

TABLE OF CONTENTS

PREFACE

- v *Kimberly Barba, Teachers College, Columbia University*
Brandon Milonovich, Teachers College, Columbia University

ARTICLES

- 1 **Thinking in Patterns to Solve Multiplication, Division, and Fraction Problems in Second Grade**
Patricia Stokes, Barnard College, Columbia University
- 11 **Incorporating the Use of Writing-to-Learn Strategy in Grade 10 Mathematics Lessons: The Students' Perspectives**
Zuhairina Suhaimi, Sayyidina Ali Secondary School, Ministry of Education, Brunei Darussalam; Masitah Shahrill, Sultan Hassanal Bolkiah Institute of Education, Universiti Brunei Darussalam, Brunei Darussalam; Khairul Amilin Tengah, Sultan Hassanal Bolkiah Institute of Education, Universiti Brunei Darussalam, Brunei Darussalam; Nor'Arifahwati Haji Abbas, Sultan Hassanal Bolkiah Institute of Education, Universiti Brunei Darussalam, Brunei Darussalam
- 21 **Teaching the History of Tracking Time with Technology**
Margaret Fitz, Miami University, Oxford, OH
- 27 **Creativity and Insight in Problem Solving**
Laura Golnabi, Teachers College, Columbia University
- 31 **Some Thoughts on Doctoral Preparation in Mathematics Education**
Robert Reys, University of Missouri
- 37 **About the Authors**
- 39 **Acknowledgement of Reviewers**

PREFACE

At the heart of drafting the Common Core State Standards in Mathematics (CCSSM, 2010) was an attempt to shift the focus of mathematics education from a frenetic race to cover content a mile wide to an extended journey to explore concepts a mile deep. Not only are students challenged by new and demanding levels of rigor, but teachers are tasked with enhancing the quality and nature of the mathematics presented so that mathematical experiences endure to future grades. As a result, strategies have been developed that are not only rich in conceptual understanding, but better engage students in the process of learning.

One strategy to enhance learning is to explore patterns in numbers. Dr. Stokes explores the way in which the concept of place-value is influenced by the structure of language. Through the incorporation of a number system with an explicit base-10 count, elementary school students were able to think in iterative patterns in order to solve multiplication, division and fraction problems. In particular, second graders not only achieved, but exceeded, the standards required for their grade by the Common Core State Standards in Mathematics.

Metacognition is another attractive outlet for improving the comprehension of mathematics. In their study, Dr. Shahrill, Ms. Suhaimi, Mr. Tengah, and Ms. Abbas used journaling as a writing-to-learn strategy. Not only did the task engage students who were formerly disinterested in mathematics, but they found that it enabled students to monitor their own learning and increased student independence and accountability.

Finally, mathematical learning can be enriched when paired with historical contexts. In a lesson that examines the use of sundials to track time, Ms. Fitz fused technology from both ancient civilizations and contemporary culture to make mathematics more tangible, accessible, and applicable across grade levels.

As mathematical inquiry continues to evolve, an even greater emphasis on creativity, insight and perseverance is attributed to the art of problem solving. When fixation results in an impasse, students must be taught to restructure their approach. Ms. Golnabi emphasized such a process in the context of geometric proofs.

PREFACE (Continued)

Ultimately, a change in mathematics education falls in conjunction with a change in mathematics educator preparation. Our journal concludes with a commentary by Dr. Reys in which he urges that doctoral programs be held to high standards of quality. He argues that the doctoral graduates of today represent the future stewards of our discipline. They are the guiding force that drives the future of mathematics education.

It is our hope that the articles presented in this issue will inspire the reader to continue to think of new and innovative approaches to mathematics education, as well as in the field's preparation of doctoral students. With an emphasis on conceptual understanding, we are better able to serve the future generation of problem solvers.

Kimberly Barba
Brandon Milonovich
Guest Editors

National Governors Association Center for Best Practices, Council of Chief State School Officers. (2010). *Common core state standards for mathematics*. Washington, DC: NGA Center & CCSSO.