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A Century of Leadership in Mathematics and Its Teaching

Forward-Thinking Orientations for Mathematics Education

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PREFACE

This issue is the Journal's third since the coronavirus pandemic hit in March 2020. Publishing a journal is no easy feat, especially during a global health crisis. We are grateful to our Editorial Team for the time and effort they put into improving the quality of the manuscripts. We commend our authors for finding time to write for this Journal during COVID-19 disruptions.

Amidst these challenges, the pandemic forced educators to reflect on and rethink longstanding practices in mathematics education. It is encouraging that many of the shifts in practice are centered around engaging students in developing their conceptual understandings of mathematics. Moreover, there is a movement towards more humane and equitable practices within mathematics education. With the birth of this Spring issue, in keeping with the significance of the season, we are hopeful that our community will use the pandemic as a catalyst for reform. Each article featured in this issue has a forward-thinking orientation for mathematics pedagogy.

In a dialogue with JMETC, Peter Liljedahl discusses his work on building thinking classrooms. During our interview, Dr. Liljedahl recounted a moment from early in his teaching career that converged with research interests in how teachers may engage students in thinking behaviors. This paper discusses important findings from decades of classroom-based research, shares ideas for facilitating a virtual thinking classroom, and highlights opportunities for creating equitable classrooms.

The following three articles are practice-based papers that focus on engaging learners in mathematical thinking. Authors draw from their classroom experiences to investigate how students at different stages might construct, extend, and apply their understanding of fundamental mathematics concepts. First, focusing on elementary mathematics, Dimmel, Pandiscio, and Bock address the limitations of discrete multiplication models in "Multiplication by Sunlight: How Can a Geometric Definition be Realized in a Physical Tool?" In response, they investigate the use of a physical continuous model—the *Sunrule*, an analog device—that uses sunlight to illustrate multiplicative relationships. This paper suggests an alternative for building students' early understandings of non-integer multiplication.

The next two practice-based articles explore the relationship between mathematical modeling and building positive mathematics identities. Imm uses storytelling as a catalyst for mathematical modeling in "Modeling as story-building and storytelling: Redesigning Algebra with Adolescent Girls of Color." Relaying episodes from a class for algebra "repeaters," she discusses how students used storytelling to engage with concepts such as rate of change. Next, Belin and Ferrell's students applied geometric concepts to understand a sociopolitical topic, gerrymandering. Students from their high school geometry classes used proportional reasoning, area, and perimeter to intuit measures of fairness for partitioning voting districts. The authors offer samples of student work and excerpts from student dialogue, then make recommendations for teachers who wish to implement the activities they outline.

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The last article in the main section, “Hyper-acceleration of Algebra I: Diminishing Opportunities to Learn in Secondary Mathematics,” reviews the literature on the acceleration and hyper-acceleration of Algebra I to Grades 8 and 7, respectively. Through their analysis, authors Galanti, Frank and Baker found a lack of evidence that hyper-acceleration prepares students for future success in mathematics. Moreover, they claim that hyper-acceleration perpetuates inequities in high school mathematics achievement. According to Galanti et al., the research on hyper-acceleration is limited. They advocate for further studies investigating the effects of taking Algebra I in Grade 7.

By the time we publish this issue, educators will be near, if not at, the end of their 2020-2021 school year. What a year this one has been! We dedicate this Notes from the Field section to educators, who have persevered through a tumultuous, often unpredictable school year to keep students learning during the COVID-19 crisis. This section features short entries from practitioners who reflect on their pandemic teaching experiences. Authors recount their strategies for engaging and supporting students amidst challenges of remote learning, hybrid learning, and personal hardships. Several look to technological platforms for facilitating communication and individualized support. During these disruptive times, others attend to the needs of their students by creating more humane classroom environments. Whether in adjusting the course objectives, implementing forgiving grading policies, or developing new classroom norms, authors in this section discuss the implications of their adaptations from this past year for teaching post-pandemic.

The articles in this issue do not offer a panacea for all mathematics education ills, but they provide examples of practice and thought relevant for enhancing mathematics education. We close this preface with a quotation from the National Council of Supervisors of Mathematics and the National Council of Teachers of Mathematics Joint Statement (2020): “We have the opportunity to be innovative and to think purposefully about addressing traditional/systemic structures, practices, and beliefs that have allowed inequities to persist” (p.15). As we take steps towards a stronger and improved mathematics community, we invite our readers to join us in keeping this call at the forefront of our minds.

Reference

National Council of Supervisors of Mathematics & National Council of Teachers of Mathematics (2020, June). *Moving Forward: Mathematics Learning in the Era of COVID-19*. https://www.nctm.org/uploaded/Files/Research_and_Advocacy/NCTM_NCSM_Moving_Forward.pdf