

Chapter 8

A Learning Platform for the Introduction of Remote Sensing Principles in Higher Education in a Blended Learning Collaborative Environment

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ABSTRACT

The purpose of this study was the creation of a pedagogy inclusive electronic platform for the introduction of Remote Sensing principles to University students. In Universities throughout the world, there is a constant research about new and more flexible ways of teaching and organizing learning in all thematic areas. Environmental Remote Sensing is the measurement from a distance, of all the spectral features of the Earth's surface and the atmosphere. These measurements are usually made by instruments carried by satellites and they are processed to create information concerning regional and global environmental issues. Remote Sensing is an interdisciplinary thematic area that evolves in a very fast manner. This course has been taught at the Physics Department of the University of Athens in the traditional lecture-based manner until now. This study describes the design, development, pilot application and formative evaluation of the learning platform proposed. The indices derived for the educational proposal's evaluation demonstrated that the platform has a very good potential to support learning in the area of Remote Sensing and act as an interactive digital repository of knowledge that may enhance students' learning and facilitate the organization and management of the course.

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INTRODUCTION

Over the last decade the demand for higher education learning has increased dramatically throughout the world. On the one hand, there is a rapidly growing need for the widening of initial access to higher education. Globally the numbers of degree students are estimated to rise from 42 million in 1990 to 97 million in 2010 and 159 million by 2025 (West, 1997). Greece, a member country of the European Union is not at the moment able to accommodate the entire national demand for initial access to higher education. In fact, only around one third of the country's students can find places in its public institutions. Other students have to go abroad or turn to foreign or private providers which operate in Greece (Patrinos, 1995).

In quantitative terms, it has been stated that in order to keep pace with the growing demand for higher education in certain regions of the world, one new university would need to be established every week. The financial and logistical impossibility of this option became symbolic for what was called "the crisis in access to higher education" and formed the main argument for technology supported distance education as a cost-effective alternative (Daniel, 1996).

On the other hand there is the increasing need for more diversified and flexible types of higher education. The widespread use of the internet has definitely been a catalyst in the course of events in higher education demand, since this facility opened up a whole new world of easy to use technology that gives the possibility to communicate, investigate and more importantly learn. Information and Communication Technologies (ITC) enhanced environments provide excellent tools and mechanisms to deal with the Higher Education challenges, especially those technologies related to elearning platforms and campuses (Gonzalez et al., 2007).

The main goal and concern of instructors is to develop more attractive and efficient ways to communicate up to date scientific knowledge to

students and facilitate in depth understanding of its concepts. A serious challenge for science instructors is to determine how to design science courses in order to integrate effectively the use of technology in an efficient and flexible way (Barab & Luehmann, 2002; Barak & Dori, 2004).

According to the constructivist learning theory, students actively construct meaning from their experience, using their existing conceptual framework (Wubbels, 1992). Mental models of how the world works are unique to the observer and not always easily uncovered. Models may be inconsistent and students may be confused in what they believe and verbalize (Glynn & Druit, 1995), perhaps in response to facts they have memorized. Learners' misconceptions can be very highly resistant to change and are likely to hinder the acquisition of scientifically correct conception (Novak, 1988). Conventional instruction often fails to establish in students' sufficient understanding of the underlying scientific principles (Hennessy et al., 1995). Thus, science educators are challenged to develop teaching methods so as to help students make conceptual changes in their scientific thinking and acquire information that they are able to critically appraise and utilize in order to acquire knowledge. Computer assisted learning approaches seem to be very suitable to assist lecturers in this task in an effort to better meet the learners' needs.

There has recently been significant attention paid to the ways in which technology can be used to support students in Higher Education (e.g. Laurillard, 1993; Squires et al. 2000; Seale and Rius-Riu, 2001; Seale 2002). As many new technologies are interactive (Greenfield and Cooking, 1996), it is now easier to create environments in which students can learn by doing, receiving feedback and continually refining their understanding and building new knowledge (Barron et al., 1998; Bereiter and Scardamalia, 1993; Kafai, 1995).

eLearning in particular, understood as online learning, or web-based learning, has raised expectations as to what sophisticated multimedia

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