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ORIGINAL ARTICLE

Problem solving around the world: summing up the state of the art

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1 Introduction

Mathematics is universal: theorems are theorems, wherever they are proven. Similarly, aspects of human cognition are almost universal: human brains, memory, and problem solving work in much the same way around the world. Mathematical knowledge has been accumulating for thousands of years, and our understanding of thinking and learning have grown exponentially in recent decades.

In contrast, mathematics teaching and the conduct of research into mathematical thinking, teaching, and learning are very much cultural matters. The organization of schools, the sequencing of mathematics, and the determination of which mathematics goals are most important for students, all vary substantially from country to country. Similarly, the goals for research, and the major topics of interest, differ widely. (As evidence of this, one need only note that national rankings on TIMSS and PISA differ substantially.)

The very term "problem solving" has very different meanings in different countries. Indeed, as the essays in this volume demonstrate, the meaning of the term has often changed dramatically in the same country. For some time, "problem solving" has been a major theme in research and in curricula around the world—sometimes labeled as such, sometimes with an emphasis on applications, sometimes through different pedagogies that emphasize making sense, individually or collectively, of mathematical situations. As a result, it has been difficult to develop a sense what problem solving means around the world—a sense of what is being studied and what is being implemented in classrooms.

For these reasons, the Editors asked a collection of experts around the world to summarize the "state of the art" in their nations. What are the major ideas in research? What are the main themes in curricula? What are the relationships between research and curricula, as mediated by politics? As the chapters came in, we found the stories from each nation to be fascinating, and the comparisons even more so. The chapters were polished with the help of the following reviewers, to whom we are extremely grateful: Michèle Artigue, Hugh Burkhardt, Norma M. Chang, Jinfa Cai, Michiel Doorman, Victoria Hand, Catherine Kessel, Mariana Levin, Luis Moreno Armella, João Pedro da Ponte, Bharath Sriraman, Julianna Szendrej, Stefan Ufer.

There are many rewards to reading a collection like this. Seeing what other nations do can give one a fresh perspective on one's own nation, and one's own traditions of research and practice. Reading a collection like this can open up new ideas, and raise new questions. We, the editors, found this a fascinating and rewarding exercise. We hope that you, the readers, do as well.

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