BEGINNING TEACHER FEEDBACK IN THE CONTEXT OF A CO-TAUGHT INCLUSION MATH COURSE

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As schools turn towards co-teaching models to implement inclusion practices (US Department of Education, 2010), teachers are increasingly being asked to operate with a co-teacher (Scruggs et al., 2007). However, most research on co-teaching remains at the survey level; it does not examine factors that may influence co-teaching relationships over time (Scruggs et al., 2007). This paper seeks to address that gap by examining the feedback a first and second year co-teacher give one another as they teach a high school mathematics course. The question under consideration is: what kinds of feedback may beginning co-teachers offer one another and how may it influence their classroom practice over time? The results of this work contribute to the broader body of co-teaching research by offering insights into a specific case of teacher collaboration.

Keywords: Teacher Education- Inservice/Professional Development; Equity and Diversity; Affect, Emotion, Beliefs, and Attitudes

Inclusion, the practice of blending students with and without documented special needs in one classroom, has become increasingly supported in schools across United States by adopting a co-teaching model where one teacher has content knowledge and the other teacher, knowledge of special education practices (US Department of Education, 2010). When implemented well, co-teaching has been shown to be an effective way to teach all students (Cook & Friend, 1995). However, research indicates that teachers often do not have adequate supports, such as common planning time, resources, and training, and that without these advantages, these co-teaching relationships are not nearly as successful (Bouck, 2010; Dieker & Murawski, 2003; Scruggs, Masteropieri, & McDuffie, 2007). Because under-resourced, beginning co-teacher situations are common, they should be explored in greater depth to better understand how to support educators in this position.

The current body of co-teaching research is primarily limited to teacher perception studies that provide snapshot insights into co-teacher relationships (Scruggs et al., 2007). A 2012 study by Rytivaara and Kershner is an exception; their case study of two social studies co-teachers suggests that co-teachers may shift towards more student-centered practices when they collaborate effectively. This is an exciting prospect because not all teachers have access to more traditional professional development (PD) programs to improve their practices; therefore, if co-teachers can offer productive feedback towards one another, co-teaching might offer an alternative form of PD to foster productive changes in teacher pedagogy over time. Indeed, Rytivaara and Kershner (2012) emphasize the importance of "social and collaborative" (p. 1001) reflection as key to successful professional learning and note that in theory, co-teaching gives participant teachers the opportunity to engage in a "peer-learning relationship" (p. 1001).

The purpose of this paper is to consider the role of feedback given by two co-teachers, myself and my co-teacher, "Peter," in our "peer-learning relationship" (Rytivaara & Kershner, 2012, p. 1001) and examine whether and how our classroom practice changed over time. The study was conducted using action-research methodology (e.g. Chazen, 2000; Lampert, 1990; Townsend, 2014). The feedback Peter and I exchanged as we worked together for the first time

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to teach an Algebra II and Trigonometry course are analyzed to address the following research question: what feedback may beginning co-teachers offer one another and in what ways may it influence their classroom practice over time?

Theoretical Framework

This work was conducted based on the belief that learning is situated (Greeno, 1991; Lave & Wegner, 1991) and that teachers and students are "elements or aspects of an encompassing system of social practices" (Cobb & Bowers, 1999, p. 5). Therefore, this study's intention is not to strive for generalization to other contexts, but instead to seek initial patterns from the data themselves and produce context-dependent insight into a specific case, as opposed to producing "high level theory" (Flyvbjerg, 2006, p. 223). As Flyvbjerg (2006) argues, it is essential to consider a breadth of cases before developing more general theory, and that the cases themselves are useful for producing a more "nuanced view of reality" (p. 223). This study will contribute to the literature by illustrating the case of two beginning co-teachers, Peter and myself, as we collaborate together for the first time.

Research Methods

Study Context and Participants

I started teaching high school mathematics in an urban district in the Northeastern U.S. during the 2014-2015 school year. Prior to teaching, I spent two years working on a PD research project that sought to increase teachers' ability to attend and respond to their students' mathematical ideas. Based on this background, I hoped that Peter and I could work together towards developing a more responsive classroom environment for all of our students (Hammer & Shifter, 2001), where we would build our lessons on students' ideas and craft an environment where students shared and discussed one another's mathematical thinking.

Peter had taught for one year in a resource room in another district before moving to the research site, which is a relatively high-performing urban high school with approximately 1,700 students. He often reported that he loved math in high school, but found it difficult in college and changed his major to Spanish. Although he did not take many college-level mathematics courses, from our experience together it was clear that he was quite proficient in the topics we taught.

Peter and I co-taught one course together, from January to June 2015, but he taught two other classes with two other teachers that semester as well. His planning time did not align with any of the teachers he was assigned to work with, so most planning occurred via email or after school. Hence, Peter and I had little common planning time and had received no co-teacher training before teaching together. This situation is representative of many other co-teachers across the U.S. (Bouck, 2010; Dieker & Murawski, 2003; Scruggs et al., 2007).

As stated previously, Peter and I taught an Algebra II and Trigonometry course. The curriculum covered a review of polynomials, linear and quadratic functions and their transformations, and then introduced exponential and logarithmic functions, rational functions, limits, the unit circle, solving trigonometric equations, proving identities, and finally, graphing trig functions and trig function application problems.

Study Design

This study was designed as action research (Adelman, 1975; Lampert, 1990; Townsend, 2014), as I occupied the dual role of teacher and researcher whose goal was to foster a more responsive environment with my co-teacher. While some researchers have argued that the primary purpose of action research is to change practice, rather than to produce research (Elliott, 1991; Kemmis & McTaggart, 1982), I sought to design a study where the results could be similar

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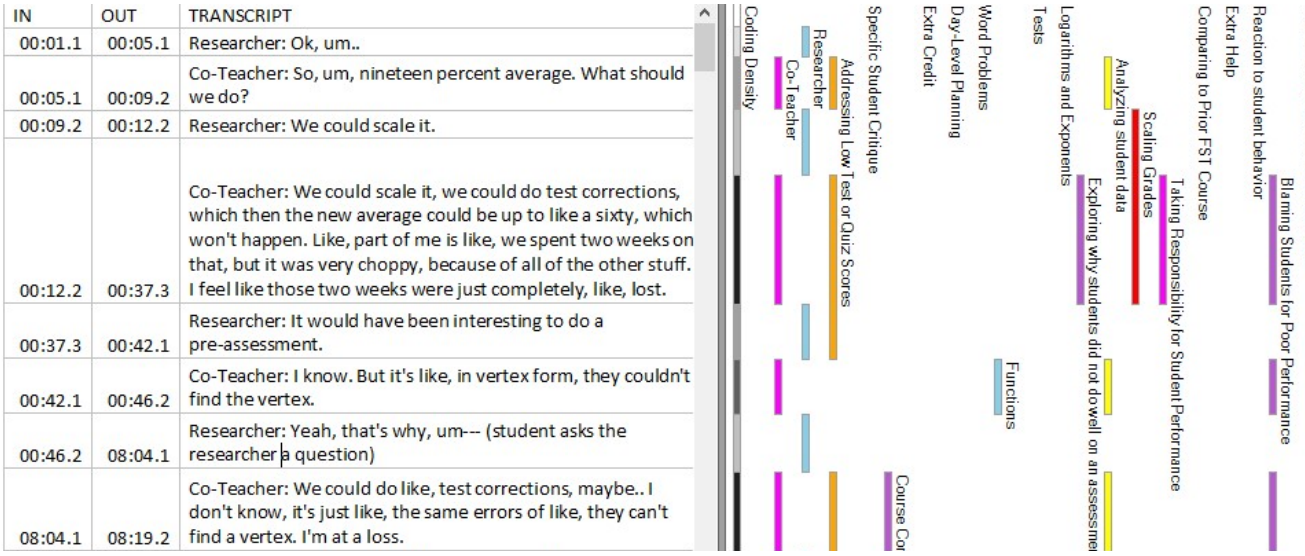
to other situations with broader research implications. Hence, I strove for it to be as authentic to a traditional co-teaching experience as possible, only intending to give feedback and argue for responsive teaching practices when the moment arose organically in conversation, rather than overtly pushing my agenda. Therefore, while I hoped that our practices would become more responsive to our students' needs, I did not explicitly communicate that to Peter.

Data Collection and Analysis

The data were collected from late January to late June 2015. I recorded 26 of the approximate 40 conversations we had we planned together. These conversations were of varying length (5 minutes to 1.5 hours) and occurred almost entirely after school. I also made daily field notes that summarized the day's class and my impressions from that day, and collected my 123 email correspondences and the assignments Peter and I developed for our students.

The data were first coded line-by-line using grounded theory methods (Charmaz, 2014). For instance, in the transcript below (Figure 1), Peter and I discussed how to address low student test scores. The lines on the right indicate the presence of some of the codes given to each piece of transcript. Peter says "part of me is like, we spent two weeks on that, but it was very choppy because of all of the other stuff…" This was coded as "blaming students for poor performance," as he says "we spent two weeks on that" and the second part, "But it was very choppy because of all of the other stuff," was coded as "taking responsibility for student performance." This entire segment was coded as "exploring why students did not do well on an assessment," because Peter discussed how time, student motivation, and instruction may have influenced the test scores. Over 200 codes were developed after analyzing all transcripts.



IN	OUT	TRANSCRIPT
00:01.1	00:05.1	Researcher: Ok, um..
00:05.1	00:09.2	Co-Teacher: So, um, nineteen percent average. What should we do?
00:09.2	00:12.2	Researcher: We could scale it.
00:12.2	00:37.3	Co-Teacher: We could scale it, we could do test corrections, which then the new average could be up to like a sixty, which won't happen. Like, part of me is like, we spent two weeks on that, but it was very choppy, because of all of the other stuff. I feel like those two weeks were just completely, like, lost.
00:37.3	00:42.1	Researcher: It would have been interesting to do a pre-assessment.
00:42.1	00:46.2	Co-Teacher: I know. But it's like, in vertex form, they couldn't find the vertex.
00:46.2	08:04.1	Researcher: Yeah, that's why, um--- (student asks the researcher a question)
08:04.1	08:19.2	Co-Teacher: We could do like, test corrections, maybe.. I don't know, it's just like, the same errors of like, they can't find a vertex. I'm at a loss.

Figure 1. Example of the initial coding process using Nvivo software.

Next, the 200 codes were sorted into 43 broader categories (Charmaz, 2014) to identify larger themes in the data. After this initial analysis was completed, I returned to the research question to examine the feedback more directly. All moments of feedback were classified based on their degree of specificity, as specificity is considered a hallmark of quality feedback (Gan & Hattie, 2014; Hattie & Timperley, 2007). Three codes were developed based on this premise:

Vague: Feedback that is merely positive or negative and does not appear to add any advice or insight or explain our reasoning. For instance, "That packet is awesome" and "That looks

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great!" are examples of vague feedback because we do not explain why the subject at hand is "awesome" or "great."

Moderately Specific: Feedback that provides some level of detail as to the strengths or weaknesses of the subject. For example, "I think it's a little long but the questions are great!" In this quote, I validate Peter's hard work ("the questions are great!") but provide the feedback that I believe the assessment he developed is too long. However, I does not explain why I believe it is too long or provide suggestions to address the issue.

Specific*:* Feedback that is detailed and explains the feedback-giver's reasoning. This feedback should also include propositions for changes. Following Peter's development of a quiz, I replied with the following:

> Overall, I really like the structure of the quiz and I think the questions are great, but I think that the graphs are <u>really</u> hard—I think that in order for us to determine what they understand and what they don't, some of them should just have a phase shift, some should just have amplitude, some should just have a vertical shift, and some could have a combination to see what they're capable of. I think it's a little much to have all three shifts in most problems.

In this example, I give the feedback that I think the quiz is "really hard," but then grow more specific: I delve into why I believe this is the case and offers suggestions to remedy the situation.

Results

The purpose of this paper is to describe the types of feedback we gave one another and how it may have changed our classroom practice. Therefore, the results are organized by first giving an overview of the feedback we gave one another, and then examining the ways in which our class changed over time.

Feedback Exchanged

There were two instances of feedback in the 26 recorded conversations between Peter and me and both occurred near the end of the semester in June. In the first instance, I followed up on a discussion Peter had with one of our students, Jalen. I recorded the events that transpired the day Peter talked with Jalen in my field notes:

> Peter stopped by my class after school and helped Jalen, one of our students who passed first quarter and then started to slack. He worked on revisions from our Limits test, but had essentially forgotten what limits were so Peter was reteaching him. Early on, Peter asked Jalen what he planned to study after graduating. Jalen said he was interested in music and in the medical field, and so Peter told him that if he was interested in studying medicine he might need to take calculus. Because limits are a 'calculus-y' concept, understanding them is very important and kind of a preview to what he'd be learning in calculus. I thought it was a good approach for Peter to relate the content to Jalen's interests, but the tone kind of (unintentionally, I think) implied that if he didn't master limits, calculus would be really hard. I don't think that Peter meant to give Jalen that message, but I'm afraid that Jalen left with a fear that he couldn't succeed in what he hoped to pursue. Also, Peter was trying to encourage Jalen, 'See, you're getting it, this stuff is easy.' But I don't think that Jalen was understanding the material to the degree that Peter thought he was, and Jalen seemed a little upset by his assertion-- he didn't want to protest, I don't think, [or] contradict what Peter was saying by pointing out that no, he didn't understand, but it was a little uncomfortable. I didn't really know how to help, either, but I probably should have said something (June 4th, 2015).

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This quote contains an important reflection. I wrote, "I didn't really know how to help." Not knowing how to approach areas of disagreement with Peter was common in the field notes; there are a few instances where I wrote notes such as, "I don't really know how to talk about that with him," especially early and mid-semester. In this case however, I was so bothered that I decided to discuss it with Peter the next time we were both after school:

Me: Yeah, I think that... I wasn't sure... like, the other day, when you were saying, um, like, 'You got it! You got it!' to him, I was like, 'I don't-- I dunno if he has it yet.'

Peter: No, but like, maybe he doesn't have it, but at least if he's taking a step in the right direction? Sometimes positive reinforcement. I think sometimes I might do that a little to much. Like a sine graph, I sometimes may go way overboard with praise, sometimes I may be like, 'screw you.'

Me: Yeah, I guess it's just making sure it's the right kind of praise too. I just remember some of my math professors, when they were trying to make us feel better about what we were learning, they would be like, 'This is so easy! You shouldn't feel bad about this. This is so easy!' And then I would be like, 'No, it's not easy! Now I just feel dumb.' And until I was that student. I was like, 'Oh, I should make sure I don't call something 'easy." Sometimes I use the euphemism of 'straightforward,' which doesn't really…

Peter: I definitely called limits easy, because it's like, we're looking at two things. They either come together or they go in different directions (June 6th, 2015).

I tried to provide feedback on the type of praise that Peter offered, that it may have been premature to assert that Jalen understood the material. Peter countered, saying that he gave "positive reinforcement" to Jalen's work. I then attempted to argue by connecting to my own personal experience, citing that when I was told by a well-intended professor that the content was "easy," it made me feel worse. Peter disagreed, saying that the material was "easy." In this example, Peter did not appear to accept my feedback to adjust the way he discussed content with students. He continued to argue that the content was "easy" and that he did provide appropriate praise.

The second instance of feedback occurred later that same day. In class, Peter had tried to "cold-call" students to hold them accountable for paying attention. As the co-teachers reflected on how class went that day, the following discussion took place:

Peter: I'm happy. I think today some people made sense of things. I feel like today was somewhat of a success.

Me: Well it was funny how many people you called upon to ask for a definition and how many people still just like, weren't listening.

Peter: Yeah, weren't even listening to the group. And like, it's sad but I think it's something that we have to keep doing.

Me: Yeah, I think it's good to do that. You probably could have kept it up a bit longer too.

Peter: Yeah.

Me: But it's hard when there are so many people who are sitting and you can only call on them some of the time (June 6th, 2015).

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This small piece of my feedback, that "you probably could have kept it up a bit longer too," is the one piece of pedagogical feedback given over the course of the semester. However, I wrote in my field notes that "I think that if we were friends it might be easier for us to give each other feedback on curriculum materials, etc." It appears that I felt uncomfortable giving Peter feedback because we were not friends. Yet, my feedback that Peter could have "kept it up a bit longer too," along with my critique of his conversation with Jalen, both may indicate that by the end of the semester I felt that our relationship was strong enough to offer small pieces of pedagogically-based feedback face-to-face with Peter.

While there was little feedback given during face-to-face conversations, there were 19 instances of feedback given via email between Peter and me, significantly more than the 2 instances given in-person.

Table 1: Number of specific, moderately specific, and vague pieces of feedback per month given via email.

Month	Specific	Moderately Specific	Vague
January	0	1	4
February	0	1	0
March	2	0	0
April	1	1	0
May	3	2	1
June	3	0	0

As Table 1 shows, as the semester progressed, there was an increase in the frequency of specific feedback and a decrease in vague feedback. Again, this may indicate that as we grew more comfortable with one another, we felt that we could give more specific critiques. All feedback related to developing course materials and assessments. For example, after grading a test on the unit circle, I wrote in an email:

> The kids bombed the test. The highest grade was in the 40s… I like the idea of having a revisions/make-up day at some point before the end of the semester, but I was thinking that we give them advanced warning and give them a group test on Tuesday or Wednesday, then average the scores… I wonder whether it makes sense to just forget about the sum/difference formulas and focus on graphing and mastering what they do know... what do you think? (May 31st, 2015).

Peter replied:

> I agree about tomorrow. I feel like the multiple representations are important. Perhaps we could use desmos or have them extend the graph to show the two graphs, or we could [ask] them [to] compare a sine graph shifted to the cosine graph (y = sin(x + pi/2) vs. y = cos(x)) so they can see the similarity between the graphs (June 1st, 2015).

This quote conversation is representative of the types of conversations Peter and I had. Here, I proposed omitting the sum and difference formulas moving forward, although it would be on the final, and instead continue work on graphing. Peter gave the feedback that he agreed with my suggestion, and then built on my comments by proposing multiple representations using technology. We often acknowledged one another's ideas about content, discussing order of topics, material development, and assessing student understanding, and agreed or pushed back accordingly.

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Changes in Classroom Practice

When Peter and I began our class in January 2015, we often opened with a "Do Now" warm-up problem for students to try, followed by direct instruction and then individual or group work. We often alternated between providing direct instruction and circulating the room to ensure that the students were on-task. A similar structure prevailed in the end of the semester. Hence, our overall classroom structure did not appear to change from the beginning to end of the course and we did not shift towards using the responsive teaching practices to the extent I had hoped for. This is perhaps representative of the lack of feedback and conversation around making our classroom more student-centered; there were only two pieces of feedback about student interactions and they occurred in June.

Peter and I did change how we delivered material to students. Initially we developed large packets of problems and notes per unit, but as the semester progressed we transitioned to daily assignments based on our perception of our students' understandings from the day before. Peter and I often alternated between making the next day's assignment and would share our lesson through email to get feedback. This shift could perhaps reflect our focus on students' understanding of content through the assignments and assessments we created, as opposed to the mathematical ideas students shared in class. This focus was especially prevalent in the feedback we gave one-another via email. While our daily structure remained the same, that our assignments became more attentive to students' mathematical knowledge raises the possibility that given more time and experience, Peter and I may have learned to practice more responsive teaching methods as well, not just more responsive assignments.

Discussion and Implications

The results show that we gave each other pedagogical feedback face-to-face only once, at the end of the semester, and otherwise gave no feedback in-person. However, we gave each other content-based feedback much more frequently over email, and this feedback increased in specificity as the semester progressed. This is an important indication of quality feedback (Hattie & Timperley, 2007; Shute, 2008). The late increase in feedback may indicate that we grew more comfortable with one another as the semester progressed and suggest that for co-teachers to give one-another feedback, they need to know one-another first. This builds upon prior research, which has found that for a co-teaching relationship to be successful, it needs to be like a marriage: "requiring effort, flexibility, and compromise for success" (Scruggs et al., 2007, p. 14). Therefore, future research should examine structures that could be put in place to help teachers develop stronger relationships, therefore fostering an environment more conducive to giving and receiving feedback.

Peter and my feedback was quite substantive as well at times, suggesting that even beginning co-teachers can give feedback to improve the content presented to a course. However, our lack of feedback towards other aspects of teaching highlights that we were not good sources of feedback for improving pedagogy, and could explain why there were no shifts in classroom practice over the semester while there were changes in how we created and delivered course material. This builds upon current feedback research, which primarily focuses on feedback given by teachers to students or from administrators to teachers (Khachatryan, 2015), by illustrating that even beginning teachers can offer suggestions for improvement.

While more co-teaching relationships should be examined to see the greater variety of the ways in which co-teachers may provide feedback and shift their practices, schools might consider using all, not simply veteran, teachers when implementing feedback protocols. This is

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because even beginning teachers may have important contributions to make to improving school experiences for students.

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