Designing Better Maps and Resources for GIS Education

NCAR BRIGHTE Workshop 2015

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Designing Better Maps

Let’s look at some examples
What not to do!  Hurricane Tracks 1851-2004
Map Note and Trace Downstream: **Keep it simple.**
Citizen Science: Symbolizing Results from an Editable Feature Service
Designing Better Maps

- **TODALSIGS**
- Title, Orientation, Date, Author, Legend, Scale, Index, Grid, **Source (cloud!)**
- Vector field renderer. Military METOC and weather symbols.
Stream Gages, Current Conditions:  Web Mapping Application
Ecological Regions of the World: Story Map: Map Journal Format

Gardiner, Montana, United States

**Bioclimate:** Cold Moist

**Landform:** Hills

**Rock Type:** Unconsolidated Sediment

**Land Cover:** Mosaic Vegetation / Cropland

Return to Ecological Land Unit map.

This place just up the hillside from Gardiner, Montana has a wide range of climates. The most likely climate encountered here is cold and moist (37%), but there are areas of cool moist, cold semi-dry, cool semi-dry and cold wet climates as well. These are hills and foothills comprised mostly of unconsolidated sediment, with some metamorphics. Land cover is a mosaic of forest with shrubland and grassland, with some areas of both broadleaved and needleleaved boreal moist forest.
Disappearing Glaciers: Story Map: Map Journal Format

Aletch Glacier, Switzerland

The large photo to the right shows Europe's longest valley glacier, the Aletch in Switzerland, which has retreated significantly over the last 30 years. The image below shows how the glacial snout (terminus) retreated between 1900 and 2005.

The image below shows the changing extent of the Aletch glacier in 1850, 1973 and 1997.

3D view of the Aletsch region with a satellite image from 1997, depicts glacier extent in 1850 (in red), 1973 (in blue). The Aletsch glacier is now formally part of the UNESCO world Heritage. DEM25000 swisstopo (BA045907)
Real Time Weather: Displaying and Analyzing Real Time Data
Temperature Extremes: In a Web Map

ArcGIS

Extreme Temperatures for USA: January and July 2011: Thematically Map...

Legend

July 2011 - High

January 2011 - High
Climate Shifts: Change Over Time

ArcGIS - Koppen-Geiger Observed and Predicted Climate Shifts
Sea Level Potential Rise: Raster Symbology
Tornadoes: Scale Dependency, Points vs Lines

ArcGIS - USA Tornadoes from Esri Feature Service
What not to do! Hurricane Tracks 1851-2004
Back to Hurricanes: Better: ArcGIS Online Map
Further Investigation:

*Map Use and Designing Better Maps*
--books from Esri Press

Esri Mapping Center
http://mappingcenter.esri.com/
Resources

1. Data
2. Tools
3. Curriculum and Training
4. Partnerships
5. Research
Resources

Data:


Real Time Data
Streaming Data vs Downloading Data
Resources

Tools:

2. ArcGIS Online web mapping applications: Storymaps, swipe, profile, 3D Scene Viewer, presentation mode.
3. Field data collection tools; citizen science capabilities.
4. Closer integration with R.
Field Data Collection Tools and Methods

- Snap2Map
- Snap2Data
- Explorer for ArcGIS
- Collector for ArcGIS
- GeoForm
Enable Ubiquitous GIS work

To discover, use, make, and share maps from any device, anywhere, anytime
Enable Ubiquitous GIS work

To discover, use, make, and share maps from any device, anywhere, anytime
GIS at Work

Integrate, display, analyze, and enrich information from many sources

- sensor networks
- images
- video
- business systems
- web services
- big data collections
- analytics
- spatial data
- social media
- spreadsheets
Supporting:
- Standards: W3C, OASIS, OGC, ISO/TC211...
- Openly published formats
- Open APIs
- Spatial ETL
- Direct Read & Write of Formats
- Esri GitHub resources & Open Source work
To Learn More:

https://github.com/Esri (270+ open source projects)


(Esri standards support paper)
Resources

Partnerships:

1. NEONINC, NCAR, USGS, Universities (Penn State, U of Redlands, U of Oregon, etc), AAG, NGS, Geotech Center.
2. Citizen Science Community.
The Geospatial Technology Competency Model
GeoMentors Program:
Connecting schools with GIS professionals

www.geomentors.net

AAG-Esri ConnectED
GeoMentors Program:
Give Back, Be a GeoMentor!
Resources

Curriculum and Training

2. SpatiaLabs.
3. Learn.arcgis.com
4. Geographyuberalles – video channel.
5. Understanding ArcGIS.
6. www.esri.com/training
8. MOOCs: Esri and University.
Resources

Research:

1. GIS in education.
2. How the Earth works.
3. How the Earth should look (Geodesign).
4. How we should look at the Earth – analysis, modeling, data sets, interoperability.

For more:
Resources

Geotechnologies:

Skills for the Geo-Enabled Future:

1. Curiosity
2. Ability to work with data.
3. Understanding geographic foundations.
4. Adaptability
5. Effective Communications
The Stool of Geoliteracy

Continental Drift?
Resources

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?
Five converging forces are making this the most exciting and encouraging time ever for spatial literacy in education using geotechnologies.
Why the Time is Perfect for Spatial Thinking In Education and Society
Now more than ever, we need people who think broadly and who understand systems, connections, patterns, and root causes ... how to think in terms of whole systems, how to find connections, how to ask big questions, and how to separate the trivial from the important.

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