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# Looking inward: (Re)negotiating and (re)navigating mathematics teacher beliefs as teacher educators, students and scholars

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## LOOKING INWARD: (RE)NEGOTIATING AND (RE)NAVIGATING MATHEMATICS, TEACHING, AND TEACHER BELIEFS

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*This paper is a reflection on a co-teaching experience during the first mathematics methods course of a teacher preparation program, where a community of teachers (teacher educators and pre-service teachers) could reflect on tensions (with teacher beliefs, with practice, and with mathematics). Cognitively Guided Instruction (CGI) was a central tenet to the course material and required learnings, opening up opportunities to (re)negotiate those tensions with beliefs, practice, and mathematics. We employ poststructural theories, attending to the documents that participants produced as well as the thinking and reading happening simultaneously, using writing as a method of inquiry.*

Keywords: teacher education – preservice, teacher beliefs, elementary school education

This paper is a reflection, of sorts, on a co-teaching experience during the first mathematics methods course of a teacher preparation program. This course brought together a safe space and community for *teachers*—teacher educators and pre-service teachers—to reflect on *tensions*—tensions with teacher beliefs, with practice, and with mathematics. Cognitively Guided Instruction (CGI; Carpenter, Fennema, Franke, Levi, & Empson, 2014) was a central tenet to the course material and required learnings, and that consistent focus opened up opportunities to (re)negotiate those tensions with beliefs, practice, and mathematics. As our pre-service teachers were navigating the often-overwhelming requirements of the preparation program, they were confronted by their beliefs about what mathematics is, who can do mathematics, as well as how mathematics ought to be taught and learned; meanwhile, we (as teacher educators, doctoral students, and novice scholars) were navigating the always difficult world of academia, dissertation-writing, and reading in theory. Kayla, for instance, is writing her dissertation on mathematics teacher beliefs reconceptualized as an entanglement that is not stable; and yet, she recognizes her beliefs about teaching and learning mathematics, names them, feels them, teaches them. Susan wonders how post- theories might help us navigate those tensions, or perhaps present more tensions, by providing us the space to explore them, question them, trouble them.

In the current educational context that privileges conformity and compliance by teachers (McDermott, 2013), pre-service teachers need strategies to help them exercise professional autonomy. Teachers often experience a disconnect between the identities cultivated in their university classrooms and those currently privileged in schools, which leaves them feeling like they do not have the freedom to act, feel, and think in the ways they desire (Labaree, 2010). Furthermore, teacher educators are also engaged in negotiating and renegotiating tensions between theory and practice. Consequently, forming a teaching identity becomes a complex task that involves negotiating often contradictory ideas about teachers and teaching (Britzman, 2003). Teacher education, however, often focuses on helping teachers develop a stable identity rather than negotiating the shifting identities with which teachers must contend. This study aims to reconceptualize teacher beliefs as teacher educators (re)negotiate tensions and entanglements with/in teaching frameworks, and to write stories of those tensions. We take up posthuman and poststructural theories of subjectivity and methodology to consider pre-service teachers and teacher educators as subjects (selves) whose beliefs about teaching and learning mathematics

are *always-already* entangled, impossible to think as pre-existing or separate (Derrida, 1967/1974).

This study is informed by poststructural theories (e.g., Foucault, 1981/2000), the purpose of which is to describe the linkages of language, power, and identity that impact how individuals interact with and produce the social world (Davies, 2003). In adopting this perspective, we attend to the documents that participants produced (e.g., reflective writings about readings, assignments about mathematics teacher beliefs, etc.) both inside and outside of class. The goal was not to collect or understand any individual participant's thinking but to explore what it is possible to learn as teacher educators in our (re)negotiating of tensions as we connect theory with practice as well as what possibilities exist and can exist for pre-service teachers to act, think, and feel as mathematics teachers.

Imagining reflection as in-constellation (Myers, Bridges-Rhoads, & Cannon, 2017) has given us the space before to question the taken for granted practice of reflection and think about it as a relation, as reimagining, as meddling in the middle (McWilliam, 2008), all to de-stabilize the too-familiar practices we ask of pre-service teachers. In co-teaching this class and in writing this paper, we again trouble the stability and familiarity of reflection alongside teacher beliefs in mathematics teaching and learning.

### Methodology

The participants in this study include 20 pre-service teachers enrolled in the first of two math methods courses during their early childhood and elementary education teacher preparation program during an undergraduate Bachelor of Science in Education degree at a large, urban university in the southeastern United States. This teacher preparation program is four semesters in duration, where pre-service teachers are enrolled in coursework as well as part-time field placements during the first three semesters, and full-time field placement (student teaching) occurs during the fourth and final semester. This first course, which takes place during their second semester of the program, was intended to focus on the primary grades and designed to introduce CGI as an instructional framework.

The following documents were produced and shared over the course of the semester: reading journals (completed weekly and outside of class), beliefs statements (written in class at the end of the semester), and course evaluations. Documents were then analyzed using a collaborative process of writing as a method of inquiry (Kvale & Brinkmann, 2009; Richardson & St. Pierre, 2005) that involved the two of us sitting together and separately to read theoretical texts and study documents while writing and talking about how they interact. In this way, we write stories about our constant (re)negotiation of teacher beliefs and instructional practices as well as theoretical paradigms and neoliberal pressures in order to illustrate how various truths about teachers and teacher educators are continuously produced as language is organized into ways of thinking, speaking, and acting. Broadly speaking, our process of writing as a method of inquiry uses writing as a way of knowing, thinking, and creating; thinking and rethinking, reading and rereading of data alongside theoretical texts, writing and rewriting as a generative and cyclical process where stories and themes are welcome to come about on the page (Jackson & Mazzei, 2012; Koro-Ljungberg, 2015; Richardson, 1997).

Here we present some of these stories of pre-service teachers negotiating their beliefs while we as teacher educators are negotiating our own. These “findings” are preliminary, not fixed or final but rather coming about in the midst of different stories and writing and thinking. We draw on class conversations, course assignments, reading journals, course evaluations, and our anecdotal notes, to begin to tell this story of tensions in beliefs, teaching, and mathematics.

### The Story (Begins...)

*Due to the way I was taught mathematics during schooling, I have never had a positive relationship with the subject. Before, I imagined math as a left-brain concept, but now, I can view it as a creative process. Math is not something to be dreaded, but teachers can and should use math to create a space where experimenting, trying, failing, and succeeding are always implied and welcome. Math is not a teacher standing in front of a chalk board, barking out orders for equation solutions, but rather, communication between students, collaboration in the classroom, and a space where creativity to solving the proposed problem is encouraged and celebrated. Over the past 15 weeks, I have had the opportunity to learn what true mathematics looks like in the elementary classroom. By learning about it in the university classroom and implementing it in the field, my entire perspective on methods of teaching mathematics and learning math has completely changed. In August, my belief was that math was taught to you. It was an art of rote memorization, and one that, quite frankly, I was no good at. However, as we learned about CGI, my perspective on the teaching and learning process regarding math completely changed.*

Beliefs were claimed to have changed in this course experience, for one reason or another, but this requires a conceptualization of beliefs as measurable or distinguishable. As the course instructors, we hope that these pre-service teachers will learn something from us, and many of them come to this course with negative and harmful past experiences in mathematics, so this new learning and outlook is subjectively good... but what happens when these pre-service teachers are confronted by all of the other aspects of teaching? What happens when it is time to enact those beliefs amidst the mandates and curricula and relationships and mathematics (and, and, and...)?

*This type of environment can be difficult to create and even more difficult to maintain. However, I think that this system on learning is so much more beneficial to students overall than rote memorization. By refusing to “take the easy route” and just give out solutions, teachers should strive year round to make the classroom climate one that promotes the success of students and their learning processes, even if that can sometimes be difficult. But, as much as I’d love to have an environment where everything is student centered, key terms are avoided, and I allow them to find strategies rather than teach them; we must think about testing. As much as I hate it, standardized tests play a huge role in our students’ academic success. And teachers are assessed based on how well our students do. I want my students to be successful and on a timed test, they do not have an ample amount of time to come up with strategies and take a deep look into every question. Therefore, I would teach tricks. However, I would only introduce tricks if the students already mastered the concept.*

The connection to practice is overwhelming. Overwhelming for us as former teachers (re)negotiating those beliefs while trying to prepare these pre-service teachers for their future classrooms (and everything that comes with them), and overwhelming for them as students in the field, getting a small dose of reality but also engaging in conversations about those negotiations, navigating the tensions and finding ways to enact with pride and confidence and responsibility. Their reading journals brought concerns to the group; questions about application and reality, ways to make teaching work for themselves and their future students.

### Initial Implications

As we have begun to think with this data and witness the tensions in both our becoming researchers in mathematics education and in the students' evolving views of themselves as future educators in elementary mathematics classrooms, important questions are beginning to surface. What does/should mathematics look like? Who can do mathematics and how do we make a mathematics that is accessible to more students? (Martin, 2015; Stinson, 2013). In what ways do these new beliefs and plans for instruction change the way we think about mathematics?

*I wholeheartedly believe that the stigma of “math is hard,” “some people just aren’t good at math,” and “there’s only one way to solve the question” are just excuses that teachers give because that’s how they were taught. But if we switched those stigmas into norms- that math is easy, everyone is good at math, there are infinite ways to solve the question- then we are believing in math for what it truly can be- and believing in the students to succeed as well.*

There is opportunity and possibility in rethinking ourselves and mathematics. It changes how we do mathematics teaching. It is our hope that in further delving into and around this data, questions and moments will arise that will push us to think differently. It is in difference, not in repetition that we can make spaces for more students and pre-service teachers to find success in mathematics, and to see themselves as mathematicians.

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