Chapter 10
A Software Platform for Enhancing Integrity in Online Testing

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ABSTRACT

This chapter describes a software platform that is designed to facilitate the integrity of Web-based exams and assessments. The purpose of the chapter is to share the success of the approach and to promote its further development and use in the e-learning environment. The custom software application, which is named eTAP (electronic Test Administration Platform), has been developed by the author for use in his own courses and is designed in response to his perceived needs in this setting. In addition to e-cheating mitigation, the software addresses the issues of real-time attendance monitoring and activity logging, while providing a well-structured, consistent experience for the students and for the instructor. The assessment platform provided by eTAP uses a software sandbox mechanism to control the examination process. That is, once the application is started, the examinee is limited to specific sanctioned computer functionality and is restricted to a well-defined, relevant region of the Web.

INTRODUCTION AND BACKGROUND

This chapter describes a software platform that is designed to support the administration of online examinations in a Web-based course environment. While the software system enhances numerous aspects of the online assessment experience for the student as well as for the instructor, a primary focus of the application is reduction of the opportunity to commit acts of cheating. The current section of the paper establishes the context and nomenclature by briefly describing the environments and accompanying challenges in which electronic exams are administered today. The ideas presented herein are based on the relevant literature on the
topics. The discussion will be primarily from the perspective of university-level education, but many of the concepts can be applied to other education and testing settings.

WEB-BASED E-LEARNING SUPPORT SYSTEMS

The term e-learning has often been used as a general term to denote IT-supported or technology enhanced learning (Dror, 2008; Markus, 2009; McGill & Klobas, 2009; Monahan, McArdle, & Bertolotto, 2008). We will adopt a similar generic definition of the term in this paper. The roots of e-learning are in the stand-alone, computer-based training programs of the mid 1980s and in the CD-ROM-based distance education efforts of the early 1990s (Markus, 2009; Monahan et al., 2008). Today’s e-learning systems are primarily Web-based (Downes, 2005; Markus, 2009; Monahan et al., 2008; Roqueta, 2008). These e-learning systems use the Internet for course delivery and for exam administration in fully online and in blended learning courses.

As the read-only Web of the 1990s evolved into the dynamic, interactive Web 2.0 that we enjoy today, so did the demands and expectations of the users of these technologies evolve (Downes, 2005; Markus, 2009; Monahan et al., 2008). The composition of e-learning systems has similarly changed to meet these modern expectations (Downes, 2005; Markus, 2009; Roqueta, 2008). E-learning in tertiary education today is usually supported by software platforms known as learning management systems (LMS). These Web-based systems are now ubiquitous on both virtual and brick-and-mortar campuses. Familiar examples are Blackboard, Angel, Sakai, and Moodle. LMSs are usually adopted and implemented by the institution at large and are made available to faculty to support online and blended courses. Some argue that LMSs represent the greatest impact that information technology has had on higher education in recent years (McGill & Klobas, 2009).

A full description of the features and functions of LMS platforms is beyond the scope of this paper. It should be noted, however, that LMSs represent the second generation of Web-based e-learning support platforms, supplanting the earlier course management systems (CMS) (Roqueta, 2008). The difference in these systems is primarily one of focus. The emphasis of a CMS is on the course, specifically the delivery of the course. The emphasis of a LMS, on the other hand, is on learning and on meeting the particular needs of the individual learner (Roqueta, 2008).

Unlike CMSs, learning management systems bring the participatory Web 2.0 approach to the e-learning environment through such features as collaborative authoring of Wikis and blogs, support for social networking, synchronous discussion forums, support for RSS and Flash, tools to develop and play podcasts, and the like. These capabilities lead to increased flexibility, interactivity, synchronicity, customization, involvement, and (hopefully) engagement (Lin, Chen, & Chen, 2011; Shen & Wu, 2011; Struck, Kynaslahti, Lipponen, Vesterinen, & Vahtivuori-Hanninen, 2011). This environment, sometimes referred to as e-learning 2.0 (Downes, 2005; Smith & Reed, 2010; Wang & Chiu, 2011), is clearly more in tune with the wants and expectations of today’s learners because students today often view education through the same lens as they view work and play (Downes, 2005). This student perspective is naturally motivating a push toward increased mobility in online learning settings, or m-Learning. The concept of m-Learning makes e-Learning omnipresent by extending it beyond the traditional PC platform to mobile devices (Jobe, 2011; Serafimov, 2012).

From the users’ side, all interaction with a CMS/LMS is carried out through an ordinary Web browser client; this is true for both students and instructors. A user’s security, privacy, and identity are all maintained through a standard extranet model of access. That is, each user has
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