Design and Implementation of a SCORM-Based Courseware System Using Influence Diagram

Flora Chia-I Chang, Tamkang University, Taiwan, ROC
Lun-Ping Hung, Northern Taiwan Institute of Science and Technology, ROC
Huan-Chao Keh, Tamkang University, Taiwan, ROC
Wen-Chih Chang, Tamkang University, Taiwan, ROC
Timothy K. Shih, Tamkang University, Taiwan, ROC

ABSTRACT

Distance learning brings convenience, stability and flexibility. People can learn anytime and anywhere. Designing a distance course and assessing the learner becomes the key issue. In order to solve the disadvantage, a systematic assessment mechanism is proposed to enhance interaction between students and teachers. This paper combines the concept and influence diagram as a courseware diagram which can be implemented as a new authoring tool. First, a course flow chart can be systematically built and student learning performance can be improved by taking different levels of remedial courses based on student performance. Second, course content can be adjusted to maximize students’ learning results with analyzing student’s learning performance. Thirdly, the courseware diagram can be generated with the international distance learning standard, Sharable Content Object Reference Model (SCORM). Finally, this mechanism can be easily used by the instructor. With its user-friendly interface, the instructor will receive prompt feedback from students.

Keywords: assessment mechanism; conceptual map; courseware diagram; influence diagram; SCORM

INTRODUCTION

Distance learning allows students to learn anytime, anywhere. It allows people to save money and time. Distance learning can be categorized into two styles: synchronous learning and asynchronous learning. In synchronous learning, learning content and instructor’s presentation are delivered in real-time. Real-time communication depends on broadband network infrastructure and sophisticated communication protocols. On the other hand, asynchronous distance learning allows students to look at a CD-ROM or Web-based instruction. The instructors and students can be located in different positions in the special and the temporal domains. Flexibility of asynchronous distance learning also excludes the requirement of expensive network infrastructures.
and is appreciated by most distance learning programs. With this advantage of asynchronous distance learning in mind, learning management systems (LMS) are able to provide online contents, member accounts, discussion boards and other helpful facilities. With the variety of LMS increasing, inconsistent representation of content databases results in a time consuming process to move a course from one LMS to another.

Some committees proposed infrastructures or specifications of standards for asynchronous distance learning. These committees include Learning Technology System Architecture (LTSA), the Sharable Content Object Reference Model (SCORM), and the IMS Simple Sequence Specification. It is very important to have standardized representation of contents which can promote the development of e-learning in industry, academics and government. The advanced distributed learning (ADL) proposed SCORM (Sharable Content Object Reference Model). This aims to provide the specifications necessary to enable content developers with the ability to produce content that is sharable, accessible, reusable, and, most importantly, interoperable.

In traditional education, the teacher can modify their lecturing style or content to maximize teaching quality with students’ responses. However, it is hard for teachers to immediately modify the learning content or style in distance learning. Before being published on the Internet, class material has to be well organized and fully understood by students. It implies that the instructor can predict their students’ learning ability thoroughly before the class begins. In addition, to predict the students’ learning ability, the instructor can use the student’s past learning records to make an accurate analysis. Accurate analysis allows the teacher to quickly and appropriately modify learning content or style.

Currently, there are many LMS providing learning content, member login, discussion boards and content viewers. Each LMS has its own learning content format, making it hard for different LMSs to exchange their content. In Figure 1, the SCORM learning content, called sharable content object (SCO), can import to any LMS which is SCORM compatible. With SCORM assistance, the SCOs from any LMS can import to other LMSs without additional transformation.

Because of the lack of an evaluation mechanism and distance learning standard, our system is designed under consideration to the characteristics of systematic design, situation occurring in a real classroom, constructed a strategic, organizational, and reasonable system for building up course content in distance education.

In our system, we offer an object-oriented tool for designing course content and a method for measuring students’ learning performance. Teachers can use our system to make adequate learning content.

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**Figure 1. SCOs and LMSs of SCORM**
Adaptivity in ProPer: An Adaptive SCORM Compliant LMS
Ioannis Kazanidis and Maya Satratzemi (2009). *International Journal of Distance Education Technologies* (pp. 44-62).
www.igi-global.com/article/adaptivity-proper-adaptive-scorm-compliant/3913?camid=4v1a