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Project Title: Beyond the Walls: Making Mobile Learning Mobile

Explain what you want to achieve and how:
My project is to integration the use of geographical information systems (GIS) into the Introduction to Soil Science course. This course requires students to evaluate the properties of soil (chemical and physical) and to determine the best management practices associated with each individual soil. My plan is to incorporate GIS into each aspect of the course to prepare students for working in the field of soil science.

1. Field Measurements/Fertilization
Each year, students are required to take measurements of a field to calculate acreage. Once the acreage is determined, students can then determine fertilization rates and estimated costs. Using GIS technologies (There are a variety of apps available) students will walk the boundaries of the fields to collect a track of data points. The data will then be uploaded into ArcGIS for land measurements and map sharing. Students will be able to compare their measured plot to the plots of other students. Students will also be able to view these imported tracks as a layer on a satellite image or a topographic map.

2. Soil Type
As part of the course, students are required to take soil samples for testing purposes. In the past, students have given a location for where they took soil samples, but at bests students have only provide an address. Using the Collector app, students will be able to pinpoint the exact location where the sample was collected. Students will also input information about the soil type and soil test results for each sample. The data collected will be compiled into one group map with a map layer containing soil type information from the Natural Resource Conservation Service (NRCS) and USDA. As a class, students will verify the accuracy of soil
survey information provided by NRCS and USDA. (Although the date of soil survey mapping by USDA varies by county, the soil survey maps are dated. For example, the soil survey map of Hamblen County was originally completed in 1947.)

3. Best Management Practice (BMP)
After collecting soil samples and conducting soil fertility tests, students will be required to recommend BMPs for the area. Students will utilize the presentation option in ArcGIS to create a presentation that defends their BMP recommendations based on soil type, topography, land use, and conservation practices. Students will utilize this GIS technology as they present their work to the class.

4. Lab Experience
Within ArcGIS, a separate map will be created for students with each off-campus lab location marked. Students will be able to utilize this map to navigate to the various farms. By having a compiled map of all lab locations, students will be able to gain a geographical perception of where each farm is located in relation to other landmarks. Students will also have the option to import additional layers (soil type, hydrological information, topographical, etc) to improve best management practices recommendations.

Provide some background on how you came up with this project:
In 2014, I was part of the GeoTED Consortium hosted by Virginia Tech. The objective of the consortium was to increase the awareness of geospatial technologies among faculty members who may not traditionally receive training in this area. Since that time, I have slowly introduced individual assignments to my students to increase their awareness of geospatial tools. As I have watched students struggle with the use of GIS software, I have recognized the need to increase exposure to GIS software and tools.

Smartphones have revolutionized the use of GIS systems, better known as navigation, by the general public. Our agricultural labs often meet off campus at area farms. In years past, copies of directions were handed out to the students. Today, the students are only interested in an address because they would much rather use the GPS/navigation app on their phones than keep up with a paper copy directions.

When I heard that the NRCS now completes a significant portion of Environmental Quality Incentive Program (EQIP) plans using online mapping software, I realized the urgency to incorporate GIS into agricultural course. As a result, I began to consider how I might be able to better prepare students for the use of GIS technologies in the agriculture industry. After talking with agriculture professionals, I decided that integration of GIS technologies was critical to the preparation of agriculture students.

How will you evaluate the effectiveness of the project:
This project will be evaluated based on the awareness of GIS and the ability of students to create and utilize maps.
To measure the student awareness of GIS technologies in agriculture, a pre- and post- test will be administered. The pre- test will be given on the first day of the classes; the post-test will be given on the last day of classes. The test will include items that measures the students' awareness of GIS technologies and the various uses of these technologies in the agricultural field.

To measure the student skill in using GIS technolgies, student maps will be evaluated based on a predetermined set of skills:
- The student maps will have an imported track file that is converted to a compatible formate (.gpx file)
- Student maps will include imported map layers from government agencies (NRCS and USDA)
- Student will create mapnotes to accompany collected waypoints that includes physical and chemical properties of the soil at each location
- Class map will include at least two waypoints from each student
- Student presenations will have a collection of maps that build the case for the use of recommended BMPs

By submitting this form, I acknowledge and agree to abide by the terms of this proposal and WSCC Fellows Program. I will complete all assessment tools (reports and video). I have read and agree to the terms of the WSCC Intellectual Property Rights policy. Read the WSCC Policy and Procedures Manual (opens in a new window); search for page 287 and read “Intellectual Property Rights,” or read the TBR Intellectual Property Policy (opens in a new window). I understand that to receive the stipend I must complete the project and present the findings at Inaugural Week.