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An Examination of Current Methodologies in Mathematics Education Through the Lenses of Purpose, Participation, and Privilege

Uma Análise de Atuais Metodologias em Educação Matemática Usando as Perspectivas de Proposta, Participação, e Privilégio

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Abstract

In this article we reflect on our practices and begin to confront the "living contradictions" (WHITEHEAD, 1989) in our identities as researchers in mathematics education (COX et al, 2014). From a first hand perspective we reveal and address our contradictions, organizing our discussion around the following four questions: How do we find meaning in educational research on teaching? Who is in control of the research design and who gets to participate? How should we collect and analyze data? and For what purpose do we disseminate our work? In order to best illustrate the contradictions in our work that are related to our methodological choices, we have constructed fictional dialogues that set the stage for each discussion. These dialogues capture the triggers that forced us to change the course of our research and shaped our current thinking about the ethics of conducting classroom-based research. We end this article with an invitation for readers to help define alternative research methodologies that are respectful, ethical, transformational and empowering for all participants.

Palavras-chave: research methodologies, mathematics education, ethics.

Resumo

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Neste artigo refletimos sobre nossas práticas e confrontamos nossas "contradições vivas" (WHITEHEAD, 1989) existentes em nossas identidades como pesquisadoras em educação matemática (COX et al, 2014). Revelamos e abordamos nossas contradições de forma pessoal, organizando a discussão aqui apresentada, em torno de quatro questões chaves: Qual o significado da pesquisa educacional sobre o ensino? Quem controla o design da pesquisa e quem tem o direito de participar? Como devemos construir e analisar os dados? e Porque disseminamos nosso trabalho de pesquisa? Para melhor ilustrar as contradições encontradas em nosso trabalho quanto a nossas opções metodológicas, construímos diálogos fictícios para motivar cada discussão. Esses diálogos representam momentos que desencadearam mudanças em nosso trabalho de pesquisa e no nosso modo de pensar sobre a ética de se fazer pesquisa em sala de aula. Terminamos este artigo com um convite aos leitores para criarmos metodologias de pesquisa alternativas que sejam respeitosas, éticas, e com capacidade de transformação e empoderamento de todos os participantes.

Keywords: metodologia de pesquisa, educação matemática, ética.

"Research, then, is not just a method but also a way of life and living with others." (HENDRY, 2010, p. 79)

Introduction

As mathematics educators study and prepare ourselves to become mathematics education researchers we may struggle to find a "researcher identity". As a means of self-discovery, we examine our beliefs and work within a theoretical and methodological framework that resonates with who we are personally and professionally. Our beliefs and our identities as teachers and learners shape the identities that we assume as researchers. In this development of ourselves as researchers we encounter many possibilities as we explore and consider the implications of theoretical frameworks and methodological strategies. Embracing a framework, a paradigm, or building expertise in a particular methodology is a goal in becoming a researcher in mathematics education.

It is not always clear to the new researcher how all of these perspectives are connected and the synergy that exists among them. In fact, it can be many years into one's profession, before the true implications of these commitments surface as we reflect on our practice and begin to confront the "living contradictions" (WHITEHEAD, 1989) in our identities and practices as researchers in mathematics education (COX et al, 2014). In this article, we will reveal this struggle from a first hand perspective.

In order to best convey that perspective, we have chosen to incorporate pieces of fictionalized dialogue rooted in the realities of central methodological contradictions that emerged in our recent work with teachers. Focusing exclusively on the work of enacting research with teachers about teaching, we explore our personal struggles with finding and

defining ourselves as mathematics education researchers, but also explore the implications of current methodologies on the positioning of both teachers and researchers within the field. We will stay within a methodological perspective as we consider the following working questions:

1) How do we find meaning in educational research on teaching?

2) Who is in control of the research design and who gets to participate?

3) How should we collect and analyze data? and

4) For what purpose do we disseminate our work?

Finding Meaning in Educational Research on Teaching

> ***Dana**: What measures should we use to evaluate our project? Should we use quantitative measures to show growth such as a content test or an observation protocol?*
> ***Bia**: What would such a test measure? What would be the meaning of that data? Do we even believe that we can come up with test questions that would reveal the complexity of a teacher's understanding of content?*
> ***Funding Agency**: Forgive me for intruding, but you agreed in writing to collect data in this form. It isn't up for debate. You are but one project in a portfolio of projects that are intended to say something in chorus about mathematics education and the development of math teacher leaders. By virtue of that inclusion, you are expected to have something to say that would make sense to outsiders, that would generalize to others and that would help them make decisions about their own professional development practices. You are expected to contribute new knowledge to the field about what works, and that can only be established through a rigorous program of evaluation, including quantitative measures.*
> ***Dana:** But that data wouldn't be meaningful to our participants. What do you mean by "works"? For whom should something work and under what conditions? So is it not enough to document that it "works" for us? Must we show that it would also work for everyone else?*
> ***Bia:** Can we (re)imagine what might constitute a high quality study? Who should benefit from this work anyway?*

The funding agency is representative of the current climate for research in the United States where the gold standard research is a backlash in the research community into the positivist notion that truth is located in evidence-based research. Establishing a verifiable and reliable truth that generalizes beyond the local context is a desired, and often required, facet of funded projects. Even more so, the call for evaluation programs that are based within an experimental model has elevated the professional discourse around control group selection and retention. In this section we will explore different perspectives on the meaning and purpose of research on mathematics teaching.

A research proposal that would be reviewed positively would have some element of establishing valid and reliable knowledge that is applicable beyond the local context. A study would have several important components. For one, it would be grounded in a

theoretical framework. This framework would define the questions to be asked, the data to be collected in order to answer the questions, and the empirical means through which the data would be analyzed. A good description of the methodology would be one in which the methods of data collection are aligned with the questions asked and likewise the data analysis would be aligned with the theoretical framework selected. The data analysis would be carefully described, and throughout the research the researcher would stick to the plan. This process is outlined in many documents aimed at guiding proposals and helping conceptualize research, such as the program solicitation for the Discovery Research Program Prek-12, funded by the National Science Foundation (NSF) (NSF, 2015).

Early in the mathematics education research tradition, researchers would start with a hypothesis, and then collect data that would allow them to confirm or reject the hypothesis. This was a tradition of process-product research (BROPHY; GOOD 1986) and characterized some of the first studies in the field. Researchers were searching for teaching strategies that worked, in other words improved student performance. Hence the name process-product. Teachers did something that was observable. The observers documented what they saw the teachers doing. The students were then tested to see if they had learned what the teacher had intended and the effectiveness of the strategy was documented. Effectiveness could be documented with quantitative measures such as counts of observable behaviors, and comparisons between pretest and posttest scores. Strong correlations between the good scores and the fidelity of processes used were indications of a teaching strategy that had worked.

Another methodology deemed trustworthy and reliable involved the study of teaching as a treatment and learning as the resulting effect. In this design, dependent and independent variables were identified. Independent variables were manipulated. As a result, the complexity of the real situation was reduced and a very sharp focus was placed on how the treatment (manipulation of the independent variables) would result in changes in the dependent variables. In most cases, the performance of a control group was compared to that of the experimental group who had been subjected to a specific instructional treatment (KILPATRICK, 1992; COBB, 2007).

We challenge the elevation of these methodologies, dependent on quantitative measures, in educational research above all others. Certainly, quantitative data provides empirical data that can be used to support or reject a hypothesis. However, in search of

understanding about why correlations exist and to understand an underlying phenomenon, qualitative data provides more explanatory power.

The alternative perspective that favors a qualitative approach to data collection and analysis, raises other issues to be considered. From these perspectives, a good methodology would be one that draws on multiple sources (TOBIN, 2000), thus allowing for the process of triangulation. It is one that produces trustworthy, generalizable and valid results. To be generalizable, work must extend beyond the locale in which it was generated. In other words, if we can strip it of context, identity and nuance and then apply that result to another situation and establish its explanatory power, we have generalized the result and pushed it beyond practicality and into the realm of theory. In order to assure the community that what we have found is trustworthy and to enhance the credibility of the claims, we use methods such as triangulation, member check, and reporting disconfirming alongside confirming evidence (CRESWELL; PLANO CLARK, 2007) .

Even within this perspective we notice the search for truth in seeking evidence that supports knowledge claims. This search may, as Hendry (2007) notes, cause us to "invest our trust in our methods, not in our relationships" (p.493). She questions the connection between these methods and the establishment of truth, a process that might be more about confirming our beliefs (matching an expected outcome) than generating knowledge. In all cases, the verity of a researcher's claims is still dependent on how well they match an expected outcome, other claims made based on different data, or the field's or even individual's expectations about what should be true. Claims that challenge our worldview or that provide counter-narrative to more mainstream theories may be subject to more scrutiny and doubt. This registers blind spots (WAGNER, 1993), or "areas in which existing theories, methods, and perceptions actually keep us from seeing phenomena as clearly as we might" (p. 16). As a result, something important may go unnoticed, misinterpreted, or rejected.

Barone (2010) provides another caution regarding the search for truth in the Illusion of Cumulative Truth. There is a perception that reality is best viewed from a variety of perspectives. The generation of counternarratives as a means of providing diverse and sometimes underrepresented perspectives can still be an attempt at uncovering objective truth. Take for instance, Jaworski's (2010) response to Goodchild (2010), where she indicates that the meaning and contribution of Goodchild's ethnographic study can only be found in examining it alongside others and establishing a

wider or more detailed picture of reality. Trustworthiness, according to her, still lives in the comparison of one version of truth to another. However, that is still a confirmationist perspective. If a study does not fit alongside others or even argues with others, then it is deemed less trustworthy. Thus, if a study fits what we believe to already be true, then it, too, must be trustworthy. Trustworthy is the term for "as we'd expect it to be", even if we wish it were a measure of reality.

Perhaps, as Wagner (1993) suggests, we'd be better off evaluating the value and meaning of a study based on "how far beyond ignorance this work takes us" (p. 16) as opposed to how closely something mirrored a perceived reality. Furthermore, we should consider the potential that work has to help us know more--and to address blind spots by enabling us to ask additional questions. In our work, we've begun valuing those projects which provoke questions more than those that purport to provide answers.

Power and Positioning of Researcher and Participant

> ***Dana:*** *I want to take a moment to introduce you to the person you've been receiving emails from regarding consent forms and scheduling your classroom observation appointments and such. This is the person who will be evaluating us.*
> ***Teacher:*** *Define us.*
> ***Dana:*** *We are us. I mean, the people in this partnership project.*
> ***Teacher:*** *So, she's evaluating all of us, or is she evaluating the partnership in general?*
> ***Dana:*** *Well, the partnership in general. She's going to be the one who tells us what impact this project has had.*
> ***Teacher:*** *So are you being observed too, or is it just we teachers?*

The teacher in the dialogue above calls into question the relative position of researcher and participant, correctly inferring that there is a contradiction between referring to our project as a *partnership,* but focusing exclusively on teachers in our evaluation data. The teacher had correctly perceived her role as an object of study and the evaluator's role (and implicitly Dana's role) as the determiner of progress. We should note here our use of the feminine pronoun here and throughout the paper. In our projects we have only worked with female teachers and that is why we have chosen to use the pronoun exclusively.

This is not unlike the relative position of the field of mathematics education research and the community of educators it purports to serve. The research community shares and disseminates their work, primarily amongst themselves. Teachers, who are often objects of studies, are positioned as consumers of knowledge generated through

research, whereas the academic world has positioned itself as the experts in understanding and describing teaching and learning. Methodological themes are central in this positioning. In this section, we will be exploring this positionality and implied power.

Even the National Council of Teachers of Mathematics (NCTM), an American professional organization that is intended to advocate directly for teachers to policy makers and citizens, has positioned teachers as incapable of interpreting research articles and distilling practical implications. This positioning is established by commissioning multiple publications that seek to translate academic research for teachers (SOWDER; SCHAPPELLE, 2002; KILPATRICK; MARTIN; SCHIFTER 2003; JENSEN, 1993; OWENS, 1993; WILSON, 1993; SPANGLER; WANKO, In Preparation) and devoting departments in the journals *Mathematics Teacher* (2015) and *Mathematics Teaching in the Middle School* (2015) to helping teachers connect research to their practice.

From a methodological standpoint, there are other ways in which the status of teachers as researchers as well as the knowledge they generate are diminished. In research where the researcher is positioned as objective and non-participant, the researcher is generally viewed as transparent, objective and neutral. In such studies, focus is placed on establishing methodological control to minimize or eliminate researcher bias (MOSCHKOVICH; BRENNER, 2000). Taking the stance that participants (teachers) are not objective interpreters of their practice is problematic because it suggests that the knowledge generated by teachers is not scientific knowledge, a distinction that is often heralded by a new label such as teacher-generated knowledge (ZEICHNER, 1995), craft knowledge (RUTHVEN, 2002), practitioner knowledge (EVEN, 1982; ELBAZ, 1999; LESTER; WILIAN, 2002), or practical wisdom (LESTER, 1998).

Some modicum of protection for the ideas and perspectives of teachers can be found in the interpretive paradigm. There are those who would argue that a researcher could never distance themselves from the research process and that objectivity in educational research is a myth (CHRONAKI, 2004). In the words of Burton (2002): “I do not believe that there is ever a case where the researcher’s beliefs, attitudes, and values have not influenced a study, nor do I believe that it is possible for a researcher ever to assume that values can be assumed as shared within a “scientific community” (p. 4). Beyond the interpretation of findings, even the questions a researcher chooses to ask and the methods a researcher chooses to employ are influenced by experience, beliefs and attitudes (FINE, 1994).

In order to account for those biases and to help others understand the interpretations a researcher makes, there is a call for researchers to position themselves for their audience by making explicit their stance and cultural membership (D'AMBROSIO et al, 2014). These discussions of position are intended to make more explicit the lens through which the researcher examines others, which we take in this writing to mean teachers. However, even here, teachers remain positioned as "other".

Simultaneously, the field of action research has served as a vehicle for teachers to take methodological control of studies within their classroom. As a methodology, action research (CARR; KEMMIS, 1996; COCHRAN-SMITH; LYTLE, 2009) enables teachers to participate in picking the research questions that are of interest to them; identify the data that would be meaningful and available; participate in collecting the data; engage in the analysis of the data; and interpret the findings. Furthermore, it repositions teachers in relation to the literature in that "teacher researchers study the work of other researchers, treating this work as generative and illuminating rather than regarding it as prescriptive and limiting" (COCHRAN-SMITH, 2006, p. xv). However, these action research studies are still questioned in terms of the standards of the field with regard to rigor and transferability, once again reducing the status of knowledge generated by teachers.

We confronted the hierarchy of positions in a recent teacher leadership development project as our participants challenged the research design. They were to be interviewed, observed, evaluated, and questioned in order to document the impact of the project that we had been calling a "partnership." The perspective taken by the teacher, in the dialogue above, suggests that a true evaluation of the project would entail positioning everyone as participants and would shatter the false dichotomy between "researchers" and "participants". In so doing, we would acknowledge that all participants would both learn and grow, while simultaneously participating in generating new knowledge about teaching and learning. Destroying the hierarchy and giving teachers agency and power, we began imagining arrangements that would eventually equalize the status of all participants within the project. What had previously been framed around measuring the impact of the project on teachers' teaching practice, content knowledge and pedagogical content knowledge was reconceptualized to describing the impact of the project on all participants, including ourselves (D'AMBROSIO; COX, 2015).

Several methodological contradictions (WHITEHEAD, 1989) emerged as we embraced the egalitarian position of all participants in the project. The first contradiction

we experienced as a funded project, was between our goal of giving teachers agency and equalizing status within the project and our "contract" with the funding agency to produce and deliver findings describing how we were able to improve teachers' content knowledge and teaching practices. The evaluation of teachers no longer fit our design; was it ethical to revise our project, in spite of what we had promised to deliver? On the other hand, was it ethical to evaluate teachers' content knowledge and practices using standards, which they were not involved in creating? We each had a story to tell of our participation in the experiences of the project. Each story would address the impact on our knowledge and understanding of teaching and learning. However, while we believed that this would be the best form of reporting our work, our insecurities towards the funding agency continued to haunt us. In an audacious act, we broke with the contract and conceptualized alternative means of telling the story of our successes and failures.

This break from expectations took three forms. First, we felt the impact of the project could no longer be tied to our actions as all of the decisions and curricular development were initiated by the teachers and established in a collaborative way. Second, there was no longer a prescribed "treatment" to be evaluated as our work emerged in the immediacy of classroom practice. It was as impossible to orchestrate complete convergence in our curriculum, as it would be to expect it across all classrooms at all grade levels. Third, the story we felt able to tell was no longer about changes in teacher participants, but about the process of breaking with norms as a project. We had proposed to develop our participants but found the collective story as well as our personal story far more compelling and legitimate.

By adjusting our project accordingly, the tension between our allegiances to our project participants, versus our allegiance to the funding agency was thus resolved. The consequence of this act was to accept that we would need to look elsewhere to fund future projects, which we readily accepted.

A second contradiction emerged when equalizing the status of researchers and participants, as our original proposal made a clear demarcation and assignment of roles. However, by creating an environment in which all were experts, the onus and responsibility for production of knowledge was shared. This was the impetus to break with the norms typical of this type of project. Which questions were to guide our inquiry? Which dilemmas would we address? Which inquiries would we pursue? What did we

want to challenge and reconstruct in each of our understandings of the teaching and learning of mathematics? We shared this inquiry space with our teachers.

We found ourselves living in a space of inquiry where instead of dwelling on descriptions of what works, we were exploring new possibilities and alternatives of what this work could be. As suggested by Skovsmose (2015), when he challenges the descriptive paradigms of research where "one has to research 'what is the case' and not 'what could be the case'" and calls for *pedagogical imagination* where "one tries to conceptualise alternatives to what is taking place" (p.114). Not only were we conceptualizing alternatives of the position of teachers as experts in teaching, but we were also exploring alternatives of teachers as autonomous agents of learning and inquiry. However, most importantly, we were repositioning ourselves from a place of expertise to a place of learners alongside our partners.

While action research does position teacher as researcher and gives them limited membership within the field of education research, it maintains the position of students as those who are studied. In the context of our project, it was this positioning of teachers as those who are studied that was so problematic and action research methodologies did nothing to resolve that contradiction. We found the practice of egalitarian positioning to be mobilizing Ubiratan D'Ambrosio's (2015 a) call to redefine expertise and challenge the scientific community to "create structure and language capable of allowing other experts and the population in general to achieve and succeed" (p. 50) in the generation of knowledge. D'Ambrosio claims that engaging new members in the production of knowledge will be essential for new possibilities to emerge in the educational process.

According to Ubiratan D'Ambrosio (2015b), embracing others into the generation of knowledge could allow us to break away from the existing "epistemological cages" in which researchers operate.

> For some years, I have been using the concept of "epistemological cage" as a metaphor to describe knowledge systems. Traditional knowledge is like a birdcage. Birds living in the cage are fed by what is in the cage, they fly only in the space of the cage, they see and feel only what the wires of the cage allow. The birds in the cage communicate among themselves in a language proper to those that live in the cage, they breed and procreate, they repeat themselves. They can not see the color the cage is painted outside. A similar situation may happen with specialized scholars. The scholars in the cage develop their own jargon and adhere to rigorous methodological and ontological standards. To overcome academic sameness is a big challenge. It is common to see researchers subordinating their students to themes proposed by the advisors, restricting their space for creativity (p. 23).

In terms of mathematics education, this might have two implications. First, opening our epistemological cages would implicate the perceived expertise of mathematics education researchers and provoke us to think about the structures of power that allow us to perpetuate our status in the field. Second, it would implicate the passivity of teachers and spur them to action. No longer relegated to the passive role of participant, teachers now have the power and responsibility to make sure that they are active storytellers and that their perspectives become heard.

Believing and Doubting: Approaching Data Collection and Analysis

> ***Evaluator:*** *Your pre/post data indicates no gains in pedagogical content knowledge over the course of the project and your student test scores have remained stagnant.*
> ***Teacher:*** *You're telling me that I haven't learned anything?*
> ***Evaluator:*** *You think you did?*
> ***Teacher****: My whole view of teaching has shifted. Mathematically, I've learned so much about why students struggle to conceptualize linear measure and what it means to build a ruler--it's so much more than glue and paper. Furthermore, in my teaching, instead of looking for answers, I'm looking for good questions; those to challenge my students as well as myself. I've even inspired my colleagues to experiment with ideas in their classrooms and to talk about what we try--these conversations inevitably end in another set of questions that we're dying to answer. I didn't have those conversations before because I wasn't aware that I wanted to.*
> ***Evaluator:*** *How can I trust what you tell me as evidence of learning?*
> ***Teacher:*** *How can you NOT?*

The conflict between the evaluator and teacher portrayed above can be distilled to a conflict between doubt and belief, a conflict that we have encountered repeatedly in our developing notion of what it means to do research. What is the role of doubt in scientific inquiry and what does it mean to read research with an eye toward belief? In this section, we'll explore those ideas and question the taken-for-granted relationship between doubt and inquiry, rigor and truth.

Doubt is pervasive in the current climate for scientific inquiry. It is through doubt that we examine the world through a critical eye. Elbow's (2008) description of the doubting game resonates with the traditional stance of mathematics education researchers. He notes:

> The doubting game represents the kind of thinking most widely honored and taught in our culture. It's sometimes called "critical thinking." It's the disciplined practice of trying to be as skeptical and analytic as possible with every idea we encounter. By trying hard to doubt ideas, we can discover hidden contradictions, bad reasoning, or other weaknesses in them, especially in the case of ideas that seem true or attractive. We are using doubting as a tool for scrutinizing and testing ideas (p. 1).

In previous writing (COX et al, 2014), we linked this concept to the idea of listening evaluatively. In our previous studies, we found ourselves listening to teachers with doubt. In doing so, we were denying those teachers agency and voice. Building on the work of Harkness (2009) who introduced the *believing game* to the mathematics education community, we shifted toward listening with belief. Only then were we able to unravel ideas that had been hidden by our doubts and sanctions, and identify those things *we had not thought to wonder about* as opposed to uncovering supporting evidence for all that we already believed to be true. Listening with belief is best described by Elbow (2008) as playing the believing game:

> ...the believing game is the disciplined practice of trying to be as welcoming or accepting as possible to every idea we encounter, not just listening to views different from our own and holding back from arguing with them, not just trying to restate them without bias (as Carl Rogers advocated), but actually trying to believe them. We are using believing as a different tool for scrutinizing and testing ideas. But instead of doubting in order to scrutinize fashionable or widely accepted ideas for hidden flaws, we use belief to scrutinize unfashionable or even repellent ideas for hidden virtues. Often we cannot see what's good in someone else's idea (or in our own!) until we work at believing it. When an idea goes against current assumptions and beliefs–or if it seems alien, dangerous, or poorly formulated–we often cannot see any merit in it (p.2).

In the dialogue above the teacher confronts the evaluator as she challenges the position of doubt from which her learning is being assessed. She is presenting a different representation of her learning using data that had not been collected, i.e. her own perceptions. As is often the case, the evaluator doubts the credibility of this teachers' self-report. Playing the believing game, or practicing *methodological belief*, would mean to step into the perspective of the teacher and away from our own. This, in turn, would lead us to a greater understanding of what the teacher has learned--free from the framing of our own expectations in that regard. In addition to being able to see what we could not possibly have expected or anticipated, we have a greater understanding of what the teacher considers as valuable knowledge, something we could not possibly have learned from anyone other than her. By valorizing her knowledge, we make her visible (JENLINK, 2014).

Acts of evaluation are at the heart of data analysis in any research project. We have experienced the very different results that emerge when we give reason to our participants and valorize teacher's knowledge. In playing the believing game, we have learned to set aside our assumptions and beliefs about what constitutes good teaching, what constitutes leadership development, what constitutes success, and most recently,

what constitutes valuable research and play the believing game with our participants. This game has taught us, as Elbow (2008) predicts, to enter into ideas and to insert ourselves into our teachers' realities. This, in turn, enabled us to see that the type of data that most accurately conveyed that reality was not always quantitative, and not always recognizable as written fact. Instead, we began to trust the poetry of our teachers' words and use more metaphor (D'AMBROSIO; COX, 2015) to unearth our internal truths such as hidden assumptions and prejudices that might cause us to doubt their narratives, and to set these internal truths aside in favor of living the experience alongside our teachers.

In the current climate of policy statements for mathematics education and the call for reform, teachers have become invisible (JENLINK, 2014). Teachers have been essentialized and their knowledge and preparation devalued. The link of student scores on standardized tests to teacher quality have demoralized teachers, as researchers assume a deficit perspective on teachers and the quality of the work they do. Participants in research on teachers and teaching are often viewed through the microscope, scrutinized at a distance and evaluated according to a standard that they did not participate in creating.

We posit that stemming from a place of methodological belief might lead to a new crop of methodologies that are aimed at helping the researcher understand more from the perspective of teachers and to understand themselves in relation. We term these methodologies *empathetic methodologies*. This goes beyond other recommendations that have been made in the field of qualitative research about positioning the researcher and acknowledging the bias and perspective of the researcher as a lens through which to observe and interpret teaching and learning (D'AMBROSIO et al., 2013). We are moving to a place of empathy where the researcher steps through their lens into the world of the participant where it is not our place to find meaning, but to accept the meaning presented to us. Any writing or analysis that we could subsequently do would be to examine the impact of that meaning on our own perceptions of the world.

As a brief example, it is our perception that narrative inquiry is one methodology that occasionally fits, as far as the format of that inquiry is first-person. As soon as we assume the mantle of interpretation, we have moved away from empathy. Elbow (2008) cautions that methodological belief is not equivalent to unconditional acceptance of ideas and we feel that caution applies here. We wish to be careful in defining these methodologies not as a "free for all" run on truth, but rather as our attempt at questioning the very purpose of data collection and analysis. We see data collection and analysis as

transcending the purpose of verification toward a purpose as change agents; for writing a narrative cannot help but change the author (KIM, 2008) and cannot help but change the reader through empathetic listening. In our work with teachers, we became aware in writing our narratives; we became aware in reading the narratives of others.

Why and For Whom: Telling A Story

Why and How Do I Write?

> ***Dana:*** *I am changed.*
> ***Bia:*** *Changed?*
> ***Dana:*** *Since the beginning of the project. I can't even imagine my thinking when we wrote the proposal and here we are at the end and I am changed.*
> ***Bia:*** *We are all changed. That's the point. Any research experience should change all those involved.*
> ***Dana:*** *That was not the intention.*
> ***Bia:*** *What do you mean?*
> ***Dana:*** *I did not intend to be changed. For, if I am changing, how can I have an objective perspective on the impact of the project? How will I tell others what happened?*

In this, the first of two dialogues highlighting the methodological issues with telling a story, we set the stage for narrative inquiry (CLANDININ, 2006). As we wrote up our work, we became more aware of the living contradictions that had previously been implicit in the project. The more we confronted those contradictions, the more inappropriate our chosen qualitative methodologies became. As our thinking shifted, so too did our methodology going through stages of action research (MCNIFF, 2006; MCNIFF; WHITEHEAD, 2009; WHITEHEAD; MCNIFF, 2006), self-study (PINNEGAR; HAMILTON, 2009), and finally emerging as narrative inquiry.

We do not apologize for the fact that we did not set out to do narrative inquiry in our work. We were unaware of the implications of our work at the outset, with respect to the power relationships in which we were entangled. As we wrote elsewhere,

> It was not until we began writing up the results of our work and the story above was shared that our thinking on these matters became concrete and available for application. It was as if the pieces of a jigsaw were flying about in the ether, but had finally begun to arrange themselves in a way to create a picture of our practice. It was very much like the experience shared by Valero (2004), "my postmodern attitude did not result from a conscious paradigm selection; rather, it was constructed as I met school leaders, teachers and students in different schools in the world whose lives shook me in significant ways (p.36)" (apud COX et al, 2014, p. 1004).

Narrative inquiry was a vehicle by which we came to even deeper realizations about additional contradictions between what we believed about good research and good communities and the research we had set out to accomplish.

As we questioned our work and our teachers questioned their role in that work, we encountered multiple stages of methodological breakdown. Do we believe in what we are doing? Is the story that we are telling legitimate or contrived? Is the story ours to tell? It became unethical to continue with the project as planned. The data we had planned to collect objectified teachers. In fact, the teachers had no control over the very questions we had asked, questions that centralized the practice of those same teachers. Furthermore, the framework we used to guide our research decisions was limited to what we understood about teaching and leadership development and did not leave room for all that we had learned as a result of the project. We had become aware of our blind spots (WAGNER, 1993) and the research design was clearly flawed. In acknowledging our role in undermining the work of the teachers we had set out to empower, we underwent personal transformation and became different researchers. We had come to realize what Chronaki (2004) wrote, that "the researcher is not a neutral instrument, but an interactive and historical human being who influences and transforms the development but is also being influenced and transformed by the study (p. 146). Why did we write? To learn more about ourselves.

For Whom Do We Write?

Reviewer 1: *In your manuscript, you are so critical of evaluation in general. This is a problematic stance, given that evaluation is core to research and to doing mathematics. Research processes involve synthesis, evaluation, and generalization. Evaluation is one of the higher -levels of thought, as described in Bloom's revised taxonomy. Evaluation is a necessary and important aspect of research.*

Dana: *We raised the question about evaluation in our work as problematic because it implied that teachers were the half of our partnership that was in need of "fixing" while we were the part that would supply the solution. However, that's not what happened. In the end, the story we wanted to tell was about how we came to reject that positioning. We want others to understand what it felt like for us to experience that shift.*

Reviewer 2: *Your manuscript does raise important questions for others in the math education community to take up and pursue. It identifies a great group of situations in which professional development providers may be confronted with tasks that cause them to question their goals and methods, and ways in which their efficacy can be documented.*

Reviewer 1: *I agree, a major point of the paper is that the research on teachers, "denied teachers agency and identity." While this critique is played out, no resolution is offered in terms of how this might be accomplished within this project or within qualitative research paradigms.*

Bia: *If our work is successful in that it helps readers raise questions or consider their practice, then isn't it worthy of publication? Must published research only focus on answers or can value be found in the provocation of questions?*

This dialogue, supported by quotations from actual reviewers about our work, illustrates the contradiction between the expectation that we publish our work and our personal satisfaction with that work. We struggle with the privilege shared by mathematics educators in our field to determine what counts as valid and publishable research and to set the expectations with regard to the format that work must take. There are expectations amongst reviewers of conference proposals and manuscripts that a manuscript have a clear and concise description of methodology within. We have found that narrative inquiry writing is rarely seen as rigorous without including a formalized way of "doing" narrative inquiry. This is a cycle that pushes new methodologies back into the positivist culture or paradigm. For, if we can't formalize a way of "doing" a methodology, then our study cannot be held up for critique and others will have difficulty judging its worth based on a standard of rigor.

Hendry (2007) tells us to question motives with regard to rigor in storytelling, in particular, to forgo our consternations about what stories are told in order to focus on why particular stories are told at particular times. Rather than focus on "getting the story right", we focus on how we share our narratives and why (p. 490). By shunning the search for truth or understanding of what exists, the purpose of narrative is to provoke conflict, to examine contradiction, or to challenge mainstream thinking (BARONE, 2010). In this revised purpose, we have a new standard of rigor that is more inclusive of the tenets of narrative inquiry. We consider those works to be rigorous that provide an opportunity to encounter a new perspective or to question what we have previously accepted as true.

However, this positions the author and the reader differently than has been traditional in scientific inquiry. This positioning is grounded in methodological belief (ELBOW, 2008) as the reader must assume the truthfulness of the author, but also accept the privileged status of the author as having exclusive access to that truth (CONLE, 2001). There can be no sources of triangulation; there is no pursuit of replication; this is living theory (WHITEHEAD, 2009) and not to be generalized.

If the work cannot be generalized, then we might question the purpose of disseminating our work at all. We answer this personally by stating that we write our work first and foremost for ourselves. Throughout the process of writing our story, we experience the events and emotions inherent in that story from a metacognitive perspective. The story is forever changing even as we tell it because in formalizing our ideas, we come to new insights about those ideas. The writing, rather than a linear process

that easily flows from an outline or bulleted list, is a constant feedback loop. As like a river, we can never tell the same story twice (CRAIG, 2010) and the story is always emerging. Publishing a manuscript is not necessarily a summative event, but rather, an installment because our learning continues as we encounter it afresh through the eyes and words of those who read it and respond.

We have shared above our perspective on what our writing might mean for others. Contrary to the request of the reviewers in the dialogue, we do not feel that the role of our writing is to prescribe, advise, or dictate. Rather, the role of our writing is to provoke a reader to engage in personal and professional reflection alongside and to help us see our experience in new ways. Similarly, our experience might help our readers see their own stories in new ways. This might influence methodological decisions they make in their work, it might help them understand local teachers and students in a new way, and it might inspire them to examine their own personal contradictions and share a unique piece of our living theory (WHITEHEAD, 2009). For whom do we write? We write for ourselves and others.

Moving Forward

***Dana**: Where do we go now?*
***Bia**: How will we get there?*
***Dana**:What should we read?*
***Bia**: What don't we know?*
***Dana**: How can we find out?*
***Together**: We just keep writing. We just keep reading. We just keep questioning.*

It is here that we acknowledge the boundaries of our knowledge and admit all that we don't yet know; all that we have not yet read; all the questions that are emerging like popcorn even as we write. We are in the midst of a search for new methodologies and our main criterias as we search are respect, ethics, and solidarity with teachers. We need methodologies that are more respectful, ethical, sympathetic and useful. This means we get away from the notion of representing teachers in our work and move toward teachers representing themselves. Establishing these types of partnerships is difficult work and fraught with places where status, expertise, and knowledge play out in unpredictable ways. We have learned from our most recent projects to anticipate this emergence and to face whatever contradictions arise (and they will arise!) head-on, work that can sometimes

be emotionally painful or provoke conflict that is uncomfortable for those who participate.

We'd like to end with an invitation to move us forward by exposing us to the methodologies you are using. We are especially eager to read the other articles featured in this special issue. However, we acknowledge the privilege of being included in such an issue and are aware that even here, there is status awarded in the process of generating knowledge. There are other ideas out there that have not yet been given that status and to those of you who have them, we invite you to share them in whatever way you can with the hopes that we can, as a field, begin to acknowledge the work that is out of the mainstream and that exposes our blind spots. We can't move forward until that happens.

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