

# Assessment of Complex Learning Outcomes in Online Learning Environments

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## INTRODUCTION

One of the most challenging issues facing educators in all levels of formal schooling, particularly higher education, is assessment of complex learning outcomes of what is called “21<sup>st</sup> century skills” (Bennett, Persky, Weissm, & Jenkins (NAEP), 2007). Faculty, administrators, students, parents, and the public at large are increasingly concerned about how assessment is conducted in higher education (Reeves, 2000). Scholars have also questioned current approaches to assessing institutional quality (Callan & Finney, 2002; Ewell, 2002), indicating assessing student learning should be the fundamental purpose of higher education. Over the years, various types of assessment models have been developed. The newer assessment models address complex learning outcomes and support measuring learning more authentically and providing alternatives to the conventional, test-based assessment models (Glaser & Silver, 1994; Resnick & Resnick, 1992; Sanders, 2001). Alternative assessment models and methods promise to promote authentic, real world learning, and to provide a diversity of learning opportunities so students are able to display critical thinking skills and greater depth of knowledge, connect learning to their daily lives, develop a deeper dialog over the course material, and foster both individual and group oriented learning activities (Muirhead, 2002). Furthermore, alternative, authentic assessment models support assessment for learning rather than assessment for grading (Black & William, 1998). The concept of assessment for learning, emphasizes integrating assessment and instruction and requires a dynamic, continuous, and performance-based assessment system that emphasizes progress in learning (formative assessment) and in becoming increasingly sophisticated learners and knowers. Ideally, performances that are based on real-life activities become an integral part of the instructional cycle, and feedback provided by the teacher and peers is meant to be formative, that is, it is intended to help the student assess his or her strengths and weaknesses, identifying

areas of needed growth and mobilizing current capacity. These performances are provocations for what needs to be learned and extensions of what is learned and can help push the student to the next level of skill in performance (NCREL, 1990; NAEP, 2007). The premises of performance-based assessment models, particularly their emphasis on pedagogical changes in teaching methods and in educational philosophy, continue to challenge educators in higher education and to call for radical reformulation of the basic assumptions of education and the role of assessment.

The emergence of distance education in the form of online or Web-based delivery has taken this challenge further and has added to its complexity and its ambiguity. Numerous studies over the past few years have sought to affirm that distance education is equally as effective (if not better) as face-to-face learning. Many studies have shown that there is no significant difference in the learning outcomes that occur in a distance environment versus face-to-face (e.g., Allen, Bourhis, Burrell, & Mabry, 2002; Bernard, Abrami, Lou, Borokhovski, Wade, Wozney, Walset, Fiset, & Huang, 2004; Shachar & Neumann, 2003). While this may be so, there is not enough information about what is assessed in online courses compared with on site courses, and whether or not a full range of assessment strategies were compared. In other words, it is not clear if online instructors are using the full potential of online learning for assessment purposes to suggest that there is no difference in student learning in a distance environment compared to face-to-face.

This article analyzes the problem or performance-based approach for assessing complex learning outcomes. It also explores the potential of online learning environments for implementing a problem/performance-based assessment system and proposes a design framework for applying such a system in an online learning environment. Finally, the article shares some thoughts on future trends and issues in assessment of complex learning outcomes.

## **PROBLEM-BASED, PERFORMANCE-BASED, ASSESSMENT**

Conventional or traditional assessment practices in higher education often refer to paper-and-pencil activities. Typically, students are asked to write a few short papers or one large research based paper and to take a mid term and final examination. Exams often consist of short answer questions (multiple-choice, true-false, fill-in-the-blank, matching) and/or short essays. Traditionally, instructors write comments on tests, papers and project. These comments range from clarifying the quality of student performance to making suggestions for improvement. Given that these comments are often provided when students have completed the work and submitted it for a grade (summative judgment) it is left up to the student to decide whether he/she wants to improve the work. Therefore, the instructor's comments may or may not serve as guidelines, compromising the value of writing comments at all. While traditional assessment practices may have their own advantages, they often measure discrete, isolated skills and do not promote complex knowledge and skills, such as critical thinking and active construction of meaning.

On the other hand, performance/problem-based assessment requires demonstration of not only what students know, but also what students can do (Hibbard, Shaw, Van Wagenen, Lewbet, & Waterbury-Wyatt, 1996). Performance/Problem-based assessment emphasizes application and use of knowledge and includes holistic performance of meaningful, complex tasks in challenging real-world environments. Authentic, real world tasks or activities are often multidimensional and require higher order thinking and problem solving skills. In addition, performance/problem-based assessment involves examination of process, as well as product of learning. Progress in both process and product is measured by continuous monitoring of performance over time. Several characteristics differentiate complex or problem-based and/or performance-based assessment from traditional forms of assessment, and may include the following:

- Assessment is focused on measuring complex learning outcomes such as higher level learning in the form of problem solving skills.
- Assessment task is presented within a meaningful context (Meyer, 1992; Reeves & Okey, 1996; Wiggins, 1993).

- Assessment task provides complex, ill structured challenges that require judgment and a full array of tasks (Wiggins, 1990; 1993; Linn, Baker, & Dunbar, 1991; Torrance, 1995).
- Assessment task requires significant student time and effort in collaboration with others (Linn, Baker, & Dunbar, 1991; Kroll, Masingila, & Mau, 1992).
- Assessment is seamlessly integrated with learning task or activity.
- Assessment task provides multiple indicators of learning (Wiggins, 1990; Lajoie, 1991; Resnick & Resnick, 1992).

## **ASSESSMENT OF COMPLEX LEARNING IN TECHNOLOGY RICH, ONLINE LEARNING ENVIRONMENTS**

An examination of the literature on online learning indicates that the online learning environment has the highest potential for complex and real world, authentic performance assessment (e.g., Hazari & Schorr, 1999; Nelson, 1998; Wild & Omari, 1996). The literature suggests that new technology tools and resources that are available in an online learning environment make implementation of a complex or performance/problem-based, project-based, progress-based assessment model a reality. Furthermore, review of the available course management systems (e.g., Blackboard Vista, Sakai, Moodle) for online delivery of instruction suggests that there are tools and resources within this technology that are not readily available in face-to-face courses. Such tools and resources provide an easier and more effective system to conduct problem-based assessment because of the emphasis on interactive, formative and continuous assessment. Some of these tools and resources are as follows:

- The database and interactive system to track, monitor and document students' activities automatically.
- Easy access and easy development process for conventional assessment tools (quizzes, open-ended question, etc.) to give students the opportunity to self-assess their own knowledge through automatic and instant feedback.
- Multiple social and communication tools (synchronous, asynchronous) to facilitate as well as to

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