

Chapter XXXIII

Adapting Problem–Based Learning to an Online Learning Environment

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ABSTRACT

This chapter explores through a case study approach of a tertiary-level unit on Land Assessment for Sustainable Use, the connections between three key elements of learning—learning outcomes, learning design, and learning objects—in the context of problem based learning conducted in an online environment. At the “heart” of learning is the achievement of learning outcomes guided pedagogically by the learning design (“head”) with the support of well-designed, pedagogically-sound learning objects (“hands”). All the students participating in this case study were undertaking the unit as off-campus or “distance” students, either at under- or post-graduate level. This chapter defines the use of learning objects and learning design in a problem based learning context. Primary evidence is presented to demonstrate the effectiveness of the problem based learning design and integrated learning objects in facilitating learning outcomes when students communicated online on discussion boards within a course management system (WebCT) under two circumstances: one, as a collective group (2001-2003) before face-to-face instruction and practice in problem based learning; and two, in small groups (2004-2006) after receiving face-to-face instruction and practice in problem based learning. Improved student participation rates and quantity and quality of online student interactions on discussion boards seemed to be the consequence of early scaffolding of student learning through face-to-face instruction and practice in the problem-based learning activity, as well as working in small peer groups for subsequent discussion board activity. Overall there seemed to be improved student comprehension of and interaction with the learning design and learning objects in the small group experience of the problem based learning activity, which resulted in a more fulfilling and robust form of learning.

INTRODUCTION

Educational developments such as the online delivery of unit content, learning activities and assessments, and Web-based learning resources have arisen from the perceived need to diversify university teaching approaches to produce more competent and competitive graduates who can meet the challenges of the workplace. Before university graduates enter the workplace, employers expect them to have proven and demonstrable ability in a range of skills and competencies along with the knowledge base.

The reasons for introducing problem based learning (PBL) into the teaching of natural resource management were primarily to immerse students in the knowledge of the discipline and for them to understand the process of knowledge acquisition and building rather than just learning content. Many undergraduate students on completion of their degree will find work in natural resource management agencies either at local, state, or federal levels, and will most likely find themselves working in small teams with disparate backgrounds and experiences with problem solving. Graduates are expected to function effectively as group members, as well as advance the work activity they are jointly responsible for. Thus, students need to understand and experience “working” as part of a small team, delegate tasks, make joint decisions, and allocate resources. PBL allows students to do this by involving them in learning about teamwork, skills (e.g., interpersonal skills, time management, report writing, communication, and active listening), and experiencing a range of team member roles to achieve an outcome. In addition, the other desired learning outcomes from using PBL in this context are: problem solving, information literacy (i.e., the ability to access, read, synthesise and interpret information), alignment of content and assessment tasks, fostering student motivation, acknowledgement of prior learning, and encouragement of “intellectual

prospecting” (Lobry de Bruyn, 2005; Lobry de Bruyn & Prior, 2001).

The use of PBL as a learning design has been well accepted in vocational degrees such as medical sciences, education, law, and business (e.g., MBA). However, the use of problem based learning as a learning design in natural sciences, particularly natural resource management remains rare. Combining PBL as a learning design in an online environment, and the use of computer-mediated communications in the delivery of learning objects¹ (including problem based learning situation statements, replies to student questions as rejoinders, and internal and external links to Web-based learning resources) is even rarer.

Traditionally PBL is conducted in a classroom environment and the various steps of the problem-solving process are conducted face-to-face in small groups in which students: introduce themselves to each other, set ground rules, acknowledge prior learning, identify contributions to group learning, identify learning needs and activities, and finally work through the problem-solving process. Transferring the problem-solving process to an online environment, asynchronous computer-mediated communication allows students to communicate independently of time and place, provides social interaction with peers, and even allows small peer groups to be created to communicate questions, opinions, and queries. The use of threaded discussion boards that allow asynchronous computer-mediated communication is advantageous when it is not possible to predict precisely when students will access discussion boards. Threading also allows students to trace and keep track of conversational chains, as each message or posting has a subject label, and is organised in a hierarchical structure that only includes those messages that are related. Unrelated threads are kept separate, and this allows students to pursue multiple avenues of thought without becoming confused (Hewitt, 2001).

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