Chapter 2
Designing a Learning Analytic System for Assessing Immersive Virtual Learning Environments

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ABSTRACT

The purpose of this chapter is to develop a template for the evaluation of learning in an educational game. In this case, gaming is referred to as 3D immersive virtual learning environments. Problem-based learning is the design template for the IVLE as it engages learners in defined learning behaviors that have been shown to encourage advanced problem-based learning. As a result of this holistic design procedure the learning analytic system proposed in this chapter is an integrated system that can be linked to P-12 educational programs augmenting their traditional programs and providing alternative instructional procedures, alternative learning processes for students and a standards-based but a more individualistic and thus viable assessment of learning to replace an outdated learning assessment model.

INTRODUCTION

The purpose of this chapter is to develop a template for the evaluation of learning in educational games. In this case, gaming is referred to as 3D immersive virtual learning environments. Immersive virtual learning environments are defined for this chapter as learning environments designed to simulate a realistic scenario or environments that provide learners with the opportunity to practice skills, respond to content in context to solve problems and engage in interactions with others. An immersive virtual learning environment (IVLE) is a virtual world or scenario that engages learners in the simulation. Problem-based learning is the design template for the IVLE template described in this chapter as it engages learners in simulated problem spaces with defined learning behaviors that have been shown to encourage advanced problem-based learning (Jonassen, 2005; Russell & Schneiderheinze, 2005b).

The learning analytic system proposed in this chapter is based on an analytical research process cultural historical activity theory (CHAT) that defines and structures the learning responses from the Problem-based learning IVLE (Engestrom, 1987) for assessment . The types and quality of learning resulting from the IVLE will be assessed using rubrics based on Bereiter's Scheme of Knowledge (Bereiter, 2002), intersubjectivity (Hui & Russell, 2009), and Pfeiffer's task and role response (1979). As a result of this holistic design procedure the learning analytic system proposed in this chapter is an integrated system that can be linked to P-12 educational programs augmenting their traditional programs and providing non-traditonal instructional procedures, alternative learning processes for students and a standards-based but a differentiated, individualistic and thus viable assessment of learning to replace an out-dated learning assessment model.

BACKGROUND

The major issue in p-12 education today is the issue of how to assess learning. Currently high-stakes standardized testing is the norm for public schools in the U.S. Standardized testing mandated by the federal No Child Left Behind Act (NCLB) of 2001 and the attendent curriculum and instructional alignments has changed the nature of teaching and learning occurs in US schools. This bill was designed to hold schools accountable for learning but the current issue being debated is that the assessment of learning that the NCLB monitors is a low-level learning response for the testing process with the movement to develop a curriculum and instructional style that is not designed based on cognitive research and best-practice pedagogy but on standardized teaching model designed to disseminate information to all students in the same manner to prepare them for a test that removes information from context and meaning and instead focuses on memorization of facts.

Some of the problems with NCLB after 12 years include:

1. Test scores result in differing levels of funding with low performing districts tagged to the tests and unable to respond to their districts', schools' and students' needs as a result schools in low performing districts are counting down to the test as part of a continual cycle of teaching to the test.
2. The assessments are identifying the individual learner response to a low-level multiple choice test. This is not the type of learning needed to prepare learners to become knowledge workers of the future.
3. Teachers are held accountable for their students' scores and can lose their jobs if test scores go down. This means that teachers are adverse to any deviation from the standardized curriculum that is linked to the standardized tests even with the teacher's awareness of and training to respond to the individual needs of their learners.
4. Testings and preparing for testing takes up increasingly large amounts of instructional time. U.S. students spend approximately 900-1,000 hours of instructional time per year (Hull, J. & Newport, M., 2011).
5. Tests include cultural biases that push poorer districts and urban districts toward loss of accreditation,
6. Test results are not available to teachers to support students until the students are gone from their classroom, and

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