Developments in Technologies and Methods in GIS In Education

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Greetings! It is an honor to be with you today.
ESRI Education Program
Formally begun in 1992; program mirrors corporate purpose

Advance geographic thinking/inquiry
Further use of GIS and related technologies
Support broadening array of users
Develop professional GIS workforce
Foster stewardship (community to global)
Provide easy access to ESRI tools and support
Relevance of GIS in Education

Name some issues of concern in...

• Your community
  • Your region
  • The World

All of the key issues of our time have a geographic component and can be better understood and solved with GIS.
Key Issues of the 21st Century

Energy
Sustainable Agriculture
Biodiversity
Natural Hazards
Traffic/Transportation
Crime/political instability
Water quality/availability
Climate change
Migration and Urbanization
A GIS offers much more than even the best paper maps.
What we see depends mainly on what we look for.

--John Lubbock
The Geographic Inquiry Process

1. Ask Geographic Questions

2. Acquire Geographic Resources

3. Explore Geographic Data

4. Analyze Geographic Information

5. Act on Geographic Knowledge

Repeat?
GIS = Hardware, software, data, procedures, people.

GIS = A decision-making tool.

GIS = Part of geotechnologies.
Context and Content – Location - where is it? Place – what is it like?

• Seeing the Whole
  • Patterns
  • Linkages
  • Trends

• Managing Places
  • Watersheds
  • Communities
  • Neighborhoods
  • Ecosystems
GIS in Schools: Why

**Individual**

- **Classroom:** Gain spatial, critical thinking, and problem-solving skills
- **Community:** Become active community participants
- **Career:** Gain key 21st century workforce skills

**Institution**

- Improve planning and decision making by school administrators
Teaching about GeoTech vs. Teaching with GeoTech

- GIS
- Remote Sensing
- Geomatics
- Informal Education: Clubs, 4H

- Environmental Studies
- Earth Science
- Chemistry
- Biology
- Geography
- Computer Programming
- History
- Mathematics
Drivers for Teaching With Geotechnologies

- Constructivism
- Problem-based learning
- Authentic Assessment
- National Curricula and Educational Standards
- National Academy of Sciences: *Learning to Think Spatially*
- Hardware, software, data advances
- New Geospatial Tools
1. Enter a location
   - Locate
   - Clear

Enter a ZIP Code, address, or place of interest (e.g., Grand Canyon).

2. Select a demographics layer
   - Median Age

3. Resize the map
   - Width 924
   - Height 300
   - Resize

Enter values or drag bottom right corner of map.

- Include scale bar.
- Hide U.S. demographics.
- Click map for specific demographic data.
Sustainable Tea Cultivation--Kenya

[Image of a map showing the Kenyan landscape with various landuse classes and integrated software interface interfaces on the side to the left. The map includes different overlay layers such as elev_point, elev_water, urban_place, and populated places, indicating a comprehensive spatial analysis interface provided by ESRI.]
Geotechnologies can *enhance* instruction because they are:

- Multidisciplinary
- A real-world technology using real data
- Involving authentic tasks and assessments
- Encouraging community connections
- Used at scales from local to global
- Tied to education standards and national curricula
More reasons why...

• Inquiry-based
• Team-based
• Problem-solving approach
• Project-based
• Engaging

Process is just as important as the product (Constructivism)
Bloom’s Taxonomy

3 Types of Learning:
- Cognitive
- Affective
- Psychomotor

GIS nudges students toward the top of the pyramid!
GeoTechnologies allow students to study local to global phenomena and incorporates fieldwork.

The importance of getting possible students out in the field as much as and as young as possible has been well documented (*Last Child in the Woods* (Louv), “No Child Left Inside”, AGI).
Learning to Think Spatially--NRC
Geospatial Technology Competency Model
New Research on GIS in Education

◆ GIS Education Research Community

◆ GIS Education bibliography: 1,600 entries

GIS is for more than teaching
A New Pathway
at Piner High School
Map Your Future!

Geospatial Technology Pathway at Piner

Welcome and thank you for your interest in Piner High School's Geospatial Technology Pathway. We are excited to bring this unique opportunity to Santa Rosa City School Students. The Geospatial Technology Pathway is led and taught by the same people who created and designed it, Ms. Erickson and Mr. Kruger.

We truly believe that this is an amazing learning opportunity that will motivate students into new career and educational opportunities. Students will experience the latest GIS technology in our new GIS lab along with our GPS field computer and survey equipment. Students will learn a valuable skill while applying science, math and technology concepts in a supportive, engaging environment that includes fieldwork and authentic projects. Ms. Erickson and I have over 33 years of teaching experience and we look forward to making your educational experience valuable and rewarding.

Kurt Kruger
Program Coordinator/GTP Instructor

Kristi Erickson
GTP Instructor

Who may participate in the GTP program?

The Geospatial Technology Pathway is aimed at students who are curious, enjoy science, math and technology, are excited about project-based learning and willing to complete a 3 year integrated program. We are looking for a diverse cross-section of Piner’s students. You do not have to be a straight A student (but can be).

Most important is that you are inquisitive, have a good work ethic and possess a passion and excitement for exploration and hands on learning. You will not only learn Science, Math and Technology, but gain skills that will take you into the workforce, certificate programs or further College/University education. Your experience begins in the GIS lab; moves out into the community for data collection and applied Independent projects, and finally a third year internship.

GTP Goals:

- To make Science, Technology, Engineering and Mathematics (STEM) relevant and approachable to students by linking the standards based content to real world application and/or vocations.

- Encourage students to participate in the scientific process by providing real, authentic, community based GIS, Astronomical, Meteorological and Salient research projects which link directly with a variety of occupational and/or educational opportunities.

- To provide students with the tools necessary to integrate science, math and technology so they may perform authentic research.

- Prepare students for both a career and/or higher education in Science, Math and Technology. Provide a collaboration and integration between science, technology, students, parents, teachers, school, and community.
GIS in Schools: What’s Needed

- Tools
- Data
- Support

Successful geospatial educators & students
Esri Education User Conference

- San Diego, July 2011
- >500 people, multiple sessions and events
National Conference on Geography Education

2011 Conference

PORTLAND, OREGON SUMMER MEETING!

August 1st - August 7th, 2011

Hotel and Travel Information
edcommunity.esri.com

- Portal dedicated to educators
GIS Education Support

• ArcLessons: Free GIS teaching materials and data

• iGETT:  http://igett.delmar.edu

• GeoTech Center: http://www.geotechcenter.org
Curricular Example: Crime Mapping

Crime Analysis and Mapping Module

Download Now

File Size: 9.90 MB

File Type: ZIP (compressed file)

Topic: GIS Software Skills

GIS Level: Beginning

Target Audience: College-University Undergraduate

Geographic Scale: Local

Location: NC

Description:

Project found in CAM1.zip
Contains Abstract.rtf, GISAccess-CIAM (Power Point), Readme.txt, and 3 exercise folders: Crime Queries, Map Design & Layout, and Crime Project. Within each exercise folder is the exercise.rtf, instructor.rtf, Readme.txt and a data folder containing arcview format data. Only the crimeproject/data folder contains several other folders, each with the data.dbf, methodology.rtf and readme.txt.

Software: ArcView 3.x

Time Required: 4 hours

Language: English

Date Posted: 4/30/01

Focus: Content

Style: Step-by-Step

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ArcGIS Online
http://www.arcgis.com
Our World GIS Education book series receives award
The National Council for Geographic Education (NCGE) presented the 2006 Geography Education in Media awards to Our World GIS Education. This award is given to recipients based on the quality and impact of the production in advancing the learning and teaching of geography at any level and for any age group. Learn more.

Thinking About GIS by Dr. Roger Tomlinson is now available in Spanish
The first Spanish language publication from ESRI Press, Planteando un GIS: Planificación del Sistema de Información Geográfica Avanzada a Generales, brings Tomlinson’s methodology for GIS planning to a wider audience. Learn more.

Listen to a Podcast
Building a GIS details a time-tested and proven system design process that will help organizations plan the necessary infrastructure to sustain a GIS. Listen to an interview with author Dave Pelley as he discusses his new book.

ESRI Press Catalog
ESRI Press publishes books on GIS, cartography, and the application of spatial analysis to public and private endeavor including land-use planning, health care, education, business, government, and science, among others. View all of the publications currently available from ESRI Press in the 2006 ESRI Press Catalog.

Browse Books By Category
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- The Case Studies Series - See GIS at work in your field.
- ESRI Software Workbooks - Step-by-step exercises teach basic GIS tasks.
- ESRI Software Documentation - ArcGIS 9 books and more.
- Atlas - New Category
From Visualization to Analysis

...Dig deeper; Think Geographically
Now more than ever, we need people who think broadly and who understand systems, connections, patterns, and root causes… how to think in whole systems, how to find connections, how to ask big questions, and how to separate the trivial from the important.

Think of the Consequences:

If future societies do not know how to think critically and spatially.
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