Chapter XX

eLearning Tools for ePortfolios

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ABSTRACT

This chapter describes eLearning tools that focus the learner’s attention on meaning, rather than rote learning of text and rehearsing problem-solving procedures. These tools are the Interactive Concept Discovery Learning Tool and the Meaning Equivalence Reusable Learning Object (MERLO). Results of several evaluative implementations of these novel instructional methodologies, which encourage learners to interact directly with the conceptual content of to-be-learned material, demonstrate their potential to enhance learning outcomes and to provide authentic, credible, evidence-based demonstration of mastery of learning and formative assessments of learning processes and outcomes for inclusion in ‘learning ePortfolios’.

INTRODUCTION

It is generally agreed that an important function of a “learning ePortfolio” is to store records that provide authentic, credible demonstration of an individual’s mastery of learning. However, at present there are no accepted standards and therefore the format of such records and their content are open to interpretation by individual learners and institutions alike. For example, a large university in Canada has been recently offering workshops to students and faculty on “How to Use our Learning Management System (LMS) to Create Presentations of
Students’ Learning” for inclusion in their ePortfolios. Such presentations usually contain graded assignments, including term papers, problem sets, and so forth. While such presentations may be viewed as authentic demonstrations of learning, the precise interpretation of “mastery of learning” remains open. This is a crucial issue; it is clear that future success of learning ePortfolios is critically dependent upon the credibility of the records as an authentic demonstration of mastery of learning. In this chapter we describe two novel eLearning tools that were designed to generate such records including their rationale, details of the instructional methodologies, and results of several evaluative implementations.

WHAT IS “MASTERY OF LEARNING”?

Credible evidence for mastery, or deep comprehension, of learned material is a necessary component of successful completion of a learning experience. However, what particular evidence is required and what lends credibility to such evidence are the subjects of a lively debate among experts in the learning community (Bransford, Brown, & Cocking, 2004). The development of the novel eLearning tools described in this chapter was motivated by a rationale that views deep comprehension as good knowledge of the conceptual content of learned material. Indicators of deep comprehension are various manifestations of an ability to identify and flexibly adapt conceptual content to different situations, and the spontaneous generation of different representations that highlight and clarify various relevant features of the conceptual situation under consideration. Learners who attain deep comprehension of a particular subject area can produce multiple representations (statements) that share equivalence of meaning, recognize that a statement encodes a particular conceptual content, and also recognize other statements that may—or may not—“look like” that specific statement, encode equivalent meaning.

In the next part of this chapter, we will offer an operational definition of concept in the context of semantic analysis; describe concept parsing algorithm (CPA), a generic semantic procedure that identifies the lexical labels and building blocks of concepts in unstructured text (Shafrir & Etkind, 2005); and describe two applications of CPA in eLearning that result in the generation of digital records particularly suitable for inclusion in learning ePortfolios, one for learners who explore the conceptual content of digital text through the Interactive Concept Discovery Learning Tool, and the other for domain experts and instructors who use CPA for detailed and accurate mapping of the conceptual content of course material and for the construction of Meaning Equivalence Reusable Learning Objects (MERLOs) that focus learners’ attention on meaning (patents pending).

What Is “Concept”?  

Unlike words in natural language, “concept” in a discipline must be precisely and clearly defined; for conceptual content of a scientific discipline to be successfully captured by language, the meaning of the words must first be disambiguated. “Concept” is a regularity, an organizational principle behind a large collection of facts, an invariant, a pattern in the data. How are concepts—patterns in the data—encoded and communicated? All content areas use “code words” to communicate meaning; it is easy to verify that such codes exist in all disciplines: science, medicine, social science, humanities, as well as in the professions.