

Proceedings of the Forty-Fifth Annual Meeting of the
North American Chapter of the International Group for
the Psychology of Mathematics Education

Engaging *All* Learners

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PME-NA HISTORY AND GOALS

PME-NA History and Goals

PME came into existence at the Third International Congress on Mathematical Education (ICME-3) in Karlsruhe, Germany, in 1976. It is affiliated with the International Commission for Mathematical Instruction. PME-NA is the North American Chapter of PME. The first PME-NA conference was held in Evanston, Illinois in 1979. Since their origins, PME and PME-NA have expanded and continue to expand beyond their psychologically oriented foundations. The major goals of the International Group and the North American Chapter are:

1. To promote international contacts and the exchange of scientific information in the psychology of mathematics education.
2. To promote and stimulate interdisciplinary research in the aforesaid area, with the cooperation of psychologists, mathematicians, and mathematics teachers; and
3. To further a deeper and better understanding of the psychological aspects of teaching and learning mathematics and the implications thereof.

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Membership is open to people who are involved in active research consistent with PME-NA's aims or who are professionally interested in the results of such research. Membership is open on an annual basis and depends on payment of dues for the current year. Membership fees for PME-NA (but not PME International) are included in the conference fee each year. If you are unable to attend the conference but want to join or renew your membership, go to the PME-NA website at <http://pmena.org>. For information about membership in PME, go to <http://www.igpme.org> and visit the "Membership" page.

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Preface

The Forty Fifth Annual meeting of the North American chapter of the International Group for the Psychology of Mathematics Education was held PME-NA 45 in Reno, Nevada, Oct. 1-4, 2023. The conference theme is listed below:

Engaging All Learners

Math learning should be a joyful experience for all students. When students are engaged and inspired, they are motivated to learn. Instruction that targets the learning needs and interests of our students makes it possible for students to excel in learning math. Participants in the conference explored how to create conditions to support learning that build on student engagement and interest in addition to other research engaged by the PME-NA community. The specific conference theme questions explored as part of the conference was:

- How can we engage all students to learn math content by building on their interest and motivation to learn?
- How do we design learning environments that take students and learning into account?
- What are the design features of tools and curricula design features considering student engagement and interest in supporting learning?
- How do we build partnerships with schools and the community to support student engagement and math learning?
- What research agendas should we pursue to ensure that all students reach their potential by paying attention to engagement and learning needs?

The acceptance rate for Research Report was 45%, the acceptance rate for brief research reports was 70 %. The acceptance rate for posters was 90%. Note: some papers were accepted in alternate format than originally proposed. The total number of participants who submitted proposals as co-authors was 1083.

Plenary Speakers

Motivation and Embodied Cognition

- Mitchell J. Nathan, Ph.D., University of Wisconsin at Madison
- James Middleton, Ph.D., Arizona State University

Connecting Math to Real-world Experiences, Culture and Technology

- Lisa Lunney Borden, Ph.D., St. Francis Xavier University, Canada
- Jose Luis Cortina, Ph.D., National Pedagogical University, Mexico City
- Theodore Chao, Ph.D., Ohio State University

Play Experiences and Math Learning Panel Presentation, "*What Do You See in Mathematical Play?*"

- Nathaniel Bryan, Ph.D., Ed.D., The University of Texas at Austin
- Melissa Gresalfi, Ph.D., Vanderbilt University
- Naomi Jessup, Ph.D., Georgia State University
- Amy Parks, Ph.D. Michigan State University
- Tran Templeton, Ed.D., Teachers College Columbia University
- Anita Wager, Ph.D. Vanderbilt University

Preparing Teachers to Engage Students (closing the plenary sessions)

- Robert Berry III, Ph.D., University of Arizona

The local organizing committee would like to thank the steering committee for all their support and everyone who helped make this conference a success.

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DEVELOPING A QUALITATIVE ANALYSIS PROCESS WITH A MULTI-RESEARCHER TEAM

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Keywords: Curriculum, Instructional Vision, Research Methods.

Teachers use curricular reasoning (CR) as they design and enact instruction with their students, curriculum materials, and standards in mind (Roth McDuffie & Mather, 2009). Teachers' CR has not been measured to the extent of other critical practices: professional noticing (cf., Schack et al., 2017) and facilitating mathematical discussions (cf., Smith & Sherin, 2019). As part of a larger project, we aim to develop and validate a questionnaire and an observation protocol to formatively measure middle school teachers' mathematical CR (Dingman et al., 2021).

Purpose and Relationship to PME-NA's Goals

This poster relates to PME-NA's conference theme of "engaging all learners" in the specific areas of investigating curricula design features by considering student engagement, and interest in supporting learning. This poster presents our research team's qualitative data analysis process. Three subgroups, each with an experienced researcher and a graduate student, applied iterative approaches to identify data patterns for ways middle school mathematics teachers use CR to engage learners. This work illuminates the creativity in data analysis: using established methods for coding data, writing analytic memos, and creating data matrices, we applied these methods in unique ways consistent with the data each subgroup analyzed (Saldaña, 2021).

Methods, Results, and Implications

Our team analyzed multiple pre- and post-interviews for eight teachers to identify the ways teachers used different CR aspects as they made decisions while planning and enacting lessons. This poster will present ways each subgroup analyzed the three CR aspects: *analyzing curricular materials*, *viewing mathematics from the learner perspective*, and *considering mathematical meaning*. Our approaches shared the common goal of leveraging existing data to capture characteristics of teachers' CR, while maintaining the teachers' perspectives and voices. The subgroups facilitated graduate students' learning about analysis methods through legitimate peripheral participation (Lave & Wenger, 1991) alongside faculty researchers. In turn, faculty learned from graduate students as they questioned why and how we might use different methods. We will illustrate how we created space for dialogue about data analysis, wove six researchers' perspectives together, and discussed different approaches to analyzing data. Our process has implications for other researchers as they consider various approaches to analyzing complex data sets.

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