A Brief Overview and Critique of Perspective II on Probabilistic and Statistical Reasoning

Richard Lesh and Bharath Sriraman

Abstract In this overview and critique of perspective II, we briefly focus on several ways that *Models & Modeling Perspectives* (*MMP*) can be used to provide a unifying theoretical framework for developing both: (a) a coherent summary of the kind of research reported in this book, and (b) a useful list of testable claims that appear to be priorities to investigate in future research emanating from the kind of studies reported here. In particular, MMP was developed to identify: (a) emerging new types of mathematical thinking that appear to be needed beyond mathematics classrooms—including in situations involving new sciences (e.g., social sciences, engineering) not traditionally emphasized in K-12 curriculum materials, (b) new ways to operationally define important achievements currently being ignored in both school testing programs and documents specifying standards for teaching and learning, and (c) new teaching and learning opportunities made possible by new model-development tools for students (Lesh and Doerr, Beyond constructivist: a models & modeling perspective on mathematics teaching, learning, and problems solving, Erlbaum, Hillsdale, 2003; Lesh, Models & Modeling in Mathematics Education, Monograph for International Journal for Mathematical Thinking & Learning, Erlbaum, Hillsdale, 2003b).

Taken as a whole, the research reported in this book provides a variety of important building blocks for a research agenda that is aimed at some of the most important-yet-neglected areas of mathematics education research. Furthermore, many of these results are described ways that have implications far beyond topics related to statistics and/or probability. For example, many of the authors in this section deal in insightful ways with interactions between *intuitive* and *formal-analytic* ways of thinking. But, theory development doesn't always occur by continually expanding current ways of thinking (Lesh and Sriraman 2010). Quite often, long-term advancements in

R. Lesh (✉)
Indiana University, Bloomington, IN, USA
e-mail: ralesh@indiana.edu

B. Sriraman
The University of Montana, Missoula, MT, USA

E.J. Chernoff, B. Sriraman (eds.), *Probabilistic Thinking*,
Advances in Mathematics Education, DOI 10.1007/978-94-007-7155-0_17,
© Springer Science+Business Media Dordrecht 2014