

## Construction of teachers' roles in collegial discussions

Odd Tore Kaufmann<sup>1</sup> and Andreas Ryve<sup>2</sup>

<sup>1</sup>Østfold University College, Faculty of Education, Halden, Norway; [odd.t.kaufmann@hiof.no](mailto:odd.t.kaufmann@hiof.no)

<sup>2</sup>Østfold University College, Faculty of Education, Halden, Norway & Mälardalen University College, Västerås, Sweden; [Andreas.ryve@mdh.se](mailto:Andreas.ryve@mdh.se)

*This paper investigates how teachers portray their teaching role in a professional-development community. By analyzing data from five groups, the goal of the study is to understand how teachers navigate between several discourses advocating different classroom practices and how the role is portrayed within these practices. In the majority of interactions, teachers position themselves within a traditional teacher discourse, an official Swedish discourse, or a reform-oriented discourse. The analysis provides examples of different teacher roles both within and between groups. Teachers who advocate a reform-oriented teacher role indicate that, in this type of role, they face challenges, and they stress that they need more specialized content knowledge.*

*Keywords: teacher role, pedagogical reform, traditional pedagogy, professional development.*

### Introduction

In initiatives to reform teaching and learning of mathematics, professional development of teachers is typically an essential part. A central component in such professional-development programs is often teachers' collegial discussions (Cobb & Jackson, 2012). Within professional-development programs, collegial discussions may be seen as a means to facilitate teacher development, which, in turn, is conceptualized as a means to improve and change classroom practices (Desimone, 2009). The opportunities created in collegial discussions for teacher development, however, are related to the characteristics of these discussions. In this paper, we examine one characteristic of collegial discussions: how the role of teachers is discussed and constructed. In particular, we are interested in understanding how teachers navigate between several discourses of advocated classroom practices and how the teacher role is portrayed within these practices. For this purpose, we conjecture that Sweden provides a productive case study. The argument for such a conjecture is that in the early years of the OECD, Sweden was one of the leading countries in educational policy. But with medium results on PISA tests and a shift toward students' learning outcomes, the mode of governance changed. Sweden has now become a country that needs advice in order to raise its educational performance (Pettersson, Prøitz & Forsberg, 2017). In the last decades, education systems have been radically and extensively transformed (Pettersson et al., 2017) and conflicting discourses about mathematics teaching and classroom practices are currently being exchanged in Sweden (Ryve, Hemmi, & Kornhall, 2016). In the traditional discourse, the instructive role of teachers is emphasized, whereas another official discourse emphasizes the role of the teacher as a motivator who should not disturb the students' development. Finally, a reform-oriented discourse stresses that teaching should be student centered and teacher led (see Ryve et al., 2016; Hemmi & Ryve, 2015). In this context, we pose the following research question:

How do teachers navigate in collegial discussions between discourses that advocate different classroom practices and the role of teachers within these practices?

We examine this question by analyzing five groups of mathematics teachers engaged in collegial discussions as part of a national large-scale professional-development program in Sweden.

## **Perspectives on the role of teachers**

There seems to be a consensus within mathematics education research on how students learn mathematics, as exemplified in the publication by the National Council of Teachers of Mathematics (2000). This document contains recommendations for teachers whereby students should develop procedural knowledge and conceptual understanding, be able to reason mathematically, and be able to communicate mathematical ideas. To achieve such aims, teachers have to work differently than the “traditional” way of teaching. In traditional classrooms, students work with procedural tasks and have few opportunities to reason and draw the connection between key mathematical concepts. To achieve high-quality teaching, new forms of teaching are required, which are based on the thinking of students (Franke, Kazemi, & Battey, 2007).

### **Teacher role**

Two decades ago, Fennema et al. (1996) asserted that the role of a teacher had evolved from demonstrating procedures to helping students build their mathematical thinking. They described two types of teachers: reform-oriented and traditional. Reform-oriented teachers think that students learn best by doing and learning mathematics on their own and that the teacher’s responsibility is to facilitate learning, and traditional teachers think that the teacher’s responsibility is to direct and control all classroom activities and that the students are responsible for absorbing and processing the given information. Even today, scholars and researchers use these labels to describe the role of the teacher (Louie, 2016). Although this is not a definite observation, in reform-oriented classrooms, teachers are responsible for facilitating discussions of the students’ approaches to mathematical tasks so that all students are actively involved in the discussion. The teacher role includes carefully inserting questions and explanations to ensure that the mathematical strategies and ideas of the students are clear to all learners (Franke et al., 2007).

The role of the teacher is important to describe a productive mathematical classroom and effective mathematics teaching. White (2003) emphasized the importance of the teacher role to include and influence the mathematical thinking of all their students. The teacher must value student ideas, explore student answers, incorporate students’ background knowledge, and encourage student-to-student communication. These two first themes are quite similar to Fraivillig, Murphy, and Fuson (1999) who describe successful teaching as eliciting student solution methods, supporting the students’ conceptual understanding, and extending the students’ thinking. Hahn & Eichler (2017) investigated the impact of a professional-development course on teacher’s beliefs toward teaching and learning mathematics. Three teachers were interviewed after the course; their responses with reference to teaching and learning of mathematics changed from a transmission-oriented view to a more constructivist-oriented view. Cai, Wang, Wang, and Garber (2009) summarized studies

from more than ten countries on what teachers emphasized as the characteristics of effective teaching and identified the following common themes for strong mathematical knowledge: All teachers highlighted that an effective teacher should have a strong background in mathematics. They should have a personality that conveys enthusiasm about teaching and students. Teachers should stimulate students' thinking and be good listeners to interact with their students more effectively. Lastly, the ability to manage a classroom was an important characteristic of an effective teacher.

As previously mentioned, a shift has occurred from teacher-centered teaching to student-centered teaching. Teachers who value student-centered teaching often use various strategies and tools to engage students in learning and tend to believe that students construct their own knowledge through active investigation and meaningful exploration (Kutaka et al., 2018). According to the standards of the National Council of Teachers of Mathematics (2000), which influence the Swedish national curricula, the student's role in the classroom is to engage in solving challenging, nonroutine tasks. Students should explain and justify their reasoning, make connections between solutions and key mathematical ideas, and share mathematical authority with the teacher in assessing what is a mathematically acceptable solution and on what grounds. To build on these standards, teachers should develop and build on the students' thinking in the classroom.

## **Method**

### **Context**

Between 2013 and 2016, the Swedish National Agency for Education launched a 649 million kr (approximately 65 million euro) curriculum-based professional-development (PD) project. Called "Boost for Mathematics" (Skolverket, 2018), this project aims to improve the teaching of mathematics. The most central components are 24 modules, eight per grade level (1–3, 4–6, and 7–9), developed to support teachers working in teams to plan, establish, and reflect on pedagogical practices in the mathematics classroom. The curriculum is distributed digitally from a website (<http://www.skolverket.se/kompetens-och-fortbildning/larare/matematiklyftet>) and includes articles, instructions, images, and video films. Each module is designed to support groups of teachers (during one semester) in engaging in eight iterations containing individual preparation, collective planning with colleagues, individual classroom teaching, and collective reflections on classroom instruction. In the PD program, teachers complete two modules, taking one module per semester. The PD sessions are held at each school with the support of a trained coach. This study is part of a larger study that was carried out in a Swedish municipality, wherein all public elementary schools ( $n \approx 40$ ) participated in the PD program. This paper focuses on five randomly selected schools. The number of participants in these groups, including the coach, ranged from 6 to 12 persons for a total of 39 teachers. The data were collected by videotaping two meetings of each group, where the first meeting was based on collective planning with colleagues and the second meeting was based on collective reflections on classroom instruction. This study analyzes a total of 10 sessions, which were held quite early in the second module during the spring semester, ranging from 33 to 90 min (two sessions for five groups), with the average being 63 min.

## Analysis

To understand how teachers navigate between different discourses when they engage in collegial discussions, we have chosen, as described in the context, to look deeper into collective planning and reflections on classroom instruction of five groups of teachers. The groups had been working together with “The Boost for Mathematics” for about six months and had established norms of participation that could affect teacher participation.

As part of data reduction, we began by identifying and transcribing all discussion episodes that related to the teacher role. In part of the analysis, we defined an episode of pedagogical reasoning as a coding unit:

Units of teacher-to-teacher talk allow teachers to exhibit their understanding of an issue in their practice. Specifically, episodes of pedagogical reasoning are moments within teachers’ interactions in which they describe issues in, or raise questions about, teaching practices that are accompanied by some elaboration of reasons, explanations, or justifications (Horn, 2007, p. 46).

Episodes of pedagogical reasoning in which teachers explicitly discuss their roles were analyzed. On the basis of the literature on the teacher roles and the Swedish context, we portray three different teacher roles that may appear in the discussion among the teachers in this project.

The traditional role: teachers emphasize themselves as instructors who offer clear explanations and present the content clearly. There is, therefore, no need for much knowledge about the students’ mathematical thinking. Furthermore, the teacher stresses classroom management.

The reform-oriented role: teachers emphasize the anticipation of and building on the students’ knowledge. Furthermore, the teachers design, initiate, and follow-up learning opportunities. Moreover, they challenge the students to think and interact. The teachers summarize and show connections, as well as discuss different solutions, mathematical ideas, and misconceptions with their students.

The official Swedish teacher role: teachers emphasize the motivation of students to make connections among different subjects. The teacher’s role is to be a coach and help make learning fun. Mathematical knowledge on the part of the teacher is not necessary, but social skills are essential. The teacher should be reactive, rather than proactive, to the student’s needs. This role could be compared to “discovery-learning” which, as proposed by Alfieri, Brooks, Aldrich, and Tenenbaum (2011), emphasizes students’ motivation, discovery of facts and relationships by students themselves, and that the teacher must provide guidance only on the students’ request.

## Results

The general overview of the episodes of pedagogical reasoning shows that all the three discourses were present in the teachers’ collegial discussions. We identified 13 episodes in which the teachers emphasized the traditional role, 16 episodes that represented the official role and 14 episodes that represented a reform-oriented role. Even though the total number of these three discourses were

quite similar, we found differences among the groups. In one group, we identified seven episodes representing the traditional role and one episode representing each of the other two groups. In another group, there were five episodes representing a reform-oriented role and two episodes representing the official role. Depending on different situations, teachers also navigate between roles. For instance, the teachers' role is portrayed differently when they discuss the introduction of a lesson, often portrayed as a traditional teacher role to introduce and show students procedures. In the middle of the lessons, students mainly worked in pairs, and a more apparent official teacher role appeared to motivate the students such that all students took part in the discussion. The episodes also revealed differences in how the teachers regarded their own roles. For example, when the teachers discussed the reform-oriented role, they expressed, to a great extent, the challenges of such a role. In the remainder of this chapter, we present some examples of episodes representing the different roles. In addition, the episodes illustrate the affordances and constraints related by the teachers to the different roles. All transcribed materials were translated from Swedish and all the names are pseudonyms.

This excerpt illustrates a traditional teacher role. In this group, each teacher presented and discussed their reflections on their own classroom instruction. In this episode, one of the teachers, Louise, emphasized her own role as an instructor who offered explanations of the content. She talked more about what she did as a teacher (I wrote, I took) than about the students' roles.

Louise: First, we had that thought-board (Swedish: Tanketavla) in common and I wrote this on the board because when I had done this and copied up I wrote everyday language and mathematical language so they could see which one. Then I gave them a very easy task, I took seven plus ten, and started in the middle. I had not even thought that we could start other places. Then we made it in common and I used an example, and I noticed that there were some who wrote exactly the same words that I had written. They wrote it and drew exactly the same.

Further on in the same discussion, there are several instances of these types of descriptions of the teacher's role, such as "First, I explained what is a thought-board and made a presentation in PowerPoint. After that, I tried to explain what everyday language is and what mathematical language is as well." The teachers speak of the role of the teacher as that of a transmitter of knowledge who explains to students what to do and models the tasks for the students. The students are, in a way, invisible in these discussions because, when the teachers talked about the lessons, they base the discussion on the task, as opposed to how the students worked with these tasks.

In the next excerpt, Mike reflects on his last lesson. His plan was to spend time discussing the tasks. Realizing that this plan would not work, he let his students finish their work. He assumed the role of a motivator who guided and supported his students but would not disturb them when they were working. His role was more that of a coach.

Mike: They worked with a problem attached to which I thought would be the fraction and percentage we have worked with from 32 rich mathematical problems. This

related to going to the theatre with different prices. What amazed me was that it was so astoundingly slow at the beginning when the students were going to work with the problem. I do not know if it was, I am not sure, because of the interruption or if their brains had an overturn or whatever it was. Because I feel that I did not intend to spend so much time, because I thought that these two first tasks they will blow away so I really could spend time on showing and discussing in whole class and so on. No, this turned out to be a lot of pilotage and support and everything we talked about earlier.

In episodes identified as the official role, the teachers are in the background motivating their students, and encounter a rather passive teacher role. They often reflect on their lessons regardless of whether their students had a fun time. Furthermore, in such episodes the teacher does not intend to discuss the mathematical content with their students other than to prepare the students for the mathematical content. In the next example, Amy describes the teacher role as one of asking questions to move the students forward. She supports the students' thinking by letting them present their thoughts. Amy wants to build upon their thinking using examples from them that are different but correct. In addition, she wants to challenge their thinking. She describes her role as proactive rather than reactive. We can find several representatives of a reform-oriented teacher role in how Amy reflects on her own role as a teacher.

Amy: When you (teacher) ask better questions, or better questions, but questions that make their reasoning go forward. But at this point I am in the start phase. It is great and I have written them on a piece of paper so that I can have a little note to watch and remember and get going. Ehh. Yes and then even more, I do it today, but even more show in different ways to think that the children can come up and show themselves, or like today, when we should make the diagnosis, and introduced to the children that we used different examples that they could see that aha, I thought in this way, and even that might be right and so.

Several episodes in which the teachers related to the reform-oriented role reveal the challenges of such a role. Sarah expresses her limitation about the mathematical concept of "relationship." She finds it difficult to understand. She notices that, in her student-centered teaching, she has problems with teacher-led questions to guide the students further because of her weak understanding of the concept of "relationship." Even if she supports the reform-oriented teacher perspective, she faces difficulties in implementing it:

Sarah: I am very inexperienced in talking about relationships to lead him in a good way. I have another group that is also on their way but they write in a different way. Here, I feel that I need to develop because they have written what they see as a pattern, and already at an early stage, they say we have seen the pattern. I feel when I explain this, my question is— what is a relationship, what is it?

## Discussion and conclusion

The preceding excerpts are presented to show how teachers navigate between several discourses of advocated classroom practices and how the teacher role is portrayed within these practices. We found three different teacher roles: a traditional-oriented teacher, a reform-oriented teacher, and an official discourse-oriented teacher. The portraying of the teacher role varies both within a group of teachers and between groups. Within a reform-oriented perspective, the findings reveal a particular discourse describing how teachers portray their role. Teachers find this type of role quite hard to fill in their classroom. They especially emphasize the challenge of acquiring the requisite specialized content knowledge (Ball, Thames, & Phelps, 2008). In a way, teachers have remained in the previously dominant discourse in Sweden of encouraging and discussing mathematics, and they do not highlight other parts of the reform discourse that relate to the role of the teacher in setting goals, challenging, conducting discussions, etc. The findings also show that teachers who portray their role as official often blame students when they reflect about their own role in the classroom and their lessons. A reform-oriented teacher with a student-centered and teacher-led lesson does not blame student difficulties on inherent traits. This can be helpful in understanding how teachers use students' ideas as a support in teaching (Jackson, Gibbons, & Sharpe, 2017).

How teachers talk about their own role can be helpful in understanding their potential for learning in collaborative meetings to improve and change classroom practices (Desimone, 2009). The findings reveal conflicting discourses about the teacher role and classroom practices (Ryve et al., 2016). Such conflicting discourses may affect the potential for teacher learning as they are not made explicit and resolved.

This paper has focused on how teachers portray the teacher role. Further developments and studies will compare this evolution between different groups of teachers and explore the connections between the teacher and student roles.

## References

- Alfieri, L., Brooks, P.J., Aldrich, N.J., & Tenenbaum, H.R. (2011). Does discovery-based instruction enhance learning? *Journal of Educational Psychology*, *103*(1), 1–18.
- Ball, D.L., Thames, M.H., & Phelps, G. (2008). Content Knowledge for Teaching: What Makes It Special? *Journal of Teacher Education*, *59*(5), 389–407.
- Cai, J., Wang, T., Wang, N., & Garber, T. (2009). Studying effective teaching from Teachers' perspectives: The journey has just begun. In J. Cai, G. Kaiser, G. Perry, & N.Y. Wong (Eds), *Effective mathematics Teaching from teacher' perspectives: National and cross-national studies* (pp. 303–317). Rotterdam: Sense Publisher.
- Cobb, P., & Jackson, K. (2012). Analyzing Educational Policies: A Learning Design Perspective, *Journal of the Learning Sciences*, *21*(4), 487–521.
- Desimone, L.M. (2009). Improving impact studies of teachers' professional development. Toward better conceptualizations and measures. *Educational Researcher*, *38*(3), 181–199.

- Fennema, E., Carpenter, T.P., Franke, M.L., Levi, L., Jacobs, V., & Empson, S.B. (1996). A longitudinal study of learning to use children's thinking in mathematics instruction. *Journal for research in Mathematics Education*, 27(4), 403–434.
- Fraivillig, J.L., Murphy, L.A., & Fuson, K.C. (1999). Advancing children's mathematical thinking in everyday mathematics classroom. *Journal for Research in Mathematics Education*, 30(2), 148–170.
- Franke, M.L., Kazemi, E., & Battey, D. (2007). Mathematics teaching and classroom practice. In F. K. Lester Jr, (Ed.), *Second Handbook of Research on Mathematics Teaching and Learning* (pp. 225–256). Charlotte, NC: Information Age Publishers.
- Hahn, T. & Eichler, A. (2017). Changes in beliefs of teachers on a PD course after reflecting on students' learning results. In T. Dooley, & G. Gueudet (Eds.). *Proceedings of the Tenth Congress of the European Society for Research in Mathematics Education (CERME 10)* (pp. 2884–2892).
- Hemmi, K., & Ryve, A. (2015). Effective Mathematics Teaching in Finnish and Swedish Teacher Education Discourses. *Journal of Mathematics Teacher Education*, 18(6), 501–521.
- Horn, I.S. (2007). Fast Kids, Slow Kids, Lazy Kids: Framing the Mismatch Problem in Mathematics Teachers' Conversations. *Journal of the Learning Sciences*, 16(1), 37–79.
- Jackson, K., Gibbons, L., & Sharpe, C.J. (2017). Teachers' views of students' mathematical capabilities: Challenges and possibilities for ambitious reform. *Teachers College Record*, 119(7), 1–43.
- Kutaka, T.S., Ren, L., Smith, W.M., Beattie, H.L., Edwards, C.P., Green, J.L., ... & Lewis, W.J. (2018). Examining change in K-3 teachers' mathematical knowledge, attitudes, and beliefs: the case of Primarily Math. *Journal of mathematics teacher education*, 21(2), 147–177.
- Louie, N.L. (2016). Tensions in equity- and reform-oriented learning in teachers' collaborative conversations. *Teaching and Teacher Education*, 53(1), 10–19.
- National Council of Teachers of Mathematics. (2000). *Principles and standards for school mathematics*. Reston, VA: National Council of Teachers of Mathematics.
- Pettersson, D., Prøitz, T.P., & Forsberg, E. (2017). From role models to nations in need for advice: Norway and Sweden under the OECD's magnifying glass. *Journal of Education Policy*, 32(6), 721–744.
- Ryve, A., Hemmi, K., & Kornhall, P. (2016). *Skola på vetenskaplig grund [School on a scientific basis]*. Stockholm: Natur & Kultur.
- Skolverket (2018). *Matematiklyftet [Boost for Mathematics]*. Retrieved from <https://larportalen.skolverket.se/#/moduler/1-matematik/alla/alla>
- White, D.Y. (2003). Promoting productive mathematical classroom discourse with diverse students. *Mathematical Behavior*, 22(1), 37–53.