Teaching Science and Investigating Environmental Issues with Geospatial Technology: Designing Effective Professional Development for Teachers

A book edited by:
James G. MaKinster, Hobart and William Smith Colleges
Nancy M. Trautmann, Cornell University
Michael Barnett, Boston College

To be published by Springer Publishing Co.

Introduction
Geospatial technologies include geographic information system (GIS), global positioning systems (GPS), Global Visualization Tools (e.g., Google Earth, WorldWind, Arc GIS Explorer, etc.), and web-based 2D and 3D visualizations of Earth, landforms, and/or other geographic data. Collectively, these technologies enable users to explore locations, explore spatial data, create maps, and access much of the same data used by professionals. Increasingly, geospatial technologies are available to science students and teachers and enable them to access the same data as and conduct investigations that are similar to professional scientists and environmental geographers.

The emerging field of using geospatial technology to teach science presents an excellent opportunity to discover the ways in which educators use research-grounded commitments in combination with their practical experiences to design and implement effective teacher professional development projects. Loucks-Horsley et al. (2003) put forth a useful framework for thinking about teacher professional development and others have since identified characteristics of science teacher professional development that contribute to reform-based practices. The next step is to explore these and other design principles within specific contexts. Often missing from the literature are in-depth, explicit discussions of why and how educators choose to provide certain experiences and resources for the teachers with whom they work, how the nature and focus of projects change over time, and the resulting outcomes.

This book will serve as a valuable resource for those designing teacher professional development projects focused on teaching science with geospatial technology. Our goals are to both document the state of this field and provide researchers with the tools, ideas, theories, and practical models to move this field forward.

The first half of this book will enable science and environmental educators to share the nature and structure of large and small scale professional development projects while discussing the theoretical commitments or professional development model(s) that undergird their work. This
book will provide an opportunity for designers of professional development efforts to describe the iterative redesign of projects over extended periods of time and the outcomes of their work. The goal of this section is to provide other scholars models for the design and implementation of similar efforts.

The second half of this book will enable faculty and others who focus on the development of geospatial resources on national and international scales to share the ways in which they attempt to meet the growing needs of teachers across the globe. These efforts will reflect the ongoing conversations in science education, geography, and the geospatial industry in ways that embody the opportunities and challenges inherent to teaching science with geospatial technology.

Target Audience
This book is primarily intended for education faculty, science faculty, geography faculty, museum or center staff, and academic researchers who are designing teacher professional development programs, conducting science outreach, and/or teaching courses on science teacher professional development. This book can be utilized in graduate courses, as a supplement to course materials, within professional development projects, and as an addition to library reference sections.

Submission Procedures
Researchers and practitioners are invited to submit a 1-2 page chapter proposal on or before March 6, 2009. The proposal should explain the focus and concerns of the proposed chapter, identify a theoretical framework and/or professional development model to be used (Section 1 chapters), present a summary of the chapter, and discuss the intellectual merit. Authors of accepted proposals will be notified by March 15, 2009. Full chapters are expected to be submitted by May 2, 2009. All submitted chapters will be reviewed by at least two reviewers and the entire manuscript will be reviewed by an external reviewer after the revised chapters are compiled.

Important Dates
March 6, 2009: Chapter Proposal Submission Deadline
March 15, 2009: Notification of Acceptance
May 2, 2009: Full Chapter Submission
June 1, 2009: Chapter Review Returned
August 1, 2009: Revised Chapter Submission Deadline
September 1, 2009: Book Draft Submitted to Springer
To Be Determined: Final Revisions Based on Feedback From Springer
Current List of Contributing Authors
Heather Almquist, Lisa Blank, Jeff Crews, George Stanley, Marc Hendrix – University of Montana
Lisa Blank, Jeff Crews, and Niels Maumane – University of Montana
Alec M. Bodzin, Violet Kulo, and David Anastasio – Lehigh University
Tom Baker and Joseph Kerski – ESRI
Shey Conover – Island Institute, ME
Bob Coulter – Litzsinger Road Ecology Center
Karen Edelstein – Finger Lakes Institute
Daniel Edelson – National Geographic
Rita Hagevik – University of Tennessee at Knoxville
Bob Kolvoord – James Madison University
Carla McAuliffe – TERC, LuAnn Dahlman – NOAA, Jeff Lockwood – TERC
Cathlyn Stylinski – University of Maryland Center for Environmental Science
Daniel Zalles, Phil Vahey, and Louise Yarnell – SRI

Draft Table of Contents
1. Introduction
2. Geospatial Technology: What does it include in the 21st century?: Editors
3. The State of Geospatial Teacher Professional Development: Editors
4. Section 1: Designing Effective Professional Development
   i. GIT Ahead and Crossing Boundaries: Trautmann and MaKinster
   iii. Using Spatial Tools to…: Bodzin, et al.
   iv. Paleo Exploration Project: Blank, Crews and
   v. Project E
   vi. Project F
5. Section 2: Supporting Teachers on National and International Scales (potential topics)
   i. Interpreting and analyzing current events using geospatial technology: Edelstein
   ii. Curricular resources
   iii. Online courses
   iv. Impact of outreach centers
   v. Research opportunities for teachers
   vi. International perspectives
   vii. Urban education
   viii. Rural education
   ix. Pre-service education
   x. Equity issues
6. Looking across models of professional development: Editors