Learning to Productively Struggle with Self-Study through Feedback and Failed Attempts

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"Weaving involves crossing two threads...To produce the textile it is necessary for these two threads to be bound, otherwise each will remain a fragile and fluttering potentiality...if the meeting of opposites does not take place, nothing is created, for each element is defined by its opposite and takes its meaning from it." (Valcarenghi, 1994, p. 9)

We are mathematics teacher educators who value learning from one another. We believe our learning is socially constructed and influenced by pre-existing theories, world views, and our contexts. During conversations, we examine, grapple, and reframe the complex problems we face (Patrizio et al., 2011). Therefore, our research is socially constructed and relevant as the procedures and data align with common understandings of our work individually and collectively (Willis, 2007).

As experienced mathematics teacher educators, we focus our work on mathematics specialists in a synchronous online graduate program. Interest in this specific research is still developing as only 20 states have created state endorsements or licensure paths (McGatha & Rigelman, 2017). Few have explored either mathematics specialist program development (Rigelman, 2017; Spangler & Ovrik, 2017) or field experience considerations (Baker et al., 2018). Due to both our interest in and access to mathematics specialists, we feel an urgency to engage in research that shares the practice of what it means to be a mathematics teacher educator of these individuals, and to provide others in similar positions with stories, experiences, and recommendations based on the lessons we have learned to advance the field as a whole.

Like other teacher educators in mathematics education, we encourage our students to partake in productive struggle (NCTM, 2014) as learners, in hopes they facilitate similar preK-12 experiences. Productive struggle "embraces a view of students' struggles as opportunities for delving more deeply into understanding...instead of simply seeking correct solutions" (p. 48). As teacher educators, we recognize the pivotal role we play in the development of mathematics specialist candidates, especially as they productively struggle with their own understandings.

Purpose

Two years ago, we investigated this phenomenon via self-study in order to "build new understandings through dialogue and validations of findings" that would ultimately benefit our students (Samaras & Freese, 2009, p. 5) and other mathematics teacher educators. In this paper we describe how feedback about the aforementioned self-study resulted in a moment of recalibration that unraveled

what we thought to be true (East et al., 2009). It is our hope that we bring to the surface the messiness (Berry & Crowe, 2009) of our own productive struggle and share with the self-study community how we took one unsettling experience that filled us with doubt and transformed it into a key moment in our continued and collective learning.

Our Critical Friendship

The critical friendship between Courtney and Laura was built on the commonalities each experienced in their journey to academia. Both served as preK-12 teachers and mathematics specialists who constantly sought feedback to grow and refine their practice. Courtney's foray into self-study aligned with her induction as a mathematics teacher educator. During her first semester, she taught a master's-level capstone course that engaged mathematics specialist candidates in self-study. Additionally, a colleague invited her to serve as a critical friend in a self-study of their practice as novice navigators of synchronous online teaching. Each semester after, Courtney dug deeper into her teaching of self-study with her mathematics specialist candidates.

Upon her own entry into academia, Laura learned about self-study as she, Courtney, and others researched the impact of the self-study mathematics specialist capstone course on the candidates (Baker et al., 2018). Additionally, Laura joined an adjunct self-study group organized and facilitated by a scholar in their university who was a prominent self-study researcher. Excited to advance her understanding of and practice with self-study, Laura became frustrated when her assigned critical friends did not challenge her practice as anticipated. Laura desired to learn more from her mathematics education peers who pushed her practice in relevant ways while encouraging her to think critically.

Recognizing this, Courtney asked Laura to serve as a critical friend in a self-study centered on the mathematics specialist capstone course. Collaboratively we possessed new knowledge from their previous examination of the capstone course which Courtney wanted to implement into the upcoming course iteration. Over a period of four months, we found that regular discourse furthered our practice and met our individual needs.

Sharing Our Research

As novice self-study scholars, we first shared the results of our self-study on the capstone course at mathematics teacher education conferences. In these situations, we felt comfortable in describing self-study to our peers where our work was met with approval. We then shared our results with self-study scholars via *Studying Teacher Education* (STE) and the American Educational Research Association (AERA) Self-Study of Teacher Education Practices Special Interest Group (Baker & Bitto, 2019). We recognized that by making our thinking more public to the community of self-study scholars, we would gain "further insights and [refine]" (Berry & Crowe, 2009, p. 91) our understanding of self-study methodology. However, while our presentations within the mathematics education community had been well-received, the self- study community's feedback highlighted the fragility of our methodological understanding. Although the collective feedback was woven of a similar fabric, we failed to identify the common thread. Our confidence decreased and the strands of our understanding unraveled.

We felt insecure, embarrassed, and uncertain. The STE and AERA feedback highlighted the fact that we were not as far along in our self-study practice as expected. Although the collective feedback

shared many commonalities, we were unable to identify these missing pieces through our disappointment and frustration. We could not fathom why our work was rejected, even though the feedback echoed similar queries: *Where is the self-study in what you are sharing? What difference did this make? How did you change?* In our minds, we *knew* what self- study was. We taught graduate courses, experienced self-study collaborations, and applied the methodology to our practice regularly. What was different about these outlets?

In avoidance, we delayed the revision of our paper and placed our critical friendship to the side, unaware of each other's internal struggle. Our identities were shaken as we were left wondering what was missing in our interpretations of self-study methodology. How could we fill in the gaps of our understanding? What we did not realize, at that time, was that we needed to rebuild and reweave the strands that had come loose for the purpose of building credibility and shared understanding. Although the detailed reviewers' feedback provided extreme guidance, neither piece alone was enough to push us forward in our thinking at that time. We were not ready to hear that the foundations we built our understandings on were wrong. Overwhelmed by the required growth, we continued in conversations about our other independent projects and pushed the self-study pieces to the side. In our silence, the unintended ripple in the fabric of our journey sat in the background waiting to emerge.

Initiating Our Journey

Several weeks later, Laura attended Courtney's last class for the online capstone course to watch the students present their own self-studies. It was then that the strands of feedback wove together and illuminated the reviewers' feedback in practice. During the presentations, Courtney became frustrated. Her students were not highlighting their own growth. They spoke of standardized test scores and student surveys. They shared insights into student understanding and missed opportunities to share of their own personal struggles and accomplishments within their practice. Immediately after class, Courtney phoned Laura for feedback knowing something was missing but uncertain as to what.

> Courtney: What did you think about the presentations? Laura: They were good...
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> Courtney: Were they though? I'm not so sure.
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> Laura: Thank goodness you noticed! I didn't know what to say. No, something was missing. They didn't capture the essence of self-study.
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> Courtney: I know! The results emphasized their students and it felt more like an action research presentation rather than their own personal journeys.
>
> Laura: Yes! There was no self.
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> Courtney: I've always walked away from the last class feeling satisfied. But I'm not. What did we miss?

Emphasizing summative data over personal struggles and growth, student presentations mirrored the holes in our own understandings. That moment served as a recalibration point (East et al., 2009) in

our journey to become self-study scholars. It was easier to see what was missing from our students' work than scrutinize our own. However, once we observed the reviewer feedback in action, our necessary journey became apparent. We were not failures in self-study, we simply had more to learn.

Our presentations and papers had never before been presented to the self-study community. Submitting our work to STE and AERA not only pushed our boundaries of comfort and experience it also served us with the realization that we had not yet learned how to successfully communicate our work with methodological rigor. Because it was incomplete, our fragile understanding crumbled when presented within the self-study community. If we were to engage in meaningful self-study, we needed to embark on a collaborative journey to advance our own understanding of how to share the knowledge gained from our critical friendship. We needed to identify the point in which our understandings began to unravel and reweave the strands. But where did we start?

This paper captures the dynamic inspirations and stalled motivations of our productive struggle as we explored the following questions: *What essential understandings are missing in our interpretation of self-study methodology? How might we better communicate our learning to self-study scholars?* Similar to the process of weaving, our journey in understanding self-study as a methodology has been incredibly intricate, painstaking, and labor-intensive. To look upon the finished product one might fail to appreciate the hidden intricacies, or productive struggle, that emerged as a result of our inquiry.

Methodology

We engaged in self-study to collectively examine and improve our knowledge and practice (LaBoskey, 2004) of self-study methodology. Over four months we interacted via weekly conversations, daily emails, and texts. We turned to self-study literature and started with *Self-Study Research Methodologies for Teacher Educators* (Lassonde et al., 2009). We analyzed the table of contents and collaboratively determined to initiate our study with the introduction. After completing our first 'assigned' reading we found that the following quote resonated greatly with each of us and caused cognitive dissonance: "We are concerned that the term self-study research is being applied to a variety of practices, some of which bear little resemblance to the quality and systematic methodology our S-STEP community values" (Lassonde et al., 2009, p. xii).

> Laura: This reminded me of us and our practice. I feel as if we have so much to learn. I feel like a fraud or that we somehow hurt the methodology.
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> Courtney: I know. I highlighted that quote too, but we weren't intentionally trying to mislead anyone. And I do think what we are doing is self-study. We used the self-study literature to guide our work and we think about our practice in a systematic way. We don't just interview each other at the end of a project. We started with our wonderings, developed a plan, set a schedule for our conversations…
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> Laura: Maybe. I mean I agree with you that we were systematic in the design. Or as much as we could be with still allowing our learning to take us in new directions. But what is our methodology?

Concerned about our own methodology we brainstormed wonderings that would not only enhance our understanding of self-study methodology, but that would also increase our rigor and

trustworthiness. Laura's wonderings centered on the student presentations and how self-study was different from action research. It was apparent that for our students, particular components of these methodologies blurred together. We reflected on our own actions. If our students were unable to articulate the differences between these methodologies, we needed to better support them by firming up our own understandings.

Courtney's wondering centered on Laura's question: What *was* their methodology? Thinking about the scholarly feedback and peer conversations, Courtney recognized the need to increase their methodological rigor. To do that, we needed to be explicit in our decision-making. We also recognized that conversations were our richest data sources. We realized this early on in our critical friendship and identified a way to capture thoughts in-the-moment they occurred so as not to miss something as we waited for our audio recordings to be transcribed.

Recognizing a need to identify where our understandings unraveled, we turned to the self-study literature to ground our conversations and guide our learning. We assigned specific readings as homework between conversations. We used Google Docs to create agendas and

capture our thoughts as they emerged during our individual reading and reflection. We developed the norm of typing each other's verbal reflections to capture ideas while the other focused on articulating their thinking. We examined artifacts beyond the AERA and STE feedback such as: self-study articles and books, course materials, and our past papers and presentations. It was in this manner that we explored the essential understandings missing from our interpretation of self- study methodology.

Although we were unable to name it at the time, our self-study methodology was dialogue (East et al., 2009). Data was qualitatively analyzed using both InVivo coding to prioritize and honor our voices and process coding to capture our emerging actions over time (Saldaña, 2016). Codes were thematically grouped and aligned with our wonderings to increase relevance (Stake, 1995).

Outcomes

Using self-study literature helped us to initiate our journey in understanding and allowed the following two findings to emerge: 1) Embracing our productive struggle; and 2) Uncovering dialogue as our methodology.

Embracing Our Productive Struggle

We continued our exploration by reading Samaras and Freese's broad perspective and historical overview of self-study (2009). Immediately, we each connected with the "openness and vulnerability" described (p. 5). After electronically sharing images of quotes we connected with, there was one quote that monopolized our conversation.

> When we engaged in action research, the focus was on our students and what they learned. However, through our dialoguing we realized that by focusing on the students we research we left out a very important aspect of the study - the self, the role we played in the research, and what we learned and how we subsequently changed. (Samaras & Freese, 2009, p.12)

In this quote we saw how we had not yet embraced our own productive struggle. We needed to better communicate to our audience, but first to ourselves, the examination of *our* practice for the purpose of improving our teaching.

> Courtney: This is us! Do you see it?
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> Laura: I know! This helped me to clarify the differences between action research and self-study. I mean it makes sense. In action research the emphasis is on the action and the results of that action. Whereas with self-study the researcher is thinking about their influence or impact. In self-study we are examining *our* practice for the purpose of improving *our* teaching. I think we missed that in communicating our past work.

In our practice as mathematics teacher educators, we constantly celebrated the productive struggles our students experienced. Yet, we had not embraced our own productive struggle as it appeared in our self-study journey. The connection to productive struggle served as a cementing point.

We deconstructed self-study exemplars and analyzed them against our past efforts. Laura's wonderings on methodological differences unfolded. The exemplars' use of "I" and "we" in addition the description of developments and uncertainties was a stark contrast to our use of third person. This exploration also helped us to answer Laura's wonderings on the differences in self-study and action research methodologies. It opened our eyes to the honesty in the reviewer's feedback. "Findings focused on defining and use of the conceptual framework with students... it isn't clear how Courtney's instruction is increased or influenced in significant ways" (Reviewer 2, STE).

When we aligned the feedback with our paper our awareness of and receptiveness to the honest critique of our work heightened.

> Courtney: Have you re-read our paper? It reads like a fifth-grade science project. We focus on the variables and what happened to our students. Nowhere in our paper did we talk about our growth or journey. We never shared our productive struggle.
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> Laura: Courtney, look at the headings of our findings. *Improving instructional practices and increasing student knowledge. Clarifying instruction with explicit expectations.*
>
> These center on the students.
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> Courtney: We intended them to be about our own growth and how our actions improved our own practice....
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> Laura: But ended up writing about what happened with our students.
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> Courtney: We may have conducted a self-study, but we definitely did not write about our research like a self-study. And the reviewers were trying to tell us that. Listen to this feedback from Reviewer 1, 'Although this is definitely a study of teacher education practice by those engaged in the practice, it is not so clearly a study of self.'

As we continued to align reviewer feedback with our paper, we found multiple examples, of our

emphasis on the impact of our actions on our students. We had positioned ourselves as mediators of those experiences, and failed to share the intimate details of our struggles and interactions; something highlighted across our reviews.

Uncovering Dialogue As Our Methodology

With every reading and through our dialogue, more questions and wonderings emerged. The work of Feldman (2009) also assisted us in our exploration of the role of self, validity and "how LaBoskey uses the characteristics of self-study scholarship to identify ways to reduce the inherent bias that arises from being both researcher and researched" (p. 45). The exemplary study presented by Kitchen and Parker (2009) provided a window into how others applied methodologies centered on conversation and readings.

Throughout each conversation, we continually captured our joint-construction of new knowledge. Individually, our understandings were single threads, isolated with tremendous potential. Yet, together, our understandings merged into dynamic, rich, and complex weavings.

As we wove new strands of knowledge into our pre-existing tapestry our path became clear and we began to see how both our teacher education practice and ourselves were drawn into our self-study methodology. Reading East and colleagues (2009) confirmed that dialogue was the catalyst that served as "our primary data generation, and analysis tool" (p. 56).

> Courtney: Our methodology is dialogue. Think about it. How do we communicate our ideas, our struggles, the things that excite us? How often do we ask each other to capture what we are about to say by memoing as we share our thoughts verbally?
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> Laura: Yes, I think our past roles as mathematics coaches plays into this too. I often find myself asking clarifying questions and pushing you to articulate your thinking when I need more clarity. You do the same.
>
> Courtney: We need to dig into this more. What do we read next?

Additionally, we saw how the student presentations served as our own recalibration point, which helped us to grow as scholars and teacher educators. We connected to the enthusiasm of LaBoskey, as we were also "energized for change" by our self-initiated need to improve (2009, p. 80). Our readings connected our desire to ask "hard questions" not just our students, but ourselves, and provided "exemplars of practice" we wanted to engage in (p. 74-75) as we thought about integrating equity to better prepare advocates of mathematics education.

However, it was ultimately learning about whanderfahring (Miller et al., 2002) and seeing how the methodology Berry and Crowe (2009) employed played a part in our quest that resonated with us most. Like Berry and Crowe, we recognized that "the process of working together to better understand practice is a messy one - and one that does not become any less messy over time" (p. 84). Dialoguing with each other allowed us to examine and transform our practice. We could explore the changes that emerged and intentionally reflect on how others might use the processes we employed to refine their own practice. In previous attempts, we kept our journey private and failed to communicate our gained insights to the self-study community. We needed to make our decision-making explicit so others could retrace our steps and determine our validity (Laboskey, 2009),

ultimately contributing to the self-study community as a whole.

> Laura: We have to go back to our agendas to figure out exactly what we did. Everything we said is captured within that document.

> Courtney: The reader has to know about all of it. From the dissatisfaction I felt after that first night of class when I asked you to come on this journey with me to the unproductive attempts of integrating your framework.

> Laura: This is definitely not how I have written before. It feels so open and vulnerable.
> Courtney: But it's how the articles we have been reading are written. Look at their use of 'I' and 'we.'

> Laura: I know, everything is so personal. It's just different. We are ready for this. We just have to reframe our thinking and apply these new understandings.

We began to re-envision our rewrite with the strands of new knowledge. We needed to tell *our* story and describe our authentic exploration: how each of us pushed the other in a way that neither could have accomplished alone. In sharing the moments our dialogue stalled, gained momentum or allowed us to become vulnerable we would be sharing the aspects of our practice that inspired us to reflect and change. We viewed the open journey ahead of us as a productive struggle in which we needed to make our decision-making explicit so that others could retrace our steps. We needed to provide "sufficient information for [others] to determine [our] trustworthiness and thus, in part, [our] validity" (Laboskey, 2009, p.76).

Final Thoughts

Our collaborative projects of the past were neatly packaged in concise bundles, and student-centered. In this self-study it was our bravery and vulnerability to share the rawness of first-draft thinking with one-another that was essential for growing the self. By examining reviewers' critical feedback and digging into self-study literature to re-explore our understandings, we uncovered dialogue as our self-study methodology and redesigned the way we communicate our self-discoveries. This positively influenced the un-weaving of the already fragile understandings and guided the re-weaving and reformation of our current understandings. Similar to a tapestry in construction, the journey of self-study may be uneven and contain knots or blemishes. However, during the restructuring of the cut and frayed ends, there is a transformation into something worthwhile and meaningful as a final product emerges that may not have been apparent at the start. In weaving together our individual understandings we transformed them into collective knowledge and realized the importance of feedback in forming our self-study scholar identities. Ultimately, this has moved our teacher education practices forward, and influenced our understanding of what it means to be a self-study scholar via critical collaborative inquiry (Samaras, 2011).

The contribution of this paper lies in the study of our productive struggle with deeply understanding self-study methodology and forming our identities. This work highlights the need for mentorship and the power of self-study exemplars. Our journey informs the field by helping novice self-study researchers feel less isolated in their inquiries. By openly modeling best practice of professional

learning, we bring to attention our uncertainties while providing encouragement. We provide guidance for others in reflecting on feedback to promote growth into a supportive community.

We recognize that our self-study scholar identities still are, and will continue, forming. We are grateful for the investigation we describe above that allowed us to step back from our own notions and push past the internal barriers. Although intimidating to place ourselves in a vulnerable position yet again, our growth has allowed us to think differently about our upcoming feedback. We now eagerly anticipate and welcome feedback as we continue to weave together our new knowledge with our past and look forward to the journey to come.

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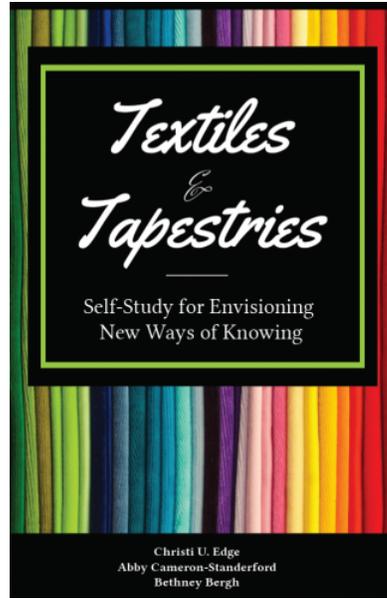
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