

Contents

Foreword	xv
-----------------------	-----------

Preface	xix
----------------------	------------

Introduction.....	1
--------------------------	----------

Status of ELLs in the United States	1
---	---

Purpose of the Book.....	1
--------------------------	---

Overview of the Book	2
----------------------------	---

How to Navigate the Book.....	2
-------------------------------	---

Chapter 1

Thoughts, Stories, and <i>Consejos</i> (Advice) from ELLs and Their Educators	5
--	----------

by Sylvia Celedón-Pattichis, University of New Mexico, Albuquerque, New Mexico

Nora G. Ramirez, Nora G. Ramirez Consulting, Tempe, Arizona

Voices of High School English Language Learners	5
---	---

Voices of College Students Reflecting on Their K–12 Classroom Experiences	6
---	---

Voices of Adults Reflecting on Their ELL Experiences	9
--	---

Understanding ELLs’ Stories.....	12
----------------------------------	----

Voices of Teachers	13
--------------------------	----

Understanding Teachers’ Stories	16
---------------------------------------	----

Chapter 2

Second Language Development and Implications for the Mathematics Classroom	19
---	-----------

by Nora G. Ramirez, Nora G. Ramirez Consulting, Tempe, Arizona

Sylvia Celedón-Pattichis, University of New Mexico, Albuquerque, New Mexico

Guiding Principles for Teaching ELLs in Mathematics.....	20
--	----

Teacher and ELL Actions Based on Stage of Language Development.....	21
---	----

Essential teacher actions with all ELLs	22
---	----

Three stages of language development.....	24
---	----

The highly advanced English language learner	33
--	----

Scenarios Showing ELLs in Mathematics Classrooms	33
--	----

Chapter 3

Language and Learning: A Conceptual Design from an Apache Perspective.....	39
---	-----------

by Rea Goklish, John F. Kennedy K–8 School, Cedar Creek, Arizona

My Conceptual Design	39
My Learning Process	42

Chapter 4

Elements of an Effective Mathematics Community for ELLs 47

<i>by</i> Sylvia Celedón-Pattichis, University of New Mexico, Albuquerque, New Mexico	
Nora G. Ramirez, Nora G. Ramirez Consulting, Tempe, Arizona	
Beyond Setting High Expectations.....	48
Taking Time to Listen, Observe, and Learn	49
Individualistic vs. Collectivistic Value Systems.....	50
Affirming ELLs’ Cultures in the Mathematics Classroom	51

Chapter 5

Cases of Practice: Teaching Mathematics to ELLs in Elementary School 55

Case 1: Using Storytelling to Pose Word Problems in Kindergarten ESL and Bilingual Classrooms 56

<i>by</i> Sylvia Celedón-Pattichis, University of New Mexico, Albuquerque, New Mexico	
Erin Turner, University of Arizona, Tucson, Arizona	
Context of the Classrooms	57
Findings	57
Video Clip: ELL as a Competent Problem Solver (ESL Classroom)	58
Video Clip 2: Storytelling—Partitive Division (Bilingual Classroom).....	59
Lessons Learned.....	60
What teachers can do with young children in mathematics.....	61
How an elementary mathematics methods course can use this work.....	61

Case 2: Fostering an Equitable Classroom for English Language Learners..... 63

<i>by</i> Cathy Kinzer, New Mexico State University, Las Cruces, New Mexico	
Maricela Rincón, Monte Vista Elementary School, Las Cruces, New Mexico	
<i>as told by</i> Maricela Rincón	
My Story as an English Language Learner.....	63
Current School Context and Demographics.....	64
Successes and Challenges in Teaching Mathematics to ELLs	65
Policies and Practices Supporting or Hindering My Teaching of ELLs	65
Advocating for ELLs in the School and Classroom Setting.....	66
Teaching Strategies—Video Clips.....	67

Case 3: Building Background Knowledge to Teach Mathematics in an ESL Classroom 69*by* Cathy Kinzer, New Mexico State University, Las Cruces, New Mexico

Ricardo Rincón, Monte Vista Elementary School, Las Cruces, New Mexico

as told by Ricardo Rincón

My Story about Teaching Mathematics to ELLs69

Demographics of Monte Vista Elementary School.....70

Successes and Challenges in Teaching Mathematics to ELLs70

Policies and Practices Supporting or Hindering Teaching Mathematics to ELLs72

Advocacy for ELLs in the School and Classroom Setting.....72

Message from This Example73

Case 4: From “Plussed” to “Added”: Supporting English Language Learners..... 73*by* Marco A. Ramirez, Associates for Educational Success, Tucson, Arizona

Chris Confer, Associates for Educational Success, Tucson, Arizona

Planning to Support English Language Learners with Mathematics Concepts74

Supporting English Language Learners in Developing Mathematical Language75

Teaching the Lesson: A New Kind of Discussion76

Summing It Up77

Case 5: Facilitating the Participation of Latino English Language Learners—Learning from an Effective Teacher 77*by* Kathryn Chval, University of Missouri, Columbia, Missouri

Sara’s Classroom.....78

Establishing Expectations for ELLs’ Participation.....79

Using Calculators to Facilitate ELLs’ Participation85

Conclusion.....88

Chapter 6**Cases of Practice: Teaching Mathematics to ELLs in Secondary School..... 91****Case 1: My Story about Teaching Mathematics to ELLs 92***by* Cathy Kinzer, New Mexico State University, Las Cruces, New Mexico

David Lee Ubinger, Chaparral High School, Chaparral, New Mexico

as told by David Lee Ubinger

School Demographics93

Successes and Challenges in Teaching Mathematics to ELLs94

Policies and Practices Supporting or Hindering My Teaching of ELLs94

Advocating for ELLs in the School and Classroom Setting.....95

Video Clips.....95

Case 2: Building Connections from Whole Number to Polynomial Long Division—Teaching English Language Learners	96
<i>by</i> Cynthia O. Anhalt, University of Arizona, Tucson, Arizona	
<i>Jennifer A. Eli, University of Arizona, Tucson, Arizona</i>	
Reflections from the Teacher	97
The Classroom Setting.....	97
The Lessons on Polynomial Long Division.....	99
Prior knowledge, scaffolding, and connections	99
A closely observed lesson segment.....	103
Case 3: Discussing Conceptually Demanding Mathematics in a Bilingual Algebra Class	103
<i>by</i> William Zahner, Boston University, Boston, Massachusetts	
The Teacher and the Class.....	104
The Lesson in Curricular Context	105
Examples Showing the Discussion Unfolding	105
Introducing the problem.....	105
Group discussion	106
Conclusion: Mathematical, Linguistic, and Social Supports Used by Ms. V	108
Case 4: Twelfth-Grade English Language Learners and the Making of Mathematical Meanings ...	109
<i>by</i> Hector Morales Jr., DePaul University, Chicago, Illinois	
Classroom Vignettes and Observations.....	110
Vignette 1	111
Vignette 2	113
Vignette 3	115
Discussion	117
Case 5: Advocating for ELLs' Education Rights in the Mathematics Classroom.....	118
<i>by</i> Matthew S. Winsor, Illinois State University, Bloomington, Illinois	
Case 6: Issues of Identity and Power in Teaching Mathematics to Latin@ Students	119
<i>by</i> Rochelle Gutiérrez, University of Illinois, Champaign, Illinois	
Language as Identity.....	120
Getting to Know Your Students	121
Definitions of Success	123
Crossing Borders	124

Chapter 7

Parents and Children Come Together: Latino and Latina Parents Speak Up about Mathematics Teaching and Learning..... 127

by Marta Civil, University of North Carolina, Chapel Hill, North Carolina

José María Menéndez, Pima Community College, Tucson, Arizona

Why Do We Need to Develop a Dialogue between Parents and Schools?	128
Vignette 1: Teachers' method vs. parents' method	128
Vignette 2: Language and homework.....	130
How Can We Develop a Dialogue between Parents and Schools?	131
Short courses and <i>tertulias</i>	132
Vignette 3: Teachers' method vs. parents' method, again.....	132
Classroom visits	134
Conclusion.....	137

Chapter 8

Cases of Practice: Assessing ELLs in Mathematics..... 139

Case 1: Providing Multiple Opportunities for ELLs to Communicate Their Mathematical Ideas 139

by Richard Kitchen, University of New Mexico, Albuquerque, New Mexico

Laura Burr, University of New Mexico, Albuquerque, New Mexico

Libni B. Castellón, Universidad Pedagógica Nacional Francisco Morazán, Tegucigalpa, Honduras

Vignette: Zenia's Progress through the Protocol.....	140
Research Methods and School Setting	142
The Discursive Assessment Protocol	142
Looking Back: Communicating Mathematical Ideas	144

Case 2: Attending to Student Gestures..... 145

by Anthony Fernandes, University of North Carolina–Charlotte, Charlotte, North Carolina

Vignette: Rita's Gestures Related to Her Understanding of Area	146
Episode 1: Gestures related to the concept of area	146
Episode 2: Gestures related to the process of determining area	148
Context of the Vignette.....	150
Discussion: Rita's Use of Language and Gestures	150
Implications for Assessment.....	151

Case 3: Exploring ELLs' Understanding of Word Problems in Mathematics Assessments—

The Role of Text Complexity and Student Background Knowledge 151

by María Martiniello, Educational Testing Service, Princeton, New Jersey

Mikyung Kim Wolf, Educational Testing Service, Princeton, New Jersey

Assessment Item 1: Polysemy and Background Knowledge Issues	153
Challenges to ELLs	154
Interview on assessment item 1	154
Polysemy: What can teachers do?.....	155
Assessment Item 2: Background Knowledge Issues.....	156
Challenges to ELLs	156
Interview on assessment item 2	157
Background knowledge: What can teachers do?	158
Assessment Item 3: Reading Comprehension Issues.....	158
Challenges to ELLs	159
Interview on assessment item 3	159
Reading comprehension: What can teachers do?	160
Summary	161

Chapter 9

Knowledge for Teaching English Language Learners Mathematics: A Dilemma..... 163

by Mark Driscoll, EDC, Newton, Massachusetts

Daniel Heck, Horizon Research, Chapel Hill, North Carolina

Kristen Malzahn, Horizon Research, Chapel Hill, North Carolina

Vignette: A Seventh-Grade Lesson	164
Three Guiding Principles	167
Relevance of the Three Principles	169
Looking for Evidence of the Three Principles.....	170
Lesson planning	171
Lesson implementation.....	172
Lesson reflection.....	173
Putting the Principles into Action	175
Conclusion.....	177

Chapter 10

What's Language Got to Do with It? Identifying Language Demands in Mathematics Instruction for English Language Learners..... 183

by Julia M. Aguirre, University of Washington–Tacoma, Tacoma, Washington

George C. Bunch, University of California–Santa Cruz, Santa Cruz, California

Identifying Mathematics Language Demands	184
--	-----

Using the LDML Tool	187
Post-Viewing LDML Analysis	189
Listening and speaking.....	189
Reading and writing.....	190
Representing.....	191
Language demands in all lesson phases.....	191
Conclusion.....	192

Chapter 11

The Language Demands of Word Problems for English Language Learners..... 195

by Luciana C. de Oliveira, Purdue University, West Lafayette, Indiana

Word Problems in Mathematics.....	195
Word problem 1.....	196
Word problem 2.....	203
Language-Based Mathematics Instruction	203

Chapter 12

Analyzing Effective Mathematics Lessons for English Learners: A Multiple Mathematical Lens Approach..... 207

by Julia M. Aguirre, University of Washington–Tacoma, Tacoma, Washington

Erin E. Turner, University of Arizona, Tucson, Arizona

Tonya Gau Bartell, University of Delaware, Newark, Delaware

Corey Drake, Iowa State University, Ames, Iowa

Mary Q. Foote, Queens College, City University of New York, Flushing, New York

Amy Roth McDuffie, Washington State University–Tri-Cities, Richland, Washington

Multiple Mathematical Lenses: Task, Learning, Teaching, and Power and Participation.....	208
Task lens	208
Learning lens.....	208
Teaching lens.....	209
Power and participation lens.....	209
Reader Invitation and Video Descriptions	209
Analysis of Selected Lessons Using MML Tool.....	211
Task lens analysis.....	211
Learning lens analysis.....	213
Teaching lens analysis.....	215
Power and participation lens analysis	217
Concluding Remarks and Next Steps	219

Chapter 13

Professional Development Suggestions and Resources..... 223
by Nora G. Ramirez, Nora G. Ramirez Consulting, Tempe, Arizona
Sylvia Celedón-Pattichis, University of New Mexico, Albuquerque, New Mexico

A Lesson in Spanish on Number Sequences..... 224
by Elsa Medina, California Polytechnic State University, San Luis Obispo, California

A Mathematics Lesson Taught in Portuguese..... 227
contributed by Elmano Costa, California State University, Stanislaus, Turlock, California

A Fourth-Grade Lesson on Triangles..... 227
contributed by Jana Ward, Rio Grande Elementary School, Hatch, New Mexico,
and Cathy Kinzer, New Mexico State University, Las Cruces, New Mexico

Reflections on Teaching Perimeter..... 227
by Erin Salazar, Roosevelt School District, Phoenix, Arizona, Phoenix, Arizona

Fractions on a Number Line..... 228
by Victoria Enoch, Roosevelt School District, Phoenix, Arizona, Phoenix, Arizona

Arrays: A Collaboratively Planned Lesson 228
by Andrew Hutchinson, Roger Sherman School, Meriden, Connecticut

TODOS LIVE! Professional Development Sessions 228
TODOS LIVE! “Achieving Excellence and Equity for Latino Students:
A View through Their Eyes”228
by Kathryn Chval, University of Missouri, Columbus, Missouri

TODOS LIVE! “Teaching Mathematics to English Language Learners (TELM)”228
by Nora Ramirez, Nora G. Ramirez Consulting, Tempe, Arizona, and Bob McDonald,
Cartwright School District, Phoenix, Arizona

TODOS LIVE! “Supporting Proof for ELLs, Struggling Learners, and Others.....229
by Melissa Hosten, Chandler Unified School District, Chandler, Arizona

TODOS LIVE! Part 2 of 2: “Multiplication from Concrete to Abstract”229
by Heather Navarro, Chandler Unified School District, Chandler, Arizona

Planning a Mathematics Lesson for ELLs 229
by Nora Ramirez, Nora G. Ramirez Consulting, Tempe, Arizona and Sylvia Celedón-Pattichis,
University of New Mexico, Albuquerque, New Mexico

NCSM Position Paper on Teaching Math to ELLs 229

Online Resources 229

Index..... 231