

# Practical Considerations in Computer-Based Testing

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With 17 Illustrations



Springer

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*To my children, Daniel, Sarah, and Stefanie Angela*  
—C.G.P.

*To my sister, Jan*  
—J.A.S.

*To Tom, Jake, and Kacey*  
—J.C.K.

# Preface

This book introduces computer-based testing, addressing both nontechnical and technical considerations. The material is oriented toward practitioners and graduate students. The practical emphasis will be useful to measurement professionals who are or will be responsible for implementing a computerized testing program. The instructional information is also designed to be suitable for a one-semester graduate course in computerized testing in an educational measurement or quantitative methods program. While certain theoretical concepts are addressed, the focus of the book is on the applied nature of computerized testing. For this reason, the materials include such features as example applications, figures, and plots to illustrate critical points in the discussions.

A wide range of nontechnical issues need to be considered in implementing a computer-based testing program. Separate chapters are provided on test administration and development issues, examinee issues, software issues, and innovative item types. Test administration and delivery issues include the location of exam administration, selection of hardware and software, security considerations, scheduling of administration frequency and time limits, cost implications, and program support as well as approaches for addressing reliability, validity, comparability, and data analysis. Examinee issues include the influence of examinees' reactions to adaptive testing, the effect of computer-based task constraints, and the impact of examinees' prior computer experience. Software issues include usability studies and software evaluation as tools in selecting and developing appropriate software, based on the test program needs. Additional software issues include critical features of the user interface and software design. Finally, innovative item types are items that use some feature or function of the computer (such as audio, video, interactivity, or alternative response actions) to enhance their measurement capacity. Issues with innovative item types include the measurement purpose, the innovative dimension, and the effect of task complexity on test development.

One strong feature of this book is the exposition of a number of test delivery methods. Computer-based testing can be conducted in a variety of ways, beyond simply "linear" or "adaptive" methods. A test delivery method should be selected based on the characteristics of a specific examination program, as each method has particular strengths and weaknesses. A full chapter is provided on each of the delivery methods: computerized fixed testing (CFT), automated test assembly for online delivery (ATA), computerized classification testing (CCT), and computerized adaptive testing (CAT). Additional technical aspects of

computer-based testing are addressed in a chapter on item pool evaluation and maintenance. Finally, the book concludes with a comparison of test delivery methods in terms of both technical and nontechnical considerations.

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