

Chapter VII

Earth Observation: Conveying the Principles to Physical Geography Students

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ABSTRACT

In our experience of earth observation (EO) online learning we highlight the usefulness of the World Wide Web in terms of its software, functionality, and user accessibility for developing and delivering a range of activities and delivery modes to both undergraduate and advanced learners. Through the mechanism of developing teaching materials and adapting them for the online classroom, EO learning can become highly interactive and well-illustrated by linking to online image processing software and relevant image data, make use of the Web's graphical interface to reinvigorate DOS-based remote sensing programs to be more student-friendly, and with the advent of collaborative Web software, such as Wiki, provide a networked community for EO learners. In this chapter we showcase a variety of delivery modes for our EO materials—online lectures delivered within a blended learning module for the undergraduate to individual online activities (remote sensing practical exercises and an electronic learning diary) for the advanced EO learner. Examples of our learning materials are discussed in this chapter to show how adapting to online delivery and making use of Web technology has supported our teaching of EO.

INTRODUCTION

Earth observation (EO), the science of remotely investigating the earth's surface from airborne or satellite imagery, is a topic ripe for learning online. It is a visual, contemporary topic in geography, which relies heavily on computer-assisted digital processing and analysis. EO e-learning can encompass a variety of learning activities from comprehensive content-oriented modules to smaller topic-specific e-activities. In this chapter we illustrate the wealth of online materials that we have created: materials aimed for the novice undergraduate and for the advanced EO learner. We discuss the development and delivery of an undergraduate module delivered predominantly online and illustrate how this module is greatly enhanced by the media-rich nature of the Web. We also show how the World Wide Web is of benefit as a highly adaptable medium where legacy and DOS-based EO programs and courseware can be adapted to provide a user-friendlier interface. We illustrate how, with the advent of Wiki software, it is now possible to make the Web a learner community in which participants in field courses or other group-based activities can contribute equally and work collaboratively. From our experience of developing and delivering a variety of EO e-learning materials we provide knowledge for the student and guidance to the aspiring e-learning tutor.

The chapter will address the need for good online EO materials, explain the structure and delivery of the blended delivery module *Earth Observation of the Physical Environment* with an online lecture example and illustrate our smaller e-activities: *Atmospheric Correction*, *Visualizing Directional Reflectance*, and use of an *Electronic Learning Diary*.

BACKGROUND

What About EO Tutorials Already on the Web?

We want to introduce EO to the undergraduate student who wishes to acquire good quality EO image processing skills, the student with more than a passing interest in image data. For the person asking, "How did they do that?" or "What does NASA's image of the day mean?," the content of existing Web tutorials on EO are of interest to the novice user. In terms of conveying sound principles of EO to the undergraduate student, learning materials based in the foundation of EO as a science that also provide skills and techniques for the advanced EO learner are necessary. The examples we show in this chapter provide that level of learning: both in the basis of the science and in the higher-level detail.

Why Translate Traditional Courses and Create EO Online Materials?

Is EO as a topic ripe for online learning? We would argue, absolutely! EO more than most topics benefits from visual examples, which capture both the spatial and spectral richness of the subject. Add to this the availability of video images to represent dynamic phenomena and the case becomes compelling. Learning in an online mode takes advantage of the Web – we can access image databases or spectral data within the learning materials. That means for the student the subject matter is immediately relevant, well illustrated, and accessible.

What are the EO E-Activities?

EO is one of the core geography sub-areas of the DialogPLUS project. Within our e-learning project online learning materials were created from existing courses consisting of face-to-face

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