Transition between discourses – portraying teaching practices in collegial discussions

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This paper investigates how teachers portray their own teaching practices while reflecting on them and discussing them in collegial discussions. Analysing data from eight groups with a total of 59 teachers, this study investigates how teachers portray their teaching practices and draw upon different discourses to represent their role as a teacher. This analysis finds that teachers describe different teaching practices in different lesson phases and draw upon different discourses in doing so. From this study emerges an eclectic, pragmatic teacher who rather comfortably navigates between different discourses to create a new, blended discourse.

The reform movement in mathematics education, which emphasizes learning additional mathematical competencies such as problem solving and reasoning encourages the development and reorganization of syllabi, curriculum materials, and classroom practices (Lindvall et al., 2021). Central policy initiatives undertaken to facilitate change often involve professional development (PD) intended to support teachers in establishing productive classroom practices. However, the results of many studies suggest that the establishment of productive mathematical practices in the classroom is challenging, and many ambitious PD programs have only a modest effect (or none at all) on classroom teaching and student learning (e.g. Desimone & Garet, 2015; Lindvall et al., 2021; Lindvall et al., 2018).

One important component in PD programs is collegial discussion among teachers (Cobb & Jackson, 2011; Cobb et al., 2018) as a means to facilitate teacher development, which, in turn, is expected to improve classroom practices (Desimone, 2009). According to Kim et al. (2020), teachers' pedagogical reasoning can become visible in their lesson planning sessions, and tracing shifts in their discussions with their colleagues can reveal the development of their pedagogical reasoning. However,

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the process of change is inherently challenging (Desimone & Garet, 2015). Researchers have provided a range of explanations why the desired change from a more traditional conception of the role of the mathematics teacher to that of a reform-oriented conception has not taken place and has proven hard to achieve (e.g. Cross, 2009; Valoyes-Chávez, 2019; Zimmerman, 2006). The challenge in achieving reform-based practices has been described by Zimmerman (2006) as rooted in teachers' resistance to change. Valoyes-Chávez (2019), however, challenges this conceptualization and finds that teachers struggle over the meaning of being a mathematics teacher and have begun to reinvent these meanings during reform initiatives. Conflicting views have been put forward to explain the challenges teachers face in achieving reform-based practices. Therefore, we need to develop a deeper understanding of the processes whereby teachers negotiate the diverse meaning of being a mathematics teacher.

This study investigates how teachers portray their teaching practices in collegial discussions. We pose the following research question: *How do teachers portray their own teaching practices by drawing upon different discourses describing the role of the teacher*?

We use the concept of discourse to capture certain ways of viewing and interacting with respect to a specific phenomenon (cf. Hemmi & Ryve, 2015). In this context, we make reference to a range of discourses, such as traditional and reform-oriented discourses (see e.g. Fennema et al., 1996; Munter et al., 2015; Valoyes-Chávez, 2019). Each discourse features a set of assumptions, terms, and categories to portray classroom practices and the differing roles of teachers and students within them. This approach allows us to determine how teachers portray their teaching practices, drawing upon assumptions and categorizations from these different discourses. As this article shows, teachers mobilize teaching practices from different discourses in discussions with colleagues, constructing what we here refer to as a blended teacher role.

Previous research

The review of previous research is presented in two parts. The first elaborates on the different roles that teachers take on and associated discourses on mathematics education. The second part discusses how teachers relate to, navigate, and portray their practices with respect to reform-oriented efforts in PD.

The teacher's role within different discourses

Discourse regarding the role of the teacher in mathematics has identified different subjectivities for teachers, such as those of a traditional versus a

reform-oriented teacher (Valoyes-Chávez, 2019). In Sweden, where this study was performed, a different conception of the role of the dominated in the 1990s and 2000s and persists today, namely, that of a facilitator of democratic citizenship (see Section 2.1.3) (Forsberg et al., 2016). In characterizing these three roles with respect to mathematics classroom practices and the teacher's role, we here focus on the differences in relation to *instructional practices*, *classroom interaction* and *mathematical tasks* (cf. Munter, 2014).

Traditional role of the teacher

Teachers who can be identified as exhibiting the features of a traditional teacher role (cf. conventional instruction, Heyd-Metzuyanim et al., 2018; transmission-based instruction, Swan, 2006; and direct instruction, Munter et al., 2015) emphasize the teaching practices of explaining ideas clearly, demonstrating procedures such that students can follow them and enabling sufficient practice that students can execute these procedures quickly and accurately (Hiebert et al., 1997). In this discourse, the teacher possesses mathematical authority in instructional practices and is the provider of knowledge (Munter, 2014). These views are constituted by such actions as demonstrating procedures for problem solving, explaining concepts, and correcting students' errors. The most common mode of communication in these classroom interactions is one-way talk from teacher to student (Munter, 2014). Hence, the role of the expert is constituted through interactional patterns in which teachers talk and students listen or through the well-documented initiate-response-evaluate pattern. In the traditional discourse, mathematical tasks are instituted to support students' development of procedural fluency. Task pacing is characterized in terms of procedural practice before application.

Reform-oriented role of the teacher

Teachers operating within a reform-oriented teacher role (cf. constructivist, Lui & Bonner, 2016; learner-focused, Bray, 2011; and dialogic instruction, Heyd-Metzuyanim et al., 2018) emphasize anticipating student interactions and building on existing mathematical thinking. Within this discourse, instructional practice dictates the monitoring, facilitation, and challenging of students' discovery and mathematical thinking. This practice includes such actions as encouraging students to pose problems, asking them to describe their thinking and eliciting and discussing their errors. Further, teachers should initiate and orchestrate discussions that elicit, engage, and challenge students to think and interact. Teachers should orchestrate these discussions to enable students to share multiple problem-solving strategies, analyse the relationships among these strategies and explore contradictions within their own ideas to provide

greater insight into their mathematical thinking (Franke et al., 2007). Classroom interaction is not limited to the teacher-to-students pattern but also involves interactions between students in small groups and in the whole-class setting (Munter, 2014). In such classrooms, teachers value student-to-student talk that is student-initiated. These conversations do not depend on explanations of strategy on the part of the teacher or on the teacher explaining connections between mathematical ideas alone, as occurs in the traditional conception of the teacher's role (Munter et al., 2015). Students need to have the opportunity to talk about their mathematical thinking to explain their ideas and arguments to their peers and teachers. Mathematical tasks that allow for multiple solutions and are cognitively demanding for supporting students' conceptual understanding has a central role in this instructional practice. Students should be given cognitively demanding tasks and allowed to wrestle with them without the teacher's immediate interference. According to Munter et al. (2015), students should be presented with tasks that can introduce them to new ideas and deepen their understanding of the concepts and tasks that can help them become more competent in what they already know.

The democratic teacher's role in Sweden

In Sweden, national education policy identifies a common discourse that continues to be present and was predominant during the 1990s and 2000s (Forsberg et al., 2016). This is the general conception of the teacher's role, and it is not specifically connected to the role of the mathematics teacher. Its key components are equality of opportunity and equal rights. In addition, it seeks to foster democratic citizenship and the development of a democratic mind and skills (Forsberg et al., 2016). This means, for example, learning to show respect, take responsibility and adopt a critical attitude (Forsberg et al., 2016). In practice, teachers have the combined role of a mentor and a supervisor (Diehl et al., 2015). This style of teaching practice is reflected in the Swedish curriculum (Skolverket, 2018a, p. 8) as follows.

> The school should stimulate pupils' creativity, curiosity and self-confidence, as well as their desire to translate ideas into action and solve problems. Pupils should have the opportunity to take initiatives and assume responsibility, and to develop their ability to work both independently and together with others.

This includes, for example, showing respect, taking responsibility, and developing a critical and reflective attitude. Within this discourse, instructional practice is for the teacher to function as a motivator for learning (Forsberg et al., 2016). The main role of the teacher is not to explain

things to students or challenge them but to create instructional contexts and social norms that encourage students to explore and construct mathematical connections. Playing this role, teachers are more closely preoccupied with the social aspects of classrooms than the mathematical aspects of their teaching and learning. The interactional pattern is characterized by teachers' giving responses to students' questions as well as, to a larger extent, functioning as an invisible actor who avoids disturbing the students in their interactions regarding mathematics. These practices are part of discovery-learning (Alfieri et al., 2011), which emphasizes students' motivations and asserts that students should discover facts and relationships on their own requiring the teacher's guidance only upon request (Ryve & Hemmi, 2019). That is, student-to-student interactions are a focus of Swedish democratic discourse in education (Forsberg et al., 2016). Because exploration and inquiry are central, mathematical tasks often take the form of doing mathematics itself (Stein et al., 1996), with a very strong focus on everyday connections. Such everyday connections are important not only for modelling and exploration but, above all, for motivating students (Hemmi & Ryve, 2015; Ryve et al., 2016).

Changing teachers' roles from traditional to reform-oriented

As growing numbers of teachers are adopting reform-based teaching practices that build on student thinking, it has become clear that embracing this category of practice has been quite challenging (Franke et al., 2007). Cross (2009) investigated the relationship between beliefs and classroom practices among five high school mathematics teachers at different stages in their careers. She found that, even though these teachers were engaged in ongoing PD to support their incorporation of reform-oriented practices into their teaching, they were only beginning to question the effectiveness of their previous practices. These teachers reported that they did not have confidence in their ability to adopt alternative methods of designing and orchestrating their teaching. Even among those who welcomed the new practices, the conceptualization of new practices was filtered through the old belief system, resulting in minimal overall change. Another way of understanding the challenge involved in achieving reform-based practices is to use the designation of the resistant teacher (Lui & Bonner, 2016; Zimmerman, 2006), referring to teachers wish to avoid changing their teaching practices. Zimmerman (2006) emphasizes the different barriers for such teachers. Among the many barriers is the resistance to recognize the need for change, leading to unwillingness to accept it. Another barrier is habit: rather than working with reform-oriented practices, teachers find it easier to continue

teaching in the same way as before. Another barrier that Zimmerman (2006) indicates is the fear of the unknown, as seen in teachers who feel secure doing things in older and more familiar ways.

However, Valoyes-Chávez (2019) challenges the resistant teacher description, characterizing teachers as struggling with the implementation of reform-based activities and reinvention of the meaning of being a teacher. Through a study of what she describes as moments of crisis in an instructional context, she found that teachers used metaphors to describe the conflicting meanings of being a reform-oriented mathematics teacher. One of these is that of the director of the orchestra, where the teacher is the central person who sets the tempo of the lesson and ensures the correctness of students' work. Another crucial metaphor used to describe these moments of crisis was that of the invisible man, which signifies a way of coping with the role of the reform-based teacher. The requirement of having a student-centred classroom caused the teacher to take on an invisible role in which she/he was no longer an important person for the mathematical activity to proceed and could step away from the classroom.

Heyd-Metzuyanim et al. (2018) examined the narratives of 12 elementary teachers regarding their mathematics teaching and on themselves as teachers. In interviewing with their participants, they found that even where they drew on reform-oriented discourse to discuss their work, these teachers mostly discussed students' "doing and solving," aligned with a traditional teaching discourse. This is consistent with the findings of Boesen et al. (2014), who investigated the impact of national educational reforms in Sweden using interviews, classroom observations, and an online survey involving the participation of nearly 200 teachers. Overall, their study found that the teachers focused on procedural competency and showed limited knowledge of competency goals. Boesen et al. concluded that the difficulties of these teachers in identifying the meaning of the reforms were the reason for the weak impact of reform.

Here, we have outlined a range of discourses on mathematics education, classroom practices, and instructional practices. Further, we recognize an ongoing research discussion of how to conceptualize teachers' positioning and processes of engaging in reform initiatives, like PD. This study provides further elaboration on and understanding the ways that teachers portray their teaching practices in discussion with colleagues. We examine how teachers portray their instructional practice through their use of categories and specific words related to different teacher roles.

Methodology

To identify the ways that teachers portray practices and draw upon different discourses on the role of the teacher, we video-recorded teachers' collegial meetings as they worked with the PD program called Boost for Mathematics (see *Study context*). The data were drawn from the members of eight groups of teachers taking part in this PD program (see *Data collection*). In the section *Analysis*, we describe how we analysed the ways that teachers portrayed their teaching practices at different phases of the lesson by identifying the discourses (ways of interacting using specific words and categories) within different teacher roles. We build our understanding of discourse on Goodwin's (1994) idea that discourse is constitutive of practitioners' professional vision, indicating how they, explicitly and implicitly, gaze upon and make sense of phenomena in their domain of work (cf. Ryve, 2011).

Study context

Between 2013 and 2016, the Swedish national agency for education launched a 649 million SEK (approximately 65 million EUR) curriculum-based PD program called Boost for mathematics (Lärarlyftet) (Skolverket, 2018b), which strengthens the quality of mathematics teaching and student performance. Its most central components are 24 modules, eight per grade level (1–3, 4–6, and 7–9), developed to support teachers, who work in teams to plan, establish, and reflect on pedagogical practices in mathematics classrooms. Each module is designed to support a group of teachers (for a period of one semester) in engaging in eight iterations containing individual preparations (session A), collegial discussion regarding resources and planning lessons (session B), individual classroom teaching based on the content (session C) and collective reflections on their classroom instruction and the process (session D). In this PD program, teachers are required to complete two modules by taking one per semester, and the PD sessions are held at schools with the support of a trained coach.

Over the past few decades in Sweden, education systems have been radically and extensively transformed (Pettersson et al., 2017), and conflicting discourses on mathematics teaching and classroom practices are currently being negotiated (Ryve et al., 2016). This study considers that Sweden is a productive case for studying how teachers portray their practices in discussions with colleagues and potentially building upon different discourses. To identify how teachers portray their practices, we collected data from the Boost for mathematics program, which supports teachers in establishing ambitious teaching (Lampert, 2001; Skolverket,

2018). The key principles of ambitious teaching are, for example, focusing on developing a conceptual understanding of key mathematical ideas and engaging students in mathematical practices that include reasoning, problem solving, and communicating mathematically. The role of the teacher is not an explicit part of this program, but because Boost for mathematics builds on ambitious teaching, we find this program to be an interesting case in indicating how teachers portray their practices.

Data collection

Data were retrieved from a large dataset consisting of video recordings of collegial discussions within 16 teacher groups meeting during Boost for mathematics. The selected data involved eight teacher groups, chosen using convenience sampling (Miles & Huberman, 1994), which covered all of the thematic modules in the PD program. All of the teachers provided ethical consent to use their data in the research. Each teacher received a letter containing information about the research project, the use of the data, and what participation would entail. They then had to sign to indicate if would consider participating in the study. Only teachers who signed the letter were filmed.

The groups consist of four lower primary schools (Grades 1–3), three upper primary schools (4–6), and one school with teachers from both upper primary and lower secondary schools (4–9). These groups, counting the coach, had from 6 to 9 people each, giving a total of 59 teachers. The participating teachers had teaching experience ranging from 1 to over 30 years. Data were collected by video-recording two meetings for each group, the first of which was a collective planning meeting (session B) and the second extracted collective reflections on classroom instruction (session D). During the two sessions, the teachers were placed around a table at their workplace. Two video cameras were used to capture all the participants and document the meetings completely. An audio recorder was also placed in the middle of the table. The video and audio recordings were combined into one video file that showed all of the participants. Assistant researchers were responsible for the film recording. We chose to video-record the meetings for several reasons: it allowed us to share the data and discuss certain segments of the conversation as many times as was needed, and it also allowed us to look at the data with different analytical foci. The meeting lengths ranged from 37 to 88 minutes, with an average of 56 minutes; see appendix.

Analysis

To identify how teachers portrayed their practices when engaging in discussions with their colleagues, we analysed collective planning and reflections on classroom instruction among eight groups of teachers, as described in the context section.

This study characterizes the different teaching practices that appeared in discussions among the teachers in this project. During the discussions, the teachers dealt with several topics, such as student perspective, organizing the classroom, and planning the lessons. Thematic analysis (Braun & Clarke, 2006) was employed to identify and analyse patterns within the data. Therefore, in the first phase of analysis – generating initial codes – the researchers identified meaningful utterances in the group meeting. The meaningful unit of coding was defined as an episode of pedagogical reasoning (Horn, 2007) concerning a teaching practice. This included moments within teachers' interactions in which they described issues concerning teaching practices related to their role as a teacher accompanied by detailed reasoning, explanations, or justifications. A category was then assigned to each unit of pedagogical reasoning using inductive coding in which categories are derived from an initial reading of the data. We identified 76 episodes of narration in which the teachers portrayed how they taught, what they taught, and why they adopted or ignored certain teaching practices. Each episode was described in relation to what the teachers reported doing in their lesson and their reason why. These extracts were coded using data-driven codes. Examples of such initial codes are: present the task; new content, challenge; make students reflect, organize; and involve everyone.

Focusing on teachers' explanations of what they will do or have done, as well as the reasons they give, can identify how they navigate between these practices. This can be done by first identifying discourses (ways of interacting with the use of specific words and categories) within the teacher roles. All of the segments were transcribed after being identified by the first author and being discussed with the second author.

During the next phase, searching for themes (Braun & Clarke, 2006), we applied inductive analytical codes to the 76 units of meaningful episodes with indicators of teaching practices and collated these codes into potential themes. The development and refinement of these categories was an ongoing, iterative process and was repeatedly re-evaluated by the two authors, as well as being discussed with other researchers in mathematics education at weekly meetings. In the third phase of analysis, in which themes were reviewed, defined and named (Braun & Clarke, 2006), the authors conducted another round of coding of the 76 episodes

previously identified. This analysis produced eight major themes that served to represent how teachers portray their practices. These are presented in table 1.

Table 1. *Examples of the categories*

Category (n = number of episodes)	Short example from teachers' utterances to illustrate the category.
Give feedback ($n = 7$)	I want to be better at giving feedback to the students. I do not want to just give the right answer when they ask.
Avoid intervening ($n = 15$)	I did not intervene when they were working in groups. They were allowed to keep going, even if they did not answer the question.
Practice of organizing ($n = 12$)	I let all the groups demonstrate their solutions on the board.
Demonstrating procedures ($n = 10$)	Since they did not know, I showed, explained, and gave similar examples of what they should do.
Challenge ($n = 5$)	It is important to be prepared as a teacher so that we can ask challenging questions to put students into action.
Motivational practice ($n = 9$)	We must find tasks that make students positive and motivated.
Facilitating practice ($n = 9$)	Almost all the groups got stuck on that task. I had to stop and talk and lead them forward.
Other practices ($n = 9$)	I remind them a lot that there are many ways to work with mathematics, but just one way to arrive at the right answer.

For the next step of the analytical process, we categorized these episodes in association with the different lesson phases. This choice was based on two reasons. First, the phases of introduction, working on mathematical tasks, and finalising the lesson were recurrently present in the discussions. Second, we based our categorization on Jackson et al. (2013), who described a common lesson structure in a reform-oriented mathematics curriculum as having a three-phase structure: a complex task is introduced, students work on solving it, and the teacher orchestrates a concluding discussion in the class. This step in the analysis identified 16 episodes related to introducing the lesson, 19 related to teachers' actions as the students worked alone or in groups and 14 related to how teachers identified their practice as they finalised the lesson. The most common categories in relation to the lesson phases were demonstrating procedures ($n = 8$) and motivational practice ($n = 6$) in the introduction to the lesson, avoiding intervention ($n = 10$) and providing facilitation ($n = 6$) when students are working alone or in pairs/groups and finally organizing practice ($n = 9$) in the whole-class discussion to conclude the lesson. We could not identify the remaining 27 episodes that we categorized as belonging to one of the three phases of the lesson.

To enhance the reliability of this study, the first author identified the 76 episodes separately. A random selection of 15 episodes was shared with the second author. Of these, agreement was found for the type of category for 12, and the other items were discussed and agreed upon. Further, the categorization of the episodes was discussed on multiple occasions, along with the analytical process and the results, with the other members of the research group. The sequences of the video material illustrating the categories were also discussed and agreed upon.

Results

This section provides an analysis of how teachers portray their teaching practices in collegial discussions. They portray different practices in different phases and, interestingly, draw upon and navigate between different discourses in doing so. These results are organized according to the practices portrayed in the lesson introduction, where students work alone or in pairs to solve the task, and in discussions involving the whole class. The reason for this, based on the analysis, was that these phases of the lesson were clearly present multiple times in the discussions.

Teaching practices in the introduction of lessons

The data analyses indicate that teachers typically portray two different practices when discussing the introduction of mathematics lessons – introducing new content by demonstrating procedures ($n = 8$) and motivational practices ($n = 6$) – to engage students in mathematics by stressing everyday contextual aspects.

The demonstration of procedures was repeatedly observed during the introduction of new content in the discussions, which is related to a traditional teacher role. The teachers emphasized that they needed to explain new content corresponding to traditional instructional practices and during these explanations, students are portrayed as passive receivers of the teachers' explanations, similar to the one-way teacher-to-students discussion recognizable within a traditional classroom interaction.

Romford school[1] (The coach is marked as C)

1 Helena: Actually (...) what should I do, should we do a problem first together
2 or should we just (...).
3 Anna (C): Do you not think yours (students) can do one?
4 Helena: Yeah, some of them.
5 Hanna: Mmm (...) mine are rather weak.

6 Helena: But eh (Anna (C): mm), yes but we will do one, we will formulate a
7 problem based on an image.
8 Maria: Yes, you do a similar problem then (Hanna: mm).
9 Jenny: With your group.
10 Maria: So they (Helena: mm) have a similar (...) structure to follow
11 (Hanna: mm).

Helena (line 1) expresses concern as to whether the students would be capable of tackling tasks or solving problems directly or whether the lesson should begin with an introduction to the material. The teachers planned to introduce a problem based on considerations of the students' capacity (3–5) and the necessity for the teacher to provide a structure for them (8–10). As will be seen later, this type of reasoning can be attributed to how teachers portray group work and the students' and teachers' practices within that context. Teachers' practices during group work are typically portrayed as invisible, that is, they should not disturb students. Students thus need to have clear instructions and structures, so that they know what problem they have to work on and how to do it in groups. The teachers describe the forms of instruction as "doing and solving" (1), rather than as exploration of mathematics by the students. In the excerpt above, the teachers suggest introducing a similar problem (8–10) because the students are weak in mathematics (5). Further, this extract is typical of the way that they only confirm the problematic aspects of the introduction of a lesson but avoid developing any action to ameliorate them, typically advocated in a reform-oriented practice, such as discussing the problem and inherent mathematical concepts without then diminishing the cognitive load. On the other hand, this extract is somewhat atypical, as these teachers are discussing the introduction of the lesson. More often, teachers simply present what they intend to do or have done during the introduction of their lessons. We also note that when discussing the introduction phase, the teachers in this study seldom elaborate on the students' practices or how to engage them during this part.

The other aspect that was portrayed as crucial during the introduction phase is emphasizing instructional practices to motivate students by stressing mathematical tasks in connection to everyday contextual aspects, recognizable within common Swedish democratic discourse. The next excerpt is a typical example of how teachers' pay closer attention to context than to the mathematical ideas to be learned, that is, in discussing their actions during the introduction phase, everyday contexts are often portrayed as more central than the mathematical goals and concepts.

Romford school

1 Jenny: I had a picture, they were going to formulate a problem on their own
2 and then I had a picture of these three famous minions, Stuart, Kevin,
3 Bob. These are the three most famous ones, and all the children know
4 them, I can say. And from that picture they were to formulate their
5 own problem.
6 Anna (C): One thing I would like to ask you about these open problems, because
7 the context was the minions (Jenny: Yes): Did you have some
8 thought about the mathematical content, I think, as you said (pointing
9 to another teacher), what parts of fractions do we talk about?
10 Jenny: No, no, we told them the four arithmetical operations you have to
11 choose from and so on. We said that you have to decide for yourself
12 how you want to use them, but you also have to think that you have to
13 test, you have to explore. That's why they were paired in twos, so that
14 they could look at each other and see what the problem is, if I could
15 solve this at once.
16 Anna (C): So the mathematical content itself was really a kind of problem-
17 solving structure (Jenny: Yes), so what a problem-solving task really,
18 is really the mathematical ability itself.
19 Jenny: Yes, and being able to formulate a problem for them.

In the excerpt above, Jenny portrays actions such as introducing an excerpt from well-known cartoons (2–4) as a way of motivating the students. It is notable that, although her colleagues ask her about the mathematical idea of the problem (8–9), Jenny explicitly portrays this aspect of classroom practice as being of minor importance (10–13). It therefore seems as if Jenny has constructed a classroom practice wherein the most important aspect is that learning should be fun and where mathematical knowledge and activities are treated as secondary.

To sum up, during discussions of the introduction phase, the teachers portrayed two dominant teaching practices: first, demonstrating procedures, which is apparent in their discussion about introducing new content, and second, motivational practice, which is apparent in their discussion of the necessity for students to have fun and maintain their interest in learning. Our analyses of how teachers portray their practice during the introduction of their lessons are in line with those of Wiliam (1997), who asserted that the provision of context is most often done to motivate or interest students. However, the teachers do not discuss the contexts according to how the relevant relationships are set up and

the specific contexts that are chosen. This motivational practice is also apparent where students are required to create their mathematical tasks based on a given context (Alfieri et al., 2011). From the analyses of all groups, this study contends that a common understanding of these teaching practices seems to be in play during the introduction phase.

Teaching practices during students' group work

In the collegial discussions, the teachers repeatedly emphasized that students should have sufficient opportunities to work with their peers. As they indicated with respect to their practices during students' group work, the teachers emphasized one perspective in particular, namely, avoiding intervention during group work ($n = 10$), which indicates a classroom interaction based on the invisible teacher and motivating students to work together. This practice fits well within Swedish democratic discourse. However, while the non-intervention perspective was not opposed or questioned, the teachers also used a facilitation practice to challenge students to discuss and reason ($n = 6$). The first excerpt below illustrates a non-intervention practice.

Bedford school

1 Susanne: We had a task that looks like this. Then it is a square, the students
2 should know the properties of a square. One side was marked with "a"
3 and this was very difficult. They did not understand, there were a lot of
4 pupils who did not get that one side was "a" so they thought they could
5 use "b," "c," and "d." And then they got ... thought what are the
6 properties of a square? Aha: "All sides are the same length." Yes, how
7 long should it be? Yes "this is two" ... this is two. It was really stupid.
8 Someone started measuring, I say nothing, they can proceed. They
9 worked in pairs.

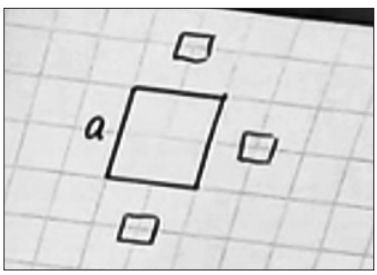

Figure 1. *Task at Bedford school*

This is a typical example of a non-intervention practice. Susanne let her pupils work out the problem, although they employed a "stupid" approach (3–7) as they attempted to solve it – she chose not to act (8). This implies that even if Susanne finds a situation rather surprising, she accepts the practices of not intervening during group work, and neither she nor any of her colleagues discuss alternative ways of acting in such situations.

In the excerpt, Susanne is concerned with the mathematical approaches adopted by her pupils in understanding the problem. However, teachers do not always comment on the mathematical approaches that their students use. Instead, their involvement in students' group work resembles unassisted discovery-learning in which the teaching practice is to facilitate students' motivation as to allow them to discover facts and relationships. More generally, it is worth noting that throughout the collegial discussions, the teachers never discussed how to monitor their students' actual responses to tasks while working in pairs or small groups. This was typical for all groups of teachers.

However, based on their collegial discussion, there were also instances in which teachers used a more facilitating practice, especially when students experienced difficulties with the mathematical content at hand. In such situations, as the excerpt below indicates, the teachers intervened and deliberately challenged the students to discuss and reason, which indicates instructional practices that recognizably belong within a reform-oriented discourse.

Bentham School

1 Alice: We are working with decimal numbers. First, I went through an
2 example on the board. And then the students worked in pairs. It was
3 very peaceful and quiet. But when I walked around I discovered it was
4 possible that, since I hadn't given a proper example from the beginning,
5 that many groups were having problems. Therefore, I had to talk to
6 each group and lead them forward. But they were very eager to show
7 and discuss.

Alice frames the students' enactment in this situation, describing the perspective that focuses more on how to facilitate learning for them by challenging them to discuss and reason and less on their making sense of or exploring mathematical principles. It seems that Alice has not developed strategies for how to listen to and monitor the students' reasoning or use her observations (5–7). This is in contrast to the description of teaching practice, which involves carefully attending to what students are doing when working in pairs or groups to allow the teacher to use

their observations to determine on what and whom to concentrate in the discussion that follows.

To sum up, two teaching practices are shown during students' group work: first, the non-intervening or invisible teacher (Valoyes-Chávez, 2019), even if errors are observed in the students' work, comparable to Swedish democratic discourse; alternatively, in other cases, the facilitator's practice of challenging students to discuss and reason, emphasized within a reform-oriented discourse (Munter et al., 2015). This teaching practice, however, is in contrast to how respondents identified by Heyd-Metzuyanim et al. (2018) envisioned teachers' practices while their students worked in groups, that is, as walking around and encouraging their students to think. As we will see later, the invisible teacher approach to handling group work is very logical, as with this method, the teachers can use only the students' solutions in class discussions at the end of the lesson.

Teaching practices during whole-class discussions

Our analyses show that when the teachers discussed their practices during the final whole-class phase, their conversations seemed to reflect that they engaged in a practice of organizing ($n = 9$). This implies that the teachers are in charge of the class interactions: they take care of the students in an orderly manner and allow everyone who wants to speak up to do so, a practice that relates to arranging instructional context and creating social norms (Forsberg et al., 2016) similar to what is found in Swedish democratic discourse, as illustrated in the excerpt below. The results show that the teachers do not discuss content such as orchestrating class discussions to enable students to share multiple problem-solving strategies or analyse relations among strategies and explore contradictions in their ideas to develop greater insight into their mathematical thinking.

Harrow School

1 Karin (C): Did you have a final discussion when you brought it up in class?
2 Malin: I actually even drew it on the board, some solutions, they could say
3 something different in each group, all groups could say something.

In this excerpt, Karin, the coach, asks the teachers if they held discussions at the end of their lessons (1). Malin focuses on the social perspective, reporting that she had all of her student groups speak up (2–3). According to her way of portraying the discussion, Malin seems comfortable taking up the practice of an organizer and chairperson by letting her students show and tell about their solutions rather than focusing on making

connections, elaborating misconceptions, or stressing mathematical ideas. It is also worth noting that this means of facilitating the final phase of the lesson is neither questioned or challenged by the coach or Malin's colleagues. Further, no indication is seen that Malin focused or reflected upon the students' responses to call on particular students to present their mathematical work and connect students' responses to key mathematical ideas.

How can the practice of creating an organized conclusion during the final phase of the lesson be understood? This practice could be related to another phase of the lesson, for example, when students work in pairs or groups. In these situations, as we have seen, teachers stress that their practice is to be invisible. They do not discuss their practices in terms of the actions of monitoring and collecting information during group work. Consequently, allowing the students to show and tell on their solutions, with no particular mathematical purpose, might be the solution for teachers emphasizing social norms (Forsberg et al., 2016).

Discussion

This article contributes to research on teachers' discussions with their colleagues in a PD program, indicating how they portray their teaching practices (Cross, 2009; Valoyes-Chávez, 2019; Zimmerman, 2006). More precisely, this study expands the research field by highlighting the ways in which the teachers portray different teaching practices and how they draw upon discourses on their role as a teacher.

The analysis shows that the teachers portray different teaching practices when they refer to different lesson phases and draw upon a range of discourses in doing so. This study exhibits eclectic, pragmatic teachers who navigate between discourses to create a new, blended discourse. By contrast to other research reports, which describe teachers' practices as being neither traditional nor reform-oriented (Cross, 2009; Ernest, 1991; Swan, 2006) and, in other cases, teachers struggling with the enactment of reform-oriented practices (cf. Heyd-Metzuyanim et al., 2018; Valoyes-Chávez, 2019), our results show another approach – portraying different practices and drawing upon different discourses in the divergent phases of lessons. In addition, these teachers neither resist nor struggle but instead seem to navigate comfortably across discourses. We find this result particularly interesting, as other studies have emphasized teachers' resistance and struggle as the explanation for why it is difficult to achieve the desired change from a traditional to a reform-oriented mathematics teacher is difficult (Cross, 2009; Valoyes-Chávez, 2019; Zimmerman, 2006). This study provides a view of teaching practice as open and

dynamic rather than closed and static and identifies another way in which teachers portray their teaching practices within different teacher roles.

We have investigated groups of teachers participating in a PD initiative. These teachers discuss how they have planned, conducted, and reflected on their teaching practices. These teachers' role is not an explicit part of the program, but as Boost for Mathematics builds on ambitious teaching, it is a natural part of teachers' discussions. These discussions were conducted without our intervention. If the teachers had been challenged to reflect on their teacher role and teaching practices (as i.e., Cross, 2009; Valoyes-Chávez, 2019; Zimmerman, 2006), the results might have been different. On the other hand, we believe that we have a good picture of teachers' concerns regarding their teaching practices during this PD program. We have also used words and categories to illustrate the ways in which teachers portray their teaching practices. It remains unclear how the boundaries between these words and categories can determine a discourse. For example, the purpose of clearly explaining novel content by giving the students examples that they can build on could indicate other reasons beyond being a traditional teacher. Our results, by contrast, show that teachers portray different practices when they refer to divergent phases of the lesson. They are not consistent within one specific discourse on the role of the teacher.

This study is limited to collegial discussions and the ways that teachers reflect on and discuss their practices. The excerpts also indicate that the teachers mostly agree with each other and do not question others' teaching practices. It seems they do not push to deepen understanding as a productive social norm (Elliott et al., 2009), as they are in agreement. Questioning is important (Brodie, 2014), and teachers must be challenged to move outside their comfort zones to create new ways of thinking regarding their own role as teachers. A natural continuation of the study would be to examine to what extent and how teachers question each other's teaching practices.

The result has implications for designers of PD programs in mathematics education. Teachers' transitions from a traditional role to a reform-oriented one is vital for raising student achievement (Munter & Wilhelm, 2020). The literature identifies transition challenges in reform-oriented teaching practices. Our findings indicate that teachers draw upon a blended conception of the role of the teacher and adapt practices connected to different teacher roles to their own understanding of being a reform-oriented mathematics teacher. We believe that this understanding must be challenged and questioned if teachers' practices are to be developed through PD initiatives. We hope that our findings will provide insight to those working to understand and support teachers' practices in PD.

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Note

1 Pseudonyms are used to ensure the confidentiality of the schools and the participants.

Appendix

Group	Session B Collective planning	Session D Collective participation
Bentham 4–6	6 participants 55 minutes	8 participants 48 minutes
Marlow 4–6	4 participants 88 minutes	8 participants 70 minutes
Romford 1–3	6 participants 50 minutes	5 participants 49 minutes
Bedford 7–9	3 participants 46 minutes	7 participants 37 minutes
Harrow 1–3	6 participants 64 minutes	7 participants 52 minutes
Tring 1–3	6 participants 57 minutes	8 participants 49 minutes
Penryn 4–9	6 participants 68 minutes	5 participants 53 minutes
Tipton 1–3	7 participants 62 minutes	9 participants 4 2 minutes

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