, computerized environment.

Where is it being held?

Steamboat Springs High School
45 Maple St.
Steamboat Springs, Colorado

When is it being held?

June 18 - 22, 2001
8:00 am - 5:00 pm

What will you receive?

- 45 hours of hands-on ArcView GIS training, fieldwork, and theory
- Instruction at Steamboat Springs High School, nestled in the majestic Rocky Mountains, by nationally renowned instructors
- Teacher manual with ready-to-use lessons easily applied to content standards
- Digital data for use in the classroom, map books, and goodies
- *Getting to Know ArcView* (ESRI)
- *Optional:* (2) Re-certification credits - *OR* - (2) graduate credits from Adams State College (additional $35.00/credit)
- Catered lunch Monday - Friday and refreshment breaks each morning & afternoon

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. This system uses the power of the computer to answer geographic questions by arranging and displaying all kinds of data about places in a variety of ways such as with maps, charts, and tables.

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.

Who are Your Instructors?

Dr. Joseph Kerski, USGS

Joseph Kerski serves as education outreach geographer at the US Geological Survey in Denver, Colorado and also a community college instructor. He 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.

Roger Palmer, Red River High School

Roger Palmer teaches high school chemistry and summer field science in Grand Forks, ND. He is involved with a NASA initiative in the upper mid-west that uses NASA generated imagery to teach math science and geography to students in grades K-12. He has a M.S. in Chemistry and continues to do research with students in the use of GIS to model integrated approaches to environmental problems.

Anita Brooks, E.T.C.

Anita Brooks is a former high school technology teacher who most recently taught GIS and AutoCad classes. She has authored and taught various technology classes for K-12 teachers such as GIS, Microsoft Office, desktop publishing, and integration of technology throughout the curriculum. Her students have participated in local historical restoration projects using GIS and she developed a nationally recognized GIS class for Hispanic girls. She is completing her M.S. in geography with an emphasis on GIS in education.

Dave Smith, TerraSmith Consulting

David Smith is an independent GIS consultant specializing in education and training for both K-12 and higher education. He works with schools in northwest Colorado integrating GIS into their curriculum and assists in creating partnerships with local community mentors. He is a Colorado certified secondary science teacher and teaches GIS courses at the local community college. As an

ESRI authorized ArcView instructor, he has taught GIS and ArcView classes in private, public and education settings. He has Masters' degrees in Geology, Business, and Teaching.

What are your costs?
Registration - $700.00
Airfare for out-of-town guests
Shuttle to/from Hayden Airport ($42 roundtrip) or rental car from Denver Airport

Dorm rooms $45/sgl & $32.50/dbl per night or 800-922-2722 for

Steamboat Springs lodging reservations; Breakfasts and dinners. Entertainment/activities – Hiking, bicycling and exploring the beautiful Steamboat Springs area high in the Rocky Mountains with hot springs and history galore. Roger Palmer's incredible harmonica playing is also a favorite event!

Application

Please fill out the following information along with answers to the questions:
Name:
Address:
City:
State & Zip:
Telephone:
Email:
School:
Address:
City:
State/Zip:
Grade(s) you teach:
Subject(s) you teach:

Please attach a separate sheet with answers to the following four questions:

How do I feel I will benefit from GIS training?

How will I introduce GIS into my curriculum?

How do I rate myself as a computer user?

How can my class work with the community and apply GIS technology to a real life issue?

Please send your answers, this form, and a deposit of $150.00 payable to:
The Orton Institute
Box 881522
Steamboat Springs, CO 80488

Balance of $550.00 due by May 15, 2000.

Acknowledgements

I would like to thank my co-instructors for their excellence in preparing and conducting this institute: Anita Brooks, Roger Palmer, and Dave Smith. I also appreciated the assistance of Margaret from the Orton Foundation and Glenn from the high school, the high school staff, and especially Connie Knapp from the Orton Foundation. I also appreciated the resources and assistance from Esther Worker, ESRI. I would also like to thank Toni Smith and Elissa Adams who rescued the institute from an undesirable situation by transferring the data for the CD when the original CDs did not work. Finally, I appreciated those at the USGS who loaned laptops just in

case we needed them: Stafford Binder and Patty Volkel.

One-Week GIS Institute Agenda

Day 1

8 Introductions
Goals of the Institute

840 What is GIS?

Who uses GIS?

Applications of GIS.

Review materials in notebook.

915 Hands on exercise: Build maps and conduct queries using Internet Map Server sites.

935 Exercise: What is the missing theme?

10 Break

1015 Thematic Mapping with ArcVoyager: Human Geography
[Special Topics and Thorough Investigations]

1115 Thematic Mapping with ArcVoyager: Physical Geography
[Special Topics and Thorough Investigations]

12 Watch and Discuss K12 GIS Movie

Lunch

1 Thorough Investigations: Earthquakes Everyday with ArcView

Special Topics: 3D Island, Snowfall Across the USA

315 Break

330 All: Institute Participants Analysis

445 Evaluation

5 End

Day 2

8 Introductions
Goals for the Day

815 Thorough Investigations: Tornado Analysis
Special Topics: 3D Analysis, USA Snowfall Analysis

945 Break

10 All: Description of Major Data Sets for GIS in Education

1015 All: Digital Elevation Model Analysis

Noon Lunch

1245 Thorough Investigations: County Demographic Pattern Analysis

Special Topics: County Demographic Pattern Analysis

2 Break

220 Thorough Investigations: Participants Analysis

Special Topics: Participants Analysis

345 GPS Introduction

415 Collecting GPS Points

445 Evaluation

5 End

Day 3

8 Goals for the Day

815 Procedures for Collecting Field Data

830 Field Trip: Collecting Data

Coordinates
Digital image
Copper
Molybdenum
Dissolved Oxygen
pH
Temperature
Alkalinity
Hardness
Free Chlorine
Total Chlorine

Noon Lunch

1 Entering Field Data into GIS

3 Break

315 Analyzing Field Data within GIS

445 Evaluation

5 End

Day 4

8 Goals for the Day

815 Thorough Investigations: Field Trip Hydrologic Data

Review of Importing GPS points into ArcView

Thematic Mapping, Hotlinking, Layouts

Special Topics: Hotlinking Field Trip Data

Routt County Blowdown Analysis

945 Break

10 Thorough Investigations: Hurricane Analysis

Special Topics: Hurricane Analysis

11 Discussion: Integrating GIS in the Curriculum

1130 Work on Projects of your own interest.

Noon Lunch

1245 Thorough Investigations: Historical Demographic and Elections Analysis

Special Topics: Historical Demographic and Elections Analysis

2 Break

217 Thorough Investigations: Examining Online Lessons

Special Topics: Examining Online Lessons

235 Thorough Investigations: Snowfall Analysis

Special Topics: Geology and Land Use Analysis

4 Evaluation

415 End

Day 5

8 Goals for the Day

820 Thorough Investigations: Hurricane Analysis

Special Topics: Hurricane Analysis

940 Break

10 Thorough Investigations: Elections and 3D Analysis

Special Topics: Elections Analysis

1145 Lunch

1245 Thorough Investigations: Snowfall Analysis, Routt County Census Data
Downloading Internet Data for Use in GIS

Special Topics: Land Use Analysis

230 Lunch

245 Report from group discussions
GIS Data Resources
GIS Lesson Resources
Description of CDs
Future Opportunities
EDGIS Listserve:

Post to edgis@list.terc.edu
Info on: https://list.terc.edu/mailman/listinfo/edgis

335 Exploration of web resources and CDs (on your own)

415 Evaluation

430 End

end of report