

Self-Study Through Narrative Inquiry: Fostering Identity in Mathematics Teacher Education

Tracey Smith
Charles Sturt University
tasmith@csu.edu.au

This paper explores an innovative methodology — self-study through narrative inquiry — as a way of critically examining pedagogical practice in mathematics teacher education. A unique feature of this self-study was the simultaneous use of narrative inquiry as a research method and a pedagogical tool used with prospective teachers. By juxtaposing my own learning experiences with prospective teachers' learning into accounts of practice I have reconceptualised my approach to mathematics teacher education in terms of *establishing an inquiry landscape for co-learning*. Three core features of this landscape are outlined to illustrate the potential of self-study to foster critical reflection that impacts on practice. The implications for mathematics teacher educators, and the programs they develop, are threaded throughout the paper.

Teacher educators, by definition, “meddle with” and take charge of learning through the content, structures and processes they establish when designing learning opportunities for their students (Wenger, 1998 p. 15). As such, our practices as teacher educators warrant careful and critical deliberation. The process of engaging in a self-study through narrative inquiry provided a methodological structure for me to examine my practice as a teacher educator as it was intended, enacted and then reconceptualised. The goals of the self-study were to systematically examine and improve my practice and to explore, from multiple perspectives, the nature of learning that occurred through participation in narrative practices. Undertaking a self-study meant that I became a co-learner alongside the prospective teachers I worked with. My aim in this paper is to describe self-study as a methodology and outline three markers of practice that influenced co-learning. By doing this it is hoped that other mathematics teacher educators might implement and systematically examine similar narrative practices to determine their effectiveness in other contexts.

Setting the scene

While the research referred to in this paper extended over five years, the context for gathering data was a year-long mathematics curriculum subject (EMC 403) in which I was the sole teacher during 2001. There were fifty-six prospective teachers enrolled in the subject who were in their fourth, and final, year of a BEd (Primary) teacher education program. The fifteen years I spent teaching in primary classrooms before becoming a teacher educator significantly shaped my identity and influenced my orientations towards researching and working with prospective teachers. In addition, my prior experiences as a teacher researcher led to an underlying belief that participation in practical inquiry can be an empowering learning process that connects theory and practice in purposeful and productive ways. Thus, the learning experiences and assessment strategies designed for EMC403 required prospective teachers to become researchers of their own practice and authors of their own narratives of learning. The three narrative practices I implemented in this self-study constituted “the interventions” in my research design (LaBoskey, 2004, p. 834). Detailed findings that focused on different aspects of these narrative practices, and

the nature of prospective teachers' learning, have been documented in previous papers (Smith, 2002, 2003, 2004). This paper focuses more specifically on the methodology of self-study through narrative inquiry and three of the markers of influence that emerged from the study and contributed to the production of generative learning for all the participants in the study. Eisner (2002) suggested that "ultimately, the growth of students will go no farther than the growth of those who teach them" (p. 384). Similarly, Mason (1998) has noted that participation in inquiry-based learning provides opportunities for developing sensitivities, restructuring perspectives, and generating a greater awareness of our identities as teachers and researchers. Self-study provided a process for "growth" and for the transformation of my identity as a mathematics educator.

Self-study through narrative inquiry

Self-study

The term self-study is employed when the explicit focus of the research being undertaken is related to teaching and teacher education practices (Loughran, Hamilton, LaBoskey & Russell, 2004). The nature of self-study has been summarised by LaBoskey (2004, pp. 859-860) as: improvement-aimed; interactive; employing multiple, primarily qualitative methods; and a formalisation of our work as teacher educators that makes it available to our professional community for deliberation, further testing and judgement. Self-study describes the focus of a study not a specific method for carrying it out (Loughran, et al. 2004). Methods such as action research or teacher research, ethnography and narrative inquiry are typically used in self-studies. Thus, undertaking a self-study *through* narrative inquiry provided a focus for this inquiry and a methodology to carry it out. This methodology is a relatively unexplored phenomenon in mathematics teacher education.

While the self-study component of this inquiry implies a personal sense-making quest, undertaking a narrative inquiry allowed me to broaden and strengthen that quest by involving prospective teachers in the same inquiry process. The movement away from the self is a paradox of *self*-study because one of its most vital components is to pursue alternative perspectives on experience (Loughran, et al. 2004). As well as documenting my own research experiences through the use of a reflective journal, I also collected prospective teachers' stories that described their sense-making journeys learning to teach mathematics. Because narrative inquiry was used as both a research method and a pedagogical tool, prospective teachers' insights as inquirers and learners provided alternate perspectives and layers of learning that were able to be examined and integrated.

Narrative inquiry

Narrative inquiry is a particular narrative practice constituted by "intentional, reflective activity" that is "socially and contextually situated", but perhaps most importantly, the nature of narrative inquiry is embedded in "interrogating aspects of teaching and learning by *storying experience*" (Lyons & LaBoskey, 2002, p. 21, emphasis added). Narrative inquiry allows for the structured quality of experience to be studied and it also describes the nature of the research material that is generated during an inquiry (Clandinin & Connelly, 2000). In recent years, narrative has become a valuable method for making sense of mathematics

teaching (see, for example, Barnett, 1998; Schifter, 1996). However, it is interesting to note that the possible use of narratives as a pedagogical tool for enhancing *prospective* teacher learning has rarely been explored. Recently, Cooney (1999) called for the development of a framework for conceptualising teachers' "ways of knowing" that would "contribute to our insight and wisdom" (p. 184) in mathematics teacher education. The findings in my self-study suggest that establishing narrative practices as a pedagogical tool has the potential for developing a narrative way of knowing that goes some way to meeting the call made by Cooney.

In this paper I refer to three accounts of practice (Simon & Tzur, 1999) taken from the larger self-study to illustrate the nature of what I have termed *an inquiry landscape for co-learning*. Accounts of practice were developed as a result of coding field texts (such as my journal entries and narratives constructed by prospective teachers) to highlight patterns, narrative threads, tensions and themes (Clandinin and Connelly, 2000). These accounts document three key aspects that only became apparent from the iterative analysis of prospective teachers' narratives that have been reframed from my perspective as a self-study researcher.

Establishing an inquiry landscape for co-learning

The term *inquiry landscape for co-learning* is an attempt to capture the living, dynamic, and open space for learning to teach that narrative practices created in this study. Three markers nested within this landscape that appeared to influence learning were the connective process of *noticing, naming and reframing learning, creating a pedagogical middle ground for co-learning, and the emergence of an authentic community of inquirers*. Co-participation in inquiry helped me to monitor, become more critically aware of, and document markers of practice that influenced learning from multiple perspectives. As such, these three markers of influence are framed from the position of co-learner and co-inquirer in the sense that each marker provided learning opportunities for me as a teacher educator and for the prospective teachers I worked with. *Noticing, naming and reframing learning* emerged as an important connective process that allowed for timely and productive connections between theory and practice that have often been missing in teacher education programs (Feiman-Nemser, 2001).

Noticing, naming and reframing learning

Narrative practices provided a way of bridging different worlds and connecting learning experiences. These connections were often mediated through reflection during the writing process itself. In this study, participation in the framing and reframing of personal theories, the writing of two case stories, and the co-construction of a poster presentation constituted the narrative practices undertaken by prospective teachers during their involvement in EMC403. Similarly, my account of those collective practices, framed into one coherent form is what constitutes this paper. The construction of narrative texts provided a way for all the co-inquirers in this study to end up thinking something they were not able to start out thinking. For example, the critical examination of my own practice, through the writing of accounts of practice, helped me to find relationships and conclusions that were not there when the self-study began. An explanation of how I came to identify the process of *noticing, naming and reframing* illustrates this point more fully.

The idea of *noticing and naming* first emerged from a learning journal entry written

after I had graded prospective teachers' first case stories (August 4, 2001). It was noted in the entry that "the idea of 'naming' needs to be explored — by naming a concern, practice or personal theory we are taking ownership for it...that is we have made sense of the idea through the naming process by bringing it into words". I went on to note that for the second case story, prospective teachers should be reminded to "listen to their inner voice and to other people's conversations (public theories) and *notice* what resonates with them as a learner and prospective teacher, then *name* that resonating moment so it becomes a part of their personal theories for the future". Choosing to describe this process as *noticing, naming and reframing* was influenced by the notion of "noticing and marking" outlined by Mason (1998) and first identified in Smith (2003).

Within an inquiry landscape there needs to be an emphasis on being attentive and *noticing* aspects of practice and learning. Essentially, the writing process is a *naming* process that required prospective teachers to frame what they noticed into language. Thus, naming implies a type of initial framing. An ironic twist to this self-study is that as I was constructing accounts of practice to describe aspects of prospective teachers' writing, I came to the realisation that I was also *noticing and naming* my own practice. However, after many analytical iterations, I realised what was also occurring was a type of *reframing*, a messy type of back and forth that led to the restructuring and reinvention of my teaching identity. The sustained and iterative examination of prospective teachers' narrative texts gave me further insights into the importance of *reframing* what has been named.

Put another way, the *noticing and naming* of a life experience brings it forth and frames it for closer examination, but what has been noticed and named needs to undergo a process of *reframing* in order to learn from it and become personally committed to it. From this perspective, *reframing* what one knows is a process of contextualising one's understanding, making conceptual connections so that practice can be understood theoretically, and representing such understanding in a public form so that it can be shared and critiqued. A second marker of influence that enhanced learning in an inquiry landscape was the way in which it created *a middle ground for co-learning*.

Creating a pedagogical middle ground for co-learning

A balance between support and challenge has been identified as a crucial aspect of learning to teach, but the implementation of such a balance in teacher education programs has rarely been documented (Feiman-Nemser, 2001). The narrative practices used in this study produced *a pedagogical middle ground for co-learning* that created a balance of private and public spaces for learning to learn from experience. Based on an analysis of the narratives produced by prospective teachers, a crucial aspect of this middle ground was that prospective teachers valued the opportunity for "slowing teaching down" (excerpt from Ronnie's second case story, October, 2001) so that it could be examined and re-examined more intentionally.

Through the use of narrative practices, prospective teachers had the opportunity to revisit and reframe their experiences as teachers and learners and address issues that emerged as they attempted to put theory into practice in school settings. For example, prospective teachers indicated that during their micro-teaching experience they valued the opportunity to step back from being responsible for a whole class situation and then being able to refine their assessment skills in a one-on-one situation. During the micro-teaching sessions, where they worked with one primary student from a cooperating school during

five one-hour visits, prospective teachers had total authority for determining the nature and focus of their visits. The following reflections, taken directly from the second case stories submitted in early October, 2001, typify prospective teachers' responses and highlight the learning events that were most valued during the second case story experience. These events included opportunities to: "go right back to the basics and reshape thinking" (Sheena); "collect work samples as concrete evidence to support judgements about a child's learning" (Alison); and "to make judgements about learning and to act upon these — learning to go with the flow and follow the learning instead of always trying to control it" (Karen). In effect, this setting created a natural middle ground that provided a more supportive and less demanding environment for learning that provided "the time to look at learning" (Ronnie) and was "one-to-one instead of thirty-to-one" (Doug).

In contrast, many contradictions and misalignments between university learning and school-based practicum learning were revealed in prospective teachers' first case stories. Such dissonant experiences, that often accompany practicum placements, have been well-documented by other scholars in teacher education (see, for example, Feiman-Nemser, 2001). Perhaps the most compelling realisation for me as a teacher educator was that the structured opportunities for interacting with students one-to-one, as described in the second case story, reinforced the powerful nature of teacher learning that comes from listening attentively to students' thinking in small group situations. The series of micro-teaching lessons that occurred over an extended period of time gave prospective teachers the opportunity to shape their mathematical teaching identity without interference from other outside influences. I argue that these findings challenge the privileging of a formal practicum as the most powerful and effective site for learning to teach mathematics. Another learning space within a pedagogical middle ground, where a balance of support and challenge was provided, occurred during the poster experience.

An authentic community of learners

While this self-study did not set out to explore and describe learning within a community, markers of a community of inquirers were retrospectively identified as a result of my narrative analysis. My attempt to capture in words the markers within prospective teachers' narratives that influenced learning potential and identity transformation was significantly supported by Wenger's (1998) social theory of learning. Paradoxically, using Wenger's theory as a frame of reference also helped me identify the silences in my previous practice as I began to compare them to aspects of practice in the poster experience. While the notion of learning within a "community" had a compelling appeal, a critical examination of my use of personal theories and case stories as narrative ways of learning and knowing led me to the realisation that they had not fostered the establishment of an authentic community of practice. Initially, such a realisation came as a shock to me. I was dangerously close to being one of those researchers described by Grossman, Wineburg and Woolworth (2001) who stated that "groups of people become communities, or so it would seem, by the flourish of a researcher's pen" (p. 943). In this inquiry, the absence of a shared goal (as opposed to having a goal that is the same) and the lack of allocated time for collaborative engagement during the construction of personal theories and case stories meant that a sense of community existed by declaration rather than by design or emergence (Grossman et al., 2001).

As I proceeded to analyse the poster experience, a heightened awareness of what

constituted a community began to emerge. In November 2001, after one of the poster presentation workshops, I wrote in my journal that “as a teacher, I have just witnessed an energy I have rarely seen”. While I could not fully explain such energy at the time, a subsequent examination of the multiple field texts gathered during the four weeks of the poster experience shed some light on this phenomenon. I was able to notice and name specific interactions and dynamics that I now believe constitute some of the markers that shaped a more authentic sense of learning within a community.

My analysis suggests that the designing of poster presentations in late October, 2001 created an opportunity for prospective teachers to establish a mutual partnership where their goal was to share and collectively critique the findings of their individual case stories, written earlier in the year. For the first time in our year-long subject, prospective teachers were deliberately placed in groups to strategically work together towards a shared goal. Personal theories and case stories were tasks that prospective teachers had in “common”, but this did not imply or necessitate collaboration, interdependence or collective engagement towards a shared goal. On the other hand, the poster experience represented the *reification* of understanding that emerged through the *negotiation of meaning* and the existence of a *joint enterprise* (Wenger, 1998).

I identified that the poster experience led to *a shift from individual to social participation* which also led to *collegial conversations* that were more interactive and collaborative. In this way, a more dialogic and negotiated pathway for seeing and hearing multiple stories of experience extended learning opportunities because prospective teachers could also learn from the experiences of others. The nature of these collegial conversations provided a forum or middle ground for telling and exchanging stories of experience. Such a safe haven for learning created the intellectual and social space for airing, acknowledging and affirming the struggles, the dissonances between images and realities and the resonating moments prospective teachers’ had experienced in school settings.

The opportunity for strategically sharing stories of success and challenge seemed to nurture a sense of hope and confidence to continue pursuing innovative practices because prospective teachers could hear for themselves that they were not alone with their stories of discord and their quest for making a difference in how mathematics was taught and assessed. Creating the time and opportunity for collective reflection, for being seen and heard as teachers, evoked strong emotions in prospective teachers and became a vital marker of influence in terms of fostering learning and developing a teaching identity. Prospective teachers were able to generate resonance by aligning the “theory” they had learnt at university, and their “practice” within the classroom. They were given permission to be something other than experts who have all the answers. In this way, collective feelings of dissonance were addressed explicitly and reconciled into a more resonant form of understanding and learning about practice that was generative in nature.

Fostering generative learning

An inquiry landscape for co-learning characterises a site for generative learning because it emphasises the *bringing forth* of actions for inspection and the *co-production* of new understandings and identities. The nature of teacher learning that was evident in this self-study can be described as generative because it was ongoing, situated, sustainable, and connected (Franke, Carpenter, Levi, Jacobs & Empson, 2000; Hiebert, 1998). As the year-long study progressed, prospective teachers’ developing ability to enact the practice of

noticing, naming and reframing their understandings, particularly when this occurred in collegial ways, meant that most of their texts became increasingly rich in structure and connectedness. In addition, a sense of ownership and authority of their learning became progressively more evident.

The underlying goal of establishing an inquiry landscape is to bring forth beliefs and images into a more public space, show that they are valued, and then provide authentic opportunities for those beliefs and images to be enacted in practice and then critically examined in supportive ways. Instead of changing prospective teachers' beliefs and images of teaching, or compelling them to substitute their own ideas for those of others, it is argued that an inquiry landscape provides a more natural and developmental learning space for reconstructing and representing understanding. An implication for teacher educators is that the process of *noticing, naming and reframing*, when identified and made explicit in a community of learners, can become a pedagogical strategy that creates a middle ground for learning and enhances the reflexive and critical nature of written and oral reflections.

The writing of narratives led to a developed sense of ownership and authority of ideas that grew from prospective teachers' professional decision-making processes as they represented, and in some instances reinvented, their actions as teachers. Narrative practices for learning afford a more practice-oriented, experiential conception of the way teachers know and come to know teaching. In mathematics teacher education in particular, this is an important outcome for any program if a mathematical identity and a sense of pedagogical power are to be nurtured (Cooney, 1999).

Conclusions and cautions

This self-study has contributed to new insights about how methods such as narrative inquiry can simultaneously nurture a way of knowing and a way of framing and reframing what is known to maximise generative learning in mathematics teacher education for all stakeholders. Getting inside narrative inquiry allowed my identities as classroom teacher, teacher educator, learner, and researcher to come together. It enabled me to monitor my own learning journey so that I could become more attuned to where the highs and lows of learning to teach are, and where prospective teachers need the most support in their quest to become effective teachers of mathematics.

However, the collective accounts of learning in this self-study also drew attention to a pedagogical imperative. The moral considerations that accompany narrative practices need to be considered carefully. My use of these practices brought with it an assumption that interrogating practice and revealing personal thoughts was an essentially "good" and "effective" practice that would be enabling and empowering. However, the unique and revealing portrayals of learning gathered in this self-study provided a vivid reminder that I need to constantly question, and monitor, the suitability of such practices and the ethical limits for asking prospective teachers to publicly share their inner thoughts when they inevitably reveal vulnerabilities and uncertainties. What this study has revealed most cogently is that teacher educators who choose narrative practices as a tool for learning must ensure that a timely balance of support accompanies the challenges inherent in interrogating and theorising one's own practice. Collectively, the findings reported in this paper challenge and extend conversations about how meaning is made, how it is represented, and what counts as knowledge in mathematics teacher education.

References

- Barnett, C. S. (1998). Mathematics teaching cases as a catalyst for informed strategic inquiry. *Teaching and Teacher Education*, 14(1), 81-93.
- Clandinin, D. J., & Connelly, F. M. (2000). *Narrative inquiry: Experience and story in qualitative research*. San Francisco, CA: Jossey-Bass.
- Cooney, T. J. (1999). Conceptualizing teachers' ways of knowing. *Educational Studies in Mathematics*, 38, 163-187.
- Feiman-Nemser, S. (2001). From preparation to practice: Designing a continuum to strengthen and sustain teaching. *Teachers College Record*, 103(6), 1013-1055.
- Franke, M. L., Carpenter, T. P., Levi, L., & Fennema, E. (2001). Capturing teachers' generative change: A follow-up study of professional development in mathematics. *American Educational Research Journal*, 38(3), 653-689.
- Grossman, P., Wineburg, S., & Woolworth, S. (2001). Toward a theory of teacher community. *Teachers College Record*, 103(6), 942-1012.
- Hiebert, J. (1998). Aiming research toward understanding: Lessons we can learn from children. In A. Sierpiska, & J. Kilpatrick (Eds.), *Mathematics education as a research domain: A search for identity* (Book 1, pp. 141-152). Dordrecht, The Netherlands: Kluwer Publications.
- LaBoskey, V. L. (2004). The methodology of self-study and its theoretical underpinnings. In J. J. Loughran, M. L. Hamilton, V. K. LaBoskey, & T. Russell (Eds.), *International handbook of self-study of teaching and teacher education practices* (pp. 817 – 869). Dordrecht, The Netherlands: Kluwer.
- Loughran, J. J., Hamilton, M. L., LaBoskey, V. K., & Russell, T. (Eds.) (2004). *International handbook of self-study of teaching and teacher education practices*. Dordrecht, The Netherlands: Kluwer.
- Lyons, N., & LaBoskey, V. K. (Eds.) (2002). Why narrative inquiry or exemplars for a scholarship of teaching? In N. Lyons & V. K. LaBoskey (Eds.), *Narrative inquiry in practice: Advancing the knowledge of teaching* (pp. 11-27). New York: Teachers College Press.
- Mason, J. (1998). Researching from the inside in mathematics education. In A. Sierpiska & J. Kilpatrick (Eds.), *Mathematics education as a research domain: A search for identity* (pp. 357-377). Dordrecht, Netherlands: Kluwer Publications.
- Schifter, D. (Ed.) (1996). *What's happening in math class? Envisioning new practices through teacher narratives, Volume 1*. New York: Teachers College Press.
- Simon, M. A., & Tzur, R. (1999). Explicating the teachers' perspective from the researcher's perspectives: Generating accounts of mathematics teachers' practice. *Journal for Research in Mathematics Education*, 30(3), 252-264.
- Smith, T. J. (2002). Positioning the personal in mathematics teacher education through pedagogical conversations. In B. Barton, K. Irwin, M. Pfannkuch, & M. Thomas (Eds.), *Mathematics Education in the South Pacific*, (Proceedings of the 25th annual conference of the Mathematics Education Research Group of Australasia, pp. 625-632). Auckland, NZ: MERGA
- Smith, T. J. (2003). Using case stories as a tool for listening more and telling less in mathematics teacher education. In L. Bragg, C. Campbell, G. Herbert & J. Mousley (Eds.), *Mathematics Education Research: Innovation, Networking, Opportunity*, (Proceedings of the 26th annual conference of the Mathematics Education Research Group of Australasia, pp. 841-850). Geelong, VIC: MERGA.
- Smith, T. J. (2004). Learning in a community of inquirers: Developing an inquiry stance. In I. Putt, R. Faragher & M. McLean (Eds.), *Mathematics Education for the Third Millennium: Towards 2010*, (Proceedings of the twenty-seventh annual conference of the mathematics Education Research Group of Australasia, pp. 525-532). Townsville, QLD: MERGA.
- Wenger, E. (1998). *Communities of practice: Learning, meaning and identity*. Cambridge: Cambridge University Press.