TEACHER TENSION: IMPORTANT CONSIDERATIONS FOR UNDERSTANDING TEACHERS' ACTIONS, INTENTIONS, AND PROFESSIONAL GROWTH NEEDS

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Mathematics teachers do not come to their professional growth opportunities as blank slates. They come to them carrying a complex array of tensions that affect their intentions and actions as a teacher, and are often the very reason that they are seeking out professional growth opportunities. In this article we explore some of these tensions in the form of dichotomous pairs of forces that emerge out of, and act on, mathematics teachers' experiences. Results indicate that, unlike prior research on tensions, teachers do not simply manage these opposing forces, but also work at, and seek help in, resolving them. This extension has important implications for our work, as a research field, in the crafting and delivery of professional development opportunities for mathematics teachers.

INTRODUCTION AND THEORETICAL BACKGROUND

Teachers do not approach their professional learning as blank slates. They come to it with a complex collection of experiences (as students, future teachers and teachers) and of wants and needs and use professional development opportunities as resources to satisfy those wants and needs (Liljedahl, 2014) in the light of their previous experiences. Often, what teachers want are answers to the tensions that they are experiencing in their daily practice – tensions between what they want to do and what they have time to do, tensions between what they believe to be important and what they are being pushed to do. These tensions are, themselves, complex collections of opposing forces of wants and needs that complicate the decision making processes of teachers. For a field that places at its core the mathematics education of students, it is important to better understand these tensions and the role they play in the decisions that teachers make, the lessons they deliver, and the answers they seek through their professional growth. In this article we explore a framework for looking closer at these tensions and offer an extension of this framework that will allow us to better understand the wants and needs of mathematics teachers.

Tensions, often expressed as "dilemmas", have been recognised as an integral part of teaching practice dating since the early 1980's. Berlak and Berlak (1981) examined the complex and sometimes contradictory behaviours of teachers in responding to the curriculum within socio-cultural contexts. Building on this work, Lampert (1985) emphasised the personal and practical aspects of dilemmas. For her, tensions can be

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understood as problems to be managed, rather than solved. As such, Lampert (1985) characterises teachers as "dilemma managers", who find ways to cope with conflict between equally undesirable (or desirable but incompatible) options without necessarily coming to a resolution. For Lampert (1985), the ongoing internal struggles presented by the tensions arise from, and contribute to, the developing identity of the teacher, and as such have value in themselves. In contrast to other approaches to understanding the practice of teaching, from Lampert's (1985) perspective the admission that some of the conflicts encountered in teaching are not resolvable is not a weakness.

Adler (2001) also takes the view that dilemmas in teaching are often managed rather than solved. As well, she agrees with Lampert (1985) that their instances arise in the context of teaching, and that the recognition and management of the dilemmas is tied to personal biography. However, along with these considerations, she integrates the Berlaks' (1981) socio-cultural perspective, which emphasises the importance of the wider context, beyond the classroom situation.

Building upon the work of Adler (2001) and Lampert (1985), Berry (2007a, 2007b) utilized the notion of tension as a framework for both doing and understanding her research. By looking at tensions as dichotomous forces acting on a teacher, Berry (2007a) conducted a self-study of her efforts to improve her practice in her new role as a teacher educator. She found that the notion of tensions captured well the feelings of internal turmoil experienced by teacher educators as they found themselves pulled in different directions by competing pedagogical demands in their work and the difficulties they experienced as they learned to recognize and manage these demands (Berry, 2007b). The result was twelve tensions, expressed as dichotomous forces, that "capture the sense of conflicting purpose and ambiguity held within each" (Berry, 2007b, p. 120):

1. *Telling and growth*: between informing and creating opportunities to reflect and self-direct or between acknowledging prospective teachers' needs and concerns and challenging them to grow.

2. *Confidence and uncertainty*: between making explicit the complexities and messiness of teaching and helping prospective teachers feel confident to progress or between exposing vulnerability as a teacher educator and maintaining prospective teachers' confidence in the teacher educator as a leader.

3. *Action and intent*: between working towards a particular ideal and jeopardising that ideal by the approach chosen to attain it.

4. *Safety and challenge*: between a constructive learning experience and an uncomfortable learning experience.

5. *Valuing and reconstructing experience*: between helping students recognise the 'authority of their experience' and helping them to see that there is more to teaching than simply acquiring experience.

6. *Planning and being responsive*: between planning for learning and responding to learning opportunities as they arise in practice (Berry, 2007b, p. 32-33).

Although developed within the context of teacher education, Berry's (2007a, 2007b) structuring of tensions as dichotomous forces appeals to us in our consideration of teacher tensions. As such, our research question is aimed at identifying comparable pairs of forces within the lived experiences of mathematics teachers. Although we are ultimately interested in developing a more detailed understanding of how these tensions are born within teachers and teacher practice, as well as how they affect their decision making and teaching actions, for the purposes of this study we are focusing only on emerging a set of tensions, expressed as dichotomous forces.

METHODOLOGY

The data from this study comes from our collective experiences as teachers, teacher educators, professional development facilitators, and researchers. Through each of these roles we have encountered thousands of teachers and collected endless data. Because of space considerations it is not possible to describe the varied and various contexts and methodologies from which our data is drawn. As such, we have chosen, instead, to present our data in the form of an amalgam – a fictionalized aggregate of four different cases drawn from our collective data sets.

This amalgamation of cases into one single case is not new. For example, Piaget (1923/2001) built his developmental stages of a single, fictional child, from the disparate observations of his own children, each at different stages of development. In the context of mathematics education, Lerron and Hazzan (1997), and more recently Zazkis and Koichu (2014), have used the methods of virtual or fictional inner monologues as a way to tell a more complete and aggregated story than any one set of data could.

The cases from which this amalgam was constructed were each, in themselves, carefully developed through methods of narrative inquiry (Di Martino & Sabena, 2010), ethnographic study (Liljedahl, 2014), mathematical biographies (Andrá et al, 2010), or case based research (Pezzia & Di Martino, 2011). Because our various research programs were focused on different aspects of teaching and teachers, from teacher beliefs to teacher professional development, each case tells a portion of a story with the amalgam telling the whole story – the story of Janet.

THE STORY OF JANET

As an elementary school student, Janet was good at mathematics. When she moved onto lower secondary school, however, her marks began to slide and by the time she was in upper secondary school she was barely passing her mathematics classes. The rest of her marks, however, were good enough to give her entry to university. Janet had known all her life that she wanted to be an elementary school teacher. Knowing that this would require her to take more mathematics courses, coupled with her recently emerged low self-efficacy around mathematics, almost dissuaded her from

following this dream. But she endured and finished her undergraduate degree and gained entry into the teacher education program.

During teacher education Janet learned philosophies and methods of teaching mathematics that allowed her to see that mathematics doesn't have to be the way she had experienced it as a student. It could be taught through activity, with a focus on building understanding through collaborative problem solving. This gave her hope that she could become the type of teacher that did not drive students to fear mathematics.

During her practicum Janet was paired with a teacher that was more traditional in her views and practices. Although willing to let Janet build the types of classroom that she wanted, the practicum teacher was also quick to criticize Janet's teaching for its non-conformity to the traditional values that she held. Janet understood the importance of pleasing her sponsor and so she shifted to a teaching model based on transmission of information and practice of rudimentary skills.

Janet knew that this was not the kind of teacher she would be once she had her own classroom. She was playing a part – a part that would get her through the program and into a job. She played this part very well and was one of the few student teachers who were immediately given her own classroom after graduation.

Janet was now a grade 7 teacher. The school where she worked had a strong sense of teamwork among the staff. In mathematics, each grade had a team leader who picked the textbook, identified and created resources and tests, and who sequenced and paced out the curriculum. The particular teacher in charge of the grade 7 mathematics curriculum was unhappy with the new textbooks that were being written and had, instead, opted to use a series of workbooks to guide the students through the curriculum. These workbooks were very traditional in nature, requiring Janet to give brief lectures on how to do a skill and then the students would practice this skill in the workbook. These were then to be checked for completeness every day. Janet did not like these workbooks, but as a beginning teacher, felt that she was too novice to complain. So, she followed along with the system set out for her.

Janet's first two years of teaching were unbelievably busy. She was quickly named as the curriculum coordinator for grade 7 language arts and this took a lot of her time. Although still not happy about the mathematics program, she did appreciate the little effort and time it took her to deliver the mathematics lessons.

In her 3rd year of teaching Janet began to take stock of her mathematics teaching. She had two students who were really struggling and she could see their frustration and anxiety building. She began to make small changes in the way she taught. She would let students work in pairs on their exercises and would occasionally have little warm-up puzzles at the beginning of mathematics class. Janet also decided to have the students do a project on a famous mathematician. Other than this, however, her teaching remained much the same. She still relied heavily on the transmission model and the students worked out of the workbooks for the majority of class.

Janet knew that the changes she had made were not enough. The light in the two girls' eyes, although briefly illuminated during the project, were continuing to dim. She needed to do more to change her teaching. So, over the next two years she sought out some of the professional development opportunities offered within her school district. She attended workshops on teaching mathematics through literature, formative assessment, and technology. With each of these she made small changes in her teaching. Her students were not much impressed with her new use of literature and hated the journaling she was trying to get them to use. She endured for three months, but in the end abandoned these efforts. Her principal was really keen on her interest in technology and supported her efforts to bring this into her classroom. The student liked this too, but in the end it had little to no impact on her mathematics teaching.

Janet then attended the first of a number of sessions on teaching mathematics through problem solving. During the first session, in which the facilitator immersed the teachers in a number of problem solving activities, Janet immediately felt at home. This was the same experience she had had during her teacher education program – the experience that had given her so much hope for the type of teacher she could become.

The next day she implemented one of these problem solving activities. The students did not put up any resistance. They were working with their friends and they were used to this. However, they were not as effective in working on their own as Janet had hoped. But she persisted and, with the help of the ongoing professional development sessions, became more skilled at facilitating such an environment. Over the course of the next month she began to teach with and through collaborative problem solving more and more. At first, everything was fine, but after about two weeks she began to get questions from some of students' parents about when she would be going back to teaching mathematics the "normal way" and one of her students was suddenly transferred out of her class. At about the same time she also began to see resistance from some of her students. But Janet believed in what she was doing and was seeing some positive effects in some of her students. So she persisted.

ANALYSIS AND DISCUSSION

In what follows we present an analysis of the case of Janet in the form of dichotomous forces present in the Janet's lived experience as a mathematics teacher. In so doing, we begin with some of Berry's tensions (2007a, 2007b), but then extend this framework to include other pairs of dichotomous forces present, not only present in the case of Janet, but also recurrent in our experiences with teachers.

Confidence – Uncertainty

Before entering a teacher education program, Janet was confident that she would like to become a teacher. Her recent performance in mathematics, however, made her uncertain to the point that her bad marks "almost dissuaded her from following this dream". But Janet's desire to become an elementary school teacher and her confidence that she would be a good teacher, were stronger than her uncertainty, and

she persisted. We see here an emergence of the dichotomy confidence-uncertainty, and a way that Janet coped with this tension through persistence.

Intent – Action

During her teacher education program Janet learned new ways of teaching that she liked, and in the practicum she took action – enacting with her students teaching methods she had recently learned. But, a conflict emerged between her practicum teacher's traditional ways of teaching and Janet's more progressive and innovative efforts. Janet deals with this tension in a very pragmatic way. Since her intent is to become a teacher, rather than challenging the practicum teacher, she plays along with her practicum teacher's wishes. Not taking action is not a resolution of this conflict, but a way to cope with it. This tension between intent and action is something that emerges over and over in the next few years of Janet's experiences as a mathematics teacher.

Tradition – Innovation

The aforementioned tension between intent and action, resolved (or postponed) through inaction is centred around another tension – a tension between the traditional wishes of Janet's practicum teacher and Janet's desire to be more innovative. This tension comes up again when she is a grade 7 teacher and she is stuck between wanting to enact her own teaching program and following along with the school adopted workbooks. Again, Janet does not resolve this tension, but takes the safe position in consideration of the social and collegial environment of her new school.

Safety – Challenge

Her preference for safety also characterizes her early time as the language arts coordinator when she "appreciates the little effort" required to teach mathematics. In order to change this situation, something needs to happen – and it does.

Janet noticed two students whose frustration and anxiety towards mathematics were beginning to build. Janet recognized these feelings from when she was a secondary school student. She recalled how her negative relationship towards mathematics was attributed to her teachers and their ways of teaching. So, Janet decided that she had to do something. So, she made little changes. In the dichotomy of safety-challenge, Janet is still on the "safety" side because the little changes she made do not challenge her way of teaching and she can still largely rely "heavily on the transmission model".

Valuing – Reconstructing Experience

Then Janet makes some major changes by, once again, valuing her experience from her teacher education program. The dichotomy valuing-reconstructing experience emerges as the tension between Janet's recollections of the, *then*, impact of her experience as a student teacher is pitted against the reality that there is more to teaching than simply acquiring experience – and that Janet, *now*, needs to reconstruct

this experience for her students. This stress on "valuing" leads her to give up, and not to pursue her effort to change her practice, even if her principal was supportive.

Telling – Growth

Janet entered the teaching profession aware that the transmission model of teaching was not in the best interests of the majority of her students. Her desire was to provide mathematical experiences for her students that were unlike her own. She felt her role should be to create opportunities for students to construct their own knowledge rather than lecturing and explaining. Yet, a tension surfaces during her practicum when she finds herself succumbing to traditional teaching methods. Her later attempts to incorporate aspects of collaborative learning heightened the tension as she saw how positively her students responded.

Conforming – Personal Convictions

Teachers often feel a great deal of pressure to conform to the norms and standards of their school, their mentors, and their grade partners. This is especially true for beginning teachers. Tension can emerge when abiding by the norms conflicts with personal pedagogical beliefs. Janet experienced this tension twice. The first was when her practicum teacher criticizes her non-traditional approach. She then experienced it again when she discovered she was required to follow her team leader's mathematics workbook policy. In both of these instances Janet felt the tension between the need to conform and personal convictions. Initially compliant, the resulting tension, in the end, becomes the impetus for her to seek out professional development opportunities.

Time – Results

Eventually Janet began to teach with and through collaborative problem solving. She had ambitious teaching goal and she encountered her first significant teaching failure when one of her students was suddenly transferred to another class. This failure could have persuaded Janet to backtrack on her educational choices and develop a didactical approach where the results were less significant but more immediate. But Janet persisted with her didactical choice and decided to give more time to herself and to her students.

DISCUSSION AND CONCLUSION

These are but a few of the tensions experienced by Janet. Many of these, like time-results and safety-challenge, are connected and interrelated. Some of these tensions can be recast as other pairings. For example, in the case of Janet, conforming-personal conviction can also be seen as a tension between her as a novice, and her mentor teacher and colleagues as being experienced.

Janet is a fictional person, but the tensions she experienced are those experienced by the four real teachers that the case of Janet is built upon, as well as the countless teachers that have experienced, or are currently experiencing, similar dichotomous forces pulling on their intentions and their actions.

Lampert (1985) and Adler (2001) would characterize Janet as managing these tensions. And they would be correct – for a time. As much as Janet does initially manage her tensions by choosing safe and conforming paths, our results show that eventually these managed tensions move her to try to seek resolution. Janet starts to make changes in her teaching, she begins to seek out professional development opportunities. These changes create new tensions for Janet – tensions that she is learning to deal with through persistence. In the end, persistence turns out not to be a management strategy, but a resolution strategy.

Much of who Janet is as a mathematics teacher, like all mathematics teachers, is shaped by the tensions she is experiencing. Regardless of whether teachers manage these tensions or try to resolve them, better understanding of these tensions would allow us, as mathematics education researchers, to better understand the intentions and actions of mathematics teachers – and to better respond to their needs in the crafting and delivery of professional development opportunities.

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