



Chapter IX

Development of a Computerized Adaptive Test for a Large-Scale Testing Program: A Case Study of the Development of the North Carolina Computerized Adaptive Testing System

Lori McLeod, RTI International, USA

Albert Bethke, RTI International, USA

Cheryl Hill, University of North Carolina at Chapel Hill, USA

Pamela Van Dyk, North Carolina Department of Public Instruction, USA

Kelly Burling, North Carolina Department of Public Instruction, USA

Abstract

In 1997, the Individuals with Disabilities Education Act (IDEA) amendments stated that “children with disabilities must be included in general state-and district-wide assessment programs, with appropriate accommodations, where necessary.” Where accommodations alone could not make the testing program accessible, the amendment required that the agencies develop alternative assessments so that every child would be included in the accountability programs. In response to the IDEA Amendments, the

North Carolina Department of Public Instruction (NCDPI) reviewed its testing program and identified areas where additional accommodations were necessary. Based on this review, a research plan was developed for a computerized adaptive testing (CAT) accommodation, where computers and the Internet are used for administration of an adaptive test. This chapter explores several of the issues and lessons learned in the development of a computerized adaptive test in a case study of the design, development, and delivery of such a test in a large-scale testing environment. Findings from the case study have implications for item-pool development, curriculum alignment, and comparability to the paper and pencil tests, scoring and scaling of the computerized adaptive test accommodation, test reliability, validity, programming for the computer-adaptive test, and state and local technology infrastructure. The chapter concludes with lessons learned and future directions.

Background

For a large-scale testing program, computer administration offers several student advantages over paper and pencil administration, as suggested by Wainer (2000):

- a. testing can be scheduled so that students have their own block of time for testing rather than large classroom administrations;
- b. the environment for the computer exam is more controlled than a large-scale administration;
- c. the test can be tailored (or adapted) to each individual student so that more proficient test takers do not waste time on easy items and less proficient students do not become frustrated by having to answer the more difficult items. The adaptive nature of the test eliminates some of the impact of extraneous variables such as boredom and frustration;
- d. for the same precision of a conventional test, an adaptive test can administer a reduced number of items;
- e. score reports can be generated immediately instead of hours, days, or weeks later.

Although computer-adaptive testing, with its many advantages, allows more students to participate in a large-scale testing program, there are practical issues to consider when implementing a computer-adaptive test in a large-scale assessment environment. Mills and Stocking (1996) identify some of these issues as dealing with test design, programming and testing the adaptive algorithm, establishing comparability, developing and maintaining item pools, and calibrating the test items.

11 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: www.igi-global.com/chapter/development-computerized-adaptive-test-large/27670

Related Content

Sensed Data Sharing in Cloud Federation for Advances in Health Information Exchange

Antonio Celesti, Maria Fazio, Antonio Puliafito and Massimo Villari (2013). *International Journal of Measurement Technologies and Instrumentation Engineering* (pp. 36-50).

www.irma-international.org/article/sensed-data-sharing-in-cloud-federation-for-advances-in-health-information-exchange/109650

The Context and Culture of the Web Research Environment

Paula B. Doherty (2006). *Online Assessment, Measurement and Evaluation: Emerging Practices* (pp. 10-27).

www.irma-international.org/chapter/context-culture-web-research-environment/27697

Coordinating Distance Learning Software Rollout with the Needs and Visions of a Mature Test Organization: Political and Technical Lessons Learned

Luke Fernandez (2006). *Online Assessment and Measurement: Case Studies from Higher Education, K-12 and Corporate* (pp. 15-26).

www.irma-international.org/chapter/coordinating-distance-learning-software-rollout/27663

Disease Classification Using ECG Signals Based on R-Peak Analysis With ABC and ANN

Suman Lata and Rakesh Kumar (2019). *International Journal of Electronics, Communications, and Measurement Engineering* (pp. 67-86).

www.irma-international.org/article/disease-classification-using-ecg-signals-based-on-r-peak-analysis-with-abc-and-ann/232284

Case Study: Developing a University-Wide Distance Education Evaluation Program at the University of Florida

Christopher D. Sessums, Tracy A. Irani, Ricky Telgand T. Grady Robers (2006). *Online Assessment, Measurement and Evaluation: Emerging Practices* (pp. 76-91).

www.irma-international.org/chapter/case-study-developing-university-wide/27701