Content Engineering Agent: A TBL-Based E-Course Development Tool with TQM

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ABSTRACT

With the advance in Internet technology, “e-learning” becomes an alternative means of learning and teaching, and is currently an active research topic in both IT and education professionals. However, to make “e-learning” an effective learning mode, besides technology, the issue of pedagogy and quality control are equally important. Most of the existing e-learning platforms and tools usually focus on the technology aspect without much investigation on the pedagogical issues and the quality control on the e-learning material. In fact, there is still a big gap between pedagogy and technology. The SPACE Online Universal Learning (SOUL) platform is designed to fill this gap and provide an effective e-Learning platform for e-course providers and students. In particular, the content engineering agent of the platform is designed for e-course development, which is based on the Task-Based Learning (TBL) curriculum development framework and is incorporated with the concept of Total Quality Management (TQM), a well-known technique in quality control. In this paper, we discuss the details of this content engineering agent and show how TBL and TQM are incorporated in the agent. As a remark, the content engineering agent has already been integrated in the SOUL platform, which is being used by more than 17,000 students and teachers. A preliminary evaluation on the usefulness of the Content Engineering agent has been performed and the result is positive.

Keywords: e-learning, total quality management, task-based learning

INTRODUCTION

With the growth in Internet and the advance in Internet technology, “e-learning” provides an alternative learning model for teachers and students. This emerging mode of learning is very different from traditional classroom education and distance learning. And e-learning has become the focus of research by education professionals (Leadbeater, 1999). A lot of e-learning platforms, such as BlackBoard (2002) and WebCT (2002), have been developed by different researchers and vendors (see also Gertner & VanLehn, 2000; Zhou et al., 1996). However, these existing platforms usually focus on the technology aspect without paying much attention to other issues such as pedagogical concerns and quality control. These issues are, in fact, critical...
for the success of e-learning (Harasim, 1999, Furnell et al., 2001). The following summarizes some of the drawbacks of the existing platforms:

- **Big gap between technology and teaching pedagogy:** Existing platforms seldom emphasize the pedagogical aspect. Consequently, the lack of pedagogy makes these platforms more like just repositories of course materials. They allow students to retrieve learning materials from the platform. As a result, they are still far away from traditional face-to-face teaching.

- **Poor personalization:** Truly personalization of individual student’s learning path based on individual’s study pace and knowledge background is not implemented in existing platforms. Specific advice for individual students regarding personal learning problems are missing. In most of the existing platforms, either they do not provide any advice for students or the advice is not personalized. In this case, students may not benefit from this kind of general advice.

- **User-friendliness (usability):** Teachers are required to take a long time to learn to use the platform and usually a team of technical support staff is necessary for ensuring smooth operations performed by the teachers. And communicating the instructional requirements between teachers and the technical team is usually a major bottleneck of e-course development provided that the communication is possible at all.

- **Quality control:** Existing platforms usually do not have quality control in e-course curriculum development and have poor feedback mechanism to evaluate the effectiveness of the course materials. Without this feedback mechanism, it is not easy to implement a good and standard procedure to improve the quality of the course materials.

In order to address these issues, the School of Professional and Continuing Education (SPACE) of the University of Hong Kong set up a team, called the SPACE Online Universal Learning (SOUL) Project team, in 1998. The aim of the project is to provide online support for educational purposes, to develop SPACE online support courses in both Hong Kong and the Mainland China, and to carry out researches related to online learning. The SOUL platform is the major product of the project group.

The SOUL platform is based on the system architecture, called the PowerEdBuilder, which will be described in the next section. Different components of PowerEdBuilder will tackle different issues regarding online learning and will work together as a single platform to provide a comfortable and user-friendly environment to teachers, students and administrators. In particular, the **Content Engineering Agent** together with the **Smart Tutor** component of the PowerEdBuilder are designed to provide pedagogical support for teachers to create e-course as well as tailor-made personalization for students to learn the material. In this paper, we will focus on the Content Engineering Agent, which is based on the Task-based Learning (TBL) (Fenstermacher, 1998, Raggatt et al, 1996, Willis, 2000) curriculum development framework and is embedded with the concept of Total Quality Management (TQM) for the quality control of the developed course material. In fact, TQM applied in education is not a new topic and it is generally believed that TQM is one of the approaches to guarantee the quality of courses (for example, see Chizmar 1994; Sherr and Lozier]. For the detailed descriptions of dif-
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