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SHARING SPATIAL DATA WITH STUDENTS ON THE IPAD

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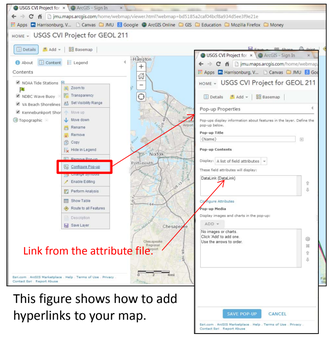
Abstract

Utilizing authentic data in the classroom gives students an opportunity to practice scientific decision making. This skill is important for upper-level geology majors and non-science majors. Using authentic data in introductory classes can be challenging because it is often in a format that is not user-friendly. Spatial data has a particular importance in the geosciences and is unique compared to many data formats that students have experience with in other disciplines- it is not verbal or tabular and location does matter. Spatial data requires students to visualize data in a format that many have little experience with.

Today technology and content can be merged to create a user-friendly platform to share spatial data. Most students are intimately familiar with smartphone and tablet technologies. The techniques students use repetitively in their day-to-day lives can be helpful in the classroom. The iPad offers simple, free apps that take advantage of the students ability to zoom, pan, and toggle between screens. These skills allow students to easily navigate spatial data in an environment they are familiar with. The ESRI app provides tools to measure distance and area and identify and query features. The integration of pop-up dialogue boxes with hyperlinks integrates data from any other online source.

Combining ArcGIS and the iPad through ArcGIS Online and the ESRI app seamlessly transfers spatial data compiled on your computer to your students. This allows the instructors to take advantage of the plethora of free online spatial data. This poster explains the process of compiling and disseminating spatial data for student use.



This figure shows how to add hyperlinks to your map.

How it works:

Table 1. NOAA Water Level Data		
Station	Maximum Observed Water Level (green), ft	Maximum Storm Surge (purple), ft
The Battery	11	9
Kings Point	13	13
New Haven	11	9
New London	<8	6.5
Bridgeport	13	10
Montauk	7	<6

Why use iPads in the classroom?

Our students love tablets and smart phones. Too often these devises become a distraction and hinder learning in the classroom. *Is there an opportunity to use this technology to improve learning outcomes?* It is generally assumed that enhancing **student interaction** and incorporating **data** into the learning experience will improve learning outcomes. The iPad offers opportunities to do both.

In the geosciences we often work with spatial data. Spatial data can be cumbersome to work with in traditional formats. It does not fit nicely into an Excel spreadsheet and printing paper maps that allow students to analyze data at multiple scales and locations can be time consuming and expensive. However, the *free* ArcGIS app allows students to easily view and analyze data on the iPad. With the ArcGIS app students are able to pan and zoom to different regions and interact with the data using the identify tool and hyperlinks. This app provides a way to organize and connect limitless amounts of data for further analysis.

Positive Outcomes

- Positive feedback from students. They like using this technology.
- Students are highly engaged during the exercise.
- Projects are extremely interactive and use authentic data. Students can complete real world analysis.
- Minimal technical challenges for the students.
- ESRI App is free and compatible with the iPhone and Android. Therefore, some students can provide their own hardware.
- The iPads are easier to use in a large format classroom than laptops. They are easier to move than laptops and have no cords. Because they start much faster than a laptop students lose little time waiting for the device to turn on.

Additional Challenges

- The instructor will need a subscription to ArcGIS online to post data.
- Need Wi-Fi because the maps are stored online.
- More research needs to done on the effectiveness of these types of projects.

Example Projects:

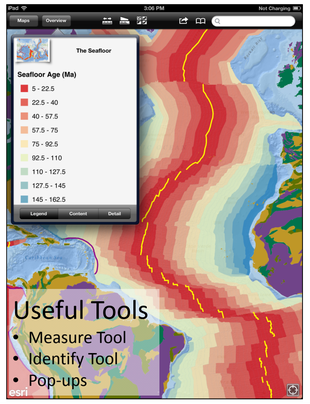
Project 1: Plate tectonics and the Seafloor:

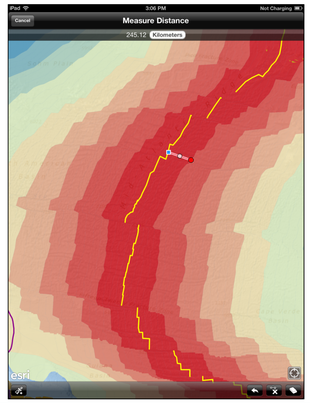
Objectives

- Examine the age of the seafloor and explain how it supports plate tectonics.
- Use the age of the seafloor to calculate spreading rates.

Analysis

- Measure Tool





Project 2: Shoreline Change Analysis

Objectives

- Evaluate how variables such as tide range, wave height, geology, and sea level rise affect the rate of shoreline change.

Analysis

- Wave Data
- Erosion Rate
  Using the measure tool.
- Tide Range
- Sea Level Rise