Effective Math Interventions: A Guide to Improving Whole-Number Knowledge

By Robin S. Coddington, Robert J. Volpe, and Brian C. Poncy

New York, United States: Guilford Press, 2017, 258 pages.

ISBN: 978-1-4625-2828-8 (paperback)

Reviewed by:

Christine MacKechnie, OCT

Algoma District School Board

Given the importance of math knowledge and skills for adulthood combined with current measures that suggest that US math achievements are below international standards, Coddington, Volpe, and Poncy seek to answer the question: what can districts, schools, and educators do to improve whole-number knowledge? Drawing on comprehensive research, the authors highlight how a Response to Intervention model (RTI) can be used to assess current math skills and implement classroom wide, small group, and individual interventions.

Effective Math Interventions begins by placing the concept of interventions in the broader dialogue about math. The authors provide a well-referenced overview of math proficiencies (conceptual understanding, procedural fluency, strategic competence, adaptive reasoning, and productive disposition). They also introduce readers to the “instructional hierarchy” (p. 9) which includes five stages: acquisition, fluency, maintenance, generalization, and adaptation.

In chapters 2 to 6, the authors provide a framework for effective classroom interventions (also called Tier 1 interventions in the RTI model). Considering the American context, the authors argue that “curricula have favoured breadth over depth” (p. 23). They advocate for a model balancing foundational skills and problem solving skills at a pace that is developmentally appropriate. They cite research that highlights the importance of balancing “teacher-directed and student-centered approaches” (p. 28) in the classroom. In addition to advocating for the use of research-based instructional content and practices with the classroom, the authors support the use of supplemental strategies, including “peer-assisted learning” (p. 31). For situations where the majority of a class is struggling, Coddington et al. suggest classroom wide interventions. The authors provide systematic instructions for teachers to implement strategies aimed at improving whole

number knowledge. They also provide a well-referenced review of available computer-assisted math instructional programs for use in the classroom.

Educators are also asked to consider the role of motivation in the mathematics classroom. The authors argue that to be effective in math one needs “the will to do it and stick with it” as well as the “cognitive skills” (p. 109). Using a self-regulated learning cycle, Coddling et al. suggest that goal setting and a student’s internal dialogue are important components of motivation. They highlight that students who have learning difficulties often accept blame for failing to perform a task while attributing “their success to external and unstable factors” (p. 113). By supporting goal setting and teaching students how to monitor their progress, the authors provide strategies educators can use to improve motivation in the math classroom.

Coddling et al. advocate for using universal screening tools to identify students at risk in mathematics. For students who score at the 25th percentile or lower, the authors outline additional assessment tools that can be used to isolate the specific skills that require additional interventions. In chapters 7 to 11, the authors examine interventions that can be provided to individuals or small groups (tiers 2 and 3 of the RTI model). The authors focus on three key areas where students require support: number sense, basic and complex computations, and word-problem solving. For each target area, Coddling et al. describes the skills needed to perform the task. They also provide a range of commercial and non-commercial interventions that can be used during Tier 2 and Tier 3 interventions. Finally, Coddling et al. argue that in order to see ongoing growth, educators need to evaluate student progress regularly and adjust the interventions as needed. They provide a structure for reviewing progress and determining if the intervention should continue, change, or be discontinued.

Well-researched and effectively situated within the current mathematical landscape, *Effective Math Interventions* is a valuable addition to the bookshelf of mathematics educators everywhere. In particular, Coddling et al. provide classroom teachers with some effective intervention tools that can be used in a classroom immediately. The tools are flexible enough that teachers in a range of grades can modify the tools to measure student progress and develop the mathematical skills of their students. The appendices provide clear protocols for the interventions and samples that guide a teacher in creating interventions appropriate to their class. The authors also provide educators with some effective strategies for developing math confidence and motivation with their students.

While the tools are of value as “stand alone” interventions, Coddling et al. argue that their real value is within the context of a district wide program that includes standardized screening tools and requires access to several commercial products. Therefore, educators in schools where these tools and products are unavailable may find aspects of the book inaccessible and may wonder how they can apply the concept of pre-screening to their context. Moreover, many of the examples provided, while having international application, are grounded in the American context. Therefore, educators outside of the United States may have difficulty determining how some of the research applies in their context.

Overall, *Effective Math Interventions* provides a strong argument for how educators can apply interventions within the current educational framework and, through specific examples,

provides teachers with the resources they need to start implementing interventions immediately. However, to use this model in its entirety requires a district-wide approach with adequate resourcing for screening tools and commercial interventions.

References

Codding, R. S., Volpe, R. J., & Poncy, B. C. (2017). *Effective math interventions: A guide to improving whole-number knowledge*. New York, NY: Guilford Press.