At the Intersections of the Embodiment and Emergence for a Mathematics Teacher Educator

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Richardson, K. (2010). At the intersections of the embodiment and emergence for a mathematics teacher educator. Journal of Curriculum Theorizing,26(1), 54-64.

Article:

Research in mathematics education and curriculum theory currently has a very limited set of intersections. Few education researchers claim to work in both fields. I draw on the work of those few researchers for my own understandings as a mathematics teacher educator. Now as a part of this small community, I continue to struggle with what it means to be a mathematics educator from a curriculum theorist's perspective. In my journey and in my research, I have come to realize that mathematics is often perceived as an external truth, a fixed set of ideas, and based on that perception, mathematics pedagogy is proffered as basics-as-breakdown (Jardine, Clifford, & Friesen, 2003). As an alternative, I propose that a different way to consider mathematics education is to imagine how one can experience being in the world with mathematics. This being with idea emerged by reviewing two topics in particular: curriculum and the history of mathematics, which are central to my understandings of teacher education, specifically mathematics teacher education. Coupled with this investigation is an autobiographical reflection of how I have experienced being in the world with mathematics and how this investigation allows for a more meaningful engagement in the teaching and learning of mathematics. The intertwining of the personal with the contextual displays how the idea of being with is an interconnected and dynamic notion.

The Being With

So what does it mean to experience being in the world with mathematics? Many models of schooling lend themselves to the banking metaphor of education, where the teachers are the depositors and the students the depositees of information (Freire, 1970). In this model, teachers are on the "outside" of learning—watching, evaluating, and judging. Creating this inside/outside perspective is prevalent among the discourses and practices of mathematics. Watching mathematics is the common practice in mathematics education, and this mode of transmission is still prolific in mathematics classrooms at all levels in a variety of ways. Teachers list definitions and examples on the board, and students watch. The teacher demonstrates one way to work a problem and then offers worksheets with a large quantity of the same type of problem for students to imitate. Success in this explain-practice mode (Wheatley, 1992) is seen as a way to "know" if students know mathematics. Knowing, itself, assumes the "outside" perspective—a demonstration evaluated by objective measures that leave little room for ambiguity.

Although the National Council of Teachers of Mathematics (2000) issued Principles and Standards, which outlines both content standards and process standards, the focus of pedagogical strategies still remains on content. The process standards offered by NCTM—communication, problem solving, representation, reasoning and proof, and connections—are dispositions that learners of mathematics should develop. A question remains as to how students are supposed to develop and demonstrate these characteristics. As long as teachers dominate the classroom dialogue, students will be limited in their abilities to be successful in these areas, to process what is mathematics, and experience being in the world with mathematics. Questions that teachers should consider include: How do your students experience mathematics? How do they live in the world with mathematics? How are they being with mathematics?

Being with mathematics entails a very different understanding of students' interactions with mathematics and their world, with implications for instruction and assessment. Being with is not just another side of a dualism but emphasizes that we must achieve a personal connection with that which we come to know. Making connections, forming relationships, and seeing patterns are large parts of a type of classroom that goes beyond dualisms and embraces the connectedness of the inner life. Being with mathematics can involve deep exploration into a problem or idea, which may include conversation, experimentation, manipulation of objects, or a combination of all of these.

Fleener and Matney (2006) have also posited being-with-others-in-the-world mathematically by problematizing authenticity in a high school context. Their work, which focuses on the Heideggarian notion of "self" as clearings, informs my own ideas of "self" as intersections. Clearings and intersections are not in contrast with one another but rather a complementary idea. In Heideggarian terms, "self" and experience are interrelated which is in contrast to the idea of "self" as occupying space. Therefore, the "self" is created in the spaces or clearings, and the relationships between "self" and experiences are what maintain the clearings, as well as what connects them. Intersections complement clearings because relationship is also the focus. Matney and Fleener focus on being-with-others-in-the-world, and I focus on my own being in the world. I call this focus my intersections. In this paper, I outline particular intersections I have experienced.

One of my passions as an elementary mathematics teacher educator is to provide opportunities for preservice teachers to feel more confident about their mathematical knowledge, to connect on a personal level, and to model how to encourage others to experience being in the world with mathematics. I provide opportunities for all of us to be with mathematics, which means understanding, not just recalling, mathematical content. My approach includes what Wheatley (1992) calls a "problem-centered" approach, rather than teacher-centered or student-centered. As a teacher educator who works with elementary education preservice teachers, I work to address the harbored, strong, and negative views toward mathematics that are apparent in our initial conversations together. What is disturbing is that these views directly affect their perspectives for teaching mathematics, a subject they will be responsible for teaching in their future classrooms. I take the stance that mathematics classrooms, pre-kindergarten through college, should be spaces for learning in which teachers and students alike problematize their mathematical perceptions and experiences as a vehicle for understanding being with mathematics.

Curriculum and Mathematics History: Three Intersecting Perspectives

In order to unpack the implications of how being with mathematics requires a different perspective in teaching and learning, I engage in research based on inquiry, historical analysis, and personal reflections, all of which I use in an eclectic, thoughtful, and explorative manner. My analysis of mathematics curriculum and pedagogy is derived from the works of three mathematics education researchers: M. Jayne Fleener, William Doll, and Brent Davis. Their works inform my notion of being with mathematics, for their perspectives on mathematics education, curriculum studies, and teacher education have changed my entire mode of being with. While there are other mathematics educators who stand in these intersections, I have chosen these three researchers for particular reasons.

In Curriculum Dynamics: Recreating Heart, Fleener (2002) outlines her visions of curriculum and how a postmodern perspective lends itself to a more organic, emergent, and complex approach to teaching and learning. Fleener defines the basic tenets of modernism "as an emphasis on scientific reasoning and individual rationality, an assurance in universal truth, and a certainty in social progress" (p. 20). She further offers a critique of the modernist lens: "The curriculum, based in the modern paradigm, similarly reflects and perpetuates the oppressive framework of value-hierarchical thinking, value dualisms, and the logic of domination" (p. 47). As an alternative, Fleener draws on the complexity sciences to argue a postmodern interpretation, not one that rejects all that has been learned in the past but one that does not reject ideas outside of the dominant discourse. Consistent with the organicism of Alfred Whitehead, John Dewey, and Ludwig Wittgenstein, Fleener contends that mathematics is a more general science in which number, quantity, and space are all interconnected. Her idea of what is mathematics is also consistent with Davis' (1996) post-formalist

mentality. Patterns and relationships are significant, both in mathematics and in education. They are also important as one learns to be with mathematics.

Taking Fleener's (2002) idea that "students are complexes of relationships rather than things, living within individual and social contexts, [and this notion] has completely affected what I feel is important in my own classroom, how I approach instruction and think about teaching, and how I view assessment" (p. 80), I seek to explore within my own beliefs as well as with my students how to engage in understanding mathematics education in a complex manner. How one defines being with mathematics is subjective, just as interpreting education from a postmodern lens is subjective. Fleener warns us to "take Wittgenstein's warning to heart and avoid introducing postmodern approaches to meaning as the way of understanding" (p. 140). In mathematics classrooms, teaching and learning become dynamic, rich and alive, when allowed to transpire in a space in which being with mathematics occurs.

In concert with Fleener's research, I have situated main ideas from William Doll. First, Doll's (1993) four R's—Richness, Recursion, Relations, and Rigor—are another postmodern lens for education and mathematics. His postmodern perspective of curriculum stems from his research in complexity theory, so his intention is for the four R's to be used as interconnections, intertwined parts of a larger whole. They are all descriptors of a system, an educational system in which all are active participants. These systems are defined specifically as open systems, for "closed systems transmit and transfer; open systems transform" (p. 57). His suggestions for reconsidering education echo Fleener's (2002) suggestion that understanding is subjective and that there is more than one way to understand.

I encounter a resistance to the idea that mathematics is subjective in my work with pre-service teachers every semester, which directly influences perceptions of how to teach mathematics. The prevalent idea in educational methods courses is still that "that knowledge itself can be 'handed-on.' Students seem desirous of having such knowledge/methods handed to them and many a methods teacher is willing to comply" (Doll, 2005, p. 23). These modes of transmission remain fixed and limiting, and they do not promote an experience of being with mathematics that is vital to truly learning for understanding rather than process.

Doll (2005) continues his argument that the very concept of "methods" is historically problematic. He outlines that the modernist, rationalist epistemology of teaching as transmission stems from a hierarchical perception of knowledge. Modern, scientific methods adhere to the notion that replication is possible, assume that language is universal, and maintain predictability based on cause-effect relations. Instead of perceiving method as universal, linear, and simplified, he offers a different kind of method, "not the pedagogy of mimesis (copying) but the 'pedagogy of practice' wherein the practice is not mere repetition but the practice of doing, reflecting, visioning, doing yet again with a 'difference'" (Doll, 2005, p. 52). This form of doing, reflecting, visioning, and embracing difference is rare in mathematics classrooms as well as university "methods" courses.

Consistent with Doll and Fleener's organic nature of curriculum thought, Davis' (1996) ecological perspectives on mathematics also informed my transformation. The historical tracings of mathematics mentalities by Davis offer an analysis of how mathematics understandings have evolved over time.

Davis' (1996) notion of the five mentalities traces a historical route into the beginnings of mathematics, the present focus of mathematics, and the future becomings of mathematics in regards to the role it plays in society. Described as Oral Pre-civilization, Pre-Formalism, Formalism, Hyper-Formalism, and Post-Formalism, each mentality gives us insight into why so many in our modern society experience mathematics as meaningless and disjointed from our ways of being in the world (Davis, 1996). Being with mathematics has little bearing on the lives of individuals in pre-formal, pre-modern cultures. Formalism separates mathematical ideas apart from experience, thus diminishing the ontological component, while in Hyper-Formalism, power is associated with knowing mathematics. In the formalist and hyper -formalist mentalities, being with the world in mathematical ways is in actuality a separation of experience from knowing, and the abstraction of mathematics is elevated to a higher status of knowing than bodily experience or feelings. Applications and practicalities of mathematics are

only secondary as hyper-formalism emphasizes the mathematical relationships among mathematical structures.

Post-Formalism, Davis' fifth mentality emphasizes the recursive nature of mathematics in which our mathematical experiences are very much a part of our mathematical knowledge as an unfolding and continuous process. The teaching of mathematics in schools, from a post -formalist perspective, is an alternative strategy that allows moments for students to be with mathematics, experiencing mathematics as a meaningful way of understanding themselves in relationship to their world (Fleener, 2002). Analyzing the NCTM (2000) Standards using the curricular perspective of being with, I contend that although the NCTM Standards were born of a hyper-formalist need, specifically the idea of power as associated with mathematics, a post-formalist approach to the Standards is not only plausible but possible. I contend that it is only from a post-formalist perspective that the NCTM framework makes sense. Sarah Smitherman Pratt (personal communication, December 15, 2008) provides an excellent visual representation of the interconnectedness of the NCTM process standards (see Figure 1).

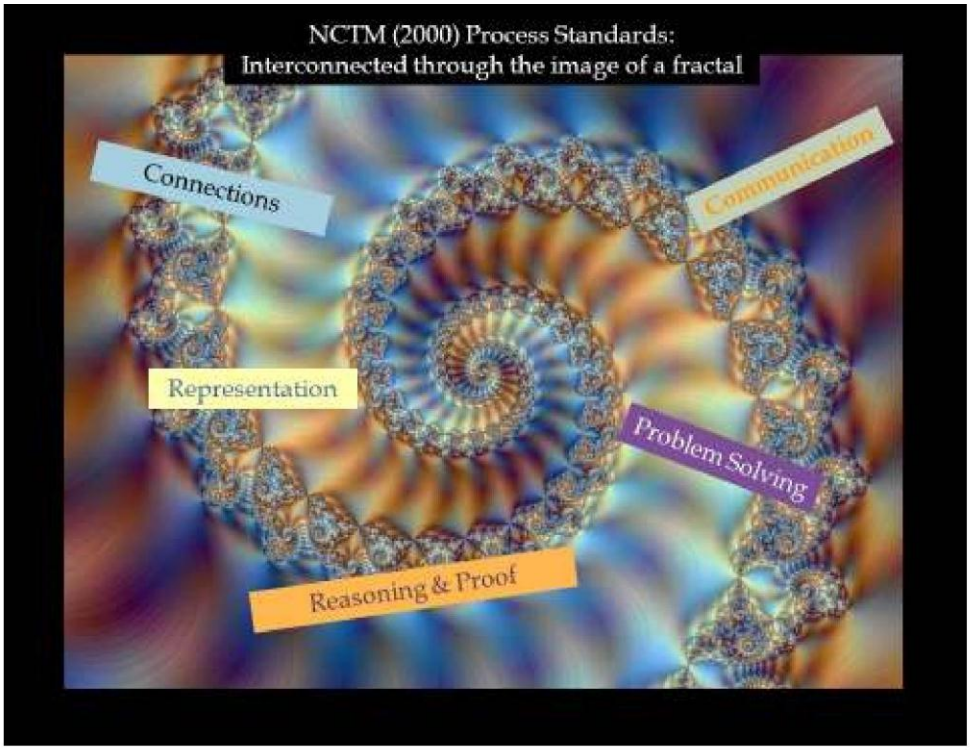

Figure 1. **A post-formalist depiction of the NCTM Process Standards. (Source: Sarah Smitherman Pratt)**

I connect all of these ideas as a way of being with, and I see relationships to my development of mathematics methods instruction. My own experiences in mathematics classrooms as a student and a teacher provide a text to outline potential connections of being with mathematics. This text can do more than just acknowledge who I am or who you are in relation to my story. Rather than viewing autobiography as a fixed perspective of the past, this form of discourse is a "reflective process that allows the mind to wander but notes the path and all its markers" (Grumet, 1980, p. 25) and reveals "those cracks in the smooth surface of our conceptual world that may suggest new interpretations of human experience" (p. 29). The use of autobiography is not a "new" idea in teacher education. Many researchers have been using this approach for years (e.g., Hesford, 1999; Miller, 1998; Pinar & Grumet, 1976). A teacher educator Erica McWilliam (1994) argues that autobiography can stimulate

> better educational practice for ourselves and our students, [for] we must acknowledge and confront the partiality of our own stories and their potential for surveillance and repression. And to do this, we must keep generating new strategies for storytelling, not continue to rely on old plots. (p. 22)

My story confronts my own experiences and practices to acknowledge that I have been as complicit in the perspective of teaching as transmission and mathematics as an external truth. I wish to offer my transformations

as a potential site for analyzing how mathematics teacher education research can continue to change, shift, and potentially recreate heart (Fleener, 2002).

Intersections

By identifying my own intersections, I am able to describe my shift in re-imagining teaching and learning. As a way to encourage how to understand mathematics in meaningful ways, I have identified key elements in my spirited mathematics methods instruction and my being with mathematics: listening, collaborating, reflecting, and struggling. These four descriptions are not separate categories but are intersections that depict how being with mathematics can be dynamic, alive, and meaningful. Each of these ideas can be understood from the curricular perspective outlined above. They are not meant to be a checklist; rather, they are experiential qualities that can be embodied and identified retrospectively. Therefore, I offer my experiences with respect to these four ideas to describe how I now strive to be with and encourage others to experience being in the world with mathematics. By narrating my experiences, I invite others to identify their own notable transformations with respect to teaching and learning.

Implications of this inquiry offer a way to open up spaces and create new spaces and new ways of thinking about mathematics instruction. Tearing down walls and opening up spaces for mathematics learning to occur include a variety of components that may look like constructivist teaching approaches: students and teachers having a conversation about a particular issue, students expressing an idea in a mathematics journal, working a problem on the chalk board, manipulating a set of objects to gain a new perspective on an idea, or taking some sort of a field trip that relates to a particular notion being discussed in the class. What is uniquely different is that constructivism as an epistemology is concerned with the conceptual understandings of learners. What I am proposing is more than an epistemology. It is an embodied knowing (Lakoff & Johnson, 1986). It is a focus on how teaching and learning are interconnected and how our ways of being in the world directly influence our imaginations for what it means to both teach and learn. The particular approach of this inquiry provides the potential to understand how my experiences with mathematics teaching may impact my understandings of and beliefs and feelings about mathematics methods instruction. Thus, the purpose of my inquiry is to explore my ideas of mathematics methods instruction from my perspective of being in the world with mathematics.

Reflecting & Struggling

When initially confronted with my interests in mathematics education, I harbored a variety of assumptions. These assumptions ranged anywhere from the importance of memorization to the thought that all students need to learn the same "math." When asked in a graduate level course, "What is mathematics?" I quickly jotted down a few sentences. I was bored with the question because I thought everyone would have the same response as I. Interestingly enough, some of my colleagues who were further along in their programs challenged my assumptions of mathematics consisting of only content. Their perceptions of mathematics included a more relational and integrated explanation. Many used words such as manipulating, finding, discovering, and exploring. For me, mathematics was this separate entity that consisted of the content of subject-area studies in geometry, algebra, and calculus. There was little room in my previous understandings of mathematics learning for discovery or meaning—mathematics was performance and doing, and I was successful in this endeavor. I gave little thought to expanding my ideas about mathematics. Some of my colleagues who expressed such dynamic responses had a lot of negative mathematical experiences. It occurred to me that I had simply been successful at playing the traditional mathematics game, that I had not really explored my perceptions and experiences of mathematics.

As an undergraduate in the United States, I earned a degree in elementary education, which entails learning all four content areas—mathematics, science, language arts, and social studies. My focus at the time was to learn how to teach my content, but even more important to me was presenting that content in the "right" way. Another worry I had was classroom management and how I was going to maintain control in the classroom. For me, mathematics methods instruction was somewhat meaningful simply because I happened to like the content, unlike most of my classmates at the time. However, I only looked at the external factor of mathematics instruction. I was consumed with questions of how, what, and where. How am I going to make students

understand place value? What do I need to do so that they will get it right? Where should I go if I they don't understand? Never once did I really question my own assumptions of mathematics nor was I encouraged to do so (that I recall). For me, mathematics was a constant that never changed and I never asked why.

Listening & Collaborating

After graduation, I taught seventh grade mathematics to about one hundred students per day with 20 or so students per class. I liked the students and job but felt overwhelmed with the day-to-day tasks and realities of public schooling. Feeling this way spilled over into my teaching, and I expected my students do math in the way that I told them to do it. My engagement was limited to them watching me. Although my approach was mechanistic, I began to grow when students would ask me why something worked the way it did. A student once stated her confusion with multiplication, which meant getting bigger to her, so "why do the numbers get smaller when multiplying two fractions?" Luckily, I was able to engage the student and class in a conversation about the "why" question and we finally came to a consensus. One way the students dealt with the problem was by changing the language. Instead of saying "1/2 times 1/4," they decided to say "half of a fourth" because that is really what is happening when multiplying two fractions.

Another turning point was when I engaged my students in a base activity which involved studying numbers in base two, five, etc. and comparing them to our base ten system. I received the idea from a colleague and the students ran with it. I had never really questioned our base ten system to that extent and the activity enabled me to start asking "why" of my own teaching and of mathematics in general. It was the "why," not the "how, what, where" questions about mathematics that inspired me to finish my master's degree and ultimately pursue a doctor of philosophy.

Reflecting & Listening

Just prior to beginning my doctoral work, I taught a statistics class for a mathematics department. The course was designed for elementary education majors, and my experience teaching this course is what really fueled my desire to work with preservice teachers. Many of those students had spent one or two semesters taking remedial courses and were extremely concerned about taking any more mathematics classes. As I probed further through various readings and experiences with preservice teachers, I wanted to know what is occurring prior to college that leads students on the path of remedial mathematics classes, besides the other issue of overreliance on one measure for placement. From a mainstream perspective, answers to this question may be discussed in a variety of ways. Some of these ways include: students' lack self discipline; students' lack of appropriate study habits; the curriculum provides insufficient preparation in high school; high school instruction is impeded by poor teaching or grade inflation leading students to negative feelings about mathematics; or, students have a false sense of accomplishment in their mathematics classes. Despite "feel good" instruction at the pre-collegiate level, as those who object to "humanistic" approaches associated with constructivist teaching methods argue, students still come to college with little confidence and desire to learn mathematics at the college level. Despite the interplay among students' previous mathematical experiences, classes, instruction, and expectations, students' lack of performance or desire to learn mathematics typically is blamed on the individual either as an expression of personal choice or of innate intelligence (failing to possess the "math gene"). Few challenge the meaningfulness of mathematics for our children as related to the meaningfulness of mathematics for society or the role mathematics has played in establishing what we value and who we are.

Collaborating & Listening

Thinking about where we as a society have been, where we are, and where we are going in terms of mathematics education was at the heart of my doctoral work. As stated earlier, important topics that challenged my thinking were that of curriculum and mathematics history. Thinking about curriculum from an organic perspective was entirely new to my repertoire. A moment that really stood out for me was taking a class from Jayne Fleener. She commonly spoke about curriculum and even mathematics in a metaphoric sense. For example, my peers and I paired up during class and developed metaphors for schooling and were then asked to illustrate and describe them on a large piece of paper. I found this task to be very challenging because I had always thought there was one set meaning for everything in education and was afraid I would be wrong in my

metaphor. Quickly, I realized Fleener was interested in the varied relationships each group discussed and what would emerge from our collaborative efforts.

She listened, not in an evaluative or interpretive way, but hermeneutically (Davis, 1996). She wasn't evaluating us as a quest for a precise answer from a knowledge base that was already established and from which a consensus should be drawn. Nor was she on a quest for imitation of her own ideas—instead she listened for moments of transformation coming from our own in-between spaces. The activities in her class were not about being right or wrong; they were about seeing schooling as something different than we had before. Her thoughts on the idea of Weltbild or "seeing as," as noted by Wittgenstein, describe not seeing our world as specific things, but seeing them as "exhibited through our actions" (Fleener, 2002, p. 135).

The metaphoric exercises that took place in Fleener's curriculum class were a way for us, as students, to problematize our own experiences, to collaborate in a way that we had never before, and to hermeneutically listen to one another. It was through collaboration and listening that I realized how vital the intellectual exercises she was engaging us in would be to my personal growth as a mathematics educator. She enabled me to engage in curriculum in new ways and for me it was to see mathematics as a way of being in the world. For me, thinking about a broad perspective on curriculum and narrowing my focus to mathematics curriculum involved many transformational moments. Recursively, I return to reflection and struggle as such moments that stand out in my journey.

Struggling & Reflecting

Seeing mathematics as a way of being in the world or what I like to refer to in simpler terms as being with mathematics meant positioning myself in uncomfortable areas of thought. As a "math person" it was reassuring to know that I could perform a mathematical procedure well, such as isolating the variable in an algebraic equation or simplifying an expression. For me, this meant I was good at math and I found a lot of positive reinforcement in my mathematics content courses to support my thinking. However, reform based approaches that are supported by the National Council of Teachers of Mathematics (NCTM, 2000) mean something very different than memorizing and performing a procedure. Not only are the content standards (number and operations, algebra, geometry, data analysis and probability, measurement) part of the NCTM design, but process standards are as well. They include: problem solving, reasoning and proof, communication, connections, and representation, and the overall intention is for students and teachers to engage in mathematics in more dynamic ways.

Mathematics, for most people, is not a way of being in the world but a performance or set of discrete facts that have little relevance to everyday life beyond the ability to "do" simple calculations or routine mathematical tasks. In the following sections, I will describe my own journey, as a teacher educator, beyond such a narrow perception of mathematics to a more integrated and relational perspective by describing personal moments of transformation—listening, collaboration, reflection, and struggle.

Implications of Being With for Mathematics Teacher Education

Each semester I face the challenge of balancing the realities of public schooling with my vision of being with mathematics. As preservice elementary teachers taking their one and only mathematics methods course, my students often enter our class extremely scared of mathematics but also excited to engage children in ways they had never experienced themselves. Often times when they challenge themselves to try something new in the classrooms assigned to them for their field placements, resistance happens.

Based on my experiences with mathematics teaching, mathematics learning, and mathematics teacher education, I have spent the last five years designing and refining my methods course. The refinement comes from formal student feedback (end of semester evaluations), informal student feedback (in class conversations), my own self-reflection, and colleague collaboration. I like to think of my methods courses containing a certain spirit (Doll, 2005), and in that spirit, I view both the curriculum and students as interrelated (Fleener, 2002).

I enact hermeneutical listening as a central theme in my own teaching, and one way I do this is through an activity called Quick Draw (Wheatley, 2007). Quick Draw is a visual-spatial activity in which the participants are shown a geometric figure for three seconds and then asked to draw what they see on unlined paper. This activity is designed to "help students develop: mental imagery, recognition of shapes, analysis of mental images, spatial memory, concepts of symmetry, geometric vocabulary and to negotiate social norms" (Wheatley, 2007, p. 7). Quick Draw is part of our methods curriculum as a way to demonstrate 'playing-with' mathematics, as well as encourage complex conversations (Pratt, 2007) in the mathematics classroom. However, the Quick Draw activity itself does not necessarily guarantee that students and teachers will 'play-with' mathematics; it is how we engage in the activity (i.e., the teacher's role) that facilitates this. Wheatley (1992) makes this point when he explores how even the mere question with which a teacher starts the conversation will set the stage for how the students will play. If the teacher's question sets up a right/wrong dichotomy, such as "Did you do it correctly?" or an imitation of what the teacher presents, then the "language can imply that there is just one way of thinking about the figure (the teacher's way) and that the student's task is to see it the teacher's way" (p. 538). By starting, instead, with the question, "What did you see?" students are encouraged to "give meaning to their experience in ways that makes sense to them" (p. 538).

Collaboration is another element for mathematics methods instruction that enables students and myself to question assumptions, try out new ideas, and work together to solve problems. It is through collaboration that I have continually changed the way in which I engage in curriculum. Instead of a comprehensive final exam, I assign a collaborative newsletter at the end of the semester. Students are asked to bring all of their ideas throughout the semester into one newsletter that describes their curriculum and what they plan to do throughout the year (aligned with state standards). In addition, they are also assigned to teach a mathematics lesson at their current field placement, which involves collaborating with their cooperating teacher, myself, and classmates.

Reflection is an ongoing element to the design of my class. After each class period, students are asked to write how the activities of the day relate to mathematics instruction and how they are personally affected by those activities. In addition, they are asked to reflect on articles read each week along with lessons taught during their field placements. Assigned articles purposefully coincide with topics covered in the class.

Finally, struggle is part of our class. Open-ended problem solving is enacted each class so students can put themselves in a similar place to their future students. I offer rich non-routine tasks for students to work and justify their findings. As an extension of this struggle, they are assigned five child interactions to conduct through the course of the semester. The idea is not to tutor a child but to find out how a child thinks mathematically. This is a struggle for many of the preservice teachers because they want to tell the student the right answers to the questions they give them and move on. Instead they are encouraged to question, listen, and engage the student in new ways. The preservice teachers almost always express some sort of change in their final reports. My reading of those reports informs my thinking greatly because they tell me if I am helping my students to better understand the mathematical thinking of the child and if my students are building on their knowledge base of mathematics teaching.

Regarding the implications for mathematics teacher education, being in the world with mathematics is a process that requires listening, collaboration, reflection, and struggle. Rich, non-routine tasks add to this framework along with rich connections to experience. Mathematics methods courses should encourage students to realize that mathematics is very much a part of who they are and the importance of conveying that being in the world with mathematics is a distinct possibility.

Overall, I engage in teacher education from a curriculum theorist's perspective. Pinar (2004) asserts that in teacher education, what this means is that:

> We curriculum theorists do not regard our task as directing teachers to apply theory to practice.... Rather, curriculum theorists in the university regard our pedagogical work as the cultivation of independence of mind, self-reflexivity, and an interdisciplinary erudition. We hope to persuade teachers

> to appreciate the complex and shifting relations between their own self-formation and the school subjects they teach, understood both as subject matter and as human subjects. (p. 24)

Cultivating these qualities may be difficult, but if we offer meaningful opportunities for all of us to reflect, listen, struggle and collaborate, maybe we can all transform in our being with.

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