Educational Assessment of Students
EIGHTH EDITION

Educational Assessment of Students

Susan M. Brookhart
Professor Emerita, Duquesne University

Anthony J. Nitko
Professor Emeritus, University of Pittsburgh

Pearson
330 Hudson Street, NY NY 10013
Director and Publisher: Kevin M. Davis
Content Producer: Janelle Rogers
Media Producer: Lauren Carlson
Portfolio Management Assistant: Casey Coriell
Executive Field Marketing Manager: Krista Clark
Executive Product Marketing Manager: Christopher Barry
Procurement Specialist: Carol Melville
Full Service Project Management: Katie Ostler, Cenveo® Publisher Services
Cover Designer: Cenveo® Publisher Services
Cover Image: Paradoxe/offset.com
Composition: Cenveo® Publisher Services
Printer/Binder: LSC Communications
Cover Printer: Phoenix Color/Hagerstown
Text Font: 11/13 Palatino LT Pro

Copyright © 2019, 2015, 2011 by Pearson Education, Inc. by Pearson Education, Inc. or its affiliates. All Rights Reserved. Printed in the United States of America. This publication is protected by copyright, and permission should be obtained from the publisher prior to any prohibited reproduction, storage in a retrieval system, or transmission in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise. To obtain permission(s) to use material from this work, please visit http://www.pearsoned.com/permissions/

Acknowledgments of third party content appear on the page within the text, which constitute an extension of this copyright page.

Unless otherwise indicated herein, any third-party trademarks that may appear in this work are the property of their respective owners and any references to third-party trademarks, logos or other trade dress are for demonstrative or descriptive purposes only. Such references are not intended to imply any sponsorship, endorsement, authorization, or promotion of Pearson’s products by the owners of such marks, or any relationship between the owner and Pearson Education, Inc. or its affiliates, authors, licensees or distributors.

Library of Congress Cataloging-in-Publication Data is on file with the Library of Congress.

10 9 8 7 6 5 4 3 2 1
Susan M. Brookhart is an independent consultant in educational assessment and Professor Emerita and former Chairperson of the Department of Educational Foundations and Leadership in the School of Education at Duquesne University. She has served on several state assessment technical advisory committees. Previous to her higher education experience, she taught both elementary and middle school. Her research interests include the role of both formative and summative classroom assessment in student motivation and achievement, the connection between classroom assessment and large-scale assessment, and grading.

Professor Brookhart was the 2007–2009 editor of Educational Measurement: Issues and Practice. She has served as the education columnist for National Forum, the journal of Phi Kappa Phi. She is a past president of the American Educational Research Association’s Special Interest Group on Classroom Assessment. She was named the 2014 Jason Millman Scholar by the Consortium for Research on Educational Assessment and Teaching Effectiveness (CREATE) and is the recipient of the 2015 Samuel J. Messick Memorial Lecture Award from ETS/TOEFL.

In all, Professor Brookhart is author or coauthor of 18 books and over 70 articles and book chapters on classroom assessment, teacher professional development, and evaluation. With Anthony J. Nitko, she is the coauthor of Assessment and Grading in Classrooms. With the late Norman E. Gronlund, she is the coauthor of Gronlund’s Writing Instructional Objectives (8th ed.). Some of the journals in which her research has appeared are Applied Measurement in Education, Assessment in Education: Principles, Policy, & Practice, Educational Measurement: Issues and Practice, Journal of Educational Measurement, Journal of Educational Research, Oxford Review of Education, Review of Educational Research, and Teachers College Record. She also serves on the editorial boards of Applied Measurement in Education, Assessment in Education: Principles, Policy, & Practice, Educational Assessment, and Teachers College Record.

Professor Brookhart’s assessment books for practitioners include How to Give Effective Feedback to Your Students, Formative Classroom Walkthroughs: How Principals and Teachers Collaborate to Raise Student Achievement (with Connie M. Moss), How to Assess Higher-Order Thinking Skills in Your Classroom, How to Use Grading to Support Learning, Learning Targets: Helping Students Aim for Understanding in Today’s Lesson (with Connie M. Moss), and How to Create and Use Rubrics for Formative Assessment and Grading.

Anthony J. Nitko is a private consultant in educational measurement and Professor Emeritus and former Chairperson of the Department of Psychology in Education at the University of Pittsburgh. His research interests include curriculum-based criterion-referenced testing, integrating testing and instruction, classroom assessment, and the assessment of knowledge and higher-order thinking skills.

Professor Nitko is author of the chapter “Designing Tests That Are Integrated with
Instruction” in the Third Edition of *Educational Measurement* and coauthor (with Susan Brookhart) of *Assessment and Grading in Classrooms*. He coauthored (with Susan Brookhart) the chapter “Strategies for Constructing Assessments of Higher-Order Thinking Skills” (2011). He also coauthored (with C. M. Lindvall) *Measuring Pupil Achievement and Aptitude* (with T-C Hsu), *Pitt Educational Testing Aids* (PETA) (a package of computer programs for classroom teachers), and (with R. Glaser) the chapter “Measurement in Learning and Instruction” in the Second Edition of *Educational Measurement*.

Professor Nitko has been Editor of the journal *Educational Measurement: Issues and Practice*, and later served as the International News Editor of this journal. He was also Editor of d’News, the AERA Division D newsletter. Some of the journals in which his research has appeared include *American Educational Research Journal*, *Applied Measurement in Education*, *Assessment in Education: Principles, Policy, & Practice, Educational Evaluation and Policy Analysis*, *Educational Measurement: Issues and Practice*, *Educational Technology*, *Journal of Educational Measurement*, and *Research in Developmental Disabilities*.

Professor Nitko received Fulbright awards to Malawi and to Barbados. He has served as a consultant to various government and private agencies in Bangladesh, Barbados, Botswana, Egypt, Ethiopia, Indonesia, Jamaica, Jordan, Liberia, Malawi, Maldives, Namibia, Oman, Saudi Arabia, Singapore, United States, Viet Nam, and Yemen.
Brief Contents

Part I  The Bases for Assessment
1  Classroom Decision Making and Using Assessment  1
2  Describing the Goals of Instruction  18
3  Validity of Assessment Results  37
4  Reliability of Assessment Results  66
5  Professional Responsibilities, Ethical Behavior, and Legal Requirements in Educational Assessments  86

Part II  Crafting and Using Classroom Assessments
6  Planning for Integrating Assessment and Instruction  107
7  Diagnostic and Formative Assessments  132
8  Providing Formative Feedback  152
9  Fill-in-the-Blank and True-False Items  166
10  Multiple-Choice and Matching Exercises  181
11  Higher-Order Thinking, Problem Solving, and Critical Thinking  218
12  Essay Assessment Tasks  240
13  Performance and Portfolio Assessments  260
14  Preparing Your Students to Be Assessed and Using Students’ Results to Improve Your Assessments  299
15  Evaluating and Grading Student Achievement  322

Part III  Interpreting and Using Standardized Tests
16  Standardized Achievement Tests  354
17  Interpreting Norm-Referenced Scores  377
18  Finding and Evaluating Published Assessments  411
19  Scholastic Aptitude, Career Interests, Attitudes, and Personality Tests  425

Appendixes
A  Educational Assessment Knowledge and Skills for Teachers  447
B  Code of Fair Testing Practices in Education (Revised)  448
C  Code of Professional Responsibilities in Educational Measurement  452
D  Summaries of Taxonomies of Educational Objectives: Cognitive, Affective, and Psychomotor Domains  457
E  Implementing the Principles of Universal Design via Technology-Based Testing  464
F  Basic Statistical Concepts  466
G  Computational Procedures for Various Reliability Coefficients  479
H  A Limited List of Published Tests  484
I  List of Test Publishers and Their Websites  486
J  Answers to Even-Numbered Exercises  487

Glossary  491
References  511
Name Index  523
Subject Index  526
Contents

Part I  The Bases for Assessment

1  Classroom Decision Making and Using Assessment  1
   What Is Assessment?  2
   Assessment and Classroom Decisions  7
   Assessment and Educational Decisions About Students  7
   High-Stakes Assessment and Accountability  14
   Assessment Literacy  16
   Conclusion  17
   Exercises  17

2  Describing the Goals of Instruction  18
   Importance of Specifying Learning Outcomes  19
   Educational Goals, State Standards, and Learning Objectives  20
   Evaluating the Learning Objectives of a Course or Unit  24
   How to Write Specific Learning Objectives  24
   Aligning Assessment Tasks with Learning Objectives  28
   Sources for Locating Learning Objectives  30
   Taxonomies of Learning Objectives  30
   Cognitive Domain Taxonomies  31
   Conclusion  36
   Exercises  36

3  Validity of Assessment Results  37
   General Nature of Validity  38
   Four Principles for Validation  38
   Validity of Teacher-Made Classroom Assessment Results  40
   Validity of Large-Scale Assessment Results  45
   Validity Issues When Accommodating Students with Disabilities  62
   Conclusion  64
   Exercises  64

4  Reliability of Assessment Results  66
   General Nature of Reliability  67
   Causes of Measurement Error or Inconsistency  68
   Reliability of Classroom Assessments  68
   Reliability of Large-Scale Assessments  71
   Obtained Scores, True Scores, and Error Scores  78
   Standard Error of Measurement  78
   Reliability of Mastery and Pass-Fail Decisions  81
   Factors Affecting Reliability and SEM and How to Improve Reliability  83
   Conclusion  85
   Exercises  85

5  Professional Responsibilities, Ethical Behavior, and Legal Requirements in Educational Assessments  86
   A Teacher’s Professional Responsibilities in Assessment  87
   Six Categories of Responsibility for Teachers  88
   Students’ Rights and Responsibilities as Test-Takers  96
   Secrecy, Access, Privacy, Confidentiality, and the Teacher  98
Part II  Crafting and Using Classroom Assessments

6 Planning for Integrating Assessment and Instruction  107
Assessment Planning for a Marking Period  108
Assessment Planning for One Unit of Instruction  110
Preassessment to Plan Your Teaching  112
Planning for One Summative Assessment  113
Improving the Validity of Assessment Plans  116
What Range of Assessment Options Is Available?  119
Differentiating Instruction  127
Assessment Planning for Response to Intervention  127
Using Technology as an Aid in Assessment  128
Conclusion  131
Exercises  131

7 Diagnostic and Formative Assessments  132
Diagnostic Assessment  133
Formative Assessment  140
Learning Progressions  149
A Coherent Assessment System  150
Systematic Record Keeping  150
Conclusion  151
Exercises  151

8 Providing Formative Feedback  152
Types and Characteristics of Feedback  153
Helping Students Use Feedback  157
Differentiating Feedback  159
Peer Feedback  162
Feedback from Technology  163
Conclusion  164
Exercises  165

9 Fill-in-the-Blank and True-False Items  166
Three Fundamental Principles for Crafting Assessments  167
Fill-in-the-Blank Items  167
True-False Items  172
Conclusion  180
Exercises  180

10 Multiple-Choice and Matching Exercises  181
Multiple-Choice Items  182
Creating Alternative Varieties of Multiple-Choice Items  199
Matching Exercises  206
Creating Basic Matching Exercises  208
Creating Alternative Varieties of Matching Exercises  211
Conclusion  216
Exercises  216

11 Higher-Order Thinking, Problem Solving, and Critical Thinking  218
Assessing Higher-Order Thinking  219
Concept Learning  221
Assessing Whether Students’ Thinking Uses Rules  224
Problem Solving  226
Critical Thinking  229
Reading Skills  235
Conclusion  238
Exercises  238

12 Essay Assessment Tasks  240
Formats for Essay Items  241
Usefulness of Essay Assessments  243
Constructing Essays Assessing Subject-Matter Learning  245
Optional Questions  249
Constructing Prompts for Assessing Writing Achievement  249
Scoring Essay Assessments  253
Writing Assessment and Technology  256
Conclusion  258
Exercises  258

13 Performance and Portfolio Assessments  260
Performance Assessment  261
Designing Performance Assessments  272
Portfolios  291
Conclusion  298
Exercises  298

14 Preparing Your Students to Be Assessed and Using Students’ Results to Improve Your Assessments  299
Preparing Students for Assessment  300
Testwiseness  302
Test Anxiety 303
Assessment Format and Appearance 305
Correction for Guessing 306
Item Analysis for Classroom Assessments 308
Item Difficulty Index 314
Item Discrimination Index 315
Improving Multiple-Choice Item Quality 316
Selecting Test Items 318
Conclusion 320
Exercises 321

15 Evaluating and Grading Student Achievement 322
The Meanings and Purposes of Grades 323
Reporting Methods 326
Choosing a Grading Model 334
Grading Practices 337
Techniques for Combining Grades to Summarize Achievement 343
Conclusion 352
Exercises 352

Part III Interpreting and Using Standardized Tests

16 Standardized Achievement Tests 354
Overview of Standardized Tests 355
Varieties of Standardized Tests 357
Commercially Published Achievement Tests 358
Federally Mandated State Assessments 364
Commercially Produced Interim and Benchmark Assessments and Services 366
Other Commercially Available Tests 368
Appropriate Uses of Standardized Test Results 369
Inappropriate Uses of Standardized Test Results 371
How to Administer Standardized Tests 372
Ethical and Unethical Student Practice for Standardized Tests 372
Conclusion 374
Exercises 374

17 Interpreting Norm-Referenced Scores 377
Three Referencing Frameworks 378
Using Norms 381
Types of Norm Groups 382
Norm-Referenced Scores 385
Percentile Ranks 385
Linear Standard Scores 387
Normal Distributions 389
Normalized Standard Scores 392
Developmental and Educational Growth Scales 396
Extended Normalized Standard Score Scales 396
Grade-Equivalent Scores 397
General Guidelines for Score Interpretation 405
Conclusion 409
Exercises 409

18 Finding and Evaluating Published Assessments 411
Locating a Published Test 412
Locating Evaluations of Published Tests 415
Locating Computerized Testing Materials 417
Locating Unpublished Test Materials 418
Restrictions on Purchasing and Using Tests 418
Evaluating and Selecting a Test 419
Locating Information About Your State Tests 422
Conclusion 424
Exercises 424

19 Scholastic Aptitude, Career Interests, Attitudes, and Personality Tests 425
Aptitudes for Learning 426
Group Tests of Scholastic Aptitudes 428
Group Tests of Specific Aptitudes 433
Individually Administered Tests of General Scholastic Aptitudes 436
Assessing Adaptive Behavior 440
Assessing Vocational and Career Interests 441
Assessing Attitudes 444
Assessing Personality Dimensions 444
Conclusion 445
Exercises 445

Appendixes
A Educational Assessment Knowledge and Skills for Teachers 447
B Code of Fair Testing Practices in Education (Revised) 448
C Code of Professional Responsibilities in Educational Measurement 452
D Summaries of Taxonomies of Educational Objectives: Cognitive, Affective, and Psychomotor Domains 457
E Implementing the Principles of Universal Design via Technology-Based Testing 464
<table>
<thead>
<tr>
<th></th>
<th>Basic Statistical Concepts 466</th>
<th>Glossary 491</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>Computational Procedures for Various Reliability Coefficients 479</td>
<td>References 511</td>
</tr>
<tr>
<td>H</td>
<td>A Limited List of Published Tests 484</td>
<td>Name Index 523</td>
</tr>
<tr>
<td>I</td>
<td>List of Test Publishers and Their Websites 486</td>
<td>Subject Index 526</td>
</tr>
</tbody>
</table>
| J | Answers to Even-Numbered Exercises 487 | **NOTE:** Every effort has been made to provide accurate and current Internet information in this book. However, the Internet and information posted on it are constantly changing, so it is inevitable that some of the Internet addresses listed in this textbook will change.
Preface

As for the previous editions, the goal of *Educational Assessment of Students*, Eighth Edition, is to help teachers and those in training to teach to improve their skills through better assessment of students. It focuses directly on the professional practices of elementary and secondary school-teachers. This edition features:

- A continued strong emphasis on classroom assessment, both formative and summative.
- Complete coverage of the basics as well as advanced topics and topics of contemporary interest.
- Practical advice and examples of how good and poor classroom assessments affect students’ learning.
- A revised chapter on standardized testing to reflect recent changes in the assessment landscape.

*Educational Assessment of Students* is a core text written for a first course in educational testing and constructing classroom assessments, and it serves equally as the textbook for an undergraduate course or a first graduate course in educational assessment. No formal coursework in statistics or college mathematics is necessary to understand the text.

The book provides complete coverage of educational assessment, including developing plans that integrate teaching and assessment; using formative assessment strategies and providing effective feedback to students; crafting objective, performance, and portfolio assessments; evaluating students and discussing evaluations with parents; and interpreting state-mandated tests and standardized achievement tests.

It is important in a first course that students receive a balanced treatment of the topics. Because the book is a comprehensive treatment of traditional and alternative assessments, we give examples, discuss the pros and cons, and give guidance for crafting every assessment technique that we introduce. Research is cited that supports or refutes assessment and teaching practices.

The text prepares teachers and those in training to teach as professionals. We recognize that teachers’ experiences and judgments are necessary for proper and valid use of educational assessment. We do not hesitate to point out teachers’ and school administrators’ erroneous judgments and assessment abuses, however, where good lessons can be learned from them.

NEW AND REVISED CONTENT

In preparing this edition, we made a special effort to make it easy for the reader to apply the material to classroom practice through improved explanations, improved practical examples and illustrations, checklists, and step-by-step, how-to instructions. As with previous editions, we have written the text from the viewpoint that assessment is part of good teaching practice that helps the teacher improve students’ learning. Material new to the eighth edition includes:

1. Updated information that reflects the Elementary and Secondary Education Act of 2015 and the current assessment landscape.
2. A change in the order of chapters to put the chapter on higher-order thinking before the chapter on essay questions.
3. Up-to-date discussion of published achievement tests in Chapter 16.
4. Update of websites related to assessment, including a discussion of how to access information about state testing programs on the Internet, and update of references.

**MyLab EDUCATION**

One of the most visible changes in the new edition, also one of the most significant, is the expansion of the digital learning and assessment resources embedded in the etext and the inclusion of MyLab in the text. MyLab for Education is an online homework, tutorial, and assessment program designed to work with the text to engage learners and to improve learning. Within its structured environment, learners practice what they learn, test their understanding, and receive feedback to guide their learning and to ensure their mastery of key learning outcomes. The MyLab portion of the new edition of *Educational Assessment of Students* is designed to bring learners more directly into the world of K-12 classrooms and to help them see the very real impact that the assessment concepts covered in the book have on learners. The materials in MyLab Education with *Educational Assessment of Students* include three types of resources.

- **Application Exercises** allow readers to practice assessment tasks like writing different types of assessment items, clearly communicating learning targets to students, interpreting standardized assessment reports, and grading.
- **Video Examples** illustrate classroom assessment in action, helping students better understand course content.
- **Self-Check Quizzes** help students assess how well they have mastered chapter learning outcomes. The multiple-choice, automatically graded quizzes provide rationales for both correct and incorrect answers.

**SPECIAL FEATURES**

The following special features highlight the practicality of this text:

1. Examples of how to craft classroom assessments and what they typically look like.
2. Checklists with succinct tips for evaluating the quality of each type of assessment taught in the book.
3. Strategies for assessing higher-order thinking that serve as models and descriptions for developing problem-solving and critical-thinking assessments.
4. Key concepts that serve to introduce each chapter, coupled with online MyLab exercises and videos.
5. Important terms and concepts listed at the beginning of the chapter and defined in both the chapter’s text and in a glossary.
6. End-of-chapter exercises that let students apply their learning to practical situations and an appendix with answers to even-numbered exercises.
7. Appendixes of statistical concepts with spreadsheet applications and tutorials for calculating reliability coefficients for instructors and students interested in a more quantitative approach than the text provides.

**ACKNOWLEDGMENTS**

A project of this magnitude requires the help of many persons. We are very much indebted to the reviewers whose critical reading contributed greatly to the technical accuracy, readability, and pedagogy of the eighth edition: Kathryn Anderson Alvestad, University of Maryland; Mary K. Boudreaux, University of Memphis; Kristin L. Koskey, The University of Akron; Connie M. Moss, Duquesne University. Special thanks go to Steve Ferrara, Measured Progress, and to Michael J. Young, Pearson Assessment, for helpful reviews and suggestions for improvement and updating.

We would also like to thank the reviewers for the second, third, fourth, fifth, sixth, and seventh editions: Peter W. Airasian, Boston College; Lawrence M. Aleamoni, University of Arizona; Kathryn Anderson Alvestad, University of Maryland, College Park; Carol E. Baker, University of Pittsburgh; W. L. Bashaw, University of Georgia; Gary Bingham, Georgia State University; Pamela Broadston, University of Arkansas at Little Rock; Deborah Brown, West Chester University; Marcia Burell, SUNY Oswego; Heidi Legg Burross, University of Arizona; Alice Corkill, University of Nevada at Las Vegas; Lee Doebler, University of Montevallo; Leonard S. Feldt, University of Iowa;
PREFACE

Terry Fogg, Minnesota State University; Betty E. Gridley, Ball State University; Gretchen Guiton, University of Southern California; Anthony E. Kelly, George Mason University; Jin-Ah Kim, Illinois State University; Thomas M. Haladyna, Arizona State University; Charles Hughes, Pennsylvania State University; Louise F. Jernigan, Eastern Michigan University; Suzanne Lane, University of Pittsburgh; Robert Lange, University of Central Florida; Robert W. Lissitz, University of Maryland; Nancy Martin, University of Texas–San Antonio; Craig Mertler, Bowling Green State University; William P. Moore, University of Kansas; Pamela A. Moss, University of Michigan; Robert Paugh, University of Central Florida; Susan E. Phillips, Michigan State University; Bruce Rogers, University of Northern Iowa; Marianne Robin Russo, Florida Atlantic University; John Shimkanin, California University of Pennsylvania; William M. Stallings, Georgia State University; Hoi K. Suen, Pennsylvania State University; James S. Terwilliger, University of Minnesota; Charles L. Thomas, George Mason University; Michael S. Trevisan, Washington State University; Anthony Truog, University of Wisconsin–Whitewater; Tary L. Wallace, University of South Florida, Sarasota-Manatee; Kinnard White, University of North Carolina; Richard Wolf, Teachers College, Columbia University; and David R. Young, State University of New York–Cortland.

We thank our students at the School of Education, University of Pittsburgh; the School of Education, Duquesne University; the College of Education, University of Arizona; the Curriculum Development and Evaluation Centre, Botswana Ministry of Education; teachers working with the Jamaica Ministry of Education; teachers and assessors at the Examination Development Center, Indonesia Ministry of Education and Culture; and trainers with the Integrated Language Project in Egypt, who used the second, third, and fourth editions. They provided insightful feedback and corrections of errors that have greatly improved the usefulness of the text. Francis Amedahe helped classify chapter learning targets and write test items for the third edition. Sarah Bonner contributed test items, practical examples for classroom activities, and many elements of the Instructor’s Manual for the fourth edition. To all of these persons, and others we have failed to mention, we offer our most sincere thanks and appreciation.

We are grateful for permission to use checklists and examples that Anthony Nitko originally published with colleagues Harry Hsu and Maury Lindvall. Specifically, the checklists for evaluating the quality of a test blueprint (Chapter 6), multiple-choice items (Chapter 10), matching exercises (Chapter 10), and essay items (Chapter 12) and the example in Figure 6.4 originally appeared in A. J. Nitko and T-C. Hsu, Teacher’s Guide to Better Classroom Testing: A Judgmental Approach, 1987, Pittsburgh, PA: Institute for Practice and Research in Education, School of Education, University of Pittsburgh. The examples in Figures 13.4, 17.4, and 17.12 originally appeared in C. M. Lindvall and A. J. Nitko, Measuring Student Achievement and Aptitude (Second Edition), 1975, New York: Harcourt Brace Jovanovich.

Special thanks to Veronica Nitko and Frank Brookhart, whose support and encouragement were invaluable throughout the work on this text and its previous editions.
Educational Assessment of Students