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# Peer Coaching as a Model for Professional Development in the Elementary Mathematics Context: challenges, needs and rewards

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**ABSTRACT** As our knowledge about education continues to change, educators must refine and redefine their beliefs and teaching practices through professional development. In the peer coaching model of professional development, both participants have a chance to reflect on what they observe and on their own teaching practices. This reciprocal gain is one of the major benefits of peer coaching. This study examined the experiences of elementary mathematics teachers engaging in a peer coaching model of professional development. A Grade 1 and a Grade 3 teacher in Western Canada act as the participants in this case study and qualitative data were gathered from teacher interviews and observations of peer coaching sessions. Each teacher selected two dimensions from the Ten Dimensions framework for professional growth. This framework allows teachers to focus on the areas of teaching practices that generate higher levels of student achievement. The findings focus on three major areas, highlighting: (1) the fact that resources are needed to support the peer coaching process; (2) the challenges of peer coaching; and (3) the benefits of peer coaching. Overall, participants valued the peer coaching process and declared its collaborative nature as the greatest benefit.

## Introduction

In order to become the best practitioners possible, teachers look for professional development opportunities to hone their craft. This is particularly true for mathematics teaching in elementary schools, where teachers are more likely to teach many subjects and usually have not taken courses in mathematics beyond the secondary school level. Many teachers are turning towards professional development opportunities to expand their teaching toolkit (Loucks-Horsley et al, 2003). To keep up with our rapidly growing knowledge base, educators must refine and redefine their beliefs and teaching practices.

This research project aimed to discover how elementary school teachers experience a peer coaching model of professional development. The research questions were: how does the peer coaching model enhance professional growth? And how does the Ten Dimensions framework guide these teachers' learning?

## Literature Review

One model of professional development is peer coaching. This method involves the pairing of two colleagues in a session with classroom observation, with feedback and discussion that allow both members to have a chance to learn from one another (Loucks-Horsley et al, 2003). This opportunity to dialogue and provide additional support between colleagues supports Guskey's (2000) systemic characteristic of professional development.

In order to grow, both participants have a chance to reflect on what they observe and on their own teaching practices. This reciprocal gain is one of the major benefits of peer coaching. Having an extra set of eyes in the classroom gives teachers another perspective that they may not have come up with through their own reflections (Guskey, 2000). The colleague can help identify both strengths and weaknesses for the teacher to focus on, along with seeing practices that they may not have had exposure to beforehand.

In order for peer coaching to be successful, participants must be eager to learn from the experience (Arnau et al, 2004). This model requires an investment of time by both colleagues, but time may be difficult to find in an already busy schedule, so enthusiasm towards the process is essential.

At first there may be hesitation to engage in the process as the teacher may be uneasy at the prospect of being observed and evaluated, but being paired up with a colleague whom they trust will calm some fears (Arnau et al, 2004). An environment of 'trust, collegiality, and continuous growth' (Loucks-Horsley et al, 2003, p. 208) will ensure that participants feel more comfortable. Each member of the pair must acknowledge the body of knowledge that they bring to the partnership as well as the expertise that their colleague can contribute to the dialogue (Ross et al, 1999). As long as both participants focus on the goal of professional development and maintain a level of respect for their peers, the advantages will certainly outweigh the disadvantages (Slater & Simmons, 2001).

### *Conceptual Framework*

This study uses the Ten Dimensions of Mathematics Education (McDougall, 2004) as a conceptual framework to improve the quality of mathematics education in elementary classrooms. The framework was created to identify the components of mathematics teaching so that teachers can focus their attention on smaller aspects of mathematics in order to improve their teaching. Many of the dimensions are interlinked, and focusing on one invariably leads to improvement in other areas. The Ten Dimensions are:

1. Program scope and planning (encouraging teachers to consider all strands, expectations/outcomes and key ideas of the mathematics curriculum);
2. Meeting individual needs (teachers should vary lessons and instruction to cater to the needs of all students);
3. Learning environment (varied student groupings and student input should be used);
4. Student tasks (teachers should vary the types of tasks that are being used in lessons, and all tasks should be meaningful);
5. Constructing knowledge (multiple instructional strategies and thoughtful questioning techniques help students construct knowledge);
6. Communicating with parents (parents are influential in student achievement, and as such, they should be kept informed);
7. Manipulatives and technology (these teaching tools enhance student learning);
8. Students' mathematical communication (students should experience oral, written and physical forms of communication);
9. Assessment (teachers should use a variety of assessment strategies to gain diagnostic, formative and summative data about their students); and
10. Teacher's attitude towards and comfort with mathematics (teachers affect student perception and should project positive attitudes towards mathematics).

The Ten Dimensions framework was chosen to correspond with Guskey's (2000) characteristics of professional development: intentional, ongoing and systemic. As teachers select one or two dimensions at a time, the framework encourages teachers to focus on key areas that will generate higher levels of student achievement, giving teachers an intentional approach to their growth. With set goals and areas for improvement that are selected by the teacher, the personal interest and continued investment in professional change is undoubtedly present. Thus, the Ten Dimensions framework allows teachers to effectively move forward on their journey of professional growth, and in turn, schools will get closer to meeting standards set out by the National Council of Teachers of Mathematics (NCTM, 2000).

## Method

This study spanned two years and concluded in November 2008. The participants were part of a larger study to determine how the use of the Ten Dimensions framework improves student achievement and teacher understanding in elementary school mathematics (McDougall et al, 2011). At the beginning of this larger study, teachers and administrators attended a professional development session about the Ten Dimensions of Mathematics Education (McDougall, 2004). Some participants of this larger study were then invited to join this study.

The teachers and administrator then completed an Attitudes and Beliefs Survey (Ross et al, 2003) to determine how their current practices fared with respect to current mathematics education trends through the lens of the Ten Dimensions of Mathematics Education. A low score in one dimension may provide the impetus for the educator to focus on that particular dimension for personal growth. Individual teachers decided which areas they wanted to concentrate on for personal improvement.

Within the participating school, four colleagues were paired up. The participants created the partnerships based on comfort level with their colleagues. The researchers interviewed each participant to gain a better understanding of their beliefs as a teacher and goals as a mathematics educator. Questions were asked about the school culture and about any programs at the school that may foster a conducive environment for mathematics. The participants were provided with the *PRIME School Mathematics Improvement: leadership handbook* (McDougall, 2004), which contained observation templates and guiding questions to be used during their peer coaching sessions. The observation templates were specific to the dimension chosen by the teacher and contain characteristics of exemplary teaching in the area of the chosen dimension that observers could look for while watching the teacher in the classroom. The guiding questions were also specific to the teacher's chosen dimension of focus to elicit reflection by the teacher about areas pertinent to the chosen dimension, but started with general questions, including: What are you planning to do today in the classroom? What did you do in the past in this topic? What would you like me to observe?

Teachers observed each other, and some teachers were observed by researchers following procedures established by Simon and Tzur (1999). The peer coaching process had three components: (1) a pre-conference meeting to discuss which dimension the teacher chose and the parts of their teaching to which they wanted the observer to pay close attention; (2) in-class observation where the observer would take notes; and (3) a post-observation conference meeting. The observed teacher reflected on their lesson and shared what they would change/do differently the next time. The observing teacher shared their observations specific to the areas of focus. Finally, the observed teacher identified the area(s) of improvement they would like to focus on during the next session. A final individual interview occurred to determine what the teachers had learned from the study and to collect concluding reflections about the peer coaching process.

In this article, we discuss the findings from the pairing of the Grade 1 (Molly) and Grade 3 (Courtney) teachers at St. Mary's School. St. Mary's is a K-7 independent Catholic school located in a residential area in the centre of a large city in Western Canada. Both teachers have over 20 years of elementary teaching experience.

## Data Sources

There were four peer coaching sessions in total, with each teacher observing her colleague twice and being observed twice. The pre- and post-observation conferences as well as the individual preliminary and final interviews were audio-taped and transcribed by the researchers. There were also group meetings where pairs of participants were in attendance. Data management software, nVivo8, was used to organize the interview transcripts. Data analysis was completed by allowing the data to dictate the outcome, as the themes that emerged from the data analysis became the foundation for the major findings of the study (Glaser & Strauss, 1967). The analysis began with an exploratory review of the data, followed by a constant comparison analysis (Miles & Huberman, 1994) of interview transcripts and field notes. The transcripts were sent to the participants to check for accuracy. Two researchers talked about the codes to ensure that various interpretations were

taken into account. The initial themes covered the peer coaching process, the dimension chosen, challenges, benefits and collaboration.

## **Findings**

The pairing of Molly and Courtney illustrates many facets of a peer coaching model of professional development. Although both teachers were eager to engage in the process and improve their practice, they were grateful for the resources that accompanied the Ten Dimensions framework, which facilitated the peer coaching process. The findings also uncover the fact that the process is not devoid of challenges in spite of its many benefits. The major themes were process resources, benefits of the process and challenges of peer coaching.

### *Process Resources*

The teachers were provided with various resources to support them in the peer coaching process. Before the in-class observation, Molly and Courtney would meet for a pre-conference. Courtney explains that during this pre-conference, '[Molly] told me what it was that she wanted me to focus on and what dimensions as well as what it was for herself that she wanted me to focus on' (Teacher interview, 28 November 2008).

A resource in the form of an interview protocol helped the teachers to explore teaching behaviours and practice during the pre- and post- observation meetings. This protocol was a series of questions that the observer could ask the teacher during the pre-conference. One key question guided the teacher to discuss the area(s) in which they wanted feedback. Molly shares that the questions also allowed her to get a better understanding of the background of the other teacher. The teachers used the guiding questions provided by the protocol instead of having to create their own questions. These questions were specific to their chosen dimension and allowed observers to ask relevant questions even if they were unfamiliar with key components of the dimension. Courtney shared that she enjoyed having the questions be specific to her chosen dimension because otherwise she would find the process overwhelming. She uses the following metaphor to explain how a dimension could focus her goals for improvement: 'You have to have the big picture but you have to be able to see which parts. Looking at an engine of a car, which part needs the fixing?' (Group interview, 21 November 2006).

The guiding questions allowed both the observer and the teacher to frame their thinking within the guidelines of the dimension. As Courtney puts it, the guiding questions allowed her to 'pinpoint' key areas pertinent to the chosen dimension (Teacher interview, 28 November 2008).

Another resource in the form of an observation template with things to look for and other guiding notes was also provided to the teachers. These templates were taken into the classroom and had space for the teachers to write their observations and notes directly on the them. Both Molly and Courtney used the template as a guide and took notes in their own style. Molly explains her strategy as an observer during the process:

I want to know ahead of time what I am supposed to be looking for, because I do not want to key on things that are not important or not what the teacher wants. Courtney was very clear about what she wanted me to look at. I think there were two or three things that she wanted me to check, so I put those headings down, that is what I want check for and then each one goes along. I will add notes to those different categories. (Teacher interview, 28 November 2008)

It is clear that Molly thought that she should focus her notes on the areas in which Courtney wanted feedback. She made these areas the main headings of her notes and added secondary comments that related to the prompts on the observation template only if they were relevant to Courtney's improvement plan. She explained that the guiding questions and observation template helped her to focus on what to look for specific to the dimensions; however, she said it was 'most helpful to know what the teacher wants me to look for' (Teacher interview, 28 November 2008).

Courtney used the observation template as more than just a prompting device. She thought that the template was easy to use and simplified the process. Courtney explained that 'it was really well laid out and we could just quickly jot down what we were looking for' (Teacher interview, 28 November 2008). She went on to say that she also had her own separate observation page to jot

down any additional notes that were not covered by the notes on the template. Like Molly did with her, Courtney mentioned that she focused on any activity in the classroom that related to what Molly wanted her to look for.

The resources were particularly helpful in alleviating the stress of engaging in this unfamiliar model for professional development. Molly shares the feelings that she had when she first started the process:

The part at the beginning is a little nerve wracking because you are not sure of the whole process. You do not know who is going to say what and what we are going to be looking for and we just look for exactly what you ask us to look for and we do not look for and do not have time to look for anything else. (Peer coaching session, 23 January 2008)

Both teachers found the resources provided to be helpful in the peer coaching process. As they had never engaged in such a process before, Molly and Courtney valued having these tools to guide them and focus their thinking so that it aligned with their chosen dimensions.

### *Benefits of the Process*

Both teachers admit that there were many benefits to the peer coaching process. Molly and Courtney shared that one of the biggest benefits was the chance to dialogue with a colleague. Courtney explains, 'I think it was nice to have collaboration. To go into Molly's classroom and to collaborate and to say, "You know what, this is what I observed and this is what I saw"' (Teacher interview, 28 November 2008). The teachers appreciated getting feedback after being observed. Molly mentioned this component on several occasions. First, she said she likes to have 'something that someone else could look for' (Peer coaching session, 23 January 2008), and later she said, 'It is good to get the feedback. [Courtney] notices things that I may do naturally, but I do not notice, so that is good' (Teacher interview, 28 November 2008).

It was the act of collaboration that had the most profound effect on the teachers. Each of them saw that they were doing more than just sharing their observations with their colleague – they were able to work together to improve each other's practices. There was a reciprocal investment in their growth, in that each teacher contributed ideas and suggestions for improvement.

The process opens the lines of communication, and as this pairing consisted of two teachers in different grade levels, it allowed for teachers to learn more about the students and the mathematics program in the school. Courtney summarized this joint benefit as follows:

Just being able to, first of all, work with Molly, one of my colleagues, has been quite a bonus. But, especially also the fact that her teaching Grade One and me teaching Grade Three, I can see how things are introduced, how concepts and skills are introduced in Grade One and then how, things kind of branch from there, how she introduces them, and then, how the students come to me, after Grade Two, they come to me with the prior knowledge and prior learning and then I can take them further. So that has been quite valuable to see that and interesting to see. (Peer coaching session, 15 May 2008)

Molly reinforced this benefit:

I can see the progression. I know at my level, this is what I am doing. I know that in terms of being a teacher and professional and looking at all the guides, but it is nice to see it in action. (Teacher interview, 28 November 2008)

Going into a colleague's classroom as an observer served both as a chance to provide feedback to the teacher and as a chance for the observer to watch another professional in action. Molly enthusiastically talked about this benefit: 'Courtney is such a good role model. I really enjoyed [observing her], because I see her way of going about it' (Teacher interview, 28 November 2008). Molly continued by explaining the kinds of questions that she would ask herself while observing Courtney: 'What kinds of attitudes is she bringing to the kids? What kinds of opportunities is she bringing to the kids? How does she use her manipulatives? How much exploration do they do? It was good to see that' (Teacher interview, 28 November 2008).

This process allowed the teachers to have a chance to reflect on their own practices. Molly said that peer coaching made her more aware of her teaching practices and made her 'think about what [she] was doing'. She asked herself, 'Do I have a positive attitude? Do I help those kids who are struggling to go back and try something new?' (Teacher interview, 28 November 2008). Courtney agreed: '[Peer coaching] has certainly made me more aware of how I am teaching and certainly challenged me in the area of math and how I teach it and approach math' (Peer coach interview, 14 May 2008). She elaborated, '[Peer coaching] has made me more aware as a teacher on how to structure my own lessons and the need for a few different things' (Peer coaching session, 15 May 2008).

In her final interview, Courtney summarized the benefits of the peer coaching process:

We enjoyed doing [peer coaching] together and it was nice to be a part of the learning process on both ends. Not only being in the spotlight, but also having somebody else come in and say, 'I really like the way you did that, and this is what I observed' and reinforcing what you may have already known or maybe we have a tendency to be a little bit too harsh on our own self, being the perfectionist that we think that we are. (Teacher interview, 28 November 2008)

### *Challenges of the Process*

There were a small number of challenges identified by the teachers. One challenge that the teachers faced was the amount of time that the process required. Even before engaging in the peer coaching process, Courtney expressed that 'just having the time to meet, to share, to go into each other's classes to observe, and talk about what was really great and what we need to do further' would be of benefit to her development (Teacher interview, 5 October 2007). After engaging in the process, she reiterated that it was a challenge to find time for the peer coaching process. In order to save time, the actual observation would often take place during the observer's prep time; however, this was complicated to schedule. Courtney shared one example of how they were able to schedule a session:

This week, we did it during our prep time. While my students were at gym, I went into [Molly's] room. We coordinated so that she would have her math class at that time, and, she did the same during her music time. I taught math in the afternoon, where I would not normally teach math because I like to [teach math] in the morning. (Peer coaching session, 15 May 2008)

The teachers would often ask a colleague to watch their students during the pre- and post-conferences and found it difficult to 'find the personnel to relieve and release [us]' (Teacher interview, 28 November 2008).

Courtney added that another challenge concerned space. The staff room at St. Mary's is a busy space where all the teachers at the school convene. It was not the ideal setting for a focused interview during the peer coaching process. Molly and Courtney's classrooms were always occupied with their students as their school does not operate on a rotary system. There are limited vacant spaces where the teachers could quietly complete their pre- and post-observation discussions. Courtney admitted that space was an issue 'that we could not really help' (Teacher interview, 28 November 2008).

Courtney chose the Manipulatives and Technology dimension as an area of improvement and found it a challenge to grow in an area where there were not enough resources for her to use. She said, 'I think having a bit more hands-on stuff at our school would really be helpful' (Teacher interview, 28 November 2008).

One of the most frequently talked about challenges by Molly and Courtney was the initial fear of having an observer in the classroom. The teachers were wary of how their colleague or the researcher perceived their teaching. Molly voiced her fears as, 'Am I just such a rotten teacher? Is the instruction bad or the directions bad?' (Peer coaching session, 23 January 2008).

The teachers' initial hesitation towards the peer coaching process quickly disappeared after going through the process for the first time. They quickly realized that they were so engaged in their teaching that observers would not affect their work. Molly shared: 'After a while, I did not even know you guys were in the room. I am too busy and I am trying to get to as many kids as

possible' (Peer coaching session, 23 January 2008). She continued to discuss how she felt about being observed:

For me, I am fairly confident. It does not bother me. It helps me with the things that I can work on, because I was aware, especially because you were there. I may do it more often when I am alone, so if someone was there to say, 'You are doing it a lot,' then that would help me. I was very aware of [my actions] today, because you were there. So it would not bother me to have someone there. Because someone is there, I am very aware. I am not going to worry very much about colleagues coming in and if there is something to suggest, suggest it. Do it, because you want to make it as good as possible for the kids. (Peer coaching session, 23 January 2008)

Molly has other adults in her classroom on a regular basis. For example, she has an educational assistant assigned to the one student she has with special needs. Although these adults are in the classroom while Molly is teaching and invariably observing how she teaches, she comments on the difference between these individuals and a peer coach. She said, 'They do not judge me publicly. [Peer coaching] is more a public thing, right? [The educational assistants] certainly judge me, but I guess it never gets back to me' (Teacher interview, 28 November 2008).

Molly tried to overlook this challenge by focusing on the benefits of the peer coaching process. She said, 'I know it is a very positive thing, but it is still stressful' (Teacher interview, 28 November 2008). The teachers are hesitant about being judged by observers; however, their overwhelming desire to improve reinforced to them that peer coaching can illuminate their practices and allow them to improve in the areas on which they were focusing. The teachers' positive outlook towards this process allowed them to focus on the benefits rather than focus on the challenges.

## Conclusion

In this research project, the goal was to discover how a peer coaching model of professional development affects elementary school teachers and how the Ten Dimensions of Mathematics Education acted as a framework for professional growth. Through teacher interviews and in-class observations of peer coaching sessions, it was found that teachers benefited from engaging in a peer coaching model.

This study supports the work of previous research that highlights the need for teachers to be collaborators for professional development to be successful (Klingner, 2004). As such, the peer coaching model where participants inherently have to rely on one another for support and feedback is an effective model of professional development (Loucks-Horsley et al, 2003). The participants felt that this collaboration was the most valuable component of the process. They described the quality of their reflections to be deeper as a result of the feedback that they received and said that they learned new strategies from observing their colleague in the classroom. The feedback that they could provide for one another and the reciprocal gain that resulted from the process allowed each partner to gain deeper insight into their teaching than they would have been able to have acquired on their own (Guskey, 2000).

The participants shared that it was stressful to be observed by a colleague; however, they found it reassuring to work with a colleague whom they trusted and whom they knew would be respectful of their shortcomings (Arnau et al, 2004; Klingner, 2004). One of the guidelines of the peer coaching model used in this study asked the observer to state observations about what they saw in the classroom rather than make judgments. This guidance allowed the teachers to focus on helping each other to improve in the areas in which they wanted to improve rather than promoting a feeling of evaluation (Slater & Simmons, 2001). Both participants shared that they welcomed additional feedback from their partner, thus giving evidence that there was mutual respect between the teachers.

The framework of the Ten Dimensions of Mathematics Education (McDougall, 2004) gave a clear focus to the process. The peer coaching process allowed participants to become better aware of their current teaching practices, but the focus on one or two on the dimensions allowed the teachers to improve specific elements of their teaching practice. This framework gave the participants a focused lens through which they could target one area for professional growth. It

allowed the teachers to carry out their model of professional development with a clear purpose (Guskey, 2000).

Another preliminary concern for the participants was how they were to go through the process. As neither teacher had engaged in peer coaching previously, they were unsure of how to use the model effectively. As the time that they had available to dedicate towards the process was limited, they wanted to ensure that their efforts were used productively. The resources that accompanied the Ten Dimensions framework supported the teachers through the peer coaching process. These resources aided in the procedural aspects of the process as well as helping the teachers to keep their focus on the dimensions chosen by them for professional growth.

The peer coaching model coupled with the Ten Dimensions provides a framework for teachers seeking to improve their professional practice. Along with the clear areas for improvement as outlined by the Ten Dimensions, the resources to support teachers engaging in the process for the first time allow for the professional development to be deliberate and focused.

As this study involved one pairing of colleagues, future research on the effectiveness of the peer coaching model with more partnerships would provide more rigorous results. An extension to other subject areas and grade levels would also provide more insight into the value of peer coaching as a model for professional growth.

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