

Introduction

ELMC Addresses Implications of the Common Core State Standards for Teaching English Learners Mathematics

WHY THIS NEW EDITION ■

The first edition, *English Language Learners in the Mathematics Classroom*, discussed teaching strategies for effectively including English language learners (ELLs or ELs) in all mathematics classrooms, even when sufficient support systems for teachers and English learners were not in place. The first edition was appreciated by individual educators, preservice and graduate classes and their instructors, professional development groups, and individuals for its descriptions of mathematics instruction that focused on both the development of strong foundational understanding of essential mathematical topics and skills, and access and achievement for all students in a class. The various language-rich mathematics lessons that focused on developing all students' understanding of key concepts were different from commonly recommended structures and tactics for teaching English learners in regular mathematics classes.

Today, new standards with high-stakes assessment systems call for considerable English language use and expanded ways of demonstrating mathematical proficiency. The change in emphasis in assessment to numeric and short-answer solutions, written responses, and performance assessment responses necessitates a depth of mathematics understanding for all students, but is especially challenging for English learners. The type of instruction and the strategies that are described in each chapter are highly relevant, even essential aspects of teaching students in a manner that addresses the CCSS and related assessments.

Students develop expertise that is an asset for completing formal assessments, and they are empowered to problem-solve on their own and with a small group when they work with challenging tasks in the classroom. This new edition seeks to support educators as they envision preparing students to grapple with accessible, yet challenging mathematical content and situations in the classroom and to independently think and communicate their knowledge during formal assessments. The topics and examples in this book illustrate how classroom teachers can foster English

language development and simultaneously support English learners to achieve and communicate high levels of mathematics learning.

■ THE SECOND EDITION AND THE COMMON CORE

With adoption of the CCSS for mathematics and other new state standards, an English learner's demonstrated level of achievement in mathematics is now more than ever dependent upon the type of instruction that is experienced. Recent reviews of research have led to the Stanford Center on Instruction's assertion that effective instructional programs for teaching English learners have the following attributes: "a focus on oral language development, such as opportunities to practice English in the classroom, . . . cooperative learning, explicit instruction in the elements of English literacy, differentiated instruction, the use of graphic organizers as a comprehension strategy, and a focus on academic language" (Moughamian, Rivera, & Francis, 2010, p. 22). In regard to assessment, the Center on Instruction asserts that "language-rich performance expectations" such as "obtaining, evaluating, and communicating information; articulating and building on ideas; constructing explanations; and engaging in argument from evidence" permeate the new Common Core State Standards for Mathematics" (Moughamian et al., 2010, p. 1).

In the document titled *Application of Common Core State Standards for English Language Learners*, the CCSS authors point out wide-ranging elements of mathematics instruction for English learners, "Regular and active participation in the classroom—not only reading and listening but also discussing, explaining, writing, representing, and presenting—is critical to the success of English learners in mathematics" (CCSSO & NGA, 2012b). They point out that English learners can learn from cognitively challenging tasks that focus on important concepts. And they can engage with mathematical practices while interacting with peers in English and in native languages while using a variety of representations. Also, the CCSS authors have created the English Language Proficiency Development (ELPD) Framework to outline and draw attention to "the sophisticated language competencies that students will need to perform across their respective academic subject areas" (CCSSO, 2012). These include specific types of necessary receptive and productive language functions, with connections to Standards of Mathematical Practice. For example, English learners use Productive Language Functions such as, "Explain in words orally or in writing relationships between quantities and multiple representations of problem solutions" as they address Practice 1: "Make sense of problems and persevere in solving them" (NGA & CCSSO, 2012b, pp. 21–25).

■ HIGHLIGHTS OF THIS EDITION

- Each chapter's lesson scenario and chapter questions are newly written or adapted to address CCSS and a specific Standard for Mathematical Practice. Lesson scenarios illustrate a variety of ways of supporting English learners' comprehension and English language development.

- The instructional aspects of the lesson scenarios that span from primary to middle school classroom settings are intended to be generalizable across many grades and to be sources of discussion among educators. The scenarios demonstrate a variety of ways in which classroom teachers might provide mathematics instruction that addresses the CCSS and Standards of Mathematical Practice.
- Each chapter's commentary on the mathematics teaching example, along with targeted chapter questions, provides opportunities for educators to contemplate, discuss, and envision helping all students, but particularly English learners, work toward proficiency with the Standards for Mathematical Practice and the CCSS.
- Each chapter's discussion of research and teaching tips serve as a "tool" for educators to understand, discuss, and visualize their own highly effective standards-aligned mathematics teaching of all students, including English learners.

Widespread changes in emphasis in assessment now often require numeric, short-answer, written response, and performance assessment responses. These call for a significant depth of mathematics understanding for all students. English learners are challenged to have both the conceptual understanding and the communication skills needed to demonstrate proficiency. Teachers face the challenge of expanding their teaching practices in order to support every student in learning critical grade-level content and in engaging with the Standards of Mathematical Practices. This second edition has been revised and updated to be useful as a tool for understanding, visualizing, and implementing highly effective mathematics teaching using research-based suggestions in the CCSS, such as English learners should "participate in *mathematical discussions*," "draw on *multiple resources* . . . such as objects, drawings . . . as well as home languages and mathematics experiences outside of school" (NGA Center & CCSSO, 2012b).

The Mathematics Teaching Examples in each chapter are linked to specific standards and illustrate how an instructional focus around challenging, meaningful situations and tasks, often over a series of days, can give all students experience with in-depth problem solving and meaning making, [because] "regular and active participation in the classroom is critical to the success of English learners in mathematics," "[m]athematical tasks should be kept at high cognitive demand; . . . and students should wrestle with important mathematics" (NGA Center & CCSSO, 2012b).

PREPARING ENGLISH LEARNERS AND THEIR CLASSMATES FOR NEW ASSESSMENT SYSTEMS

With the expansion in students' expected levels of knowledge and ways of showing competence, including on Smarter Balance Assessment Consortium, Partnership for Assessment of Readiness for College and Careers, and state assessments, there is a risk that English learners may not

receive the types of instructional support that will lead to their success. It may seem counterintuitive to some educators, but *research indicates that English learners can expand their English language skills and make more mathematical progress when they are involved in more challenging, less teacher-directed lessons* (Heller, Hanson, Barnett-Clarke, & Darling, 2010; U.S. Department of Education, 2010).

- Strategies in this volume, such as using visual representations, along with the deep conceptual understanding and language skills gained while working with peers on structured group assignments and on complex tasks, can prepare English learners for independent success when being individually assessed.
- In order for students to demonstrate their understanding on performance assessment items, it is important to address students' academic communication skills in all classrooms. Throughout this book, language-rich instruction is demonstrated and discussed, with a focus on developing mathematical knowledge as well as English language proficiency, going far beyond the introduction of vocabulary and use of sentence stems. For example, in Chapter 5, students strive to articulate their understanding and build on classmates' ideas as they learn about multidigit multiplication. In Chapter 4, small groups collaborate as they develop a new concept.
- During instruction, not just during assessment, students can focus on giving an argument from evidence. For example, in Chapter 2, primary-grade children with limited English give reasons for sorting geometric shapes in a particular way.

■ SUPPORTING TEACHERS AS INDIVIDUALS AND GROUPS

Educators realize that the CCSS and new state and consortia assessment systems serve as a call for a shift in teaching in order to provide all students with effective learning experiences. The author of this volume and the authors of the first edition seek to provide a carefully prepared tool to be contemplated, discussed, and expanded from by educators who are developing their own goals and practices for supporting all students' learning of mathematics. This second edition of *ELLMC* is intended to be useful as a springboard for envisioning and planning effective instruction while working in various settings, including preservice or graduate courses, teams, staffs, professional development groups, as well as individually. By considering, even critiquing, the content of this volume, it is hoped that educators will support one another as they adapt and expand their teaching practices in order to guide English learners, and all students, in engaging in concept development and problem solving in order to be able to succeed mathematically. The ultimate goal is for all learners to acquire knowledge and strategies that support a high level of mathematics learning while also fostering language development for English learners.