WHAT AND HOW EXPERIENCED AND NOVICE COACHES NOTICE: A FRAMEWORK TO ANALYZE COACH NOTICING

Julie M. Amador
University of Idaho
jamador@uidaho.edu

Ryan Gillespie
University of Idaho
rgillespie@uidaho.edu

Jennifer Kruger
University of Rochester
jkruger@warner.rochester.edu

Adam Hanan
University of Idaho
hana3274@vandals.uidaho.edu

We examined what and how experienced (mentor coaches) and novice coaches (coach participants) noticed as they analyzed a vignette of a coaching interaction between a coach and a teacher. We modified the van Es (2011) Learning to Notice Framework for a coaching context to analyze What and How coaches notice. We collected data from ten mentor coaches, who were experienced coaches and ten coach participants who were more novice coaches. We compared pre and post noticing for coach participants based on a two-year professional development model and compared the noticing to the mentor coaches. Findings indicate coach participant noticing for What and How coaches notice collectively shifted toward a greater focus on the teacher, included more interpretation, and was more specific from the beginning of the professional development to the end. The mentor coach noticing, on average, was more teacher-focused, interpretative, and specific than those of the coach participants.

Keywords: Noticing, Professional Development, Coaching, Online Professional Development, Vignette

Coaching is a professional development process used to support teachers to improve their instruction (West & Staub, 2003). Within mathematics education, content-focused coaching (e.g., West & Cameron, 2013) is one common coaching model that involves iterative cycles in which a coach works one-on-one with a teacher with a focus on mathematical learning goals for students. Coaching cycles are typically comprised of three sequential components: a pre-conference discussion to plan a lesson; a collaboratively taught lesson; and a post-conference discussion to debrief the lesson (Bengo, 2016; West & Staub, 2003). When coaching, the coach is charged with responding to multiple simultaneous obligations, such as supporting the teacher to design a high-quality lesson, providing the teacher with assistance to learn mathematics content and pedagogy, and establishing a trusting and productive relationship with the teacher. Given the complexity of coaching, it is important to focus on how coaches learn to coach (Stein et al., 2022) and what they notice in the process of coaching. Research on noticing (e.g., Mason, 2002) has shown that attending to stimuli and interpreting what is attended to is important when making productive instructional decisions.

The purpose of this paper is to provoke consideration about what is important to notice in a mathematics coaching context and illuminate critical events coaches and mentor coaches (those with more experience) notice. Additionally, we were interested in analyzing how coaches notice aspects of coaching conversations. Researchers of teacher noticing have traditionally classified more advanced forms of noticing as those focused on students' thinking, as compared to teacher

Lamberg, T., & Moss, D. (2023). *Proceedings of the forty-fifth annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education* (Vol. 1). University of Nevada, Reno.

pedagogy (e.g., Jacobs et al., 2010; van Es, 2011). Building on teacher noticing, the intent is to better understand the critical events that coaches notice and consider coach noticing in coordination with existing teacher noticing frameworks. The following question is answered: When analyzing a coaching conversation between a coach and a teacher (a) *What and How* do coaches (coach participants and mentor coaches) notice? We situate the study within an innovative online mathematics video coaching experience, adapted from an in-person modality to an online modality to support coaches (Choppin et al., 2020).

Theoretical Framing and Related Literature

We theoretically frame this paper with noticing, adhering broadly to noticing as the concept of attending to and interpreting that which is important in each context. The work of Jacobs et al. (2010) foregrounds students' mathematical thinking as the focal aspect, signifying the importance for teachers to attend to and interpret students' thinking and then make responsive decisions based on the interpretation. Cognizant of the work of Jacobs and colleagues, we draw heavily on the concepts of noticing and learning to notice of Sherin and van Es (2009). We consider noticing to be a learned skill (i.e., van Es, 2011) with levels of traceable progression to denote more advanced forms of noticing from more rudimentary forms of noticing. We also recognize various avenues through which one could notice, such as variation in noticing the actor, variety in topic, and differing approaches in the stance of noticing (e.g., Sherin and van Es, 2009). Considerate of the purpose of our project—to support and train mathematics coaches—we consider the applicability of the Learning to Notice Student Mathematical Thinking Framework (van Es, 2011) in a context beyond that of a student and teacher in a classroom: that of coaching in contrast with that of teaching. We argue that the concept of learning to notice is as applicable in a coaching conversation as it is in a teaching conversation and emphasize transferability of noticing beyond the classroom context.

The actions of coaching and what coaching entails varies based on context, coaching model, and the coaches and teachers taking part. In a study on conversational behaviors of early childhood coaches, Jayaraman et al. (2015) highlight the work of Trivetter (2009), noting that adults learn best when they are active participants, can apply their learning in an immediate context, and have multiple opportunities to practice their learning and reflect. However, the core of coaching and what the role encompasses varies depending on context and intended function. Russell et al. (2020) recognized that roles for coaches are not all the same, but the process typically includes creating intensive teacher learning opportunities that are job embedded, which occur through workshops, one-on-one work, and professional learning communities. Gibbons and Cobb (2017) described specific activities in which coaches take part. They noted that coaching can include analyzing classroom videos, facilitating book studies, visiting classrooms, co-designing instruction, conducting action research, examining student work, and more. These activities can vary in duration and intensity, with some lasting an entire school year and others being single opportunities. In many cases, the divergence in coaching activities (e.g., Johnson et al., 2018; Russell et al., 2020) can be attributed to different models of coaching. In the mathematics education context, common models include instructional coaching (Knight, 2007), cognitive coaching (Garmston, Linder, & Whitaker, 1993; Denton & Hasbrouck, 2009), and content-focused coaching (West & Staub, 2003).

Content-focused coaches strive to deepen a teacher's understanding of the content they teach and content-specific pedagogy needed to foster student learning (West & Staub, 2003). According to West and Staub (2003), the art of content-focused coaching lies in balancing

"direct assistance" coaching moves that provide teachers with specific instruction or guidance and coaching moves "that invite teacher contributions" such as self-reflection throughout these three phases (p. 15). Learning to coach in this way, and to coach in ways that ultimately support teacher learning is challenging. Baker and Knapp (2019) recognized the importance of supporting coaches and developed a tool, the Decision-Making Protocol for Mathematics Coaches, to help coaches be purposeful in their work. They argued that mathematics cannot be separated from the work of coaching. Results from their work indicated that support may be necessary to help coaches with their interactions with teachers. Analysis of coaching interactions has shown that coaching actions can support teacher learning (Gibbons & Cobb, 2016). Although Gibbons and Cobb (2016) focused on coaches' actions and not how coaches talk with teachers, they identified particular aspects of coaches' planning practices that supported teaching, such as identifying long-term goals, assessing instructional practice, and identifying paths for teacher development, among others. Their work and others (e.g., Sailors & Shanklin, 2010) have shown that coaching can have positive outcomes; however, more research is needed on how to support coaches and on how coaches learn and perceive coaching interactions. To know how to support coaches, data on coach thinking and how coaches approach their work is necessary. Parallel to teacher noticing, we consider coach noticing to be an essential aspect of a coach's practice that may relate to a coach's ability to effectively support their teachers. Therefore, knowing what and how coaches notice as they analyze coaching conversations can illuminate how coaches approach and make sense of coaching situations, a foundational step needed to better support coach development. Just as classroom teachers analyze students' thinking and work, often based on video of teaching episodes, we argue a similar importance for coaches analyzing teachers' thinking based on coaching interactions.

Methods

In our content-focused coaching model (Choppin et al., 2021), coaches engaged teachers in online coaching cycles that included a planning meeting, lesson implementation, and a debriefing meeting. We then used video from the planning discussions of the coaching cycles to provide professional development to those learning to coach. For the purposes of this study, we engaged coaches (termed *coach participants*) and those teaching coaches (termed *mentor coaches*) in analyzing segments from transcriptions of three different planning discussions—we refer to both groups collectively as *participants*. We refer to the transcribed segments from the planning discussions as *vignettes* to determine what and how coaches notice.

Participants

Participants included 10 mentor coaches and 10 coach participants. Mentor coaches were part of the project team and had experience as mathematics coaches. Their role was to provide professional learning opportunities to those learning to coach. Coach participants were those enrolled in our professional development experiences as participants (see Amador et al., 2021) to learn how to support teachers through content-focused coaching cycles.

Data Collected

Data came from interviews with each of the 20 participants. Participants were interviewed about their coaching background and practices. The interviews also included the focal section for this analysis, which we term *vignette analysis*. Prior to the interview, each participant was given three different vignettes, which were actual transcripts from coaching conversations we recorded as part of a prior professional development project to support teachers. We used transcripts from our prior project intentionally, as they reflected authentic coaching conversations. Each of the

three vignettes was from a different coach; we purposefully selected coaches for the vignettes who had varying discourse patterns (see Gillespie et al., 2019). The vignettes represented approximately 3-5 minutes of coaching conversation. For the purpose of this paper, we focus on only one of the three vignettes. During the interview, participants—both mentor coaches and coach participants—being interviewed were given time to review the vignettes. In addition to the transcript of the coaching conversation that included 14 talk turns back and forth between the coach and teacher, participants were given the following overview:

In this vignette, the coach and teacher are planning a lesson about fractions in a 4th grade classroom. The lesson involves a task in which students are asked to use visual strategies to determine the amount of brownies a person would receive if seven brownies were shared between four friends.

For the interview process, participants had copies of the entire transcript of the vignette and were given as much time as they needed to review the transcript and respond to prompts. Figure 1 shows an excerpt from the transcript participants were provided.

1	Coach 1:	Let's start with what's our goal. What are we trying to achieve by doing this task?
2	Teacher 1:	I think the goal is to see how they can divide eight brownies, or a group of brownies into seven parts, no, four parts equally. Taking what they have, seven, and how can these four people all get the same amount?
3	Coach 1:	That's zooming in on this problem itself. If we try to step out, one step, mathematically speaking, what are we trying, what's the big idea that we're trying to get at with the kids?
4	Teacher 1:	The big idea for them is to make sure that they can visually represent the division in the fractions and support their answers that way.

Figure 1. Vignette excerpt

Participants were asked a series of questions about the vignette. For the purposes of this study, we focus on one question they were asked because it was specific to noticing and designed to broadly elicit what they notice: (a) What is your overall reaction and what did you notice as you read the vignette? The prompt was intentionally open-ended to gather participants' initial noticing about the coach and teacher interactions in the vignette.

In this paper, we focus on coach participant responses at the point they entered the two-year professional development project (pre data, n=10) and responses to the same vignettes at the point they exited the two-year professional development project (post data, n=10). We also analyzed responses from the mentor coaches at one point in the project (n=10), intentionally not interviewing them pre/post as they were leading the professional development. The purpose of including the mentor coaches in the analysis was to provide a baseline of the type of noticing that occurred for these vignettes by those with considerable experience teaching and coaching mathematics. There were 10 coach participants, resulting in 20 analyzed responses (including pre and post) and 10 mentor coaches, resulting in 30 total coded responses.

Data Analysis

To answer the research question, about what and how do coaches (coach participants and mentor coaches) notice, we worked from the Learning to Notice Student Mathematical Thinking Framework (van Es, 2011) and modified it for the purposes of analyzing a coaching

conversation, as compared to the implementation of a lesson. Figure 2 shows the modified framework, termed the Coach Noticing Framework.

	Level 1 Baseline	*Level 2 Mixed*	*Level 3 Focused*	*Level 4 Extended*
What Coaches Notice	Attend to whole conversation, participant engagement or behavior, the math task or related lesson plan broadly	Primarily attend to coach's action Begin to attend to teacher's mathematical thinking or pedagogical reasoning	Attend to teacher's mathematical thinking or pedagogical reasoning	Attend to the relationship between teacher's mathematical thinking or pedagogical reasoning and coach's action
	Level 1 Baseline	*Level 2 Mixed*	*Level 3 Focused*	*Level 4 Extended*
How Coaches Notice	Form general impressions of what occurred Provide descriptive and evaluative comments Provide little or no evidence to support analysis	Form general impressions and highlight noteworthy events. Provide primarily evaluative with some interpretive comments Begin to refer to specific events and interactions as evidence	Highlight noteworthy events Provide interpretive comments Refer to specific events and interactions as evidence Elaborate on events and interactions	Highlight noteworthy events Provide interpretive comments Refer to specific events and interactions as evidence Elaborate on events and interactions Make connections between events and principles of teaching and learning On the basis of interpretations, propose alternative coaching solutions.

Figure 2. Coach Noticing Framework

For clarification to Figure 2, to be coded as a Level 3 for *What*, the response had to focus on specific aspects of the teacher's mathematical thinking (meaning the teacher in the vignette). To be coded as a Level 4 for *What*, we considered comments about the teacher's content knowledge to be encompassed in the meaning of "teacher's mathematical thinking.

Data from the coach participants and mentor coaches were entered into a spreadsheet and blinded for participant type and for whether or not the response was pre or post for the coach participants. Four researchers each independently coded each of the vignette responses for the 30 total participants, assigning only one level for *What Coaches Notice* and one level for *How Coaches Notice*, based on the Coach Noticing Framework. The entire utterance of the coach in

response to prompts about what was noticed was coded. The highest noticing level obtained at any point in the utterance was the code assigned, similar to the coding process of other researchers analyzing noticing (i.e., Jacobs et al., 2010). The four researchers then met and reconciled each of their codes until they agreed on all 30 responses. Data were then unblinded by participant type and whether the response was at the beginning of the project (pre) or end (post) for coach participants. Descriptive statistics were then calculated, with attention on the 10 mentor coaches and 10 coach participants. Themes in the levels of responses and types of responses were then identified. For example, all responses receiving a Level 1 code for *What* were reviewed and memos were written about similarities. This was done for each of the eight options (i.e., *How Coaches Notice* Level 1-4; *What Coaches Notice*, Level 1-4).

Findings

From analyzing 20 pre and post participation responses from coach participants and 10 responses from mentor coaches, we identified three noteworthy trends.

Coach Participant and Mentor Coach Noticing

First, based on averages, the mentor coaches noticed at higher levels than the coach participants for *What Coaches Notice* and *How Coaches Notice*. The baseline noticing for coach participants (pre) for *What Coaches Notice* was 1.6/4.0, compared to a baseline noticing for mentor coaches at 2.2/4.0. The baseline noticing for coach participants for *How Coaches Notice* was 1.9 for coach participants (pre) compared to 2.4 for the mentor coaches. For both *What Coaches Notice* and *How Coaches Notice*, the mentor coaches as a group demonstrated higher levels of noticing. Despite the difference in overall average, we found variability within each group. Four of the ten coach participants and three of the ten mentor coaches noticed at a Level 1 for both *How Coaches Notice* and *What Coaches Notice*, indicating that despite the increased coaching experience, the mentor coaches were not all focused on teachers' reasoning (*What*) or focused on noticing in a way that emphasized elaborated interpretation and connections.

To illustrate the Level 1 findings there were evident in both participant groups, we provide an example. Coach Arnold, a coach participant, shared the following during the pre-interview in response to the question, "What is your overall reaction and what did you notice as you read the vignette?":

> One thing that really stuck out to me about that one was that they were spending a lot of time kind of anticipating what kids would do and what felt hard and how they would tackle that, which I thought was important. It was really focused on the goal.

We coded this statement as "Level 1 - Baseline" for *What Coaches Notice* because the statement from the participant coach broadly described the focus of the vignette conversation without any attention to the coach actions or teacher thinking. Similarly, we coded this statement as "Level 1 - Baseline" for *How Coaches Notice*. This score was based on the participant coach providing only descriptive and evaluative comments, without any attempt at interpreting events in the vignettes using evidence.

Of notable difference between the coach participant group and mentor coach group was the demonstration of higher levels of noticing. For the baseline data, all coach participants noticed at a Level 1 or Level 2 for both *What Coaches Notice* and *How Coaches Notice*. No coach participant reached a Level 3 or Level 4. In contrast, five of the mentor coaches noticed at a Level 3 or Level 4 for either *What Coaches Notice* or *How Coaches Notice*, indicating half of the mentor coaches demonstrated more advanced noticing. In fact, two of the mentor coaches

noticed at a Level 4 for both *What Coaches Notice* and *How Coaches Notice*. When comparing the two different participant groups, the range in noticing from the mentor coach group compared to similarities in How coach participants noticed, within the group, is a notable point. And although mentor coaches on average noticed at higher levels, higher levels of noticing were not evident for all mentor coaches, which speaks to the challenge of learning of notice effectively, even for those with considerable experience.

Changes in Participant Coach Noticing

Second, when comparing the pre and post noticing levels for coach participants, increases were seen in the averages for *What Coaches Notice* and *How Coaches Notice*. For the coach participants, the average level of noticing for *What Coaches Notice* increased from 1.6 to 1.9 from pre to post and the average level of noticing for *How Coaches Notice* increased from 1.9 to 2.0. Most coach participants noticed at a Level 2 or higher for the post response. Table 1 shows the breakdown for pre and post for coach participants for both *What Coaches Notice* and *How Coaches Notice*.

Table 1: Comparison of Coach Participant Noticing

	Pre-participation Responses		Post-participation Responses	
Participant Coach	What	How	What	How
Dyson	1	1	2	1
Stevens	2	2	2	4
Bell	1	1	1	2
Butler	1	2	2	1
Clark	2	2	2	2
Glover	1	1	1	1
Logan	2	3	3	3
Rice	1	2	3	1
Howard	2	2	1	2
Snyder	2	2	2	3
Participant Coach Average	1.6	1.9	1.9	2

The following is an example of a Level 2 response for *What* and *How* coaches notice:

> I really thought it went well. You know? I highlighted how the coach starts right away with, "Let's start with, what's our goal?" It's very goal-focused. I like that the coach used the word "our" instead of "your". It kind of takes ownership. You know? They're working together as a team. The coach also did a great job letting the teacher talk and having the wait time to really let the teacher get their thoughts out. The coach wasn't jumping in and trying to give the answers. The one question the coach asked was like, "What's the big idea?" Which I thought was great. "Let's talk about what we think the kids are going to do with this problem. What misconceptions might pop up." I just thought that the coach did a really good job in drawing stuff out of the teacher that the teacher might not have necessarily thought of.

In this example, for *What Coaches Notice*, the coach participant primarily focuses on the coach and the actions of coach, with some indication about the teacher. The response is primarily evaluative, with comments such as, “the coach did a really good job”, with some initial interpretation such as indicating that that particular pronoun used demonstrated shared “ownership.” Responses that this level were common in the post data, with 7 of 10 coach participants noticing at a Level 2 or higher for *What Coaches Notice* and 6 of 10 noticing at a Level 2 or higher for *How Coaches Notice*.

Third, we found inconsistent changes from pre to post when analyzing coach participant data with respect to whether or not noticing improved from the beginning of the two-year professional development to the end. Results at the individual coach participant level, comparing changes from pre to post in noticing indicated that for *What Coaches Notice*, 4 of 10 coach participants increased their noticing level, 5 remained the same, and 1 decreased. For *How Coaches Notice*, 3 of 10 coach participants increased their noticing level, 5 had the same level pre and post, and 2 decreased. Only one coach participant increased their noticing level for both *What Coaches Notice* and *How Coaches Notice* from the pre to the post data collection. These findings indicate that even though the average level of noticing for *What Coaches Notice* and *How Coaches Notice* increased from the pre to the post interviews, the data were inconsistent at the participant level.

Despite the variability, there were coach participants noticing at higher levels at the end of the project. The following is an example from a coach participant coded as a Level 3 for *What Coaches Notice* and Level 3 for *How Coaches Notice*, from the post data set:

> I noticed that, at the beginning, the coach asked, "What's the goal," and I think the teacher—I don't remember exactly—but sets a mathematical goal. The coach pushed her more to think—like a mathematical thinking goal or a bigger, overarching idea goal? I liked that there was that push to really think about a deeper goal for her instruction. I noticed, at some point, they were talking about misconceptions, and it seemed like—I think the coach—the teacher said, "A misconception?" and then the coach validated, like, "Right." Then the teacher kept talking. I thought that was valuable, and I think that the coach's input wasn't too, it wasn't trying to steer the teacher into a different direction. It was more carrying the conversation.

In this example, the teacher's thinking is mentioned, even quoted at one point, and the emphasis is on the interaction between the coach and teacher. The coach participant makes interpretations about the coach's intent with the conversation, "to steer the teacher into a different direction" and discusses how the coach pushes the teacher toward increased mathematical thinning and emphasis on the big mathematical idea.

Discussion and Conclusion

We consider the shift of coach participant noticing toward higher levels as a group to be noteworthy; however, we also highlight the lack of change for some participants and the shift to lowers levels for others to be worth consideration. Of note, we recognize that no aspect of the three-part professional development process was focused specifically on noticing, although the emphasis was on supporting coach participants to learn how to support teachers, thus an emphasis on considering teachers and making responsive decisions—aspects akin to noticing (e.g., Jacobs et al., 2010; van Es & Sherin, 2002). Likewise, neither the coach participants nor the mentor coaches had the Coach Noticing Framework (Figure 2) during the professional learning activities. We conjecture that if we had specifically focused the professional development on the framework, then we would have seen more dramatic shifts in noticing. Given that the framework was not available for participants, we consider the shifts that occurred noteworthy and consider the changes favorable for many of the participants. Additionally, we conder the modification of the van Es (2011) Learning to Notice Student Mathematical Thinking Framework to be a contribution to the field of coaching and noticing, as the framework provide ways for the field to analyze and consider noticing in a coaching context, specifically, content-focused coaching (e.g., West & Staub, 2003).

Acknowledgments

This material is based upon work supported by the National Science Foundation under Grant #2006263. We acknowledge the contributions of Jeffrey Choppin and Cynthia Callard.

References

Amador, J. M., Bragelman, J., & Superfine, A. C. (2021). Prospective teachers' noticing: A literature review of methodological approaches to support and analyze noticing. Teaching and Teacher Education, 99. https://doi.org/10.1016/j.tate.2020.103256

Baker, C., & Knapp, M. (2019). The decision-making protocol for mathematics coaching: Addressing the complexity of coaching with intentionality and reflection. Mathematics Teacher Educator, 7(2), 27-43. https://doi.org/10.5951/mathteaceduc.7.2.0027

Bengo, P. (2016). Secondary mathematics coaching: The components of effective mathematics coaching and implications. Teaching and Teacher Education, 60, 88-96.

Cherasaro, T.L., Broderson, R.M., Reale, M.L., & Yanoski, D.C. (2016). Teachers' response to feedback from evaluators: What feedback characteristics matter? U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Center, Washington, DC. https://files.eric.ed.gov/fulltext/ED570162.pdf

Choppin, J., Amador, J., Callard, C., Carson, C., Gillespie, R., Kruger, J., Martin, S., & Foster, G. (2021). A three-part synchronous online model for middle grades mathematics teachers' professional development. In K. Hollebrands, R. Anderson, & K. Oliver (Eds.), Online Learning in Mathematics Education.(pp. 167- 186). Springer.

Corbin, J., & Strauss, A. (2008). Basics of qualitative research: Techniques and procedures for developing grounded theory (3rd ed.), SAGE Publications. https://doi.org/10.4135/9781452230153

Costa, A. L., & Garmston, R. J. (2016). Cognitive coaching: Developing self-directed leaders and learners. Rowan & Littlefield.

Denton, C. A., & Hasbrouck, J. (2009). A description of instructional coaching and its relationship to consultation. Journal of Educational and Psychological Consultation, 19(2), 150-175. https://doi.org/10.1080/10474410802463296

Garmston, R., Linder, C., & Whitaker, J. (1993). Reflections on cognitive coaching. Educational Leadership, 51(2), 57-61.

Gibbons, L. K., & Cobb, P. (2016). Content-focused coaching: Five key practices. The Elementary School Journal, 117(2), 237-260. https://doi.org/10.1086/688906

Gibbons, L. K., & Cobb, P. (2017). Focusing on teacher learning opportunities to identify potentially productive coaching activities. Journal of Teacher Education, 68(4), 411-425. https://doi.org/10.1177/0022487117702579

Ippolito, J. (2010). Three ways that literacy coaches balance responsive and directive relationships with teachers. The Elementary School Journal, 111(1), 164-190. https://doi.org/10.1086/653474

Jacobs, V., Lamb, L., & Philipp, R. (2010). Professional noticing of children's mathematical thinking. Journal for Research in Mathematics Education, 41(2), 169–202. https://doi.org/10.5951/JRESEMATHEDUC.41.2.0169

Jayaraman, G., Marvin, C., Knoche, L., & Bainter, S. (2015). Coaching conversations in early childhood programs. Infants & Young Children, 28(4), 323-336. https://doi.org/10.1097/IYC.0000000000000048

Johnson, S. R., Pas, E. T., Bradshaw, C. P., & Ialongo, N. S. (2018). Promoting teachers' implementation of classroom-based prevention programming through coaching: The mediating role of the coach–teacher relationship. Administration and Policy in Mental Health and Mental Health Services Research, 45(3), 404-416.

Knight, J. (2007). Instructional coaching: A partnership approach to improving instruction. Corwin.

Landis, J. R., & Koch, G. G. (1977). The measurement of observer agreement for categorical data. Biometrics, 33, 159–174.

Russell, J. L., Correnti, R., Stein, M.K., Thomas, A., Bill, V., & Speranzo, L. (2020). Mathematics coaching for conceptual understanding: Promising evidence regarding the Tennessee math coaching model. Educational Evaluation and Policy Analysis, 42(3), 439-466. https://doi.org/10.3102/0162373720940699

Sailors, M., & Shanklin, N. L. (2010). Introduction: Growing evidence to support coaching in literacy and mathematics. The Elementary School Journal, 111(1), 1-6. https://doi.org/10.1086/653467

Sherin, M. G. & van Es, E. A. (2009). Mathematics teachers' "learning to notice" in the context of a video club. School of Education and Social Policy, 24(2), 244-276. https://doi.org/10.1016/J.TATE.2006.11.005
Stein, M. K., Russell, J. L., Bill, V., Correnti, R., & Speranzo, L. (2022). Coach learning to help teachers learn to enact conceptually rich, student-focused mathematics lessons. Journal of Mathematics Teacher Education, 25(3), 321–346. https://doi.org/10.1007/s10857-021-09492-6
van Es, E. A. (2011). A framework for learning to notice student thinking. In M. G. Sherin, V. R. Jacobs, & R. A. Philipp (Eds.), Mathematics teacher noticing: Seeing through teachers' eyes (pp. 134-151). Routledge.
West, L., & Cameron, A. (2013). Agents of Change. Heinemann.
West, L., & Staub, F. C. (2003). Content-focused coaching: Transforming mathematics lessons. Heinneman.