Chapter XXXIV
Learning Objects and Generative Learning for Higher Order Thinking

Tan Wee Chuen
Centre for Innovative in Teaching & Learning Southern College, Malaysia

Baharuddin Aris
Universiti Teknologi Malaysia, Malaysia

Mohd Salleh Abu
Universiti Teknologi Malaysia, Malaysia

ABSTRACT

This chapter aims to guide the readers through the design and development of a prototype Web-based learning system based on the integration of learning objects with the principles of generative learning to improve higher order thinking skills. The chapter describes the conceptual model called Generative Learning Object Organizer and Thinking Tasks (GLOOTT) which was used to design and build a technology-supported learning environment. The chapter then describes how the effectiveness of the Web-based learning system was evaluated and reflects on the importance of the findings more generally.

INTRODUCTION

While many people are actively developing Web-based learning environments, there are questions about how to keep online learners self-motivated and engaged in higher order thinking skills (HOTS). Developing such skills is important as they prepare learners to cope with the rapidly changing world. Hence, it is important to design and develop Web-based learning environments that focus on learners' needs and that can be economically customized to the individual learner

in order to promote HOTS (Tan, Aris, & Abu, 2006). This transition from current one-size-fits-all approaches to customization fits well with the growing use of the learning object, an instructional technology currently being developed by educational technologists and instructional designers for the design, development, and delivery of e-learning (Wiley, 2000).

There is limited research on the use of learning objects in supporting learning. This chapter describes a conceptual model for the design and development of a Web-based learning system called Generative Learning Object Organizer and Thinking Tasks (GLOOTT). The proposed model incorporates multi-faceted learning approaches: learning object, generative learning, essential components of HOTS, and technology-supported learning environment.

BACKGROUND

The emergence of the World Wide Web has caused change and innovation in the way people learn and work. An educational innovation is gradually taking place in the development and delivery of instruction through the use of learning objects. The changes provide an opportunity to improve the learning with the appropriate use of pedagogy coupled with technologies.

Most instructional designers understand the importance of pedagogical perspectives in the design and development of Web learning environments. Snow (1989) noted that instruction differs in structure and completeness, and highly structured instruction (linear in sequence with restricted and high external control) seems to help learners with low ability but hinder those with high ability. This suggests that the concept of one-size-fits-all design is not suitable in the design and development in e-learning. Instead, the learning environment should be highly flexible in structure and transfer the control of the learning system from the instructors to the learners whereby learners can actively participate in the learning process. The concept of learning object design fits this goal very well as can provide flexible paths for the learners' exploration. Nonlinearity in the learning object approach allows students to access information in different patterns and to take control in their own actions and learning.

Learning object has been described by Wiley (2000) as reusable digital resource that supports learning. Grounded in the object-oriented paradigm of computer science, learning objects require the design of instruction into small learning contents that can be reused in different contexts, deployed into multiple setting and learning goals (Collis & Strijker, 2003; Wiley, 2000).

The idea of packaging information in small, reusable, and flexible units in a learning environment has received a lot of attention from the educators and instructional designers of e-learning environments. According to Reigeluth and Nelson (1997), when teachers first gain access to instructional materials, they often break the materials down into their constituting parts and then reassemble these parts in ways that support their instructional goals. Thus, the notion of small and reusable units of learning content, learning components, and learning object design have the potential to provide flexibility and reusability by simplifying the assembly and disassembly of instructional design and development.

Learning objects can be configured in generative learning environments based on the theoretical perspectives of constructivist learning (Bannan-Ritland, Dabbagh, & Murphy, 2000; Bonn & Grabowski, 2001). In this type of environment, learners are active and focus on the construction of their own learning. The environment promotes active processing through the linking of the concepts and includes supports that encourage them to think and construct their understanding. Learners generate and organize their ideas about the content being studied and relate new concepts to existing