A Professional Development Approach for Teaching Socio-Environmental Science Investigations with Mobile Geospatial Technologies

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Curriculum Approach

Develop geospatial learning activities in such a way that the software and hardware become transparent to the user.

Visualizations are designed to be quick and intuitive for both students and teachers to use.

Novel form of hybrid professional development (PD), with both face-to-face and online learning.

Design partnership with classroom teachers.

Incorporates design principles in each investigation to promote geospatial thinking and reasoning skills:

(1) Use motivating contexts and personally relevant and meaningful examples to engage learners.
(2) Design image representations that illustrate visual aspects of social studies and Earth and environmental scientific knowledge.
(3) Design web GIS data to make geospatial relations readily apparent.
(4) Scaffold students to analyze geospatial relations.
(5) Develop curriculum materials that better accommodate the learning needs of all students, while also expanding the geospatial pedagogical content knowledge of teachers.

Support Materials

- Student and Teacher Guides
- PD Materials
- Video Tutorials

Learning Activities

- Students collect geospatial data in their local environment.
- Students analyze crime and tree canopy data in their city to explore patterns in the data.
- Students and teachers analyze data using various tools and features in ArcGIS online.
- ArcGIS online is free for US K-12 schools.
- Data collected from six separate classes color coded by tree genus. Also shown is an individual class’s data table, which can be sorted or filtered by field.
- Crime Data Layer
- Tree Canopy Percentage Layer
- Customized interface and data displays to support teacher and student’s teaching and learning needs.

Sample GS-TPACK items:
1. I can analyze data using GIS.
2. I can plan lessons that make effective use of GIS.
3. I can adapt my use of teaching strategies when using geospatial technology for student learning.
4. I can use geospatial technology to teach content effectively using a variety of teaching strategies.

Sample GS-TPACK items:
1. Strong growth in teacher’s geospatial pedagogical content knowledge.
2. Increased map use by teachers, both within and outside of SESI activities.
3. Teacher use of maps as media for inquiry, not didactic instruction.
4. Teacher modeling to guide student’s analysis in GIS.

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