

## Preface

**T**HE ONE NAME on the cover means only that I served as overall editor, tying the threads of each chapter together to form a cohesive whole. The ideas included here (as well as the structure and focus of the book) are much more than mine alone—they are the result of a collaborative effort of all the authors of the chapters.

When the National Council of Teachers of Mathematics (NCTM) Educational Materials Committee first approached me to write this volume, I sought the assistance of colleagues engaged in on-the-cusp work on intervention at various levels: Alice Gabbard, Tim Hudson, Janan Hamm, Rachel Lambert, Jan Valle, Judy Storeygard, and Susan Friel. Some were curriculum authors, teachers, and district-level math coordinators; others were math staff developers and professors of special education and math education. Some of us were leading large-scale national, state, or district initiatives; others were working in schools and classrooms with children. No matter our background or role, each of us had been doing serious thinking about intervention in this era of the No Child Left Behind Act.

Funded by NCTM, we met at Mathematics in the City (at City College of New York in New York City) to discuss our various projects, analyze the common threads in them, and outline this book. Initially NCTM had suggested a working title of *Intervention: What To Do When Children Don't Succeed*. As we discussed our various projects, one common thread that quickly surfaced was our belief that it is not the children who fail. As Marie Clay once said, “If children are unable to learn, we should assume that we have not yet found the right way to teach them.”

From this perspective we began to envision a new tapestry for intervention—one that became the thrust of this book. Whereas most work on intervention focuses on a medical model (diagnose the problem or deficit, label the child, and prescribe the treatment), we chose instead to focus on intervention as prevention. We propose that improving interventions for students with challenges in mathematics requires us to look more closely at an already-woven tapestry—how we define mathematics (and success in it), how we assess and label students, the present culture of schooling, and how we view instruction. Successful intervention demands a reweaving of this tapestry. The book you hold is about that: descriptions of successful small-group work, large-scale district and state intervention initiatives, summer school programs, curricular reweaving, and promising Internet possibilities. Rather than describing strategies for remediation, we chose to tell stories of our successes in prevention.

Chapter 1 describes how we view a successful learner of mathematics—a mathematical thinker who works on his or her edge, enjoying puzzlement and competently inquiring, generalizing, and proving relations. Accomplishing this outcome means that frameworks of learning may need reweaving—away from a top-down dissection of the discipline with lists of behavioral objectives comprising skills and concepts, to a bottom-up, emergent approach more characteristic of the learner’s development of big ideas, strategies, and ways of modeling. Chapter 2 develops this case and graphically shows developmental trajectories—landscapes of learning for number and operation, K–6.

Chapter 3 illustrates teachers using such a developmental framework, eliciting what children know as a way to begin and building from there to support the development of numeracy. Determining what children know requires a reweaving of how we assess—and it demands knowing what is important to assess. Typically, assessments are static; they measure a moment in time—how a child scored on a given item on a given day. In contrast, dynamic assessment is continuous and informs about the zone of proximal development (Vygotsky 1978). It foresees “where and how one can anticipate that which is just coming into view in the distance” (Streefland 1985). It captures genuine mathematizing and development—children’s strategies, their ways of modeling realistic problems, their understanding of key mathematical ideas. In essence it captures where they are on the landscape and offers implications for instruction. Chapter 4 gives several examples of how to assess dynamically.

Chapter 5 turns to guided small-group work. At times forming flexible small groups is helpful to give children more opportunities to explore specific topics that challenge them. Examples show how and why teachers form such groups, the focus of the work they might do together, and how the group work supports children and ensures that all members can contribute to whole-group class discussions.

Powerful teaching happens when teachers collaborate. Chapter 6 turns to collaboration—how special education teachers and classroom teachers might work together to provide consistency of learning opportunities. Push-in, pull-out, and coteaching models are all described and examined.

Chapter 7 narrates the learning in a Missouri middle school summer intervention program: *Mathematicians in Residence*. Involved in mathematical inquiry for two weeks alongside mathematicians, math educators, and classroom teachers, middle school children on the cusp of failing become enthused about mathematics and begin to see themselves as more numerate and empowered thinkers. The success of the program, and par-

ticularly the professional development around it, affects the intervention work throughout the district.

Sometimes the curriculum needs reweaving. Rigor and deep understanding develop from opportunities to explore topics deeply. The commercial packages that schools buy do not always use powerful tools such as math racks (rekenrekken), open number lines, and ratio tables. And even when the curricula chosen are research based, holes and gaps may exist that demand supplementation. Chapter 8 narrates a district-level intervention consisting of curriculum reweaving—how a district close to failing its children began turning itself around.

Chapter 9 shows another path to curriculum reweaving. Computer technology can be harnessed to offer students powerful adaptive online learning experiences. The result is a personal learning experience for each child, using a seamless home and school Internet environment that embodies consistent, developmentally appropriate learning opportunities. This chapter highlights DreamBox.com as an example.

Chapter 10 looks back at a large-scale K–2 state intervention initiative and the promising data results. The initiative, involving a reweaving of professional development, indicates how teacher learning can affect not only practice but also a network and structure for sustained systematic change across the state.

The volume ends with a plea from a professor of disability studies to avoid the pitfalls of labels, prescription, and remediation. Summarizing beautifully the core beliefs of the working group, she argues for a reweaving of the tapestry of intervention, for a humane education of all children: one that both gives children opportunities to think, explore, and make sense of problems in their own ways and ensures that teachers have the tools to support such rich learning environments.

## References

- Streefland, Leen. "Mathematics as an Activity and Reality as a Source." *Nieuwe Wiskrant* 5, no. 1 (1985): 60–67.
- Vygotsky, Lev S. *Mind in Society: The Development of Higher Psychological Processes*. Cambridge, Mass.: Harvard University Press, 1978.