INFORMATION SCIENCE PUBLISHING
701 E. Chocolate Avenue, Suite 200, Hershey PA 17033, USA
Tel: 717/533-8845; Fax 717/533-8661; URL-http://www.idea-group.com
ITB11489

This chapter appears in the book, *Online Assessment and Measurement: Case Studies from Higher Education, K-12 and Corporate* edited by Scott Howell and Mary Hricko and David D. Williams, © 2006, Idea Group Inc.

Chapter XI

A Computer-Adaptive Mathematics Test Accommodates Third Grade Students with Special Needs in the Pacific Northwest

Luke Duesbery, University of Oregon, USA

Leanne R. Ketterlin-Geller, University of Oregon, USA

Jan D. McCoy, Learning Point Associates, USA

Gerald Tindal, University of Oregon, USA

Abstract

Assessment of student ability is often clouded by the interaction between content knowledge and prerequisite access skills. These ancillary skills can influence the students' level of engagement with the test material by limiting their ability to access the test information or respond to the questions. In the case of mathematics, for example, reading and writing are viewed as access skills in that a student is required to be proficient in these skills in order to succeed on the multiple choice

mathematics items (Helwig, Rozek-Tedesco, Tindal, Heath, & Almond, 1999). Students with deficiencies in these access skills are unable to demonstrate their knowledge and skills in the construct under investigation by the test (Elliott, Kratochwill, & McKevitt, 2001). To compensate for these access barriers, test accommodations are provided that change the manner in which the test items are delivered, the setting in which the test is taken, the timing of the test, and/or the administration procedures employed during testing. In a traditional paper and pencil test, these changes to the test are only possible by retrofitting existing materials. In an online computerized testing platform, however, accommodations can be embedded within the design and delivery of the items, thereby creating a seamless testing environment that integrates the necessary support structures to provide all students with an equal opportunity to succeed. The purpose of this chapter is to highlight the process we used to create an accommodated mathematics test for third grade students in an online environment.

Introduction

Online assessments incorporate design features of static computer-based tests with the dynamic delivery mechanism of the Internet. Computer-based tests allow for the integration of sound measurement principles with burgeoning technologies to address such issues as accommodating students with disabilities and English language learners, while the Internet provides a network for efficient delivery and scoring as well as secure storage of student performance data. Together, these components make a powerful system for meeting the needs of schools, districts, and states.

Although an online assessment has the potential to be a powerful complement to existing assessment systems, this testing platform can be difficult to navigate. In 2001 the American Psychological Association (APA) formed the Task Force on Psychological Testing on the Internet (Naglieri, Drasgow, Schmidt, Handler, Prifitera, Margolis, et al., 2004), in which a diverse array of field scholars was assembled to address those testing issues exclusive to online assessment. The report from this task force highlights some of the issues central to the design, development, and delivery of online tests. In this chapter, we integrate the task force's recommendations with a practical application of an online test to provide an example of how to use these technologies to create dynamic, efficient, and technically adequate online assessments.

The Context for Our Online-Accommodated Mathematics Test

Under recent federal legislation, annual testing of all students is required in grades three through eight in the areas of reading and mathematics (U.S. Department of Education, n.d.). Among other requirements, state assessments must meaningfully