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Using Participant Responses to Video of Coaching Practice to Focus Mathematics Coaching Programs

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Abstract

This article addresses what practices coaching experts and school-based coaches observed and did not observe when watching the practice of another coach. A coach is broadly defined as a person who works collaboratively with a teacher to improve that teacher's practice and content knowledge, with the ultimate goal of affecting student learning. Definitions of coaching knowledge, coaching texts, and standards for mathematics specialists identify three primary aspects of knowledge for coaching: developing teacher content knowledge, promoting reflection by the teacher, and negotiating professional relationships. When we asked school-based coaches and coaching experts to assess the practice of a novice coach depicted in a video-recorded coaching session, surprisingly few of the respondents commented explicitly on these three areas of coaching practice. This indicates that professional development for mathematics coaches can focus specifically on how these three big ideas *for coaching are enacted in practice. We offer recommendations for mathematics programs for focusing professional development with respect to these three practices.*

Coaching has become an increasingly popular mechanism used by school districts to improve mathematics instruction and, ultimately, student learning and achievement. Coaches are recognized as a particular type of mathematics specialist (National Mathematics Advisory Panel, 2008) whose work is defined, in part, by what model the specialist uses (e.g., Cognitive Coaching, Content-Focused Coaching, Instructional Coaching) and, in part, by how the specialist works with teachers in schools (e.g., being assigned as a full-time coach or a peer teacher who takes on some coaching duties). At present, standards and definitions for coaching knowledge and practice are just emerging, and the primary sources of information have been coaching books written by professional development providers that advocate for one approach or another.

Recently, Sutton, Burroughs, and Yopp (2011) published definitions for Mathematics Coaching Knowledge based on a study conducted with coaching experts as "a starting point for further analysis of mathematics coaching knowledge" (p. 14). These definitions cover eight domains of coaching knowledge: Assessment, Communication, Leadership, Relationships, Student Learning, Teacher Development, Teacher Learning, and Teacher Practice. Another resource is *Standards for Elementary Mathematics Specialists: A Reference for Teacher Credentialing and*

*Degree Program*s (AMTE, 2009), aimed at identifying the "particular knowledge, skills, and dispositions needed by elementary mathematics specialists (EMS)" (p. iii). The authors of that document included mathematics coaches as a type of EMS (although it is worth noting that because the EMS Standards are intended more broadly, they do not address coaches specifically within the context of specialist). Both of these documents attend to the relationship between coach knowledge and coach practice by writing their definitions and descriptions in action form (e.g., "a coach knows how to . . ." and "a coach uses . . .").

We asked school-based coaches and coaching experts to assess the practice of a novice coach and write a brief summary of their opinions. It was our view that analyzing these reflections would allow us to understand how to focus the professional development in mathematics coaching that we were to offer a group of school-based coaches. When we analyzed these reflections, it was apparent that a minority of the respondents commented on three aspects of coaching practice consistently identified by leading coaching texts, definitions, and standards: developing teacher content knowledge, promoting teacher reflection, and promoting professional relationships. This was surprising because we believed that coaches would naturally notice and comment on these *big ideas* in coaching.

In what follows, we describe our methodology for gathering and analyzing these data, elaborate on our identification of the three areas for coaching focus, and provide suggestions for ways that supervisors and professional development providers can address these aspects of mathematics coaching.

Methodology

Participants
Data were gathered from two groups of participants: school-based, practicing coaches and coaching experts. Each of these groups represented a sample of convenience and will be described separately in the paragraphs that follow. We chose to include school-based coaches in this study because we anticipated that practicing coaches might develop views on coaching unique from those expressed in coaching texts.

School-based practicing coaches. The 21 school-based, practicing elementary mathematics coaches in this study were part of the Examining Mathematics Coaching (EMC) project, a research project that examined how a coach's

knowledge influences coached teachers' knowledge and practice. School-based coaches completed the coaching assessment discussed in this article prior to participating in the EMC coaching knowledge professional development workshop. Approximately 16 months prior to taking this assessment, all school-based coaches received a one-hour orientation to the EMC project and to its coaching model.

Table 1 provides a description of the coaching backgrounds reported by these participants. Their experiences ranged from zero to 130 hours of training in coaching, involving multiple models of coaching. All participants had at least two years of coaching experience, except two, as noted, who had no years of coaching experience in the project.

Coaching experts. Six coaching experts were purposefully selected for participation in this study. These experts were chosen to represent different coaching perspectives. Two of the experts were authors of widely used coaching books. Other experts included a mathematics specialist researcher with numerous publications in the area; a mathematics specialist policy maker and author of numerous articles; a professional development researcher who had implemented coaching in several projects; and a professional development provider who had provided training to coaches across the nation.

Assessment
In June 2011, we asked school-based, practicing coaches to complete an online assessment featuring video of a novice coach interacting with two teachers, who were co-planning a lesson on stem-and-leaf plots that would be taught by the teachers as a team. The video shows the novice coach conducting a prelesson conference with the two middle school mathematics teachers as well as the postlesson conference that occurred after the lesson was taught. After viewing the video, the school-based coaches responded to the following prompt: "Please assess this coach's practices as depicted in the video and write a brief summary (under 200 words) of your opinion." Following this activity we asked the coaching experts to reflect on the same video.

Data Analysis
We analyzed the responses to the assessment prompt separately for the school-based coaches and the coaching experts. Using grounded theory (Corbin & Strauss, 2008), we developed concepts within each data set. The emergent themes from the two data sets were then compared and integrated to form overarching themes. Differences and

Table 1. Reported hours and types of coach training

Project Coach Code	Cognitive Coaching (hours)	Instructional Coaching (hours)	Content-Focused Coaching (hours)	Other Coaching Trainings (hours)	Total Training (hours)
1			55		55
2					0
3*					0
4		24			24
5	40	90			130
6			18		18
7				24	24
8			3		3
9					0
10					0
11*					0
12		12			12
13			3		3
14			15	10	25
15		12			12
16					0
17				40	40
18		12	40	10	62
19	40				40
20					0
21			15		15

Project coaches 3 and 11 had 0 years of coaching experience at the time of this study.

similarities in how the school-based coaches and the coaching experts viewed the coaching practice of the novice coach were then noted.

After the themes were identified in the data and the data were sorted, we reflected on the themes that are expressed in coaching texts, articles, and standards and compared the way our participants discussed the themes to the way they are discussed in coaching literature. We then reflected on the frequency in which our participants mentioned the themes. We report the culmination of whether or not a participant mentioned a particular theme and how the theme was discussed.

The following subsections of results follow a three-part format for each of three themes. First, we establish that a particular practice (theme) is expressed in coaching texts, articles, and standards. Second, we present the results from our participants under this theme. Third, we offer recommendations for coaching programs that wish to address this aspect of coaching practice.

Results

Developing Teacher Content Knowledge

The issue of developing teacher content knowledge is addressed in several leading coaching texts (and the distinct coaching models they describe), although the texts and models are not consistent in the way they suggest addressing it. *Cognitive Coaching* (Costa & Garmston, 2002) relies heavily on reflective questions to encourage teachers to refine knowledge bases. Instructional Coaching (Knight, 2007) suggests structured co-planning intended to help the teacher make connections among concepts. Content-Focused Coaching (West & Staub, 2003) features a coach who at times takes a more direct approach, actually pointing out important content to the teacher. *A Guide to Mathematics Coaching* (Hull, Balka, & Harbin-Miles, 2009) discusses a scenario in which a teacher who had not acquired an adequate background was coached on effective use of manipulatives with a focus that "not only improved the teacher's knowledge of instructional strategies but also increased her content knowledge" (p. 34).

Some of the differences in how coaching texts recommend addressing teachers' understandings of content result from assumptions about the knowledge base of the coach. The distinct models of instructional coaching (Knight, 2007) and cognitive coaching (Costa & Garmston, 2002) make

no assumptions that the coach is more knowledgeable about the content than the teacher being coached. In contrast, the content-focused coaching model (West & Staub, 2003) and the mathematics coaching model (Hull et al., 2009) assume that the coach has a high level of content knowledge and is more experienced than the teacher being coached.

How a coach approaches teachers' understandings of content is also influenced by the various models' assumptions about relationships. Instructional coaching (Knight, 2007) emphasizes equality and reciprocity in learning among coaches and teachers. Similarly, cognitive coaching (Costa & Garmston, 2002) takes pains to caution against coach actions that resemble evaluation, supervision, and mentoring. The concern is that a coach who directly addresses content misconceptions runs the risk of being perceived as an authority in a hierarchy above the teacher. West and Staub (2003) point out that the relationship between coach and teacher is collegial, but the interaction "will not be symmetrical" (p. 17). In a case study of West's actual experience coaching a new teacher, West shows a willingness to give receptive teachers direct feedback and assistance. West does note the tension between refining a teacher's content and not undermining the coach-teacher relationship, and consequently West is careful to situate the discussion in the development of the lesson or in student learning to deflect some of the tension and avoid direct criticism.

EMS Standards (AMTE, 2009) address teacher content knowledge as the pedagogical knowledge needed for teaching mathematics. The EMS professional must know how and be able to:

- Utilize and build upon learners' existing knowledge, skills, understandings, conceptions, and misconceptions to advance learning.

- Create social learning contexts that engage learners in discussions and mathematical explorations among peers to motivate and extend learning opportunities.

- Use questions to effectively probe mathematical understanding and make productive use of responses. (AMTE, 2009, p. 6)

In this knowledge area, "learner" is defined to be either students or teachers (see footnote 2, AMTE, 2009, p. 3). The standards also suggest that specialists "diagnose mathematical misconceptions and errors and design appropriate

interventions and decide whether, how and how far, to utilize specific oral or written responses from learners" (AMTE, 2009).

Established definitions of coaching knowledge (Sutton, Burroughs, & Yopp, 2011) convey the importance of developing teacher content knowledge, as shown in the following excerpts from six of the eight domains:

- **Assessment:** A coach knows how to assess teachers' needs—personal, instructional, content, and management—and how to assess and use teacher content knowledge and pedagogical content knowledge to inform and support teachers. (p. 16)

- **Communication:** A coach knows how to communicate in problem-resolving conversations. (p. 16)

- **Leadership:** The coach uses this vision and knowledge to inform her or his work with other school leaders, to bridge the gap that may exist between teachers' beliefs and their ability to implement instruction that reflects those beliefs, to earn trust with teachers and administrators, and to enhance teachers' content knowledge. (p. 16)

- **Teacher Development:** A coach knows how to ascertain a teacher's understanding of mathematics, teaching, and learning and is able to differentiate experiences to support an individual teacher's learning. (p. 18)

- **Teacher Learning:** A coach knows the myriad ways teachers know and understand mathematics content and the teacher's pedagogical and pedagogical content needs, which may or may not be recognized by the teacher. (p. 18)

- **Teacher Practice**: A coach knows how to discern teacher beliefs about mathematics teaching practice and holds a depth and breadth of knowledge of all types of practice and instructional resources for effective management and mathematics learning. (p. 18)

Our review of these coaching materials suggests that developing teacher content knowledge is an important coaching practice. The coaching models discussed here assert explicitly that a coach should take specific actions to uncover teachers' mathematics content knowledge and understandings and take action to improve or refine that knowledge and understanding. The variation in the models is largely based in how a coach addresses content deficiencies

among teachers. The differing approaches are due, in large part, to differences in how the coaching models describe the coach-teacher relationship.

Participant responses in video assessment: Content knowledge. Only three of the 21 school-based coaches and three of the six coaching experts commented on the content knowledge of the teachers in the novice coaching video. The following is representative:

(Coaching Expert A) It seems to me these teachers were not particularly knowledgeable about the math they teach, and the coach did not add much to their knowledge base or even expose the fact that their knowledge was not as robust as it may need to be.

Similar subthemes of uncovering teachers' understandings of content and advancing teachers' understandings of content were found in several of the participants' comments. For instance, Coaching Expert B noted that the novice coach "did not draw out or advance the mathematical or pedagogical understandings of the teachers."

In addition to noting the content issues, several participants revealed insights into what a coach would need to know to assess teacher content understanding. For example, the teachers coached in the video worked a stem-and-leaf plot task prior to the coaching session and compared their responses during the prelesson conference. Coaching Expert C noted this moment and wrote, "I became aware [that the teachers were not on the same page] when the teachers realized they had very different stem-and-leaf plots." School-Based Coach Z also made note of this realization, writing, "The commentary on decimals used in stem-and-leaf plots raised my interest here, and I wondered if more study was needed." These statements illustrate that teachers' understandings (and misunderstandings) about content can be exposed when the teachers discuss their solutions to the lesson's main task during prelesson conferences.

Some participants also suggested that the coach has a role in advancing the teachers' knowledge of the task's mathematical content. School-Based Coach Y noted, "The teachers seemed to debate [about the task], but the coach didn't address their misconceptions." In some instances, participants suggested what the novice coach might do in response to the teachers' understandings exposed by the discussion. For example, after noting that the teachers produced different and possibly inaccurate responses to the task,

Coaching Expert C asserted, "I kind of wanted the coach to be more transparent in any concerns." Alternatively, Coaching Expert A offered a less direct approach to dealing with the teachers' inconsistent solutions, stating, "I think the lesson planning sessions need to be much richer and probably include some kind of 'rehearsal' to make sure all the players are clear about what the math concepts are."

Eighteen of the 21 school-based coaches and three of the six coaching experts did not mention the teachers' lack of content knowledge or the coach's lack of attention to the issue. While we cannot say that these respondents did not notice the issue, we can say that they, for whatever reason, did not include it in their assessment of the coach's practice. We argue that because teacher mathematical content knowledge is viewed as critical to effective mathematics instruction and because developing teacher content knowledge is central to several leading coaching models, the topic is fundamental to coaching practice.

Suggestions for coaching programs that wish to focus on developing teacher content knowledge. The results of our analysis and review of coaching texts, definitions, and standards offer specifics about what a coach might do to perform tasks associated with diagnosing and improving teacher content knowledge. Working the upcoming task with teachers and discussing solutions could be a particular way to create social learning contexts conducive to teacher content learning. Collaborating on a task and discussing solutions to the task offer neutral ground where the coach and teacher can learn together as colleagues.

In assisting coaches to recognize this big idea in coaching practice, professional development and support can be focused on how a coach can diagnose and attend to teacher content misconceptions or content deficiencies. Coaches can also be encouraged to engage with teachers in solving the problems that are central to the lesson and helping teachers identify the key mathematical concepts and learning objectives of the lesson. Teacher responses to coach questions give insights into the depth of a teacher's content knowledge and are starting points for attending to teacher content knowledge needs. Coaches can be encouraged to ask questions likely to reveal a teacher's depth of content knowledge.

Promoting Teacher Reflection

Reflection is also recognized as a key component of the coaching process through its inclusion in coaching texts, definitions, and standards. The coach is responsible for engaging the teacher in the process of reflection, although the purpose of this reflection varies across the different coaching models. For example, in cognitive coaching (Costa & Garmston, 2002), a coach's primary objective is supporting teachers in gaining skills in self-directed learning. Instructional coaching (Knight, 2007) states a similar objective with an emphasis on empowering the teacher to make decisions regarding the appropriateness and/or effectiveness of specific teacher actions. In contrast, the goal of reflection in content-focused coaching (West & Staub, 2003) is to "focus on what the teacher can do to assist the students' content-specific learning" (p. 17). Mathematics coaching (Hull et al., 2009) has a related goal of yielding appropriate interventions to support student learning. Despite these differences in purpose, the various models clearly communicate the importance of teacher reflection in the coaching process.

Beyond the purpose of reflection, the authors describing these models also give considerable attention to the coach's role in supporting this process. For example, Knight (2007) states, "[Instructional coaches] don't tell teachers what they should believe; respecting their partners' professionalism, they provide them with enough information to make their own decisions" (Knight, 2007, p. 47). According to Knight, "reflection is only possible when people have the freedom to accept or reject what they are learning as they see fit" (p. 47). Knight's assertions mark clear distinctions between a mentor, who might give specific feedback or praise for actions deemed appropriate or effective by the mentor, and an instructional coach, who facilitates teacher reflection on whether or not the teacher deems the actions appropriate or effective. Facilitating teacher reflection involves mediating the teacher's thinking and beliefs (Costa & Garmston, 2002), a process that can be enhanced through the coach's personal reflection prior to the post-lesson conference (West & Staub, 2003) and through a prepared list of reflective questions (Hull et al., 2009).

With regard to reflective questioning, not all coaching authors express the same insights. West and Staub (2003) assert that beginning the postlesson conference by asking the teacher to reflect (using questions like "How do you think it went?") is "generally a good move" (p. 34) for three reasons. First, this coaching move allows the teacher to express feelings and raise concerns. Second, it allows the coach to focus attention on areas of agreement that are genuinely important to the teacher. Third, this move

encourages the teacher to develop habits of self-monitoring and self-reflection, a goal similar to that expressed by Costa and Garmston (2002). Hull et al. (2009) provide a word of caution, however, stating that such a move may be problematic if the teacher has not gained skills of self-awareness and the ability to be critical of one's own practice.

Recognizing the importance of this reflective process, the EMS Standards also address reflection, stating that EMS professionals must be able to "support teachers in system-atically reflecting and learning from practice" (AMTE, 2009, p. 7). From our analysis, the EMS professional in the role of a coach must be prepared to move beyond judging a lesson based on teacher actions or the behavior of the students and move the teacher toward critical reflection regarding lesson outcomes and student learning.

Established definitions of coaching knowledge (Sutton, Burroughs, & Yopp, 2011) convey the importance of setting goals, collecting evidence, and using reflective questions to support teacher learning and self-reflection, as shown in the following excerpts from four of the eight domains:

- **Assessment:** A coach knows how to use data and assessment of student thinking to inform her or his work with teachers. A coach knows how to help the teacher learn how to set goals and assess lesson effec-tiveness. . . . The coach knows how to help teachers interpret and use assessment data to make informed decisions about instruction and student learning. (p. 16)

- **Communication:** A coach knows how to mediate a conversation, by pausing, paraphrasing, probing, and inquiring. A coach knows how to ask reflective ques-tions. (p. 16)

- **Leadership:** A coach knows how to strategically identify, define, and communicate specific goals and objectives that relate to student success and teachers' professional growth, and align with the institution's vision for mathematics. (p. 16)

- **Teacher Learning:** A coach knows how to support teacher learning through reflective practice and self-directed goal-setting. (p. 18)

The collective review of this coaching literature indicates that engaging in reflective coaching conversations is a big idea in coaching practice, and those conversations should include individualized, shared goals with teachers. Such conversations are likely to be best received and most effective if they are based on evidence of student learning collected during the lesson, particularly student work. Moreover, a coach should use reflective questions, includ-ing sample questions, which the coach can carefully use to navigate a reflective conversation. Because such conversa-tions can be difficult to navigate, given their personal nature, mathematics coaches need to be able to set aside personal opinions and beliefs so as to entrench these con-versations in lesson artifacts, such as student work.

Participant responses in video assessment: Promoting teacher reflection. Only five of the 21 school-based coaches and two of the six coaching experts noted reflec-tion in their assessment of the novice coach's practice. Among those who noted reflection, their assessment of the practice was mixed. Specifically, two of the school-based coaches gave responses indicating that the novice coach successfully engaged the teachers in reflection. Their state-ments follow.

(School-Based Coach X) This coach was skillful in get-ting these teachers to be reflective on their practice.

(School-Based Coach W) During the post-conference, she . . . guided the teachers into evaluating their own teaching. . . . She offered suggestions where necessary, but like the teachers she was watching, she guided the teachers to reflect.

Although both of these school-based coaches indicated that reflection occurred within the debriefing session, nei-ther critiqued the reflection. In contrast, the remaining three school-based coaches, as well as the two coaching experts, indicated that the novice coach failed to engage the teachers in reflection. Two sample responses follow.

(Coaching Expert A) It was great that the coach took notes, but the notes are not specific enough or at least not shared in specific ways that lead to deep reflection of practice. . . . I think the coach has lots of potential, good instincts, but needs to get clear about her purpose, the goals for these teachers, and learn to gather specific evidence that will prompt deep reflection.

(School-Based Coach V) I didn't see deep reflection on the part of the teachers about the mathematics and their students' success or struggles. I thought the coach

might ask the teachers what went well and have some questions ready to reflect, but the conversation was more about what the coach approved of in the lesson.

From these two responses, it would appear that the respondents expected the novice coach to move the conversation beyond a personal perception of strengths of the lesson toward areas for improvement. One should also note the differences that appear between these two responses in terms of the focus of reflection: teaching practice and student learning. The need for depth and focus within the reflection was clearly articulated by other participants as well, who called for "a reflecting conversation that focused on student performance" (Coaching Expert D) and a "reflective 'what could you have improved' conversation" (School-Based Coach U). Of the five statements indicating a lack of reflection, three focused on improving practice of the lesson and two focused on student performance. Improving teacher practice and improving student performance are not necessarily on the same level of influence; however, the ultimate goal of any coaching session is improving student learning.

Sixteen of the 21 school-based coaches and four of the six coaching experts did not comment on the coach's efforts to get the teachers to reflect on their practice. We are not asserting that these respondents did not notice these aspects of the novice coach's practice, but, for whatever reason, the majority of our participants did not mention this aspect when asked to assess the novice coach's practice depicted in the video. Because reflection is central to all the coaching literature reviewed, we include it as a big idea in coaching practice that professional development for coaching should address.

Suggestions for coaching programs that wish to focus on teacher reflection. Coaching programs that focus on promoting teacher reflection can include a discussion of ways to support teachers in becoming self-critical. All of the coaching models discussed in coaching texts promote the use of questioning techniques as a means for moving teachers toward deep reflection of lesson outcomes and student learning. Coaches can be encouraged to use student work and other lesson artifacts as a means for discussing the impact of a lesson on student achievement and improving teacher practice. Though coaches work within a local vision for coaching, they can be reminded that it is appropriate to focus attention on individualized teacher goals that may be unique among other school- or district-based goals.

Promoting Coaching Relationships

Most coaching texts address the coach-teacher relationship, and some coaching models feature coach-teacher relationships as the cornerstone of effective coaching. West and Staub (2003) identify "establishing trusting working relationships among principal, coach, and teachers and building organizational structures within schools so that coaching can take place" (p. 3) as prerequisites to coaching that can help teachers design and implement successful lessons and reflect on issues that are relevant for student learning. Similarly, Knight (2007) as well as Costa and Garmston (2002) both identify the need for relationships as a starting point in bringing about change. Knight (2007) emphasizes that coaches begin the relationship by listening to and respecting the teachers with whom they are interacting. Furthermore, he states that coaches should communicate that they are teachers who are willing to help improve practice and support student learning. To build relationships and get around teacher defensiveness, instructional coaches "can share stories, laugh and empathize, offer positive comments, discuss personal issues, and listen with great care during interviews" (Knight, 2007, p. 94). To this end, Costa and Garmston (2002) lay out useful communication and relationship-building tools that coaches can employ to help change beliefs that lead to changes in behavior.

Recognizing the importance of relationship building, Hansen (2009) suggests that "empathetic coaches with effective communication skills create trusting and respectful relationships with their peers" (p. 37). This relationship can move from casual conversations and informal classroom walkthroughs to more formal observations and interactions over time. In establishing collaborative working relationships, it is important to establish clear norms for how the coach and teacher can interact. Hansen (pp. 39–41) identifies three types of relationships that can take place: a resource relationship (in which the coach is a resource to the teacher); a modeling relationship (in which the coach models standards-based instruction); and a collaborative relationship (in which the coach and teacher share the same pedagogical beliefs about teaching and learning).

The Math Coach Field Guide (Felux & Snowdy, 2006) advocates making good relationships with teachers a priority. According to the authors, a coach can establish a good relationship by helping teachers understand that the coach values the work they are doing with students. At a time when

many teachers will feel vulnerable to outsiders coming into their classrooms, it is important to establish good rapport early while gradually moving toward the collaborative coach-teacher relationship.

Cultivating a Math Coaching Practice (Morse, 2009) focuses on building collaborative relationships in support of learning goals. The author indicates that coaches' leadership skills originate in the ability to align teacher skills and coaching goals through relationships and collaboration with others.

In *A Guide to Mathematics Coaching* (Hull et al., 2009), an entire chapter emphasizes the importance of building rapport with teachers. As the authors state, "A collaborative relationship enables a coach to help teachers develop deep mathematical content knowledge and effective research-based instructional strategies" (p. 24). The authors note that rapport is a foundational aspect of goal attainment, which is accomplished through trust developed through "positive relationships" over time.

Each of these authors recognizes the role of relationships in the coaching process, though there is some disagreement worth noting. Knight (2007) poses the question, "What good does it serve students if an [instructional coach] and teacher work together in a healthy relationship but their friendly conversation has no impact on the quality of the teacher's teaching?" At the end of that passage, however, Knight asserts, "If we are viewed in such a way [considered as any other teacher], and teachers come to see us as colleagues they can trust, there is a good chance that together we can make a difference in the way teachers teach and students learn in schools" (p. 52).

West and Staub (2003), on the other hand, do not view content-focused coaches as "any other teacher," but instead assert that the relationship between coach and teacher, while collegial, "will not be symmetrical" (p. 17). Killion (2009) draws clear distinctions between coaches who coach light and coaches who coach heavy. Killion (2009) asserts that "coaching light results in coaches being accepted, appreciated, and even liked by their peers" (p. 22), but that such actions result in "coaches who are valued, although may not be needed" (p. 22). In contrast, coaching heavy occurs when coaches ask thought-provoking questions and have fierce and often difficult conversations. "Coaching heavy causes [teachers] to feel on edge, questioning their actions and decisions" (p. 24).

The EMS Standards address relationships as well:

EMS professionals must be able to: Use leadership skills to improve mathematics programs at the school and district levels, e.g., develop appropriate classroom- or school-level learning environments; build relationships with teachers, administrators and the community; develop evidence-based interventions for high- and low-achieving students; collaborate to create a shared vision and develop an action plan for school improvement; partner with school-based professionals to improve each student's achievement; mentor new and experienced teachers to better serve students. (AMTE, 2009, p. 8)

Established definitions of coaching knowledge (Sutton, Burroughs, & Yopp, 2011) convey the importance of negotiating professional relationships. They include related domains of Communication and Leadership, but also address the domain of Relationships directly:

Relationships: A coach knows that the coaching relationship is grounded in content and how to use the relationship to support self-directedness in teachers. A coach knows how to communicate professionally with a variety of audiences, and knows how to establish and maintain rapport and credibility with teachers and other stakeholders based on trust, empathy, mutual understanding, and confidentiality. A coach knows about environments where positive relationships take place, including challenging and safe learning environments for teachers and students, collaborative working environments, and environments where people share common beliefs and goals with honest reflection. The coach knows how to work within the specific culture of the district and school. The coach knows how autonomy, issues of authority, and socio-cultural aspects of class, race, and gender for students and teachers influence relationships and influence perceptions and models of help and authority. (p. 17)

Participant responses in video assessment: Promoting coaching relationships. After viewing the video of the novice coach, only seven of the school-based coaches and coaching experts commented on the characteristics of the relationship between the novice coach and the teachers: five of the 21 school-based coaches and two of the six coaching experts. Four of the school-based coaches and one of the coaching experts mentioned favorable aspects of the relationship, as in these examples: "It was obvious to

me that there was a rapport and trust relationship between the three women" (School-Based Coach T), and "The coach was not intimidating; the teachers seemed comfortable with her and conversed with her" (Coaching Expert B). One school-based coach and one coaching expert mentioned unfavorable aspects of the relationship, as in this response from Coaching Expert E: "The planning process appeared stilted and uncomfortable for the coach and teachers."

One coaching expert made specific comments about the purpose of the coaching relationship: "This level of coaching may get 'relationships' developed . . . but it doesn't dive deep enough into content and doesn't challenge practice" (Coaching Expert A). Rather than focusing on the existence of a relationship between a coach and a teacher, this coaching expert's comment suggests that it is the focus of the relationship that is important in coaching.

Sixteen of the 21 school-based coaches and four of the six coaching experts did not comment on the coach-teacher relationship. We are not asserting that these respondents did not notice the coach-teacher relationship, only that the majority of our participants did not comment on it. Moreover, we noted that those who commented on the coach-teacher relationship did not do so in a consistent manner (e.g., some expressed a favorable view of the coach-teacher relationship and some criticized the relationship). Given that the coaching texts, definitions, and standards we reviewed make explicit reference to relationships, we believe that this aspect is a big idea in coaching practice. We believe that there is enough diversity in the how coach-teacher relationships are described in the literature that professional development can address various specific relationship characteristics.

Suggestions for coaching programs that wish to focus on coach-teacher relationships. The coaching literature supports a variety of possible relationship structures and addresses their consequences. This literature suggests several ways to establish and maintain relationships, as well as ways to move relationships beyond superficial discourse. Because some schools adopt a volunteer coaching program in which teachers have a choice as to whether or not to invite the coach into their classrooms, failure to appropriately address coaching relationship issues can result in teachers' closing their doors to coaches.

Local visions for mathematics coaching would benefit from explicitly defining the coach-teacher relationship

prescribed by their coaching models. Given the consistency with which relationships are conveyed as a cornerstone of successful coaching, and the variation in what constitutes an "effective" relationship, it would be advantageous for mathematics coaching programs to provide specific guidance and direction regarding how to establish, build, and nurture relationships in a variety of contexts with teachers at different stages along the continuum of change. For example, some programs might focus on how to ensure that the coach-teacher relationship is collegial. Other programs might focus on how to ensure that the relationship is grounded in professional discussions and centered on content and curriculum or student learning. Other programs might ask how to ensure that teachers readily participate in pre-and postlesson discussions. All programs will likely focus on establishing trust in the coach-teacher relationship.

Discussion

We asked a sample of school-based coaches and coaching experts to assess the practice of a novice coach featured in a video-recorded coaching session. Our results indicated little consistency across participants' comments, especially regarding three coaching aspects that are big ideas in coaching practice: developing teacher content knowledge, promoting reflection by the teacher, and negotiating professional relationships. Our own efforts to focus a professional development course in mathematics coaching were enhanced by our use of this video-observation assessment as a precursor to the course.

Summary suggestions for local coaching programs. There was little consistency in comments about the three big ideas in coaching practice among both the practicing coaches and the coaching experts, indicating that our findings are not limited to the particular characteristics of the coaches enrolled in our program. Instead, the lack of consensus among coaching experts emphasizes to us that a coaching professional development program or local vision for coaching would do well to focus on these three areas. Despite the widespread availability of texts that address mathematics coaching, at present there is not a shared understanding of what coaching practice that focuses on these three areas looks like. With the available material, however, local coaching programs can decide how to focus a coaching program that addresses these three areas by consulting these available resources.

How we used the study results to shape our own work with coaches. We acknowledge that our method has limitations that may have influenced our data collection or analysis. Using the open prompt "assess" allowed for our participants to comment on what they found to be most important, but may have limited their responses in a way that more specific prompts about these three big ideas would not have. Also, our prior work with teaching professionals has taught us how reluctant teachers and coaches can be to critique another professional, so it is possible that our participants noticed these aspects of coaching practice but chose not to comment on them. However, having focused our professional development course on these three aspects, we received comments from those who attended that its focus provided them the structure they needed to understand the aspects of developing teacher knowledge, promoting reflection, and negotiating professional relationships in coaching practice. We conclude that this assessment correctly allowed us to target our mathematics coaching professional development, and we encourage other coaching programs to focus, at least in part, on these three aspects of coaching practice. ✪

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