

Chapter V

Using Digital Libraries to Support Undergraduate Learning in Geomorphology

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ABSTRACT

In this chapter we outline the issues involved in developing, delivering, and evaluating a Level 2 undergraduate module in fluvial geomorphology. The central concept of the module, which was designed to be delivered in a “blended” mode, involving a combination of traditional lectures and online learning activities, was the use of online digital library resources, comprising both data and numerical models, to foster an appreciation of physical processes influencing the evolution of drainage basins. The aim of the module was to develop the learners’ knowledge and understanding of drainage basin geomorphology, while simultaneously developing their abilities to (i) access spatial data resources and (ii) provide a focus for developing skills in scientific data analysis and modeling. The module adopts a global perspective, drawing on examples from around the world. We discuss the process of course and assessment design, explaining the pedagogy underlying the decision to adopt blended delivery. We share our teaching experiences, involving a particular combination of “face-to-face” lectures and online sessions, complemented by independent online learning, and supported by the associated virtual learning environment. Finally, we discuss the issues highlighted by a comprehensive module evaluation.

INTRODUCTION

In this chapter we describe the development, delivery, and evaluation of a Level 2 module designed to support undergraduate learning in fluvial geomorphology. The central concept of the module was the use of a suite of online digital library resources, comprising both data and numerical models, to foster an appreciation of the physical processes influencing the evolution of drainage basins. In the following sections we discuss the design of the module and its assessment, and share our experiences in delivering it, reflecting on the challenges and opportunities involved in blending the “face-to-face” lectures and online sessions. Finally, the module has been comprehensively evaluated, and we discuss the issues highlighted by this process.

DESIGNING THE MODULE

Pedagogic Rationale

The central subject concept of the digital library *Drainage Basin Geomorphology* module was to employ a suite of online resources as a means of fostering appreciation of drainage basins as fundamental environmental units. Specifically, the aims were to develop knowledge and understanding of drainage basin geomorphology, while simultaneously developing students’ abilities to (i) access spatial data resources within the digital library, (ii) provide a focus for developing skills in scientific data analysis and modeling, and (iii) develop abilities to solve problems and think critically. A set of learning outcomes (Table 1) was devised around two key scientific questions: (i) how and why does the geomorphology of drainage basins vary between different geographical locations?, and (ii) the prediction, using process modeling, of drainage basin changes driven by natural (e.g., climate, tectonic) and anthropogenic (e.g., land cover, river engineering) forcings. Consistent with the nature of the DialogPLUS collaboration

itself, a key requirement of the learning approach was to enable a global perspective to be adopted, using the potential of digital library resources to provide examples and experiences of drainage basin geomorphology from around the world.

The starting point in the module design process was to consider how it might contribute to the broader undergraduate curriculum in geography, both within the specific context of the School of Geography at the University of Southampton, but bearing in mind the DialogPLUS philosophy that the learning materials would be available for use elsewhere. Focusing on the Southampton context, the general subject matter is integral to one of the main research themes, *Environmental Processes and Change* (EPC), within the School of Geography. In particular, the interdisciplinary nature of the subject matter, and its focus on predicting drainage basin responses to natural and anthropogenic drivers of local and global environmental change, offered an opportunity to add a coherent, and previously lacking, link between the diverse modules offered by academic staff members within the EPC theme. Developing the module was viewed as an opportunity to bridge a perceived gap in the curriculum between existing Level 2 and 3 modules concerned with the drivers of environmental change (e.g., *Hydrology*, *Quaternary Environmental Change*, *Global Climate Change*), and other Level 2 and 3 modules concerned with the impacts on fluvial process systems (e.g., *Fluvial Sedimentological Processes*, *River Channel Dynamics*). It was thought that this could be optimally achieved by designing the module primarily for Level 2 students. The timing of the module is coincident with students initiating their undergraduate research projects, a major piece of coursework that is submitted in the final year of the degree program. The module was also, therefore, intended to introduce students to a research-oriented approach, as discussed further below. Nevertheless, the particular nature of its structure and delivery retained the possibility of delivering tailored content and assessments to Level 3 students as well.

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