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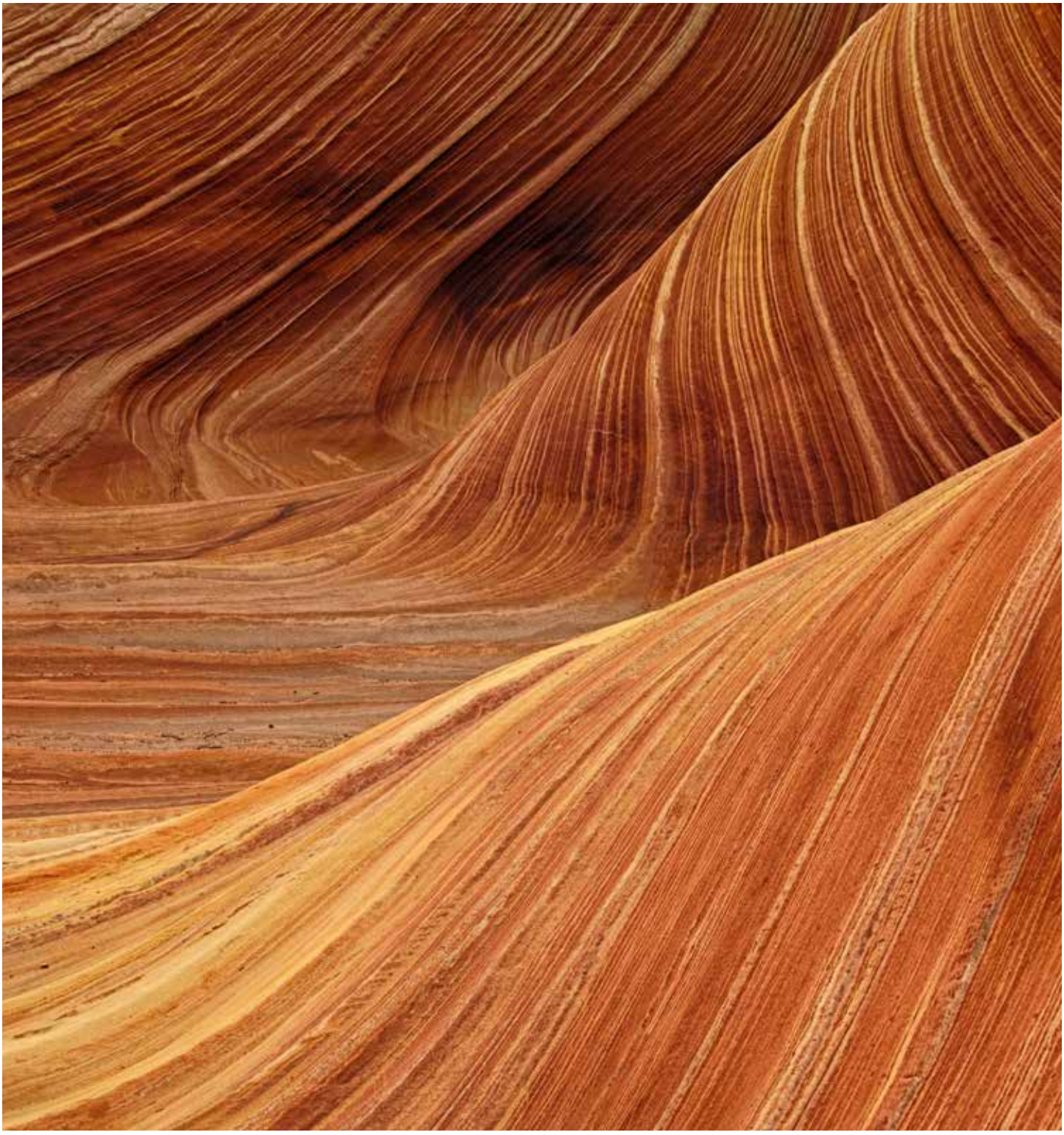

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The Teacher Action Q-Sort: A Card-Sorting Tool for Professional Learning

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Abstract

Reflection is an essential component of classroom teaching that successful mathematics teachers perform routinely and it is one of the imperatives that the National Council of Supervisors of Mathematics has identified as being integral to the provision of effective instruction that maximizes learning for all students. Reflecting on one's mathematics teaching promotes self-awareness and facilitates the implementation of the desired teaching practices. In this article, we report on the use of a Q-sort to promote teachers' reflection on their teaching as the latter relates specifically to their enactment of teacher actions associated with high-quality teaching practices. We share teachers' reflections on their use of the Teacher Action Q-sort and their views regarding the benefits of using a Q-sort. We also address mathematics coaches' insights on how a Q-sort can be used as a needs assessment and as a professional learning experience for teachers who want to conduct a self-appraisal of the degree to which they implement high-quality classroom teaching practices that provide all students with meaningful mathematics instruction.

Introduction

Mathematics teachers need to have opportunities to reflect on their classroom teaching practices, particularly their use of specific instructional practices (Loucks-Horsley, Stiles, Mundry, Love, & Hewson, 2010). The true mark of effective teachers is their ability to reflect on their teaching and seek opportunities to share what they have learned with other teachers (National Council of Supervisors of Mathematics [NCSM], 2014). Schön (1983, 1987) referred to reflection on specific actions or teaching practices after their occurrence as reflection-on-action. A critical component of professional development programs should include opportunities for teachers to reflect on their classroom teaching practices and share their experiences with other teachers (Garet et al., 2010; NCSM, 2014). Teachers gain confidence in knowing the areas in which they need to enhance their teaching practices, and they need to think critically about how to "strengthen the quality and effectiveness of their work" (Cimer, Cimer, & Vekli, 2013, p. 134). By becoming aware of their teaching and by thinking critically about their teaching practices, teachers can shape their teaching to better meet students' needs (Bengtsson, 1995; Ferraro, 2000). To this end, activities that provide opportunities for reflection on classroom teaching practices can serve as an important component of a program designed to facilitate teacher learning (Loucks-Horsley et al., 2010). Teacher leaders and coaches can develop teachers' mathematical teaching practices by providing

experiences that encourage teachers to engage in purposeful reflection on the practices they use in the classroom (Munter, Stein, & Smith, 2015).

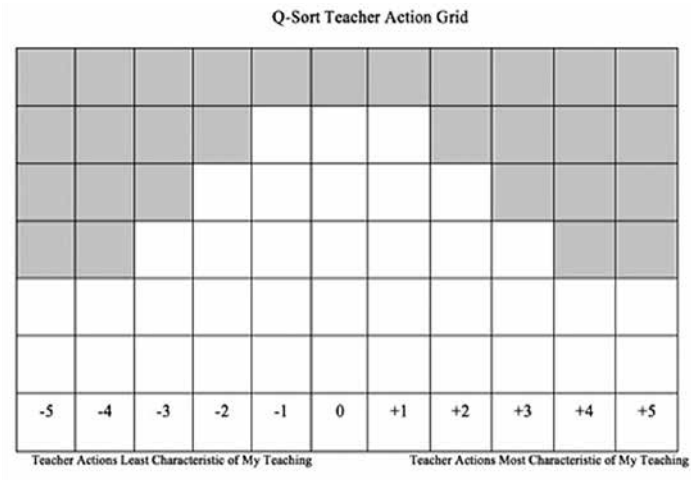
Providing meaningful opportunities for teachers to reflect on their practices is essential for teacher learning. With this goal in mind, we describe a card-sorting tool known as a Q-sort and how it was used in a research study that was conducted in Spring 2016 to promote grades 4-10 mathematics teachers' reflection on their instructional practices (Wilburne, Polly, Franz, & Wagstaff, 2017). We will summarize key points elicited from the teachers' written reflections and their reaction to the use of the Q-sort. We will also share mathematics coaches' insights regarding ways they see that the Q-sort can be used by individuals who want to conduct a needs assessment. Although we used the Q-sort as part of a research study, we will describe how it can be used by mathematics leaders in a professional development setting as well as the advantages and disadvantages of a Q-sort.

The Q-Sort Process

Q-sorts are commonly associated with a research approach known as Q-methodology (Brown, 1980). Q-methodology involves engaging participants in an active examination of their perspectives, opinions, feelings, or beliefs on a topic. Like many qualitative methods, Q-methodology does not require a large number of participants since the results are not intended to be representative of a population (McKeown & Thomas, 2013). A Q-sort, the Q-methodologist's primary data-collection tool, was developed to provide study participants and Q-methodologists with a systematic means to have participants reflect upon whatever stimuli, typically statements, are presented to the participants on cards. Q-methodologists refer to the statements as the Q-set. The Q-set, when properly constructed, represents the *concourse* or the relevant viewpoints on a topic. In our study, the concourse was 37 statements of the teaching actions that support the eight Mathematics Teaching Practices identified in the *Principles to Actions: Ensuring Mathematical Success for All* (National Council of Teachers of Mathematics [NCTM], 2014). Both NCSM (2014) and NCTM (2014) have identified high-quality teaching actions that represent the teaching needed to equitably support each student. We focused on the eight NCTM (2014) mathematics teaching practices because of the extended descriptions NCTM provided for each practice. These practices are: 1) establishing mathematics goals, 2) posing tasks that promote reasoning, 3) using mathematical representations, 4) facilitating mathematical discourse, 5) posing purposeful questions, 6) building fluency from conceptual understanding, 7) supporting productive struggle, and 8) eliciting and using evidence of student thinking. The description of each practice includes research to support the practice, case studies and vignettes that demonstrate how each practice could be implemented in a classroom, and a table that identifies *Teacher and Student Actions* that promote implementation of the practice. In total, the eight tables identify 37 teacher actions that teachers can enact in their classrooms in order to implement the eight high-quality teaching practices. Appendix A lists the 37 teacher actions which are aligned with the NCTM Mathematics Teaching Practices (see NCTM (2014) for specific practices).

The product that results from participants' use of the Q-sort is a visual distribution of the statements that each participant has ranked from *most important* or *most characteristic* to *least important* or *least characteristic*. In our study, participants were instructed to place each of the 37 cards on a forced-choice Q-grid that consisted of 11 columns labeled from -5 (Least Characteristic of My Teaching) to +5 (Most Characteristic of My Teaching) (see Figure 1). Each column consists of a researcher-specific number of cells that are chosen in order to yield a symmetrical distribution. The decision to use a forced-choice Q-grid instead of a free distribution grid is frequently made for two reasons. First, data obtained by earlier research or a pilot study suggests that a symmetrical distribution appropriately reflects the concourse. Second, a forced-choice Q-grid prevents a participant from ranking all of the statements the same way (Brown, 1980). We used an 11-column grid that reflected a symmetrical distribution. The grid forced the participants to identify the same number of similarly ranked statements. A number was randomly assigned to each of the 37 teacher action cards so that the research team could identify how each participant had ranked the statement. The participants were asked to record the number that was on each card onto a sheet of paper that displayed a smaller grid shaped like the grid that they had used to rank the 37 cards. The data recorded on these small grids by participants gave the rankings of the 37 teacher actions by the 38 study participants. Appendix A also identifies the numbers that were associated with each statement.

FIGURE 1.
Q-sort forced-choice grid.
(Wilburne, Polly, Franz, & Wagstaff, 2017)



Methodology

Q-Sort as a Card-Sorting Tool

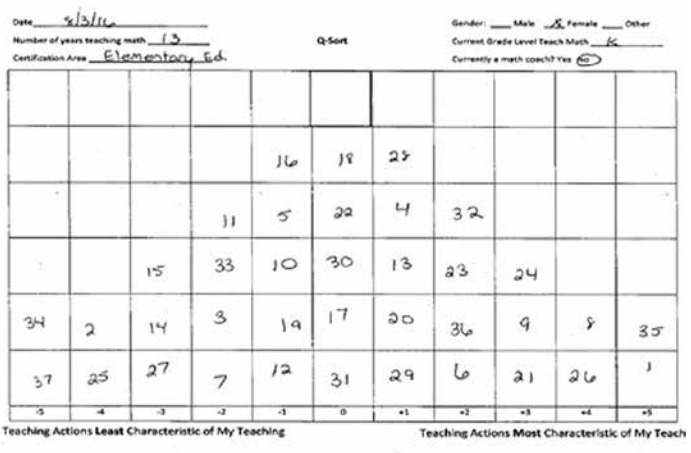
In Spring 2016, we enrolled 38 inservice mathematics teachers in a research study that required them to reflect on their classroom teaching actions and conduct a self-appraisal of the degree to which they enact high-quality instructional practices in their classrooms. The study sought to address three questions: Which teacher actions do the teachers identify as most characteristic of their teaching and why? Which teacher actions do the teachers identify as least characteristic of their teaching and why? What common perspectives do the participating teachers hold about their mathematics teaching actions?

The locations for the study were based on proximity to the authors' home institutions. The study participants were 13 mathematics teachers from Mississippi, 10 mathematics teachers from North Carolina, and 15 mathematics teachers from Pennsylvania. The 38 teachers taught grades 4 -10 in rural, urban, and suburban classrooms and had classroom teaching experience that ranged from 1 to 30 years (mean = 9.3; median = 7.5). To ensure data quality, common data collection protocols were implemented at each location. The study used the previously described data collection procedure known as a Q-sort.

Procedures

Once the participants arrived they sat at tables where they had room to work independently. Each teacher received a set of the 37 cards and a large copy of the Q-grid (19" x 10"). The 37 statements were printed on cardstock and cut to fit the 1.5" x 1.5" cells of the symmetrical Q-grid (see Appendix A). The participants read each statement and placed it in one of three piles: (a) actions most characteristic of their teaching, (b) actions least characteristic of their teaching, and (c) actions in between. Then they placed the statements from the three piles one-by-one on the cells of the large symmetrical Q-grid. This required the participants to reflect further about the extent to which they enact each of the teacher actions in their classroom teaching. After they finished placing all of the statements on the large Q-grid, the participants recorded the placement of each statement on a smaller 8.5" X 11" version of the Q-grid that they later used to discuss their grids in group discussion (see Figure 2). The Teacher Action Q-grid captured each teacher's rating of how they ranked the teaching actions that they enacted in heir classroom teaching.

FIGURE 2.
Sample of the smaller (8.5" x 11") Q-grid with a participant's statement numbers.



Upon completing the Q-sort, the facilitators directed the participants to reflect on their reasons for placing each card with its statement of a teacher action where it had been placed. Participants were to give special attention to the reasons why they had placed certain teacher actions at the extreme ends of the grid. The participants wrote their reflections on the bottom of the Q-grid. The facilitators led a group discussion after the completion of the activity asking questions such as: What teaching actions did you find easiest to place and why? What teaching actions did you find hardest to place and why? The facilitators also had the participants share their reactions to having

completed the card sort of teacher actions. Comments were recorded and transcribed by the facilitators for the research study.

Results

Teachers' Reflections of their Teaching Actions

The facilitators asked the teachers to respond to the following questions: Which teacher actions did you place as most characteristic of your teaching and why? and Which teacher actions did you place as least characteristic of your teaching and why? We tallied the number of times that each statement was identified as most/least characteristic of the participants (Saldaña, 2013). Then, we used an Excel spreadsheet to list the qualitative statements and the associated teaching action.

The most characteristic teaching action among the participants was "*Praise students for their efforts in making sense of mathematical ideas and perseverance in reasoning through problems.*" Several participants wrote that they ranked this teacher action highest because it is something they do naturally and it motivates students. One female middle school teacher wrote, "I do not have to put much effort into praising students." Another female elementary school teacher wrote, "Actions like praising students are things I do naturally." However, one male, middle school teacher who ranked this statement as least characteristic of his teaching wrote, "I know I should praise students for their efforts but I also want them to work hard and motivate themselves."

The least characteristic teaching action among the participants was "*Identify what counts as evidence of student progress towards mathematics learning goals*." Participants noted that this action should be ranked higher; however, they often struggle to identify evidence that students have met learning goals. As one female, high school teacher wrote, "I set goals at the beginning of the week but I don't look at them continuously through the week and I don't often look to see if my students are meeting the goals until I give a test." One male, middle school teacher wrote, "I want to gather evidence of student understanding but I find that I'm not consistent with it like I feel I should."

In our study we found the participating mathematics teachers held some common perspectives about their teaching practices. Many of the participants ranked teaching actions that required little planning or actions that took small amounts of classroom time such as "*Praise students for their effort in making sense of mathematical ideas*" and "*Allow sufficient wait time so that more students can formulate and offer responses*" as being most characteristic of their teaching. The participants shared that time constraints were the primary rationale for such rankings. Some of the participants' comments highlighted how activities such as engaging students in cognitively demanding tasks, facilitating classroom discussions, and posing higher-level questions require class time and were ranked least characteristic of their classroom teaching. For example, one male, elementary school teacher wrote, "Some of these I would love to do more, but I rarely have enough time in a given school day to be able to accomplish them to satisfaction." A female, high school teacher wrote, "We are so busy making sure we cover content that students lose out on many of these opportunities." In one case, a female elementary teacher wrote, "Actions like posing tasks on a regular basis I placed under least like me because I can't find the time to do them but I know I should. Also, I know my students are not ready to do these things."

The foregoing statements by our participants provide insight into how these teachers perceived their implementation of high-quality teaching practices. The Q-sort provided a visual tool that enabled participants to reflect upon the teacher actions they enact more often. Being aware of which teacher actions are most characteristic of their teaching and which teacher actions are least characteristic of their teaching can help teachers improve their classroom teaching (Cohen & Ball, 1999; Ferraro, 2000).

Teachers' Reactions to the Q-Sort Activity

The mathematics teachers who participated in the Q-sort enjoyed the activity and reported that the card sorting allowed them to purposefully reflect on their teaching practices. The activity helped the participants articulate their beliefs about what high-quality mathematics teaching may or may not look like in their classroom. The requirement to place some of the teacher action cards under *least characteristic of my teaching* ensured that each participant would think about their own classroom practices and identify the teaching actions they enact more than others. One participant commented, "It was a good reflection of my teaching practices. I like how it forced me to score some low." It was also the case that some participants found it was easy to place actions under *least characteristic of my teaching* because they believed that they do not enact

these actions as often as they enact other teacher actions. As one participant noted, "The hardest actions to place are the ones that I do not feel I have enough time to adequately give justice to, even though they describe the teacher I am, or at least the teacher I ascribe to be." Several participants said it was easy to place teacher actions in the cells designated as least characteristic of my teaching. These participants reported that they did not enact these actions often because of time pressures or classroom management issues. The following are sample statements given by the mathematics participants after completing the Q-sorts.

> "The hardest actions to place were those that I know I don't do because they have a time component. Unfortunately, this time is not available in most classrooms."
>
> "I placed actions that facilitate discourse among students on the least characteristic end. Many times the student discussions go off onto topics not related to the class and induces classroom behavior issues."

Many participants were surprised when they compared their teacher action Q-sorts with other participants and found they had ranked different practices at the ends of the Q-grid. In one notable case, participants disagreed on the value of the teacher action *Select and sequence student approaches and solution strategies for whole-class analysis and discussion*. One of the participants stated that she did not have time to have students examine different strategies and she questioned the value of this action especially with the pressures to meet state-testing expectations. This opened a discussion with the other participants who had ranked the teacher action higher because they believed it is a practice that can promote student learning. This discussion also allowed the participants to express their differing viewpoints regarding why they see this action as helping all students become mathematically proficient. Although the goal was not to have participants compare their Q-sorts with one another, many of the participants found it interesting to do so and shared their rationales for placing their cards in particular cells.

The discussion on participants' placement of the cards also exposed beliefs some participants held regarding groups of students and how the participants may limit these students' access to high-quality instruction. Identifying these inequitable learning opportunities opens the door for discussions on how to eliminate these barriers and maximize the learning experience for every student. The following three quotes highlight these beliefs:

> "The cards that referred to tasks were easy to place under least like me because my students' don't have the prior knowledge to do them."
>
> "Higher-level thinking questions like [the actions on] #13, #17, #34, and #3 are difficult when students have problems with basic math skills."
>
> "Things that require students to persevere I rated low because most of the students are lazy and don't want to put in the effort to read and solve a problem."

The use of this sorting activity actively engaged participants throughout the Q-sorting session. The activity's value comes from having to think about and decide where to place the cards initially in the three piles, having to refine one's initial placement, making discriminatory judgments among somewhat similar actions, and then having to think about and provide reasons for one's rankings. For example, a female, middle-level participant placed the teacher action *Allow sufficient wait time so that more students can formulate and offer responses* [statement 8] under the -5 column (Least Characteristic of My Teaching). During the follow-up discussion she clarified the reason for her ranking of this action. "I believe in sufficient wait time but I struggle to balance wait time with getting through the material."

Finally, the sorting activity served as an experience that allowed participants to think about research-based instructional practices and reflect on which practices align most with their actual teaching practices. Reflection was supported through the critical analysis of participants' placement of the teacher actions on the Q-grid and follow-up discussions (Cimer et al., 2013). As three participants noted:

> "It was a good reflection of my teaching practices. I like how it forced me to score some teacher actions low."
>
> "It was tough. I learned what I value in my teaching, where I need to grow, and what I should focus on in the future."
>
> "It really made me stop and think about things I do in my classroom as well as improvements that needed to be made. I could see a pattern emerging as I placed my cards. I really found areas of my teaching I want to fix."

Mathematics Coaches' Reflections on the Use of Teacher Action Q-sorts

In the fall 2016 we recruited 25 elementary and secondary mathematics coaches and had them perform the same card-sorting activity that we had conducted with the mathematics teachers. The coaches were either participating in a professional learning workshop on coaching strategies in Pennsylvania (n = 15) or in Mississippi (n = 10). We asked the coaches to sort the 37 Teacher Action cards and place them on the Q-grid according to how they characterize their teaching practices. If they were not currently in a classroom, we asked them to sort the cards as best as they could recall of their most recent classroom teaching experience. After the coaches completed the Q-sort and recorded the number of the cards on the smaller Q-grid, we asked them to reflect on the activity and on the value of doing a similar activity with mathematics teachers with whom they work.

Overall, the coaches found the Q-sort to be a non-threatening activity that encouraged teachers to reflect on their teaching practices and discuss the strengths and weaknesses of their classroom teaching practices. One male coach commented, "I like this [Q-sort] because it is not evaluative, the teachers can honestly reflect on their own practice. There is no pressure." The coaches found that the Q-sort required teachers to make decisions about their teaching practices and really think about which practices they enact more often than other practices. They noted that the Q-sort served as a needs assessment tool that coaches could use to gather information on a classroom teacher's practices such as identifying the teaching actions a teacher ranked *least characteristic* of their classroom teaching. As one coach noted, "[Q-sort] forces them to look at their teaching and think about what teaching actions they do more often than others." Another coach added, "I really enjoyed the Q-sort activity. I love the possibilities for discussion that can come from it and the ability to do some targeted goal setting with my teachers."

Additionally, the coaches felt the Teacher Action Q-sort would be ideal for use in a professional learning community to promote discussions on topics such as how the different teaching practices are enacted in classrooms, how to ensure high-quality teaching practices occur in every K-12 mathematics classroom, and how to identify goals to pursue as a group or individually with a coach in order to improve classroom teaching. One coach noted, "The Q-sort allows me to see the variety of practices that the teachers are doing and talk about what practices the teachers want to get better at." The coaches agreed that the Teacher Action Q-sort should not be used to evaluate teachers or to compare a teacher's completed Teacher Action Q-sort with a coach's observation of the teacher's instruction. One group agreed, saying collectively, "We like the Q-sort because it is non-evaluative."

The coaches recognized that the Q-sort provided a quality framework for reflection. Only with authentic reflection experiences will teachers begin to understand the changes they must make to adjust instruction. One coach noted, "The Q-sort really makes teachers reflect on how they teach and what they can change to improve in their own classroom." Further, teachers can consider their understanding of high-quality instructional practices. "The Q-sort allows teachers to ask questions about the teaching practices, get clarification." Facilitating discussions on high-quality instructional practices allows teachers to engage with each other about enacting the practices. "I can see the benefit of having teachers do the Q-sort to reflect on their practices. There could be some good discussion on the themes the teachers see as evident in their Q-sort."

Using a Q-Sort in Professional Learning Sessions

The Teacher Action Q-sort provides teacher leaders with opportunities to identify similarities and differences among teachers' enactment of high-quality practices that seek to give every student access to meaningful math instruction. Q-sorts can be used with any number of teachers and can be completed in 20-30 minutes which is less time than it takes to observe a teacher present a classroom lesson. Table 1 provides an overview of the Q-sort process. Similar Q-sorts could be used with preservice teachers, principals, and other classroom teachers as a tool to promote discussion on high-quality classroom teaching practices and to articulate participants' beliefs regarding what high-quality mathematics teaching entails. When using a Q-sort as a reflection tool, statistical analysis is not needed. However, simple descriptive statistics like means and standard deviations could be used to determine the highest and lowest ranked statements if data were obtained from a group of teachers and that information would be valuable.

Table 1: Overview of the Teacher Action Q-sort Process

Step	Activity
1	Identify the concourse or set of statements on the topic (e.g., Appendix A).
2	Prepare the Q-sort grid and cards for the activity.
3	Select the participants and a space with tables to accommodate everyone.
4	Administer the Q-sort (approximately 20 - 30 min.) (e.g., Appendix B).
5	Conduct the reflection through individual interviews, small group discussions, or as a whole group.

Q-sorts of teaching practices require that participants report which of the desirable teaching practices are *Least Characteristic of My Teaching*. This requirement reduces the opportunity for participants to provide socially desirable responses which can happen when participants complete self-report questionnaires and surveys that have items measured on a Likert scale (Kazdin, 1998). Appendix C summarizes the advantages and disadvantages of using a Q-sort.

Although the Q-sort provides teacher leaders with information that can serve as a tool for reflection and collecting data for a needs assessment, we note several cautions. The results of a Q-sort are not intended to estimate a population. Consequently, the results are not generalizable to a hypothetical or finite population of teachers. Moreover, the Q-sort should not be used as an evaluative tool. Rather, it is a tool to elicit information and promote reflection on a teacher's implementation of high-quality teaching practices. When using the tool for a needs assessment, professional development providers and mathematics coaches should be sure to use probing questions to target the issues and constraints that teachers describe restrict their implementation of high-quality teaching actions.

Conclusion

The extent to which mathematics teachers enact teaching actions associated with high-quality practices vary from classroom to classroom. Teachers place different priorities on the use of certain practices depending on such things as grade level, composition of the classroom, and learning goals. The Teacher Action Q-sort provides teachers with insight into which high-quality practices they implement more than others. Teachers found the Q-sort to be an enjoyable, easy-to-complete activity that challenged them to think deeply about their teaching. Mathematics coaches found the Q-sort served as a tool to help teachers identify which teaching actions they struggle to implement and the professional development needs that may help them promote meaningful mathematics instruction for all students. Although the Q-sort can be used to collect data for a research study, it can also be used to promote conversations and reflections for professional development purposes. Mathematics education leaders can use the Q-sort with preservice teachers, inservice teachers, and school district administrators to enable them to become aware of their teacher action knowledge and beliefs. ✪

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APPENDIX A

Cards for Q-Sort Reflection Activity

Establish clear goals that articulate the mathematics students are learning as a result of instruction in a lesson, over a series of lessons, or throughout a unit. [6]	Identify how the goals fit within a mathematics learning progression. [27]	Discuss and refer to the mathematical purpose and goal of a lesson during instruction to ensure that students understand how the current work contributes to their learning. [7]	Use the mathematics goals to guide lesson planning and reflection and to make in-the-moment decisions during instruction. [23]
Motivate students' learning of mathematics through opportunities for exploring and solving problems that build on and extend their current mathematical understanding. [28]	Select tasks that provide multiple entry points through the use of varied tools and representations. [32]	Pose tasks on a regular basis that require a high level of cognitive demand. [3]	Support students in exploring tasks without taking over student thinking. [11]
Encourage students to use varied approaches and strategies to make sense of and solve tasks. [26]	Select tasks that allow students to decide which representations to use in making sense of the problems. [24]	Allocate substantial instructional time for students to use, discuss, and make connections among representations. [33]	Introduce forms of representations that can be useful to students. [4]
Ask students to make math drawings or use other visual supports to explain and justify their reasoning. [9]	Focus students' attention on the structure or essential features of mathematical ideas that appear, regardless of the representation. [12]	Design ways to elicit and assess students' abilities to use representations meaningfully to solve problems. [13]	Engage students in purposeful sharing of mathematical ideas, reasoning, and approaches, using varied representations. [5]
Select and sequence student approaches and solution strategies for whole-class analysis and discussion. [37]	Facilitate discourse among students by positioning them as authors of ideas, who explain, and defend their approaches. [34]	Ensure progress toward mathematical goals by making explicit connections to student approaches and reasoning. [29]	Advance student understanding by asking questions that build on, but do not take over or funnel, student thinking. [19]
Make certain to ask questions that go beyond gathering information to probe thinking and require explanation and justification. [31]	Ask intentional questions that make the mathematics more visible and accessible for student examination and discussion. [17]	Allow sufficient wait time so that more students can formulate and offer responses. [8]	Provide students with opportunities to use their own reasoning strategies and methods for solving problems. [18]

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Ask students to discuss and explain why the procedures that they are using work to solve particular problems. [2]	Connect student-generated strategies and methods to more efficient procedures as appropriate. [30]	Use visual models to support students' understanding of general methods. [35]	Provide students with opportunities for distributed practice of procedures. [14]
Anticipate what students might struggle with during a lesson and be prepared to support them productively through the struggle. [21]	Give students time to struggle with tasks, and ask questions that scaffold students' thinking without stepping in to do the work for them. [15]	Help students realize that confusion and errors are a natural part of learning, by facilitating discussions on mistakes, misconceptions, and struggles. [25]	Praise students for their efforts in making sense of mathematical ideas and perseverance in reasoning through problems. [1]
Identify what counts as evidence of student progress toward mathematics learning goals. [20]	Elicit and gather evidence of student understanding at strategic points during instruction. [22]	Interpret student thinking to assess mathematical understanding, reasoning, and methods. [16]	Make in-the-moment decisions on how to respond to students with questions and prompts that prove, scaffold, and extend. [10]
Reflect on evidence of student learning to inform the planning of next instructional steps. [36]			

APPENDIX B

Administering the Q-Sort

- Each participant should have a large copy of the Q-grid with each cell large enough to fit one of the statement cards, the 37 Teacher Action cards cut, and a smaller 8.5" X 11" paper copy of the Q-grid to record their final sort.
- Be sure participants are seated at tables where they will have room to work independently and spread out the cards and the large copy of the Q-grid.
- Ask the participants to read the 37 Teacher Action cards independently and place each card in one of three piles: (a) actions most characteristic of their teaching, (b) actions least characteristic of their teaching, and (c) actions in between.
- Then ask the participants to take the statements from the three piles and place them one-by-one on the cells of the large symmetrical Q-grid. This requires the teachers to reflect further about the extent to which they enact each of the teacher actions in their classroom teaching.
- After the participants finish placing all of the statements on the large Q-grid, they are asked to record the placement of each statement on the smaller 8.5" X 11" version of the Q-grid for record keeping purposes (see Figure 2).

APPENDIX C

Advantages of Using the Q-sort	Disadvantages of Using the Q-sort
Non-evaluative	Time to complete (approx. 20-30 min)
Engaging activity	Results cannot be generalized to larger population
Can be used as a needs assessment tool	Need to prepare cards and grids
Visually informative	
More reliable than Likert-Scale survey	
Can be used as a reflection tool	
Promotes opportunities for discussion	
Can do with small to large groups of teachers	
Can obtain qualitative and quantitative results	