Chapter 38
Online Assessment

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ABSTRACT

The continuing development of online assessment capitalizes on the advantages of computerized and online technologies to improve the effectiveness and efficiencies of assessing student learning. The online environment allows for the development of complex, interactive communications between the learner and the assessment system. This presents both new opportunities and new challenges in assessment design. A review of traditional issues and best practices is essential in taking advantage of new technologies and incorporating them into new assessment designs. Understanding these factors will help to advance the field and improve future learning and assessment.

INTRODUCTION

Online assessment is an emerging field that utilizes technology in a networked environment to improve the quality and efficiency of assessing learner's knowledge, skills, and abilities. The development of online assessment has been driven by two factors that have been essential to the goals of assessment since the 1900's: complexity and efficiency.

Advances in technology are being integrated into assessment design and implementation in many fields. Current research studies the effectiveness of interactive computer games and simulations in medical and military training (R. Perez, 2008,). However, care must be given in the evaluation of online assessment tools so as not to rush into use a faulty tool (E. Baker, H., O'Neil, 2006.). Item response theory (IRT) is being used to aid in the construction and quality of computerized adaptive testing (CAT) systems. Online assessments have the capabilities to present more complex scenarios to the learner (e.g., multimedia, interaction). Online assessment is being used to streamline the quality of testing in diverse communities and with learners of differing abilities. Technical challenges remain in ensuring

the testing environment is not compromised during assessments.

Computerized testing allows for automated scoring and simplified grading. Rather than having to hire someone to grade tests, they can be run through a scantron machine for scoring.

Assessment is a broad discipline that can mean many different things applied to many different settings. This entry will focus on assessment as the process of evaluating a learner's proficiency in a given knowledge-base or skill set. Assessment is defined here as an evidence-based evaluation of a learner's proficiency. We will focus on educational settings, but the principles we discuss can be more broadly applied to many other training, learning, and developmental settings.

HISTORICAL OVERVIEW OF TRADITIONAL ASSESSMENTS

What is Assessment?

An assessment instrument in an educational context serves as one piece of evidence to support the evaluation question: how do we know when we have gotten our learners to where we want them to be (Smith & Ragan, 1999, p. 92)? The answer to the question 'where we want them to be' follows directly from the learning objectives laid out in the curriculum design process. It is predicated on the assumption that learners have effectively encoded information in the brain and have a retrieval method that allows them to access the information when appropriate.

In designing effective curriculum, we must consider in what ways the information is encoded and in what ways the learner will be asked to retrieve the information, both in terms of assessment and for later use in life, work, etc. Encoding Specificity Theory (Tulving & Thompson, 1973) indicates that the environment in which information is encoded should be similar to the environment in which

it is expected to be retrieved to better facilitate retrieval. For example, asking a learner to take a pencil and paper test (of any sort) about how to adjust a carburetor on an automobile would not lead to effective retrieval.

Furthermore, the Spread of Activation network memory model (Warren, 1977) would suggest that priming the learner prior to or during the assessment with cues that activate similar memory nodes would lead to better retrieval. Contrary to the belief that more information 'gives away the answer,' this priming better sets a more realistic context for retrieval. For example, asking a medical learner to answer a multiple choice question about which symptoms are indicative of disease X is not realistic to the retrieval with which the learner will be likely to encounter in an employment setting. Asking the learner, on the other hand, to respond to a patient that comes in with a description of presiding symptoms and durations with a potential diagnosis would activate those memory nodes appropriate to the retrieval.

Having a series of assessments that build on each other or themselves also provides cognitive scaffolding essential for challenging the limits of a learner's ability (Vygotsky). For example, an assessment which iteratively goes into greater and greater detail or specificity in response to the learners' decisions would be ideal. It would probe the limits or scope of the skill set or knowledgebase.

The Heuristic Systematic Model (HSM) proposed by Chaiken (1993) illustrates two different approaches to cognition. The heuristic approach is automatic, requires little cognitive effort and focuses on salient cues. Systematic processing is more carefully thought out. It requires attention, reasoning, and a great deal of mental effort, along with capacity and motivation. Both methods are used in problem solving at different times. Take for example, an auto mechanic's certification assessment. One simple way to set up an assessment would be to bring in a car with a problem and give the mechanic-trainee a chance to repair

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