

Presentation: Integrating GLOBE into Preservice Education

Michael Odell, Ph.D.

University of Idaho

Abstract

Integrating GLOBE into preservice teacher education is one strategy for improving science literacy, scientific inquiry skills, and teacher understanding of the nature of science. Elementary teachers typically receive minimal science as part of their preparation. This preparation typically includes 2-3 introductory science courses. Introductory courses are often taught in large lecture formats with separate labs. GLOBE can be a mechanism for designing a field-based science course that prepares students to conduct long-term scientific inquiry projects and provide the appropriate experiences that can be replicated or transferred to the K-12 classroom. This also provides universities a mechanism to teach science that is aligned with the K-12 teaching, content, and assessment standards.

The Integrated Science Course for Elementary Educators

Preparing highly qualified elementary teachers in science is one goal of the University of Idaho's preservice teacher preparation program. Prospective elementary teachers at the UI are required to complete 12 credits of science. Students must complete a course in physical, earth and life science. Typically these 3 courses were the introductory courses in biology, chemistry and geology. An analysis of the content of those courses revealed gaps in content and skills when compared to the Idaho Achievement Standards future elementary teachers are expected to teach. To remedy this issue, INTR 103: Integrated Science for Elementary Education majors was created to cover concepts in the earth and physical sciences. This change allowed for the teaching of content aligned with the Idaho standards and facilitated a non-lecture environment for the teaching of science. An added requirement to the INTR 103 course was the introduction and completion of an extended inquiry project that is conducted throughout the entire semester. Students conduct a watershed study of a local stream system. The Paradise Creek Watershed is studied from its source to its end (10 miles). There are six study sites along the stream and students in

the course have utilized the same sites for 5 years. Students in teams, study the water quality of the stream, the landcover, and soil of their site. Paradise Creek's source is located on a mountain a few miles north of town and flows down the mountain through wheat fields. Once in town, it flows through residential neighborhoods and into the heart of the city. As it exits town, it flows past the water treatment facility and finally into the Palouse River. Students are given the opportunity to see the impacts of humans on the environment. Students utilize GPS to find their study sites and GIS to map the watershed. To facilitate this activity, instructors chose to utilize the GLOBE program. Although GLOBE is a K-12 program, its online database, visualization tools, and science protocols were appropriate for the study. Selecting GLOBE also served a second purpose. Since most of the students enrolled in the course will become teachers, it provides them training in an inquiry-based technology rich program they can utilize upon entering the profession. Students collect data with traditional science equipment and hand-held computer-based probes. Hydrology data includes transparency, temperature, dissolved oxygen, pH, electrical conductivity, nitrates, and alkalinity. Landcover data includes biometry measurements, GPS location, and site photos for comparison over time as well as determination of Modified UNESCO Classification (MUC) code. Biology and biometry measurements included the determination of dominant and co-dominant vegetation types, tree height and circumference, grass biomass, canopy cover, and ground cover. Soil moisture, temperature, and soil pH are also collected. These measurements are all entered into the GLOBE database. The GLOBE Web site (www.GLOBE.gov) also provides graphing and visualization tools that preservice teachers use to create a scientific poster that is uploaded into the electronic portfolio tool of the IVC course system.

Because the data is in a large database, they can access data for their study site from prior semesters. To date, students in the class have taken over 10,500 measurements. Students can access the other study sites on the stream as well to provide a total watershed perspective. Utilizing an online program such as GLOBE actually made it possible to do extended inquiry in the class by providing the protocols, database, and visualization tools. The INTR 103 course serves as a model for future elementary teachers for teaching standards-based curriculum, conducting long-term inquiry that can be replicated in the K-12 setting.