Detailed Contents ix
List of Tables and Figures xix
Preface xxi
Foreword xxvii

	i		
SECTION I		omy: Educational Objectives and Student Learnin Introduction 3	g 1
	CHAPTER 1	Introduction 3	
	CHAPTER 2	The Structure, Specificity, and Problems of Objectives	12
SECTION II	The Revise	d Taxonomy Structure 25	-
	CHAPTER 3	The Taxonomy Table 27	
	CHAPTER 4	The Knowledge Dimension 38	
	CHAPTER 5	The Cognitive Process Dimension 63	
SECTION III	The Taxono		-
	CHAPTER 6	Using the Taxonomy Table 95	
	CHAPTER 7	Introduction to the Vignettes 110	
	CHAPTER 8	Nutrition Vignette 119	
	CHAPTER 9	Macbeth Vignette 136	
	CHAPTER 10	Addition Facts Vignette 158	
	CHAPTER 11	Parliamentary Acts Vignette 171	
	CHAPTER 12	Volcanoes? Here? Vignette 190	
	CHAPTER 13	Report Writing Vignette 210	
	CHAPTER 14	Addressing Long-standing Problems in Classroom Instruction 232	

IV	The Taxonomy in Perspective 257			
	CHAPTER 15	The Taxonomy in Relation to Alternative Frameworks 259		
	CHAPTER 16	Empirical Studies of the Structure of the Taxonomy 287		
	CHAPTER 17	Unsolved Problems 295		
	Appendixes	303		
		Appendix A: Summary of the Changes from the Original Framework 305		
		Appendix B: Condensed Version of the Original Taxonomy of Educational Objectives: Cognitive Domain 313		
		Appendix C: Data Used in the Meta-analysis in Chapter 16 320		
		References 323		
		Credits 333		

Index

335

SECTION

Detailed Contents

xix

List of Tables and Figures

xxi

xxvii

Preface

Foreword

SECTION I	The Taxonomy: Educational Objectives and Student Learning 1			
	CHAPTER 1	Introduction 3		
		The Need for a Taxonomy 3		
		Using Our Increased Understanding 6		
		The Taxonomy Table, Objectives, and Instructional Time 6		
		The Taxonomy Table and Instruction 7		
		The Taxonomy Table and Assessment 8		
		The Concept of Alignment 10		
		Teachers as Curriculum Makers Versus Teachers as Curriculum Implementers: A Closing Comment 10		
	CHAPTER 2	The Structure, Specificity, and Problems of Objectives		
		The Structure of Objectives 12		
		Content Versus Knowledge 12		
		Behavior Versus Cognitive Processes 13		
		Specificity of Objectives 15		
		Global Objectives 15		
		Educational Objectives 15		
		Instructional Objectives 16		
		Summary of Levels of Objectives 16		
		What Objectives Are Not 17		

	Specificity and Inclusiveness 20
	The Lock-Step Nature of Objectives 21
	What Does an Objective Represent—Learning or Performance? 21
	The Restricted Use of Objectives 22
	Concluding Comment 23
The Revi	sed Taxonomy Structure 25
CHAPTER 3	The Taxonomy Table 27
	Categories of the Knowledge Dimension 27
	Categories of the Cognitive Process Dimension 30
	The Taxonomy Table and Objectives: A Diagrammatic Summary 30
	Why Categorize Objectives? 34
	Our Use of Multiple Forms of Definition 36
	Verbal Descriptions 36
	Sample Objectives 37
	Sample Assessment Tasks 37
	Sample Instructional Activities 37
	Closing Comment: A Look Ahead 37
CHAPTER 4	The Knowledge Dimension 38
	A Distinction Between Knowledge and Subject Matter Content: A Tale of Four Teachers 39
	Different Types of Knowledge 40
	A Distinction Between Factual and Conceptual Knowledge 41
	A Rationale for Metacognitive Knowledge 43
	Categories of the Knowledge Dimension 45
	Factual Knowledge 45
	Knowledge of Terminology 45
	Knowledge of Specific Details and Elements 47
	Conceptual Knowledge 48
	Knowledge of Classifications and Categories 49
	Knowledge of Principles and Generalizations 51
	CHAPTER 3

A Changing Vocabulary of Objectives

Problems with Objectives

18

20

	Procedural Knowledge 52
	Knowledge of Subject-Specific Skills and Algorithms 53
	Knowledge of Subject-Specific Techniques and Methods 54
	Knowledge of Criteria for Determining when to Use Appropriate Procedures 54
	Metacognitive Knowledge 55
	Strategic Knowledge 56
	Knowledge About Cognitive Tasks, Including Contextual and Conditional Knowledge 57
	Self-Knowledge 59
	Assessing Objectives Involving Metacognitive Knowledge 60
	Conclusion 62
Chapter 5	The Cognitive Process Dimension 63
	A Tale of Three Learning Outcomes 64
	No Learning 64
	Rote Learning 64
	Meaningful Learning 64
	Meaningful Learning as Constructing Knowledge Frameworks 65
	Cognitive Processes for Retention and Transfer 65
	The Categories of the Cognitive Process Dimension 66
	Remember 66
	Recognizing 69
	Recalling 69
	Understand 70
	Interpreting 70
	Exemplifying 71
	Classifying 72
	Summarizing 73
	Inferring 73
	Comparing 75
	Explaining 75
	Apply 77
	Executing 77
	Implementing 78
	Analyze 79
	Differentiating 80

	01
	Organizing 81
	Attributing 82
	Evaluate 83
	Checking 83
	Critiquing 84
	Create 84
	Generating 86
	Planning 87
	Producing 87
	Decontextualized and Contextualized Cognitive Processes 88
	An Example of Educational Objectives in Context 89
	Remembering What Was Learned 90
	Making Sense of and Using What Was Learned 90
	Conclusion 91
SECTION III The Taxo	·
CHAPTER 6	Using the Taxonomy Table 95
	Using the Taxonomy Table in Analyzing Your Own Work 95
	Using the Taxonomy Table in Analyzing the Work of Others 96
	The Taxonomy Table Revisited 97
	The Learning Question 97
	The Instruction Question 99
	The Assessment Question 101
	The Alignment Question 102
	Problems in Classifying Objectives 105
	The Level of Specificity Problem 105
	The Prior Learning Problem 105
	Differentiating Objectives from Activities 106
	Some Helpful Hints 107
	Consider the Verb-Noun Combination 107
	Consider the Verb-Noun Combination 107 Relate Type of Knowledge to Process 107
	Consider the Verb-Noun Combination 107 Relate Type of Knowledge to Process 107 Make Sure You Have the Right Noun 108

Rely on Multiple Sources 109

CHAPTER 7 Introduction to the Vignettes 110

Characterization of the Vignettes 110

The Curriculum Unit 111

	Central Components of the Vignette Descriptions 112
	Using the Taxonomy Table to Analyze the Vignettes 114
	The Analytic Process: A Summary 117
	Organization and Structure of the Vignette Chapters 117
	A Closing Comment 118
CHAPTER 8	Nutrition Vignette 119
	Section I: Objectives 119
	Section II: Instructional Activities 120
	Section III: Assessment 127
	Section IV: Closing Commentary 128
	The Learning Question 128
	The Instruction Question 128
	The Assessment Question 130
	The Alignment Question 130
	Section V: Closing Questions 131
	Attachments 133
CHAPTER 9	Macbeth Vignette 136
CHAPTER 9	Macbeth Vignette 136 Part I: Objectives 137
CHAPTER 9	
CHAPTER 9	Part I: Objectives 137
CHAPTER 9	Part I: Objectives 137 Part II: Instructional Activities 137
CHAPTER 9	Part I: Objectives 137 Part II: Instructional Activities 137 Part III: Assessment 143
CHAPTER 9	Part I: Objectives 137 Part II: Instructional Activities 137 Part III: Assessment 143 Part IV: Closing Commentary 146
CHAPTER 9	Part I: Objectives 137 Part II: Instructional Activities 137 Part III: Assessment 143 Part IV: Closing Commentary 146 The Learning Question 146
CHAPTER 9	Part I: Objectives 137 Part II: Instructional Activities 137 Part III: Assessment 143 Part IV: Closing Commentary 146 The Learning Question 146 The Instruction Question 146
CHAPTER 9	Part I: Objectives 137 Part II: Instructional Activities 137 Part III: Assessment 143 Part IV: Closing Commentary 146 The Learning Question 146 The Instruction Question 146 The Assessment Question 148
CHAPTER 9	Part I: Objectives 137 Part II: Instructional Activities 137 Part III: Assessment 143 Part IV: Closing Commentary 146 The Learning Question 146 The Instruction Question 146 The Assessment Question 148 The Alignment Question 148
CHAPTER 9	Part I: Objectives 137 Part II: Instructional Activities 137 Part III: Assessment 143 Part IV: Closing Commentary 146 The Learning Question 146 The Instruction Question 146 The Assessment Question 148 The Alignment Question 148 Part V: Closing Questions 149 Attachments 151 Addition Facts Vignette 158
	Part I: Objectives 137 Part II: Instructional Activities 137 Part III: Assessment 143 Part IV: Closing Commentary 146 The Learning Question 146 The Instruction Question 146 The Assessment Question 148 The Alignment Question 148 Part V: Closing Questions 149 Attachments 151
	Part I: Objectives 137 Part II: Instructional Activities 137 Part III: Assessment 143 Part IV: Closing Commentary 146 The Learning Question 146 The Instruction Question 146 The Assessment Question 148 The Alignment Question 148 Part V: Closing Questions 149 Attachments 151 Addition Facts Vignette 158
	Part I: Objectives 137 Part II: Instructional Activities 137 Part III: Assessment 143 Part IV: Closing Commentary 146 The Learning Question 146 The Instruction Question 146 The Assessment Question 148 The Alignment Question 148 Part V: Closing Questions 149 Attachments 151 Addition Facts Vignette 158 Part I: Objectives 158
	Part I: Objectives 137 Part II: Instructional Activities 137 Part III: Assessment 143 Part IV: Closing Commentary 146 The Learning Question 146 The Instruction Question 148 The Assessment Question 148 The Alignment Question 148 Part V: Closing Questions 149 Attachments 151 Addition Facts Vignette 158 Part I: Objectives 158 Part II: Instructional Activities 159
	Part II: Objectives 137 Part II: Instructional Activities 137 Part III: Assessment 143 Part IV: Closing Commentary 146 The Learning Question 146 The Instruction Question 148 The Assessment Question 148 The Alignment Question 148 Part V: Closing Questions 149 Attachments 151 Addition Facts Vignette 158 Part II: Objectives 158 Part II: Instructional Activities 159 Part III: Assessment 165

	The Alignment Question	169
	Part V: Closing Questions 169)
CHAPTER 11	Parliamentary Acts Vignette	171
	Part I: Objectives 171	
	Part II: Instructional Activities	173
	Part III: Assessment 180	
	Part IV: Closing Commentary	182
	The Learning Question 1	.82
	The Instruction Question	184
	The Assessment Question	184
	The Alignment Question	184
	Part V: Closing Questions 18	4
	Attachments 186	
CHAPTER 12	Volcanoes? Here? Vignette	190
	Part I: Objectives 190	
	Part II: Instructional Activities	191
	Part III: Assessment 201	
	Part IV: Closing Commentary	205
	The Learning Question	205
	The Instruction Question	205
	The Assessment Question	205
	The Alignment Question	205
	Part V: Closing Questions 2	.06
	Attachments 208	
CHAPTER 13	Report Writing Vignette	210
	Part I: Objectives 210	
	Part II: Instructional Activities	213
	Part III: Assessment 220	
	Part IV: Closing Commentary	223
	The Learning Question	223
	The Instruction Question	223
	The Assessment Question	225
	The Alignment Question	225

169

The Assessment Question

	Part V: Closing Questions 226				
	Attachments 228				
CHAPTER 14	Addressing Long-Standing Problems in Classroom Instruction 232				
	Generalizations Related to the Learning Question 234				
	Using Complex Processes to Facilitate Mastery of Simpler Objectives 234				
	Choosing Varieties of Knowledge 236				
	Generalizations Related to the Instruction Question 239				
	Recognizing Links Between Knowledge Types and Cognitive Processes 239				
	Differentiating Instructional Activities from Objectives 242				
	Generalizations Related to the Assessment Questions 245				
	Using Summative and Formative Assessments 245				
	Dealing with External Assessments 248				
	Generalizations Related to the Alignment Question 250				
	Aligning Assessments with Objectives 250 Aligning Instructional Activities with Assessments 253 Aligning Instructional Activities with Objectives 255				
	A Final Comment 256				
The Taxor	nomy in Perspective 257				
CHAPTER 15	The Taxonomy in Relation to Alternative Frameworks 259				
	Unidimensional Classification Systems 260				
	Gerlach and Sullivan's Taxonomy of Commonly Taught Behaviors 260				
	Ausubel and Robinson's Six Hierarchically Ordered Categories 261				
	Metfessel, Michael, and Kirsner's Synonyms 261				

Gerlach and Sullivan's Taxonomy of Commonly Taught
Behaviors 260

Ausubel and Robinson's Six Hierarchically Ordered
Categories 261

Metfessel, Michael, and Kirsner's Synonyms 261

Gagné's Hierarchy of Learning 264

Stahl and Murphy's Domain of Cognition 265

Bruce's Integration of Knowledge with the Other
Categories 269

Romizowski's Analysis of Knowledge and Skills 270

Biggs and Collis's SOLO 270

Quellmalz's Taxonomy of Cognitive Processes 272
Hauenstein's Conceptual Framework for Educational Objectives 272
Reigeluth and Moore's Comparison Framework 274
Multidimensional Classification Systems 274
DeBlock's Three-Dimensional Framework 274
DeCorte's Modification of Guilford's Structure of Intellect Model 275
Ormell's Modification of the Taxonomy 278
Hannah and Michaelis's Comprehensive Framework for Instructional Objectives 279
Williams's Behavioral Typology of Educational Objectives 281
Marzano's Dimensions of Learning 282
Merrill's Component Display Theory 283
Haladyna (1997) and Williams and Haladyna's (1982) Typology for Higher-Level Test Items 284
Similarities of the Revision's Changes to the 19 Alternative Frameworks 286
CHAPTER 16 Empirical Studies of the Structure of the Taxonomy 287
Studies of the Cumulative Hierarchy Issue 287
A Weak Empirical Approach to Checking for a Cumulative Hierarchy 288
A Stronger Empirical Approach to Checking for a
Cumulative Hierarchy 288
Cumulative Hierarchy 288 A Meta-Analysis of the Available Intercorrelational Data Among Categories 289
Cumulative Hierarchy 288 A Meta-Analysis of the Available Intercorrelational Data
Cumulative Hierarchy 288 A Meta-Analysis of the Available Intercorrelational Data Among Categories 289 The Ordering of the Evaluation (Evaluate) and Synthesis (Create) Categories 291
Cumulative Hierarchy 288 A Meta-Analysis of the Available Intercorrelational Data Among Categories 289 The Ordering of the Evaluation (Evaluate) and Synthesis
Cumulative Hierarchy 288 A Meta-Analysis of the Available Intercorrelational Data Among Categories 289 The Ordering of the Evaluation (Evaluate) and Synthesis (Create) Categories 291 Evidence from Structural Linear Equation Modeling Studies 292 In Conclusion 293 CHAPTER 17 Unsolved Problems 295
Cumulative Hierarchy 288 A Meta-Analysis of the Available Intercorrelational Data Among Categories 289 The Ordering of the Evaluation (Evaluate) and Synthesis (Create) Categories 291 Evidence from Structural Linear Equation Modeling Studies 292 In Conclusion 293 CHAPTER 17 Unsolved Problems 295 Relationships Among Curriculum, Instruction, and Assessment 295
Cumulative Hierarchy 288 A Meta-Analysis of the Available Intercorrelational Data Among Categories 289 The Ordering of the Evaluation (Evaluate) and Synthesis (Create) Categories 291 Evidence from Structural Linear Equation Modeling Studies 292 In Conclusion 293 CHAPTER 17 Unsolved Problems 295 Relationships Among Curriculum, Instruction,
Cumulative Hierarchy 288 A Meta-Analysis of the Available Intercorrelational Data Among Categories 289 The Ordering of the Evaluation (Evaluate) and Synthesis (Create) Categories 291 Evidence from Structural Linear Equation Modeling Studies 292 In Conclusion 293 CHAPTER 17 Unsolved Problems 295 Relationships Among Curriculum, Instruction, and Assessment 295
Cumulative Hierarchy 288 A Meta-Analysis of the Available Intercorrelational Data Among Categories 289 The Ordering of the Evaluation (Evaluate) and Synthesis (Create) Categories 291 Evidence from Structural Linear Equation Modeling Studies 292 In Conclusion 293 CHAPTER 17 Unsolved Problems 295 Relationships Among Curriculum, Instruction, and Assessment 295 Curriculum Concerns 295

Relationship to a Theory of Learning and Cognition 300 Relationships Among the Domains 300 301 In Closing

Appendixes 303

305 Appendix A: Summary of Changes from the Original Framework

305 Four Changes in Emphasis

307 Four Changes in Terminology 308

Four Changes in Structure

The Inclusion of Understanding and the Omission of Problem Solving and Critical Thinking 311

Appendix B: Condensed Version of the Original Taxonomy of Education Objectives: Cognitive Domain 313

Knowledge 313

Intellectual Abilities and Skills 316

Appendix C: Data Used in the Meta-Analysis in Chapter 16 320

References 323

Credits 333

335 Index

List of Tables and Figures

TABLE 2.1	Relationship of Global, Educational, and Instructional Objectives 17
TABLE 3.1	The Taxonomy Table 28
TABLE 3.2	The Major Types and Subtypes of the Knowledge Dimension 29
TABLE 3.3	The Six Categories of the Cognitive Process Dimension
	and Related Cognitive Processes 31
FIGURE 3.1	How an Objective Is Classified in the Taxonomy Table 32
TABLE 4.1	The Knowledge Dimension 46
TABLE 5.1	The Cognitive Process Dimension 67
TABLE 5.2	Completed Taxonomy Table for Hypothetical Ohm's Law Unit 92
TABLE 6.1	Placement of the Objective in the Taxonomy Table 98
TABLE 6.2	Placement of the Objective and Instructional Activities in the Taxonomy Table 100
TABLE 6.3	Placement of the Objective, Instructional Activities, and Assessment in the
	Taxonomy Table 103
TABLE 7.1	Our Collection of Vignettes 111
TABLE 7.2	Elements Relevant to Taxonomic Analysis of the Vignettes 115
TABLE 8.1	Analysis of the Nutrition Vignette in Terms of the Taxonomy Table
	Based on Stated Objectives 121
TABLE 8.2	Analysis of the Nutrition Vignette in Terms of the Taxonomy Table
	Based on Instructional Activities 124
TABLE 8.3	Analysis of the Nutrition Vignette in Terms of the Taxonomy Table
	Based on Assessments 129
TABLE 9.1	Analysis of the Macbeth Vignette in Terms of the Taxonomy Table
	Based on Stated Objectives 138
TABLE 9.2	Analysis of the Macbeth Vignette in Terms of the Taxonomy Table
	Based on Instructional Activities 144
TABLE 9.3	Analysis of the Macbeth Vignette in Terms of the Taxonomy Table
	Based on Assessments 147
TABLE 10.1	Analysis of the Addition Facts Vignette in Terms of the Taxonomy Table
	Based on Stated Objectives 160
TABLE 10.2	Analysis of the Addition Facts Vignette in Terms of the Taxonomy Table
	Based on Instructional Activities 165
TABLE 10.3	Analysis of the Addition Facts Vignette in Terms of the Taxonomy Table
	Based on Assessments 167

TABLE 11.1	Analysis of the Parliamentary Acts Vignette in Terms of the Taxonomy Table
	Paged on Stated Objectives 1/4
TABLE 11.2	Analysis of the Parliamentary Acts Vignette in Terms of the Taxonomy Table
INDLE :	Raced on Instructional Activities 179
TABLE 11.3	Analysis of the Parliamentary Acts Vignette in Terms of the Taxonomy Table
(ADEL 1110	Based on Assessments 183
TABLE 12.1	Analysis of the Volcanoes Vignette in Terms of the Taxonomy Table
	Based on Stated Objectives 192
TABLE 12.2	Analysis of the Volcanoes Vignette in Terms of the Taxonomy Table
••••	Based on Instructional Activities 202
TABLE 12.3	Analysis of the Volcanoes Vignette in Terms of the Taxonomy Table
	Based on Assessments 204
TABLE 13.1	Analysis of the Report Writing Vignette in Terms of the Taxonomy Table
	Based on Stated Objectives 213
TABLE 13.2	Analysis of the Report Writing Vignette in Terms of the Taxonomy Table
	Based on Instructional Activities 221
TABLE 13.3	Analysis of the Report Writing Vignette in Terms of the Taxonomy Table
	Based on Assessments 224
TABLE 15.1	Inferred Relationship of the Original Taxonomy to Alternative
	Unidimensional Classification Systems 262
TABLE 15.2	Subcategories of Understand Comparable to Ausubel and Robinson's
	Three Characteristics of Representational Learning 264
TABLE 15.3	Stahl and Murphy's (1981) Domain of Cognition (abstracted from
	their pages 31 and 32 attributed to Stahl, 1979) 267
FIGURE 15.	Romizowski's (1981, p. 257) Expanded Skill Cycle 271
TABLE 15.4	, ,
	Classification Systems 276
FIGURE 15.	2 A Comprehensive Framework for Instructional Objectives from Hannah and
	Michaelis (1977, p. 16) 279
TABLE 15.5	j
	1994, p. 112) 283

Specification of Objectives for the Performance-Content Matrix TABLE 15.6 (Adapted from Merrill, 1994, p. 117) 285 Average Correlation for the Available Data in Each Cell of the TABLE 16.1.

Table in Appendix C 291 Correlations in Each Cell in Table 16.1 Weighted for Sample **TABLE 16.2** Size Before Being Averaged 291 Data in Tables 16.1 and 16.2 with the Order of Synthesis and **TABLE 16.3**

Evaluation Reversed 292 Summary of the Structural Changes from the Original Framework FIGURE A.1

to the Revision Intercorrelations of Scores for the Six Categories of the Original TABLE C.1 Taxonomy Based on Data from Six Studies 321