MATHEMATICS TEACHER EDUCATORS' INTIMATE SCHOLARSHIP

Being, Knowing, and Ethics

Edited by Elizabeth Suazo-Flores, Signe E. Kastberg, Melva R. Grant and Olive Chapman

ADVANCES IN RESEARCH ON TEACHING

VOLUME 49

MATHEMATICS TEACHER EDUCATORS' INTIMATE SCHOLARSHIP

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ADVANCES IN RESEARCH ON TEACHING VOLUME 49

MATHEMATICS TEACHER EDUCATORS' INTIMATE SCHOLARSHIP: BEING, KNOWING, AND ETHICS

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To all mathematics teacher educators who continue working on becoming their best selves.

Para todos los educadores de matemáticas que continúan trabajando para ser las mejores versiones de ellos mismos.

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SCHOLARLY INQUIRY AND PRACTICE IN MATHEMATICS TEACHER EDUCATION THROUGH INTIMATE SCHOLARSHIP

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ABSTRACT

Historically scholarly inquiry and practice in mathematics education has responded to societal values and questions. Drawing from the Journal of Mathematics Teacher Education*'s description of mathematics teacher educator (MTE) work as in solidarity with and alongside mathematics teachers, we turn to mathematics teacher education research as a series of paradigm shifts. MTEs committed to supporting teachers and transferring knowledge attempted to influence mathematics teachers' work by exploring and understanding teachers' behaviors. MTEs have also used insider's perspectives to report the particular of MTEs' work by describing it beyond behavior and knowledge. These scholars fulfill the call for theoretical eclecticism and facilitate a turn to ontology. Authors in this book answered the call and joined colleagues in teacher education by using self-based methodologies and insider perspective to study their practices and report findings using intimate scholarship. Chapters offer characterizations of MTE work that complement existing findings, illustrate how self-based methodologies support the*

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continued development of MTEs, and evidence how dissemination using intimate scholarship unearths MTEs' philosophical considerations. This introductory chapter provides an overview of mathematics teacher education research to situate this volume historically and methodologically. The book's chapters are then introduced in four sections highlighting chapters' evidence of being, knowing, ethics, and the interrelatedness of these three philosophical perspectives. We conclude by arguing that using self-based methodologies and writing intimate scholarship reports is a transformative professional learning experience that provides readers with opportunities to consider their own practice activated by stories of others.

Keywords: Mathematics teacher educator practice; intimate scholarship; knowing; being; ethics; self-based methodology

INTRODUCTION

For over 25 years, mathematics teacher educators (MTEs) globally have been called to recognize and use "different lenses on practice" (Jaworski, 2008, p. 4) and "theoretical eclecticism" (Cooney, 1998, p. 1) to contribute to mathematics teacher education. Cooney's editorial in the first issue of the *Journal of Mathematics Teacher Education* (JMTE) highlighted the need for scholarly inquiry and practice (Lee & Mewborn, 2009) to be mutually informing and integrated. MTEs live alongside and in solidarity with mathematics teachers to support mathematics learners (Cooney, 1998). At the same time, MTEs have studied what, whom, and how they teach while describing who they are when interacting with mathematics teachers (e.g., Kastberg et al., 2020a, 2020b; Nolan, 2015, 2018; Schuck, 2002; Schuck & Pereira, 2011; Simpson, 2019; Tzur, 2001).

JMTE is the first international journal "devoted to topics and issues involving the education of teachers of mathematics at all stages of their professional development" (p. 2). The launch of JMTE amplified international recognition of the scholarly inquiry and practices of MTE. Cooney (1998) further highlighted the importance of methodological and theoretical diversity in the study of mathematics teacher education. Cooney's call for "eclecticism" (1998, p. 1) in developing new knowledge in mathematics teacher education was reiterated in 2024 (Castro Superfine, 2024) while emphasizing the ongoing need for insights into mathematics teacher education development. We outline a historical context that informs MTE work and the persistent focus of mathematics teacher education research on the study of teachers and learners. In this book chapter, authors used self-based methodology to study their own practices aiming at "self-understanding" (Chapman et al., 2020, p. 158) and improvement. Findings from these studies were crafted using intimate scholarship (Hamilton et al., 2016; Pinnegar et al., 2021). These chapters illuminate MTEs' ways of being, knowing, and ethics in their practice creating spaces for resonance (Conle, 1996) for MTE readers. We position self-based methodology studies and dissemination in the form of intimate scholarship as fostering diversity of ideas, approaches, and context that Cooney (1998) asserted informs mathematics teacher education.

HISTORICAL CONTEXT

> We now have more reason than ever to integrate our study of teacher education with our practice of teacher education. We have much to learn. (Cooney, 1998, p. 1)

Mathematics education has historically responded to and been informed by societal values and norms. We exemplify how mathematics teacher education as a discipline has evolved using the example of assessment. Summative and formative assessment in mathematics education (Bloom et al., 1971; Wilson, 1971) serve different purposes (Black & Wiliam, 2018). Typically, summative assessments are reported in terms of national and international performances, while formative assessment is the focus of teachers seeking to gain evidence of student reasoning, concepts, and development. Results of summative assessments, such as Trends in International Mathematics and Science Study (TIMSS) and Programme for International Student Assessment (PISA), are disseminated via popular media including online. International comparisons and national trends draw the attention of governments leading to new initiatives to address gaps or declines in performance. Through political action, the assessment movement has impacted teachers' work. Mathematics teachers are tasked with supporting learners to engage with assessment instruments and demonstrate proficiency through performance. MTEs' solidarity with teachers drives the determination to describe teachers' thoughts, feelings, and approaches to assessment (Cotton, 2004), thereby highlighting ways assessments inform their work.

While summative assessment may be used by governments, formative assessment described by Bloom et al. (1971) highlighted "tools" (p. 253) for teachers to gather evidence of student learning (Black & Wiliam, 2018). This focus on summative and formative assessment produced research on mathematics teachers' design and use of assessment. In turn, assessment as a collection of concepts and skills for teachers made its way into professional development and teacher education programs worldwide. Evidence of the significance of this movement was the International Commission on Mathematical Instruction (ICMI) study of assessment in mathematics education (Niss, 1993). Concepts and skills involved in formative assessment thus became a part of mathematics teacher education curriculum. MTEs began understanding teacher learning and use of assessment. Such work motivated the development of tools and approaches to support MTE teaching of assessment (e.g., Romagnano, 2001). The assessment movement example highlights how societal values and norms inform mathematics teacher education work. Further, how mathematics teacher education research addresses mathematics teacher education work by contributing curricular resources, knowledge, and descriptions of their behaviors.

MATHEMATICS EDUCATION RESEARCH AND PARADIGMS OF INQUIRY

Stinson and Walshaw (2017) outlined moments in mathematics education and mapped these moments to "paradigms of inquiry" (p. 133). Building from this

mapping, Stinson (2020) highlighted researchers' constant entanglements with ways of being, knowing, and ethical considerations that are infrequently explicitly included in research reports. One movement focused on mathematics teaching and learning as participatory and constructive has been called a reform movement. Schuck and Pereira (2011) describe "the reform movement in mathematics education" (p. 1) as shift from mathematics content, conceptualized as procedures, to learning mathematics, as derived from problem-solving and mathematics processes. School mathematics became more than procedures and challenged teachers to shift their practice. MTEs, in solidarity with teachers, started building pedagogical and research agendas aligned with this new view of mathematics teaching and learning. Stinson and Walshaw (2017) described such a movement in mathematics education research as emerging from attempts to predict behavior to efforts to understand behavior. In mathematics teacher education, MTEs' research and practice sought to understand mathematics teacher behavior in relation to the reform movement. Studies of mathematics teachers' engagement in reform teaching included examination of their content knowledge and pedagogical content knowledge (Ball et al., 2008). Yet MTEs' efforts raised questions about the role of context in teacher's content and pedagogical content knowledge. Such questions created dialogic space for mathematics teacher education researchers to take up alternative perspectives on mathematics teaching and learning including sociocultural (Lerman, 2001) perspectives. The sociocultural view focused on culture and interaction encouraged mathematics education researchers to inquire into whose voices were heard in mathematics classrooms. Researchers addressing these questions described power and identity as mediating forces in mathematics teaching and learning. Working in solidarity with teachers, MTEs studied ways mathematics teachers' practices enabled and constrained learners' opportunities and mathematics identities. Such work contributed to the emergence of the sociopolitical movement (Gutiérrez, 2013) which sought emancipation for teachers and learners. MTEs highlighted the significance of mathematics identities (Sfard & Prusak, 2005) and encouraged humanizing pedagogy (Frankenstein, 1994; Gutiérrez, 2018; Huencho & Chandía, 2023; Rosa & Orey, 2016). MTE practice draws from these disciplinary moves, yet the primary focus in mathematics teacher education research remains the mathematics teacher. We suggest that MTE's study of self contributes to a body of findings that complements and informs how we make sense of interactions (Cooney, 1998) in mathematics teacher education.

MATHEMATICS TEACHER EDUCATION RESEARCH AS SCHOLARLY INQUIRY OF THE PARTICULAR

Mathematics teacher education research and practice done in solidarity with mathematics teachers is also informed by paradigms of inquiry. Borko et al. (2007) identified "practitioner research" (p. 5) as a means to contribute insider perspectives on teaching and teacher educator work. MTEs work alongside teachers (e.g., Jaworski, 2007; Sztajn, 2003; Zaslavsky, 2007; Zaslavsky & Leikin, 2004) highlights

characteristics of interactions, design of tasks to support teacher learning, and generates theories to frame and inform scholarly inquiry. Yet, MTEs' role in such reports was to communicate about others' experiences with few descriptions of MTEs' learning and experiences with teachers. Chapman (2008) highlighting the difference between insider and outsider positioning in mathematics teacher education research called for research reports to include insider positioning. Reports from MTEs as insiders could include "how the teacher-educator-researchers reflected, what practical knowledge they acquired, and how this knowledge impacted or is likely to impact their future behavior" (p. 132). Additionally reports from an insider perspective could support MTEs development of "self-understanding" (Chapman et al., 2020, p. 158).

Using self-based methodologies is one approach to gaining "self-understanding" (Chapman et al., 2020, p. 158) and describing MTE work from an insider perspective. In self-based methodologies, scholars are researchers and participants in their studies; and the research topic or inquiry is often inspired by a teaching moments that felt puzzling or emotionally demanding. Self-based methodologies drew from practitioners in curriculum studies and teacher education including the Arizona Group (Arizona Group et al., 1996), Portfolio Group (Craig et al., 2020), narrative inquirers (Clandinin & Connelly, 1986; Connelly et al., 1997), and autoethnographers (Ellis & Bochner, 2000). Scholars using self-based methodologies (e.g., Chapman, 1997; Chauvot, 2009; Ross, 2003; Schuck, 2002) provided examples of MTE experience in the context of scholarly inquiry. Publications using self-based methodologies appear in teacher education and mathematics education publications (e.g., Cox, 2019; Cox et al., 2014; Kastberg et al., 2020a, 2020b, 2019; Nicol et al., 2020; Nolan, 2018; Simon & Cox, 2019; Simpson, 2019; Ward, 2017). Such publications provide insider perspectives that contribute to the picture of MTE specialized work that is personally and contextually informed.

Readers from traditional research methodologies might wonder about rigor or transference of knowledge in self-based methodology studies. In self-based methodology studies, the researcher is the writer and participant who describes how their surroundings (e.g., political and cultural contexts) influenced their decisions, actions, thoughts, or feelings at a specific moment in their practice. Thus, self-based methodology studies move away from reporting on an objective reality and seeking knowledge transference. The focus is on understanding one's practice, situating findings in existing literature, and constructing a reader focused account in an effort to support resonance.

We build from Conle (1996) to describe resonance as a key dimension in self-based methodology studies. Resonance is "a way of seeing one experience in terms of another" (Conle, 1996, p. 299). MTEs' self-based methodology studies communicate the particularities of MTE experiences teaching mathematics content and teaching. Reading self-based methodology studies creates potential resonance spaces where readers memories of past lived moments feel parallel to the author's account. The reader does not share the lived experiences of the author, but the reader-focused writing allows for internal connections with the writer's experience.

Self-based methodology studies in mathematics teacher education create spaces of resonance and learning for other MTEs. The resonance process is personal and involves "cognitive and noncognitive elements" (Conle, 1996, p. 314), thus self-based methodology studies cannot claim objectivism or the transference of knowledge. In reading self-based methodology studies, MTEs may revisit a lived experience by remembering propositional details and emotions evoked in the reported study. When MTEs experience resonance, they create personal spaces to gain new perspectives on the remembered experience. Thus, we argue that self-based methodology studies have the potential to open possibilities for "different lenses on practice" (Jaworski, 2008, p. 4), that is, insider lenses, and contribute to learning and awareness (Chapman et al., 2020; Kastberg et al., 2023) of the MTEs authors and potentially MTEs readers.

Self-based methodology studies focus on particularities and situating findings in the context of existing mathematics education literature, but representations of findings may vary in the revelation of intimate details of MTE "understandings of ourselves" (Hamilton et al., 2016, p. 183). For example, Kastberg et al. (2020a) engaged in self-study to describe MTE written feedback practice. The authors aimed to describe characteristics of their written feedback and situate the description in mathematics education literature. Determined to speak to MTEs and teacher educators Kastberg, Lischka, and Hillman produced another manuscript focused on feedback practice (Kastberg et al., 2020b) that illustrates more intimate self-understanding (Hamilton et al., 2016, p. 183). These two manuscripts were benchmarks in the authors' development as MTEs and as authors of intimate scholarship. Among the challenges the authors faced in writing intimate scholarship were the use of academic and personal voice as well as the shift from "writer-based prose" to "reader-based prose" (Pinnegar et al., 2021, p. 113). Evolving as writers of intimate scholarship involves not only awareness of self as learner but also the development of ways to use written text to communicate self-understandings to readers (Hamilton et al., 2016). Therefore, in embracing self-based methodology studies and dissemination in the form of intimate scholarship, MTEs might need writing support to communicate self-awareness to external audiences using a "reader-based prose" (Pinnegar et al., 2021, p. 113).

INTIMATE SCHOLARSHIP

This book takes up the challenge of learning to write intimate scholarship. The chapters are a product of a growing scholarly inquiry community committed to producing research reports that include insider perspectives of MTEs' work. One goal of our work with the North American Chapter in the International Group for the Psychology of Mathematics Education (PME-NA) working group (Suazo-Flores et al., 2018, 2019, 2020, 2021, 2022) was a commitment to learning to write intimate scholarship. We began with an exploration of our MTE work through the lens of being, knowing, and ethics. The resulting special issue in the

Philosophy of Mathematics Education Journal documented philosophical underpinnings of self-based methodologies (Kastberg et al., 2023).

Building from our philosophical awareness, we undertook the goal of "writing toward knowing" (Pinnegar et al., 2021, p. 113) to disseminate findings through intimate scholarship (Hamilton et al., 2016; Pinnegar et al., 2021). Intimate scholarship in teacher education (e.g., Hamilton et al., 2016; Strom et al., 2018) communicates the particularities of those involved in educational settings using relational ontologies and dialog in the process of coming to know (Hamilton et al., 2016; Pinnegar et al., 2021). Such scholarship is intimate because it reveals to external audiences oneself and experiences "in relation to those they educate" (Strom et al., 2018, p. 3). The authors of this book committed to disseminating their experiences teaching mathematics or teaching about teaching (Loughran, 2006) mathematics through intimate scholarship. We worked alongside authors learning about intimate scholarship and supporting their writing process.

Authors highlighted the insider perspective using their writer's voices and professional expertise to develop their intimate scholarship. Whole group and one-on-one online synchronous meetings with authors were designed to support development through discussions of personal artifacts, examples of intimate scholarship, philosophical stances, and writing of intimate scholarship. Whole group meetings were based on readings and led by scholars in mathematics education and teacher education. Examples of intimate scholarship were shared and writing conundrums in mathematics teacher education were explored. Our discussion of Nicol et al. (2020) with Kathleen Nolan focused on questions and concerns authors had about writing mathematics education scholarship with a focus on the self. David Stinson facilitated our discussion of his paper on philosophical considerations of mathematics education researchers (Stinson, 2020). The discussion concentrated on the ongoing need in mathematics education to conduct research that focuses on the self. Stephanie Pinnegar provided insights into writing intimate scholarship based on Pinnegar et al. (2021). Questions and concerns about writing were the focus of the discussion. To support intimate scholarship from a position of awareness of experiences and commitments that inform MTE being, knowing, and ethics, we engaged the authors in sharing artifacts (Pithouse-Morgan & van Laren, 2012) that would capture the main idea of their chapters. Artifacts were objects, poems, songs, or photos that supported authors to communicate their multifaceted identities to readers, including identities as beings, knowers, and sensors of what felt right in the context of their manuscripts. We hosted one-on-one meetings with authors to dialog (Guilfoyle et al., 2004) around their artifacts and writing. Dialogs became part of authors' analytical process for identifying chapter themes.

MTEs' writer-based prose explored their being and knowing in practice, going beyond what could have been observed in their teaching. Chapters in this book evidence the continuous evolution of being not seen by observers (Dávila & Maturana, 2021). Observers see behaviors, or ways of operating by MTEs, but not MTEs' underlying aims, values, and personal commitments. By documenting the particularities of their experiences teaching mathematics and mathematics teaching, chapter authors unearth how ways of operating are informed by who

they were (i.e., being), how they knew what to do (i.e., knowing), and what they felt was right (i.e., ethics) at a moment in their practice. In doing so, MTEs envisioned new possibilities for their practices by revisiting their ways of being, knowing, and ethics. Moreover, in communicating their findings using intimate scholarship, MTEs created potential resonance spaces for fellow MTEs.

Chapters were organized using the interrelated and mutually informing philosophical considerations – being, knowing, and ethics (Stinson, 2020). These three considerations draw from and contribute to wholistic worldviews MTE use to operate as educators and researchers in mathematics teacher education. Each of the four sections below contains two chapters selected to illustrate being, knowing, ethics, and the interrelatedness of the three perspectives (Stinson, 2020). Readers are introduced to ways of being through the chapters written by Oslund and Kaschner and Neihaus; ways of knowing through Cheung's and Lischka's chapters; ethics through the chapters written by Martínez Hinestroza and Edwards and Baker; and the interrelatedness of being, knowing, and ethics through the chapters written by Kortjass and Bitto and Baker.

BEING

Ontology or "studies of existence" (Stinson, 2020, p. 18) highlight the essential nature of being. We discuss researching one's practice using intimate scholarship with a focus on being. What lurks below the surface of the calm facade of MTE practices is not observable. Studies of MTE behavior (movements, actions, and words) focused on describing patterns of behavior, external conditions that inform behavior, or internal mental operations or beliefs resulting in findings that hypothesize beliefs (Leatham, 2006) that inform behavior. Beyond observations, to gather further evidence regarding what informs MTE behavior, researchers gather descriptions from participants (e.g., Schwarts et al., 2021). In self-based methodologies, the use of dialog as a process of coming to know is similar to interviews, but different in that the researcher has an insider perspective on behavior and experience. Through self-based methodology and with a focus on producing intimate scholarship, authors provide insight into was lies beneath behavior. Such evidence reveals ambiguities that precede, accompany, or follow observable actions. Authors describe MTE experience including descriptions of the need for belonging in the world and in the disciplinary community of mathematics education. Key to seeing into MTEs' existence is gaining perspective on their intersectional identities. We highlight two chapters – Oslund, and Kaschner and Neihaus. In each of these chapters, interactions using words and movements are one piece of the complexity that intimate scholarship highlights ways of being that lie beneath the surface of observable behavior.

We do not claim that the MTE stories about their experiences are fixed. Authors' descriptions of experiences evolve over time through the telling and re-telling (Murphy & Pinnegar, 2010). Kaschner and Neihaus illustrate ways life history informed the collaboration described in Neihaus and Kaschner (2023). Their chapter pulls back the curtain on their collaboration as a mathematician