Web–Based Collaborative Assessment Systems

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INTRODUCTION

Over the past few years, distance education supported by computers and communication networks has emerged as an innovative and productive delivery mode of instruction and learning. The concept of distance learning implies the use of virtual learning environments (VLEs) that allow people distributed in space or time to work individually or in groups in order to achieve a learning goal or objective.

BACKGROUND

Computer-supported collaborative learning (CSCL) research focuses on understanding and providing successful integration for collaborative learning in VLEs. Within CSCL, one area of interest is the evaluation of student learning. Indeed, evaluating student learning is a key step in the educational process. Evaluation results give students feedback about their performance, so that they learn from their successes and failures. On the other hand, these results allow instructors to determine how well students are progressing and what areas and topics need more attention.

In a collaborative learning environment, both instructors and learners are active participants in the learning process in which knowledge is not merely transferred to students, but rather emerges from active participation in the learning process (Makrakis, 1998). It is obvious that this view of collaborative learning needs new methods of evaluation such as collaborative assessment. Collaborative review and assessment involves both the students and the instructor in thoughtful and critical examination of each student's coursework (McConnell, 2002). Topping (1998) defines peer assessment as "an arrangement for peers to consider the amount, level, value, worth, quality or successfulness of the products or outcomes of learning of others of

similar status." According to Falchikov (2001), peer assessment is "a process whereby groups rate their peers." It is a concept that has served the educational community for several generations (Gehringer, 2001). However, successful integration of collaborative assessment in VLEs has not been developed adequately yet. This article presents how a Web-based system could address these issues and explains its use in practice.

MAIN FOCUS: INTEGRATING COLLABORATIVE ASSESSMENT

Several researchers analyzed different aspects of involving students in collaborative assessment. Topping (1998) reviewed a significant number of studies (109 in all) and found it to be a reliable and valid evaluation method. Race (2001) and Brown (2001) concluded that anonymity is critical for reliable results (for example, friendship is likely to result in over-marking). Other studies highlighted benefits and drawbacks (Davies, 2000; Dochy, Segers, Sluijsmans, 1999; Falchikov & Goldfinch, 2000; Koosha & Madadnia, 2002; McConnell, 2002; Race, 2001; Sadler & Good, 2006; Zariski, 1996). It encourages involvement, teaches responsibility, provides increased feedback, improves student understanding of assessment criteria, and promotes learning. Although the collaborative assessment is beneficial to collaborative learning, it is time consuming for the instructor. The instructors' workload for preparing and implementing the collaborative assessment activities can be fairly heavy, particularly in large classes. Hanrahan and Isaacs (2001) estimated that it took over 40 person hours to run the process in a class of 233 students (mainly in preserving the anonymity of both assessors and assessees and allowing teaching staff to track the process). Is it possible to address this drawback using a computerized system? If yes, which are the pedagogical and technical requirements for a

successful integration of collaborative assessment in this electronic alternative?

We believe that the answer is to design a system with the following three key functions. First, an online registration mechanism for collecting information about users and access rights. Second, a log-in process for recognizing registered users and enabling a new session. Third, supporting the mechanics of collaborative assessment. The mechanics of collaborative assessment includes definition of the assessment criteria, anonymity, awareness of the assessment data, reviewer-mapping, and assessment. Moreover, answers to research questions, such as what is the level of agreement between the marks given by peers and those given by the instructor, whether accuracy in marking is related to student performance, or what is the level of agreement across assessors and others, have a crucial role in order to make collaborative assessment practical as a classroom strategy (Sluijsmans, 2002).

The first two functions are commonly present in an online learning platform. The problems arise when the design process tries to address the third function, and can be summarized as follows. The reviewer-mapping strategies vary widely, and there is a need to anticipate all the review strategies that will be desired by instructors using the system. A second requirement is to create a flexible environment so that instructors can investigate a wide variety of issues and adjust the process accordingly to preserve anonymity.

Our aim in this work was to provide a virtual work environment supporting collaborative assessment that addresses these needs and comes closer to meeting collaborative assessment requirements than any other such system.

System Design and Implementations

The architecture of the system is illustrated in Figure 1 and is based on a Web server (otherwise: HTTP server or WWW server) and a relational database management system (RDBMS). It allows participants to access the system through an Internet browser. The framework includes the following components: "Web browser," "RDBMS," "System Core," and "HTTP Server."

- **Web browser:** Users display the user interface on their client workstations using Web browsers.
- **RDBMS:** Data about users, assessments, and statistics, are stored in the RDBMS and accessed as needed.
- **System core:** Provides a user interface for managing the whole collaborative assessment process as well as the underlying technology needed to handle connections with the RDBMS and Web clients.
- **Http server:** It is the main component in the system architecture as it ties all the other components together.

To illustrate the user's interaction with the system, we present a walk-through, summarized in the following steps:

1. The user enters the URL of the system and the browser fetches the home page from the Http server.
2. The user has to register once as a user of the system. The registration process creates two types of users, student and teacher, with different permissions, and provides a *LoginName*, *Password,* and a unique *UserNumber* to identify each user. Students can see their own registration data except *UserNumber.*
3. To work with the system, a registered user must provide a valid log-in name, password, and type of user.
4. Instructors and students collaboratively define the assessment criteria. The document embodying the agreed criteria can be uploaded to the server and seen by reviewers.

Figure 1. Architecture of the system

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