Opening classroom practice to challenge: The role of trust in mathematics teachers' collaborative inquiry involving co-teaching.

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When working together to enact new and challenging pedagogies, sharing classroom practice is a key resource to inform teachers' inquiry conversations. Understanding the role of trust in collaborative inquiry represents an important tension when teachers are sharing aspects of their work to interrogate and improve their practice. The study used a design-based methodology to explore the affordances of teachers' collaborative inquiry for teacher learning. Expanding the inquiry activity to include co-teaching created productive conditions to promote trust and support challenging conversations and thus had the potential to support teachers to transform mathematics teaching|learning.

Expanding what teachers know and can do is an important mechanism to promote increased student success in mathematics classrooms (Alton-Lee, 2012). There is a long-recognised need for improvements in the mathematical experiences and outcomes of many of our students (OECD, 2016). A significant influence on the educational success of students is the quality of the teaching they experience (Hattie, 2009) and what teachers know and believe about mathematics fundamentally influences their teaching (Adler & Ball, 2009). Teachers inquiring into their practice in collaboration with their colleagues is increasingly seen as a productive approach to strengthening classroom practice (Owen, 2015). Opening teachers' classroom practice can provide teachers with access to an expanded repertoire of practice ideas and classroom events. Where teachers are working together to enact new and challenging pedagogies, the sharing of classroom practice for instance through classroom observations, the sharing of classroom video, and classrooms with more than one teacher, is a key resource to inform inquiry conversations.

In the context of transforming their pedagogical practice, teachers need opportunities to articulate and evaluate their knowledge of mathematical content (Bobis, Higgins, Cavanagh, & Roche, 2012). In particular, opportunities to discuss new learning support teachers to shift from thinking about ideas to thinking about how they might be applied to enhance teaching (McPhan, Pegg, & Horarik, 2008). Hunter (2007) suggests that teachers' discussions play an important role in transforming teachers' beliefs and attitudes, promoting reflection on habitual practice, and creating opportunities for changed practice. Kazemi and Franke (2004) found that individual and shared experiences mediated what ideas teachers' made public within their collaborative activity and this shaped the nature and direction of the group's work. However teachers' interactions can both support and constrain possibilities for their professional learning (Little, 2003). For instance, norms of collegiality where validation, rather than critical reflection, is the focus can shut down critical questions and thus constrain teacher learning (Allen, 2013). Thus, to be productive for teachers' ongoing learning, professional conversations need to surface and challenge problematic aspects of teachers' practice as well as affirming effective practice.

Respectful relationships are central to teachers' collaborative activity. Respect among participants and a commitment to shared decisions are key factors promoting teachers' open

engagement in conversations about their practice (Robinson, Hohepa, & Lloyd, 2009). Making classroom practice public involves risk for teachers and requires trust. Accordingly, trust is often seen as a prerequisite to teachers being willing to share their teaching with others, and where trust is compromised this can act as a barrier to teachers working together productively. Teachers are reluctant to expose weaknesses in their practice where there is a fear of negative consequences and where teachers are reluctant to take perceived risks, change can be constrained (Le Fevre, 2014). Understanding the role of trust in both affording and constraining change represents an important tension when teachers are sharing aspects of their work in order to interrogate and improve their practice.

The research approach

A sociocultural perspective was taken with the aim of appreciating the multiple, socially and culturally constructed realities of participants' experiences (Schoen, 2011) and the study drew on appreciative, authentic and participatory approaches. The research is grounded in assumptions concerned with equity, caring and social justice, valuing strength and difference as foundations for growth and learning, and privileging community over individual goals. It used a design-based methodology to explore the affordances of teachers' collaborative inquiry for teacher learning in the context of primary mathematics teaching|learning. Design-based research supports the "learning conditions which current theory promotes as productive but which may not be commonly practised, nor completely understood" (Design-based Research Collective, 2003, p. 5).

The study involved working in an urban New Zealand primary school over a 6-month period with three teachers referred to here as Pat, Casey and Kris, to design and implement an approach to collaborative teacher inquiry with a focus on strengthening mathematics teaching|learning. The project was explicitly focused on the generation of practice-based pedagogical knowledge and aimed to document the processes involved in knowledge production. Regular group meetings were held to develop ways for the teachers to share their mathematics teaching. The primary aim was to design a flexible and adaptive approach to teachers' collaborative inquiry, including resources to support its enactment. Between meetings, the teachers engaged in agreed activities in relation to mathematics teaching|learning including video-recording mathematics lessons and later co-teaching lessons in pairs. The negotiated shared inquiry focus for the teachers' practice was developing their use of "talk moves" (Chapin, O'Connor, & Anderson, 2009) as a pedagogical approach aimed at strengthening their target students' mathematical language and supporting them to engage in mathematical discourse.

The group of teachers met three-weekly on seven occasions usually for an hour or more at the end of the school day. The meetings included reflective conversations about classroom events, the sharing of classroom video, discussions of research-informed articles, and planning for future activities. I participated in and audio-recorded group meetings and observed a mathematics lesson in each classroom followed by a semi-structured interview with each of the teachers at the beginning and end of the study. I transcribed the interviews and group meetings verbatim and listened to the audio recordings repeatedly as the transcripts were analysed. The transcripts were coded thematically using an open-ended approach (Creswell, 2014) to identify patterns that emerged from data. A cultural-historical activity theory (CHAT) framework (Engeström, 2009) provided a conceptual tool to identify elements of the activity of teachers' collaborative inquiry, including contradictions that arose and actions taken to resolve them. As such, it was particularly important to note and account

for data that departed from dominant patterns (Braun & Clarke, 2006). This paper draws on data primarily from the group meetings and final teacher interviews.

Findings

The findings trace the teachers' collaborative inquiry approach through two distinct stages of design, although in practice there was considerable overlap in the process of transformation from the initial to the final design stage.

Initial Design Stage: Sharing Video

At the beginning of the study, the group designed a collaborative inquiry approach that broadly paralleled that of video clubs (van Es & Sherin, 2008) whereby the teachers video-recorded mathematics lessons in their classrooms, reviewed the recordings and self-selected an excerpt for the group to reflect on at a subsequent meeting. For teachers, making videos of their practice public and available for others to scrutinise represented a risk because

> [you] just don't want that perception … of people thinking that you're weak in teaching [Kris]

Sharing practice, particularly aspects of their practice that were identified as problematic, required teachers to trust their colleagues particularly as some teachers recalled negative past experiences of having their teaching observed by others. As part of a performance appraisal process, for instance, judgements about the quality of a teacher's practice had carried the risk of punitive action in some cases. The teachers felt that when they were open about challenges in practice, they could expect different responses from school leaders than they would from a colleague, for instance Kris suggested:

> if somebody talks critically or honestly about [their concerns for] a child, if it's senior management … it becomes a big deal whereas if it's colleague to colleague with no title attached … now there's *two* heads together to unpack why is that child stumbling

Hi-lighting an apparent contradiction, Kris later went on to suggest that school leaders should trust teachers to engage in robust professional conversations:

> if it is a true professional conversation that there's gotta be that trust there. If you trust that group to be having those conversations [then] actually more impact might be had because it's not going to be reported back on, it's not going to be judged against

In relation to sharing classroom video, two of the teachers recalled previous experiences of viewing video excerpts in a professional development context where the purpose was unclear, and the critique was overly negative and personal. Nevertheless, the teachers believed that reflecting on classroom video with colleagues had the potential to be instructive and accordingly two teachers volunteered to share excerpts from their classrooms. Contrary to the perceived risks associated with sharing video, the teachers' initial experiences focused on celebration rather than critique and this appeared to promote future sharing. As Kris commented:

> we didn't kind of say these are the positives these are the negatives but … she had this safe group that really *acknowledged* what she was doing in her classroom and really *celebrated* the mathematical learning that was going on; *that's* what I think made the difference. Once that initial hurdle was done then we were inundated with them weren't we, and that's that pride

In one case Casey, who had initially declined to even watch the video I had recorded in her classroom, later showed video excerpts of her teaching to the wider teaching staff as part of a literacy-focused staff meeting she was leading. Kris wondered

whether that would've happened if she hadn't shown us videos [as part of the study]

Sharing video was voluntary and excerpts were usually chosen with an explicit learning purpose whereby statements like, "I'm showing you this because …" became routine. This appeared to support teachers to take the risk of exposing weaknesses in their practice and positive experiences of sharing video in this context appeared to promote relationships increasingly characterised by trust. However, despite the explicit aim of improving teacher practice, opportunities for teacher learning were largely limited to the teacher who was sharing the particular video excerpt. For instance, during the sharing of video from Pat's classroom, other teachers did not pick up and engage in a discussion of the mathematics or Pat's practice and Pat's recount of this event was left mostly unexamined by the group as a whole. In this case, although the teachers had access to representations of Pat's practice, including through video and descriptions of classroom events, the learning opportunity appeared to be mostly limited to providing a forum for Pat to reflect on her practice. Expanding the inquiry approach to include co-teaching afforded enhanced opportunities for teacher learning for the larger group through active participation in the co-construction of practice, and this is discussed in the following section.

Final Design Stage: Co-teaching Mathematics Lessons

In keeping with a design-based study, the teachers' collaborative inquiry approach was continuously revised throughout. A feature of the design to emerge at the end of the study was a co-teaching arrangement whereby pairs of teachers planned, taught and reflected on mathematics lessons together. The co-teaching approach aligned with Murphy and Scantlebury's (2010) description of "two or more teachers teaching together, sharing responsibility for meeting the learning needs of students and, at the same time, learning from each other" (p. 1). Where and with whom the teachers co-taught varied on each occasion so that they taught together in their own and each other's classrooms as depicted in figure 1 below.
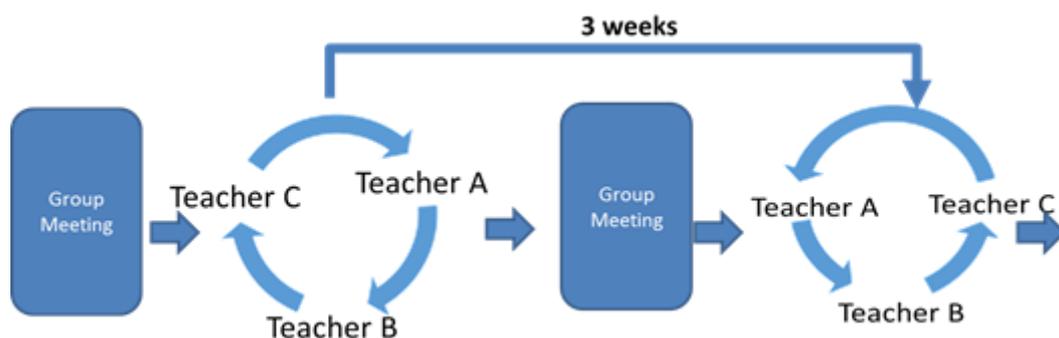

Figure 1: The co-teaching inquiry cycle

The teachers had suggested that some co-teaching arrangements might be problematic where they had previously experienced challenges in their relationship with a co-teaching partner. Contrary to the teachers' expectations, co-teaching provided a context for strengthening the trust within collegial relationships, particularly for co-teaching pairs where there had been some initial reluctance to work together. Reflecting on a co-teaching episode

involving two teachers who had previously experienced challenges in their professional relationships one of the teachers commented:

> that willingness to open up from that particular person to say I need help that was actually really powerful. That's what collaboration is

At the outset of the study, group members explicitly positioned themselves as learners and equals through the process of negotiating of their group *kawa*, or protocol for working together. Pat suggested that this orientation towards learning in the teachers' shared work supported productive co-teaching relationships:

> if people … all come in to say that I'm going to learn something from [co-teaching] then they probably won't have that much of an issue

Pat saw that the teachers' common learning goals supported the development of trust amongst them because they understood why someone was doing something:

> the advantages that we have is that we had already learnt about our talk moves and we know the purpose of having think [time]… it comes down to trust … if someone says we're gonna do some think time now then we have to trust that that's the right time to do it

Nevertheless, where relationships had been challenging in the past teachers needed their colleague's actions to reflect the learning stance they were articulating:

> people were quite clear at the beginning about roles and why they were there, but it also takes time for what's said to be actioned … words sound great to other people, but that trust has to be earnt [Kris]

The shared experience and a sense of shared accountability for the learning of a group of students supported the emergence of trust between co-teaching pairs. As Kris suggested:

> there's that accountability … even though it was my class I was accountable when you came into my room like you were accountable. It was almost like you're my mate and I didn't wanna let you down by leaving you hanging but you didn't wanna let me down by not buying into what the learning conversation was

Elaborating on the idea of teachers protecting one another's esteem, or *mana* as the teachers described it, Kris commented:

> that whole kind of concept of I've got your back … its not even I've got your back, it's that it's okay not to have it right all the time and if you haven't got it right I'm not gonna shoot you down

Comparing co-teaching to formal observations of teaching such as for appraisal, Kris suggested:

> co-teaching *I* think was that shared experience that actually you didn't do it but neither did I so that *shared* responsibility when we did talk moves when we looked at that there was that *real* the *sharing* of what was going on in the classrooms

In this way, teaching together appeared to provide support for teachers to take risks and try new pedagogical practices where the responsibility for "getting it wrong" didn't lie with any one teacher individually. Co-teaching diffused the risk of teaching challenges being exposed as weaknesses because the focus was on the students' learning rather than on an individual teachers' practice. In contrast to individually-taught lessons, reflective conversations about co-taught lessons increasingly involved teachers raising challenges in relation to classroom events. For instance, reflecting on a video excerpt from a lesson co-taught by Pat and Casey, Kris questioned the impact on the students' opportunities for think time where there were two teachers in the classroom. She had noticed that one teacher tended to fill the space left by the other when two teachers were co-instructing. She framed her question to soften the challenge she was making to Pat and Casey's practice:

> I wondered … what impact that had on the lesson for the learners … that's a snapshot of the lesson so it probably wasn't all like that but it's something that I felt too

As Pat and Casey responded to her, Kris was affirming and empathetic, and assured them that she wasn't judging them:

Pat: sometimes you can't do everything perfectly

Kris: I'm not critiquing that or anything

Casey: you're just asking us what we think [GM#6]

Kris later remarked that she would not have raised such a challenge with just any group of colleagues:

> it's not only the questions we ask ourselves as the team but also the questions we ask each other to develop them further … like the think time or whatever that there's some people I wouldn't have asked that to because of the trust issue whereas I could ask it here and know that it wasn't a personal thing that it was accepted as a constructive question to promote thinking

Exchanges involving the teachers challenging and justifying aspects of practice became more frequent. They recognised that their co-teaching experiences and the conversations they were having were influenced by the shared understandings that the group was developing through their regular reflective conversations at group meetings. As Casey said,

> we've got a lot of pre-knowledge we're bringing already

The teachers had previously seen difficult working relationships as an unavoidable product of incompatible personalities whereas in contrast co-teaching appeared to create opportunities to reimagine and build increasingly productive relationships centred on their shared accountability for teacher and student learning.

Discussion

In the early stages of the project, teachers were reluctant to collaborate with a colleague where they perceived a lack of trust, however the sharing of classroom video and the experience of co-teaching together afforded opportunities for trust to be developed amongst members of the group. Furthermore, the influence of trust appeared to be iterative whereby increasingly trustful relationships promoted increased levels sharing of teachers' practice, and this in turn supported the kinds of robust, learning-oriented conversations that could both promote shifts in practice and strengthen trust. This is an important finding as it hi-lights how avoiding working with particular colleagues due to a perceived incompatibility and associated lack of trust can be self-fulfilling and constrain opportunities for developing productive professional relationships.

In traditional teaching arrangements where teachers are individually responsible for the learning of a group of students, a tension can emerge whereby exposing classroom challenges can direct attention to the quality of the individual teacher's practice and thus make the teacher vulnerable to the risk of negative critique and punitive action. The teachers in this study were increasingly willing to open their practice to the scrutiny of others through the sharing of classroom video and so reflecting together on episodes of classroom teaching opened opportunities for teacher learning. The opportunity to examine one's practice within a community in which relationships are characterised by professional trust supported the professional learning of the teacher whose practice was being examined. Nevertheless, there were limitations to the extent to which teachers could access the practice of others and thus the conceptual resources available (Horn et al., 2016), and conversations about individual

teachers' lessons tended to be characterised by affirmations of practice and challenging one another's practice was avoided.

In contrast, co-teaching – the act of jointly engaging in the teaching task – served to focus teachers' attention on the shared goal of student learning and thus away from their individual practice, perhaps removing a potentially competitive structure which might compromise the relationship between two teachers. In particular, the teachers explicitly identifying as learners and equals appeared to support the group to engage with one another in ways that interrupted previous patterns of participation. In CHAT terms, the teachers' actions were increasingly directed towards a common object and this supported their growing sense of the collective. The shifting of attention from their feelings about one another and their focus on an individual teacher's practice, to a shared and perhaps more neutral focus on the children's learning, redefined what constituted successful collaboration. The teachers started to see that challenging problematic practice served to promote thinking and support learning. Consistent with Roth and Tobin (2002) is the finding that co-teaching produced expanded resources for teachers with which to support both the learning of their students and their own learning. Achievements and challenges in the teachers' shared work were collectively realised outcomes thereby teachers experienced working together as both promoting success and providing support, which in turn promoted increasingly positive feelings about working together.

Within the co-teaching inquiry activity, the development of trust within the group was emergent and contingent on both teachers' actions. This involved the teachers taking risks and responding to the risk-taking actions of others within their shared activity. Furthermore, teachers' actions towards attending to and upholding one another's mana supported the building of trust that then opened space for teachers to engage in increasingly robust, learning-focused conversations. The teachers' engagement in and reflection on jointly constructed practice, that of a co-taught lesson, appeared to represent highly productive conditions for promoting the risk-taking and challenge necessary for teachers to transform mathematics teaching|learning.

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