MATHEMATICS TEACHER EDUCATORS' EXPLORING SELF-BASED METHODOLOGIES

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Historically underused methodologies in mathematics teacher education such as narrative inquiry, self-study, and autoethnography (i.e., self-based methodologies) are becoming a more frequent choice of mathematics teacher educators (MTEs). This has opened new challenges for MTEs as they try to disseminate their findings in mathematics education journals. Building from our working group at PME-NA 2018, we respond to the need for creating spaces (communities) where MTEs can feel supported in their study design, implementation, representation of findings, and publication using self-based methodologies. This year, we shift our focus from discussion to mentoring and scholarship on self-based methodologies. We invite MTEs with research projects in any stage of preparation to join us to in discussions meant to promote growth, sustainability, and continued insight into the use of self-based methodologies.

Keywords: Mathematics Teacher Educators, Research Methods, Narrative Inquiry, Self-study, Autoethnography

Significance and Historical Context of the Working Group

Mathematics teacher educators (MTEs) are responding to calls to employ research approaches less often used in mathematics education (e.g., Bullock, 2012; Stinson & Walshaw, 2017). Spaces to support scholars in the design of studies, implementation, representation of findings, and publication of findings using these approaches is needed. In this proposal, we continue our effort begun in 2018. Influenced by the work of Hamilton, Smith, and Worthington (2008), we have adopted the language of *self-based methodologies* (Chapman, Kastberg, Suazo-Flores, Cox, & Ward, 2019 in press) to refer to narrative inquiry (Clandinin & Connelly, 2000), self-study (LaBoskey, 2004), and autoethnography (Ellis & Bochner, 2000). These research methodologies focus on self-understanding based on personal professional experiences and are promoted in teacher education to enhance practice. These methodologies are often used in teacher education (e.g., Grant & Butler, 2018; Ross, 2003; Sack, 2008; Samaras & Freese, 2009) and are growing in use in mathematics education (e.g., Chapman, 2011; Chapman & Heather, 2010; Grant & Butler, 2018; Kastberg, Lischka, & Hillman, 2018a). However, MTEs interested in these methodologies tend to attend conferences or workshops outside of mathematics education that are more supportive of these ways of conducting research (e.g., Self-study of Teacher Education Practices (S-STEP) International Biennial conference, or Invisible College). Although some MTEs have been successful in conducting and publishing research under self-based methodologies (e.g., Chapman, 2011; Chapman & Heather, 2010; Grant & Butler, 2018; Kastberg et al., 2018a), incorporating "outsider" practices to the mathematics education field is

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not an easy task. Yet, we cannot dismiss this need as every year PME-NA accepts more studies using self-based methodologies (Kinser-Traut, 2018; Lischka, Kastberg, & Hillman, 2018; McGraw & Neihaus, 2018).

Another challenge to creating access to less used research approaches (e.g., Bullock, 2012; Stinson & Walshaw, 2017) is the dissemination of studies in peer reviewed mathematics education journals. Challenges are usually related to describing methodologies that are new to editors and reviewers. Resulting frustration might motivate MTEs to publish their research in "outsiders" journals. For instance, Ross (2003) and Sack (2008) have backgrounds in mathematics education and their narrative inquiry studies are published in teacher education journals.

We see a need to create a community of practice (Lave & Wenger, 1991) to support conducting and publishing results of studies using self-based methodologies. Some of us have experience conducting and disseminating work using self-based methodologies and being editors of well recognized journals in mathematics education. Our experiences conducting studies using these methodologies have allowed us to inquire into our practices (Chapman et al., 2019 in press), learn about ourselves (Cox, D'Ambrosio, Keiser, & Naresh, 2014; Cox & D'Ambrosio, 2015; Grant & Butler, 2018; Kastberg, Lischka, & Hillman, 2018b), and become more empathetic researchers (D'Ambrosio & Cox, 2015). The development of a community of practice would support colleagues with similar methodological interests.

History of the Working Group

The work of this group began as a desire to build a network of MTEs using self-based methodologies (Suazo-Flores, Kastberg, Ward, Cox, & Chapman, 2018). We reasoned that such a group could support scholars at different points in their professional learning and research by creating a community of practice dedicated to understanding and using self-based methodologies. We share an overview of our PMENA 2018 working group sessions (90 minutes each), that included Melva Grant, to outline the history of our working group.

Session one provided background about each of the methodologies, including terminology, and common tools used across the methodologies. Methodologies were described by outlining (1) communities of practice, (2) focus, (3) characteristics, (4) methods. Olive engaged the group in the role and use of stories in mathematics education research from an analytic and an empathetic approach.

Session two addressed the nuances of each methodology. Melva and Jennifer described their experiences conducting studies using self-study and autoethnography methodologies, respectively, and participants were invited to add their own questions or concerns to the discussion.

Session three addressed participants' lingering questions and discussions of possible physical or virtual spaces to continue our collaboration.

PME-NA 2018 working group participants had a variety of questions and interests related to the self-based methodologies. Some attendees were interested in learning about theoretical underpinnings and differences among self-based methodologies: How do I align these [methodologies] with a theory/positionality? What is the difference between autoethnography and ethnography? How do we use these [methodologies] to help/support teachers (prospective/in-service) capture growth over time? What are the connections between the methodologies? Is there danger in too much blending between these methodologies? What is the meaning of "truthful" within the methodology of autoethnography? Truthful –relative to what

and to whom? Others wanted to know about methods that can be used under these methodologies: What are effective prompts, tasks, artifacts, contexts for engaging adolescents in narrative inquiry/autoethnography? How do you find a critical friend? Finally, attendees were also interested in learning about dissemination of studies conducted using these methodologies: Who is publishing? How is this research valued? Can I be promoted and tenured using these methodologies to inform my research? How do I prove "quality/significance/impact"? How are the conclusions/discussions different with these methodologies?

Progress Since 2018 Working Group

When we presented our working group proposal for PME-NA 2018, our intention was to gauge mathematics education researchers' interest in self-based methodologies. This goal informed the decision to structure the 2018 working group sessions to provide information about each methodology and share our experiences conducting studies. For the first two days of the 2018 working group we had approximately 20 attendees. We created an email list and during the year have maintained communication. Many of our working group participants are early career scholars with a passion for learning about self-based methodologies and a desire to gain experience conducting such studies. Therefore, we see a need for building a community of practice for scholars in all stages of career to be academically supported. Over the last year, we have worked to build a network of scholars. Central to our role as organizers and facilitators of such a network is our continued communication about and use of self-based methodologies in the research community. One vehicle for such communication is our co-authored book chapter in the *International Handbook of Mathematics Teacher Education* (Chapman et al., 2019 in press).

Each author has continued present and publish using self-based methodologies. Kastberg, Lischka, and Hillman (2018a) explored MTEs' use of written feedback and MTEs' use of questioning (2018b). In addition, the trio presented findings from their use of self-study methodology to explore MTE questioning at Association of Mathematics Teacher Educators (AMTE) 2019 conference.

Dana has continued to explore the role of empathy in her teaching and scholarship. Empathy for others in that work is supported by the use of narrative inquiry as a methodology. This positions her participants, be they teachers or students, as partners and knowledgeable people from whom she learns, and together construct new understandings of mathematics and its teaching (Cox & D'Ambrosio, 2015). She has used narrative inquiry as a methodology to explore and communicate experiences working with her students on problem solving and posing in technological environments, and mathematical design (Cox & Harper, 2017). After engaging with this working group in 2018, she was inspired to write a personal narrative about her professional trajectory (Cox, 2019) that revisits an earlier call for empathetic methodologies (D'Ambrosio & Cox, 2015), but also conceptualizes *rough draft spaces* (Jansen, Cooper, Vascellaro, & Wandless, 2017) in mathematics teacher education.

Elizabeth continued building from her dissertation study using narrative inquiry and self-study methodologies. A manuscript narrating an eighth-grade mathematics teacher's personal practical knowledge (Elbaz, 1981, 1983) was submitted to *Journal for Mathematics Teacher Education*. Another manuscript describing her experiences working with an eighth-grade mathematics teacher was accepted for presentation at American Educational Research Association 2019 annual meeting. Elizabeth lead a group of graduate students and postdoctoral fellows to explore their experiences conducting narrative inquiry studies in mathematics education (Suazo-Flores, Kersey, Bloome, Richardson, & Burdick, 2018). Signe, Elizabeth and a

colleague presented findings from a study of MTEs' motivations for using mathematics autobiographies (Drake, 2006) in mathematics courses at AMTE 2019 and have a manuscript focused on unpacking these motivations (Kastberg, Suazo-Flores, & Richardson, 2019).

Following PME-NA 2018, Jennifer has been using her experiences teaching mathematics for social justice with young children to explore how this informs her work with prospective teachers in mathematics methods focused on grades K-2. A current focus has been reflecting on her scaffolding of prospective teachers to engage in equity based mathematics teaching in their field placements. Jennifer has been disseminating her dissertation research focused on experience and the lessons she implemented including sharing her findings at 2019 National Council for Teachers of Mathematics conference and submitting proposals for 2019 National Association for the Education of Young Children conference. She has built from her 2017 (Ward, 2017) work examining her experience in teaching mathematics for social justice from a critical lens. This involves her looking at the times she missed opportunities to engage in conversations with her students during the study; revisiting these moments to reflect on what could have been done to enhance conversations around social justice.

Olive has used narrative inquiry as a research methodology in studies of her teaching and mathematics teachers, a research tool to obtain phenomenological data in studies with mathematics teachers, and an approach to in-service and prospective mathematics teachers' learning. With the goal of understanding mathematics teachers from a holistic context that considers their perspectives, Olive has been communicating mathematics teachers' personal meanings (Chapman, 1994; Chapman, 1997) and teachers' agency on their practice change (Chapman & Heater, 2010; Chapman, 2011; Chapman, 2013). Olive has also used narratives as a research tool and pedagogical tool. When working with prospective teachers (Chapman, 2008a), Olive has asked them to write and share narratives of teaching mathematics and re-write them later in the course. This pedagogical tool has triggered prospective teachers' reflection of mathematics teaching practices. Olive's research and teaching experience using narrative inquiry and narratives to approach teachers in different stages of their career had brought her to lead one of the PME 2017 plenary session, chapters in handbooks (e.g., Chapman, 2008b; Chapman, 2009), and discussion groups at 12th International Congress on Mathematical Education, PME, and ICME (Beswick & Chapman, 2015; Beswick, Chapman, Goos, & Zaslavsky, 2012; Beswick & Chapman, 2013) that focused directly or indirectly on mathematics teacher educator knowledge and learning that included narratives and self-study. Olive recently gave a presentation on self-based methodologies in mathematics teacher educators' learning at the International Symposium on Mathematics Teacher Education in UK (Chapman, 2019) and has a paper in press on mathematics teacher educators' use of narrative in research, learning and teaching (2019, in press).

We invited Melva to join our working group as a presenter and organizer in 2018. Signe became familiar with Melva's work at the Self-study of Teacher Education Practices (S-STEP) International Biennial 2018 conference. Melva has brought together her Black feminist and post-structural academic formation with self-based methodologies in mathematics education and higher education. Professional experiences in higher education led to an auto-ethnography study where she explored the construct of epistemic oppression (Grant, 2019 in press). As an entry into self-study research, Melva explored teacher educators' motivations to conduct self-study as she learned and practiced the method collaboratively (Grant & Butler, 2018). She is currently engaged in self-study work with Signe and others to explore ways to improve elementary teacher preparation using instructional technology. The technology afforded her online mathematics

method students opportunities to teach within a virtual environment and includes a small group of student avatars (i.e., virtual students). Melva is trying to determine ways to leverage the instructional technology to improve prospective teachers' capacity to facilitate productive math talk for developing student's mathematics understanding (Lamberg, 2013). In 2019, she plans to share findings through conferences and journal publications related to: (a) developing the instructional technology for improved teacher preparation; (b) prospective teachers' learning and teaching; and (c) professional learning emerging from her own practice. This line of inquiry started in spring 2018 and has spanned several elementary mathematics methods courses taught in both online and face to face settings. Melva plans to continue this self-study research until she is satisfied that her elementary method students' learning is not hindered because her teaching is maximally effective.

Energizing MTEs has been identified as critical to sustaining the field of mathematics teacher education (e.g., Whitcomb, Liston, & Borko, 2009). Our individual and collective work conducting studies under self-based methodologies have created such feelings of energy. Wilson (2006) described, being a "teacher educator-researcher requires understanding the practice of teacher education and the practice of teacher education research" (p. 316). Yet, defining a teaching and research path involves negotiating internal passions with external factors such as institutional structures, and funding policies. This could constrain MTEs' practices making them feel that academic life is unsustainable. We argue that this working group could be the beginning of a community of practice where MTEs interested in conducting studies using self-based methodologies feel sustained and empowered in their professional practices (Jaworski & Wood, 2008). Below is our plan for the 2019 working group.

Outline of Working Group Session

Our focus on participant discussion in our first year as a working group enabled us to build an emerging community of practice around the foundation of self-based methodologies (Suazo-Flores et al., 2018). Given the personal nature of that work, it was paramount that we create an atmosphere of trust and care. Extensive time was spent on setting norms, getting to know one another and our research foci, but also getting to know the methodologies and setting goals, both individual and collaborative, for our group going forward.

In 2019, we shift our focus from discussion to mentoring and new scholarship. We welcome new and returning members to our working group, thus we will begin again by building norms and (re)establishing an atmosphere of trust and care. The remainder of our work together will be oriented around project and manuscript review teams, with the long-term goal to start outlining a potential book. Working group participants are encouraged to bring works-in-progress to the group for feedback. Each day will focus on different phases of the work: Day One will focus on projects in progress, Day Two will focus on beginning projects, and Day Three will be devoted to discussing the year-long book project.

Beginning with projects in process on Day One is an intentional choice. By starting with projects with a defined methodology and whose research questions or goals are identified, we set the stage for productive mentoring and feedback cycles for beginning projects on Day Two. Sharing the origins of scholarship with others can be daunting and these ideas are the most fragile. Beginning with established projects may 1) assure new authors that their ideas will be handled gently, 2) give new authors a chance to hear the ways these methodologies shape potential studies, and 3) give us a chance, as a community, to review the tenets of each methodology in an educative way.

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Day Two will start with a progress update from each of the authors who shared work on Day One. These project updates will include where projects are going next and action(s) scholars hope to take in 2019-2020. The group will take time to consider and adjust the ways we provide (as well as the nature of) feedback to respond to the needs of participants. The remaining time will be devoted to projects that are in initial or introductory stages. These projects could include those that are still being conceptualized, those where data is still being collected, or those that still feel fragile to authors. Encouraging participants to share their work publically within our community of practice may help crystalize or generate ideas. In a whole-group setting, we will support participants as they give an overview of their current work/idea and invite us to give feedback on data sets, research questions, relevant literature, or early writing. Feedback can and should focus on specific areas identified by the author, so as to respect the fragility of these ideas and give the author agency to ask for what they need.

Discussion of a year-long project designed to support scholars in different career stages and to disseminate findings from studies using self-based methodologies will be a focus of Day 3. Building on the ideas shared in the previous two days, we will identify themes that will comprise the table of contents of a book. Before the conference, we solicited manuscripts from those who attended our 2018 working group. We have maintained contact with those participants and have continued to develop our community including scholars who expressed an interest in joining us following PME-NA 2018. Manuscripts will also be shared with the members of our email list in advance of the conference and distributed to mini review groups (2-4 people). 2019 PME-NA working group participants can also propose studies or share manuscripts designed under self-based methodologies to be included in the potential book.

Conclusion

As MTEs use self-based methodologies, spaces (communities) are needed to support their practices including study design, implementation, representation of findings, and publications in mathematics education journals. This working group intends to be such a space (community) where over time MTEs feel sustained in their use of self-based methodologies.

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