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Work-based modelling in teacher education: Show, tell and discuss

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Work-based modelling in teacher education: Show, tell and discuss[1]

Sharing practical knowledge is an important way in which experienced practitioners can support novices at work. A mentoring approach in work-based teacher education was developed aimed at sharing practical knowledge through modelling. This chapter focuses on two student teacher/mentor teams that proved to differ in their appreciation of the learning opportunities offered by this approach. Their conversations were analysed to investigate whether the differences in appreciation between the teams could be explained by the extent to which and how practical knowledge was modelled by mentor teachers. In the conversations of the team that had a greater appreciation of the process the mentor indeed better succeeded in implementing the mentoring approach: significantly more practical knowledge was modelled.

[1] Based on:
Van Velzen, C., Volman, M., & Brekelmans, M. (under review). Work-based modelling in teacher education: show, tell and discuss.

Introduction

Teachers practical knowledge "encapsulates the essence of being an accomplished practitioner" (Loughran, 2010, p. ix). Experienced teachers can help student teachers to learn to teach by allowing them to deliberate about the nature of this knowledge and the expertise student teachers seek to develop (e.g., Meijer, Zanting, & Verloop, 2002). Sharing this knowledge is important because it can: (a) prevent each individual teacher from feeling pressured to 'reinvent the wheel' (Loughran, 2010); (b) help to overcome the constraints of the apprenticeship of observation (Lortie, 1975); (c) make up a resource for learning and instructional decision making (Little, 2007); and (d) contribute to student teachers becoming knowledgeable professionals (Thiessen, 2000). Experienced teachers and teacher educators however, find it hard to make their knowledge explicit (Boyd & Harris, 2010; Lunenberg, Korthagen, & Swennen, 2007) and mentors differ in their understanding of how mentoring of student teachers should be done (e.g., Feiman-Nemser, 1998; Timmermans, 2012). So, it cannot be taken for granted that practical knowledge is explicitly shared and discussed in mentoring practices at schools (Smith, 2005).

Ben-Peretz (2011), in her review on teacher knowledge, raised the question what concrete opportunities are offered to student teachers for gaining this knowledge. To create such opportunities we developed a cyclic collaborative mentoring approach aimed at systematically sharing practical knowledge by mentor teachers (Van Velzen, Volman, Brekelmans, & White, 2012). Mentor teachers were asked to explicitly articulate their practical teaching knowledge and share this knowledge with their student teachers through modelling. Mentors and student teachers worked together, discussing actual practice to draw student teacher's attention as much as possible to specific aspects of their experiences. Such approach is seen as beneficial because it encourages effective vocational learning of novices with the help of experienced colleagues (Fox, Wilson, & Deaney, 2010).

In an earlier study, the effectiveness of the mentoring approach was evaluated by teams of student teachers and mentors. Participants appreciated its structure because it provided them with regularity. They differed, however, in their ideas on the learning opportunities provided by this approach as compared with their usual mentoring activities (Van Velzen, et al., 2012).

In the present study, we explore whether these differences can be explained through the ways in which the approach was enacted by the teams. We therefore investigate and compared how and to which extent practical knowledge was modelled by these teams.

Conceptual framework

When student teachers make the transition to becoming teachers there is more involved than applying the knowledge acquired at a teacher education institute (TEI) in a school setting (Edwards, 2009). This transition involves a changing relationship between the student teachers and the work of teaching; it is enhanced by participating in teaching and discussing it with accomplished teachers (Beach, 1999; Lieberman & Pointer Mace, 2009). Mentors, being accomplished teachers can provide guidance for both participating in and discussing practice. Doing this they have to make their knowledge explicit and articulate their experiences into shareable knowledge (Hargreaves, 1999). Modelling practical knowledge provides for this guidance (Van Velzen, et al., 2012).

Practical knowledge

Since 1888, teaching has been regarded as an enterprise involving specialised forms of knowledge (Bullough Jr., 2001). Over the years, it has become increasingly clear that this knowledge is complex, multi-faceted and embraces characteristics that are quite different from knowledge produced by educational researchers and knowledge taught in

teacher education institutes (TEIs). Practical knowledge is a practice-oriented conception of knowledge, based on the epistemology of practice instead of a foundational system founded on the justification of propositional knowledge (Munby, Russell, & Martin, 2001).

There are many terms, each with a slightly different meaning, used to depict teacher knowledge; reflecting multiple views of teacher knowledge based on different approaches in research (Rosiek & Atkinson, 2005; Ben-Peretz, 2011). In this study we use the term "practical knowledge", because it emphasises the relationship between this knowledge and actual teaching practice (Clandinin & Connely, 1996). To demonstrate this relation is the potential strength of mentor teachers in school-based teacher education.

We build on three features of practical knowledge. First its *linkage with teaching practice*. Practical knowledge is about how to deal appropriately with complexity and changing conditions in a particular practice (Guile & Young, 2003). Practical knowledge is situated in the context of making pedagogical decisions based on the teacher's definition of the situation at hand (Gholami & Husu, 2010). This type of knowledge is hardly conscious, hard to generalise, and not measurable with traditional test instruments (Eraut, 1994). Second, practical knowledge includes *the diversity of domains of profession-related insights* that are potentially relevant to a teacher's activities, including opinions, values and self-knowledge (e.g., Verloop, Van Driel, & Meijer, 2001). Third, practical knowledge is grounded in both experience and research-based knowledge and "organized according to the problem the knowledge is intended to address" (Hiebert, Gallimore, & Stigler, 2002 p. 6) and not organised in terms of formal knowledge domains, such as pedagogy. All practical knowledge components are *interconnected and intertwined* in ways related to teaching practice. And, "the extent to which teachers can integrate the various aspects of teacher knowledge *to bring about effective* learning" (Tsui, 2009, p. 424, italic in original) is one of the critical features of teachers' expertise.

As Kremer-Hayon (1998) put it so eloquently :

> This knowledge flows; it is flexible, divergent, wide ranging and entails a scent of intuition. As such, it assists in solving problems

> that cannot be solved by theoretical knowledge only… the wisdom of practice is characterized by multidirectional traits, divergence and integration (p. 380).

Practical knowledge, shaped by the history and culture of the vocation, is developed through the engagement of individual teachers in social practice and through multiple discourses with all actors involved (Billett, 2001b; Ellis, 2009; Rosiek & Atkinson, 2005). It is embedded in practice; expressed in reflections on practice, in teachers' narrative accounts, body language and, hidden messages (Cochran-Smith & Lytle, 1999; Van Manen, 1999).

Knowledge cannot simply be passed on from the teacher education institute to the classroom (e.g., Eraut, 2004) or simply be transferred from teacher to student teacher (Hager & Hodkinson, 2009). Both statements are related to the idea that in 'transfer' it is not the knowledge which moves but the student teacher (Beach, 1999). However, we do not really know "how learning entailed in such movements can be enhanced" (Hager & Hodkinson, 2009, p. 629). We do know that student teachers need opportunities to examine how teacher knowledge plays out in the particulars of teaching and how it is tied to specific situations in order to learn (about) teaching (Grossman, 2005). Guided practice at the workplace may provide these opportunities for student teachers' learning. In this study, we look at whether mentors share their practical knowledge while guiding their student teachers and, if they do, the ways in which they do so.

Sharing practical knowledge through modelling

During mentoring conversations, mentors generally comment on the ideas of their student teachers and provide them with (indirect) suggestions while holding back their own knowledge (Strong & Baron, 2004). Modelling can however, be a helpful tool to support student teachers' participation while discussing their experiences (Loughran, 2006). Modelling was defined by Tharp and Gallimore (1992) as the practice of intentionally displaying certain teaching behaviours with

the aim of promoting the student teacher's professional learning. This restrictive use of the word modelling has since been extended. Next to showing behaviour, modelling is now usually conceptualized as involving teacher educators making their in-classroom choices explicit with "self-conscious narratives" (Wood & Geddis, 1999) along with the thinking strategies they use while creating a learning environment (Glazer & Hannafin, 2006). Modelling thus gives student teachers access to the knowledge regarding practice by explicating both the underlying purposes behind and the thinking about a teaching approach. This definition is in stark contrast to the misconception that modelling is a mock teaching demonstration or a tacit call for student teachers to "teach like me" (Loughran, 2006).

Although Rowley (2005) stated that modelling professional growth is one of the six essential qualities of a site-based mentor teacher, most research on explicit modelling which goes beyond simply showing teaching, has been executed with institute-based teacher educators (e.g., Lunenberg et al., 2007; White, 2011). This modelling however takes place in the second-order setting (Murray & Male, 2004) of the teacher education institute. In this context modelling is restricted to discussions and reflection about teaching based on approximations of actual classroom teaching and modelling practical knowledge is hard (Boyd & Harris, 2010). At school actual teaching practice however provides for a context in which modelling can become a work-based mentoring tool and hence, a contribution to a pedagogy of work-based teacher education.

Research on modelling at school is for instance done by Achinstein and Barrett (2004) who studied mentors who stimulated student teachers to manage diversity among pupils and the related challenges of practice by helping them to reframe ideas and situations. This reframing supports the development of awareness resulting in a changed relationship between the student teacher and the phenomenon at hand. Russell and Bullock (1999) reported the power of discussing written reflections based on observation and questioning as means to discover practical knowledge. Hagger and McIntyre (2006) used observation by student teachers followed by discussions as a way of sharing practical

knowledge. Although seen a promising way it also proved rather difficult for student teachers to take the lead in this process. The same was found by Meijer et al. (2002) who used concept mapping and stimulated recall interviews by student teachers because student teachers' questioning can help mentors to become aware of their knowledge and make it explicit (e.g. Hagger &MacIntyre, 2006; Meijer et al., 2002).

School-based teacher education encourages a culture in schools in which experienced teachers can become teacher educators. Rather than just providing opportunities to practice teaching, mentors can provide student teachers with possibilities for new teaching behaviours and/or teacher thinking through modelling. In this study work-based modelling practical knowledge is seen as the planned or unplanned mentoring activity of experienced teachers who not only demonstrate their practical knowledge during classroom practice but also discuss their actions and the underlying pedagogical reasoning with their student teachers (based on Loughran, 2006).

Various modelling actions can be helpful in accomplishing forms of more explicit modelling. So, to make modelling a powerful mentoring tool, it is important that mentors use a diverse set of these possible modelling actions. Table 1 shows modelling actions, based on the literature mentioned.

The mentoring approach

In the study on work-based modelling, the implemented mentoring approach is structured as a repetitive cycle of three collaboratively prepared, enacted and evaluated lessons. Lessons were enacted by the mentor, the mentor and the student teacher together, and the student teacher. Table 2 represents the approach. Beforehand mentors were asked to explicitly model their practical knowledge during lessons and lesson-based conversations and both mentors and student teachers were informed on how they could realise this (Van Velzen et al., 2012).

Table 1

Possible Modelling Actions by a Mentor Teacher

	Pre lesson conversation	**During classroom teaching**	**Post lesson conversations**
Kind of interaction	- Telling about possible teaching behaviour - Discussing possible teacher behaviour informed by practical knowledge - Reflecting on ideas informed by practical knowledge - Asking student teachers' ideas and discussing expected effectivity and practicality - Suggesting teacher behaviour and discussing expected effectivity and practicality	- Showing teaching behaviour - Observing teaching behaviour student teacher - Giving suggestions during co-teaching - Observing teaching behaviour by student teachers	- Telling about observed teaching behaviour - Discussing observed teaching behaviour informed by practical knowledge - Reflection on observed teaching behaviour and its effectivity and practicality - Asking student teachers' ideas and discussing effectivity and practicality - Suggesting teacher behaviour underpinned with practical knowledge - Reframing situations and/or behaviour - Providing feedback underpinned with practical knowledge
Object of interaction	Ideas on lesson enactment Lesson plans	Teaching behaviour mentor Teaching behaviour student teacher Pupil activities	Observations of lesson enactment Written reflections of lesson enactments

Table 2
The Collaborative Mentoring Approach in Scheme

What	Enacted by
Preparing conversation: establishing learning needs student teacher	SBTE and student teacher
Cycle 1	
Pre lesson conversation	Mentor and student teacher
Lesson 1.1	Mentor teacher
Post lesson conversation	Mentor and student teacher
Pre lesson conversation	Mentor and student teacher
Lesson 1.2	Mentor and student teacher (co-teaching)
Post lesson conversation	Mentor and student teacher
Pre lesson conversation	Mentor and student teacher
Lesson 1.3	Student teacher
Post lesson conversation	Mentor en student teacher
Evaluation and establishing learning needs cycle 2	SBTE, student teacher and mentor
Discussing concept maps practical knowledge	SBTE, student teacher and mentor
Cycle 2: like cycle 1	
One post lesson conversation is based on a videotaped lesson	

Mentors and student teachers are not used to this kind of mentoring. Normally mentors observe student teacher's lessons and they provide feedback on what they saw. Doing this they are usually reluctant to give advice or discuss ideas based on their own experiences (Strong & Baron, 2004).

In an earlier study (Van Velzen et al., 2012) the satisfaction of mentors and student teachers with the collaborative mentoring approach was evaluated and compared with their regular approach. Participants were satisfied with the cyclic structure of the approach but they disagreed on the learning opportunities the approach offered compared with their regular conversations. The differences between the new approach and the regular conversations made them more or less satisfied with the collaborative mentoring approach. The present study builds on these results and focuses on the lesson-based conversations.

The present study

The aim of this study is to investigate whether the improvement of learning opportunities as perceived by mentors and student teachers can be related to the quality of the implementation of the approach. 'Better' implementation specifically refers to whether the mentoring situation showed the following characteristics: (a) the content of the lesson-based conversations reflects practical knowledge; and (b) the mentor teacher uses a diverse set of modelling actions.

Studying the way the approach was enacted using case analysis with a mixed methods approach offers the opportunity to reveal which differences in the enactment could be responsible for the differences in appreciation in the teams (in terms of perceived improvement of learning opportunities). Quantifying qualitative data is not only a helpful approach to support conclusions when it is impossible to present all the evidence, but it also makes statements such as 'less' or 'some' more precise (Maxwell, 2010).

The leading questions of this study are:

1. Are differences in mentor/student teams' appreciation of the learning opportunities offered by the collaborative mentoring approach related to:
   - 1.1 The extent of practical knowledge being shared by the mentors in the lesson-based conversations?
   - 1.2 The diversity of the practical knowledge domains shared by the mentors in the lesson-based conversations?
   - 1.3 The degree to which the interconnectedness of practical knowledge domains was shared by the mentors in the lesson-based conversations?
2. Are differences in mentor/student teams' appreciation of the learning opportunities offered by the collaborative mentoring approach related to the diversity of the modelling actions used by the mentors in the lesson-based conversations?

Method

Participants

Two teams (each consisting of a mentor and a student teacher) were selected from a larger sample, based on their satisfaction with the mentoring approach (purposive sampling; Tashakkori & Teddlie, 2003). We aimed at focusing on two contrasting cases in this study, a relatively unsatisfied team (Team One) and a satisfied team (Team Two) (Merriam, 1998; Yin, 2006). The satisfied team judged the collaborative approach provided for better learning opportunities compared to their regular conversations. They experienced lesson-based conversations that went deeper and offered the student teacher insights into their learning more quickly than in regular mentoring conversations. The approach also helped the mentor to overcome her reluctance to interfere with the student teacher's teaching, and mutual

learning was supported (Van Velzen et al., 2012). The less satisfied team did not report these outcomes.

Both teams worked in schools for secondary education that are part of school-TEI partnerships. All mentors were experienced teachers and educated mentors. The student teachers had a Masters degree in their subject and were enrolled in a one-year university-based teacher education curriculum of 60 ECTS (European Credit Transfer System). All participants volunteered to participate in this research. The names used are pseudonyms.

Table 3
Participant Characteristics

Team	**Mentor**			**Student Teachers**	**School subject**
	Name (all mentor-names start with M)	Teaching experi-ence	Mentoring experience	Name, (all student teacher names start with S), age	
One: less satisfied	Martha	33 years	20 years	Sara, 23	Biology
Two: satisfied	Megan	12 years	1 year	Selma, 25	Chemistry

Data collection

The pre-lesson conversations and the post-lesson conversations of each team were audio taped. 23 Lesson-based conversations with a total duration of more than twelve hours were available for analysis, 12 of Team two and 11 of Team one. Due to technical reasons the first pre lesson conversation of Team One is missing. In both teams a conversation stopped when the student teacher and the mentor decided there was nothing more to discuss. Table 4 shows the basic characteristics of the lesson-based conversations

Table 4

Outline of Content Analysis System for Practical Knowledge Domains, Modelling Actions in Lesson-Based Conversations

Dimension	Categories	Codes
Practical knowledge: Conversation statements of the mentor related to 'what works in practice' (PK)	- Instruction and guiding (teaching and learning activities; class management)	PK.i
	- Pupils (individual, groups, class characteristics) and relations with pupils	PK.l
	- Subject matter (and pupil's problems related to the subject matter)	PK.sm
	- Curriculum development and lesson planning (including time management), aims and objectives	PK.cd
	- Self (personal experiences, characteristics as teacher, opinions, believes)	PK.s
	- No practical knowledge	NPK
Modelling actions: The way mentors share their practical knowledge with student teachers (M)	- Showing behaviour in lesson enactment by the mentor or observations of this behaviour brought into the lesson conversations by student teachers	M.sho
	- Telling about behaviour or ideas	M.tel
	- Explaining behaviour or ideas	M.exp
	- Discussing effectiveness of lesson plans and enactment	M.dis
	- Discussing alternatives: reframing the situation and/or teachers' behaviour	M.ref
	- Providing suggestions, discussing expected effectiveness of these suggestions	M.sug
	- Asking student teachers' suggestions and discussing expected effectiveness of these suggestions	M.ask
	- Giving feedback underpinned with vocational expertise	M.fb
	- Discussing written reflections	M.wf
	- No modelling	NM

Data analysis

The lesson conversations were transcribed verbatim, and coded in terms of content analysis (Kvale, 2007), as outlined in the next four steps. All parts of the lesson conversations used in this article were translated from Dutch.

1. Splitting up. All texts were divided into meaningful fragments; the division was made when a new conversation topic was introduced by the mentor or the student teacher (e.g. Levine & Marcus, 2010). These fragments can be regarded as narrative accounts in which the mentors could express practical knowledge (Clandinin, & Connelly, 1996), and they are the units of all further analyses. We illustrate text division with an example. Team Two (satisfied) is discussing why mentor Megan started the lesson while the pupils still were coming in:

   > *Megan*:…when I am ready to begin the lesson, I get annoyed more quickly when pupils are not yet in the classroom than when I am not ready myself…I know I should not do that. It is a rule: after the second bell, doors must be closed. *Selma*: Yes, I know [End of fragment] [Start new fragment] what did you think about this lesson? *Megan*: The pupils needed too much time to discuss the practicum of last week. [Further discussion of the reasons why it took more time than planned, and what might have happened if the mentor could have moved more quickly].

2. Coding practical knowledge. Atlas ti (Atlas ti version 6, 1993-2011) was used to code each fragment. Whenever "what works in actual practice" was discussed, the fragment containing that discussion was assigned with a code reflecting the presence of practical knowledge (PK) to identify its extent (question 1.1), if not code NPK was assigned. To gain further insight into how the conversations reflected the practical knowledge of the mentor, the PK codes were refined based on five knowledge domains related

to classroom practice (see Table 4, second column, first row) and domain related codes were counted (question 1.2). Content analysis of these fragments helped us to develop a general picture of *what* mentors discussed with their student teachers. The interconnectedness of the practical knowledge shared by the mentor was uncovered by determining the number of fragments in which combinations of two or more practical knowledge domains could be identified (question 1.3).

3. Coding modelling activities. The fragments were also examined to discover whether appreciation of the approach was related to the diversity of modelling actions used by the mentors (question 2). All fragments in which practical knowledge could be established were coded for the modelling actions used by the mentor (see Table 5, second column, second row). The number of fragments in which combinations of modelling actions occur was determined.

Table 5
Basic Characteristics of the Lesson-based Conversations

	Team one Less satisfied	**Team two Satisfied**
Average length of conversations	29 min	39 min
Number of conversation	11	12

4. Cross case analyses. After analysis of the two cases, cross case analyses were executed to expose differences in the lesson-based conversations related to (1) the extent, the diversity and the interconnectedness of the practical knowledge domains used; and (2) the diversity of the modelling actions. Because we expected Team Two (satisfied) to show an implementation closer to that intended compared to Team One, a Pearson Chi-square was used to test our hypothesis, and Cramer's *V* was used to establish the strength of the association between appreciation and the enactment of the

mentoring approach (Garson, 2011). The last step was to compare ways of speaking and subjects discussed in the conversations of both teams in order to illustrate the ways both teams talked about 'what works'.

The practical knowledge domains and the modelling activities found in the data were discussed with the participants. Both groups agreed on the findings (respondent validation, Creswell, 2007). To further enhance the trustworthiness of the analysis, the outcomes of the interpretation were audited by having the scores of randomly chosen fragments checked in a peer review by two researchers familiar with this field (Kvale, 2007). Coding practical knowledge showed 94% agreement but coding modelling actions (84% agreement) was less uniform. Whether the mentors simply described (M.tel) their ideas or, in one way or another, explained and underpinned them was discussed with the peers until agreement on the coding was established. The coding of all fragments was adjusted to the outcomes of that discussion.

Results

The basic characteristics of the fragments of both teams as result of the first analysis step are summed up in Table 6.

Table 6
Basic characteristics of the Fragments

	Team one Less satisfied	**Team two Satisfied**
Number of fragments	138	174
Variation in length (in standardized lines)	4-134 lines	4-131 lines
Modelling practical knowledge in % of fragments	69%	83%

As we already saw in the methods section Team Two spent twice as much conversation time compared to team One. The same concerned the average length of the separate fragments meaning subjects at hand were more in-depth discussed.

Practical knowledge

The analysis of the topics in the conversations showed how the two teams discussed daily practice. Pre-lesson conversations started with a review of the preceding lesson and were concluded with an orientation on the upcoming lesson. Conversations followed the chronological structure of the upcoming lesson - how to begin, instructional aspects and pupil assignments. In Team One (less satisfied), most emphasis was on the activities of the (student) teacher - what to do in the classroom and how to do it right. For example, mentor Martha tells student teacher Sara how to start: "…you should first explain the difference between genotype and phenotype. ...Then we have to deal with chromosomes and genes …You must emphasise *the* pairs and not just say pairs."

In Team Two (satisfied), in addition to 'what to do as a teacher', pupil learning and lesson evaluation was also discussed. For example, mentor Megan started a fragment by asking: "What might be a good way to check whether they [pupils] actually understood it [molar volume] without calculating?" They discussed what pupils should know at the end of the lesson and how that knowledge could be evaluated.

In post-lesson conversations, enactment and pupil behaviour was discussed, particularly regarding the original planning and unforeseen events. Both teams paid attention to teacher characteristics and how to feel comfortable as a teacher 'in your own class'.

Both mentors gave attention to student teachers' subject knowledge but in Team Two (satisfied), the relationship between teaching and pupils' learning was also considered. For example, Megan and Selma discussed how to react to a pupil who asked why it was necessary to complete four assignments. Selma also thought it was unnecessary. Megan identified several questions which might help this pupil understand why doing four exercises that look the same could

actually be useful and explained to Selma the importance of sharing this with pupils.

Quantitative analysis of the data showed that in Team One (less satisfied), 69% of the fragments held practical knowledge, while in Team Two (satisfied), 83% held practical knowledge (question 1.1). The difference between the two teams was significant (χ^2 (1) = 8.32, p = .004) although the relationship between satisfaction and the extent to which practical knowledge could be recognised in the conversation (Cramer's V= .16) was weak (Garson, 2011).

In the conversation fragments in which practical knowledge could be identified, all five knowledge domains were apparent (question 1.2). Table 6 (first column) shows that practical knowledge related to giving instruction (PK.i) received the most emphasis by both teams. No significant differences between the two mentors regarding the diversity of the five knowledge domains used could be established (χ^2 (4) = 1.76, p = .780).

Combinations of practical knowledge domains, indicating the interconnectedness of these knowledge domains, were identified (question 1.3). Although Megan (Team Two, satisfied) used more different knowledge perspectives while discussing a particular topic related to the lesson at hand, no significant difference between the teams in the number of knowledge perspectives could be established (χ^2 (2) = 0.61, p = .736). Table 7 also gives an overview of the combinations of practical knowledge domains that could be identified in the conversation fragments of both teams.

Modelling actions

In each fragment in which practical knowledge could be recognised, modelling actions were identified. The number of modelling actions was significantly higher in the satisfied Team Two (χ^2 (1) = 7.57, p= .006), although the relationship between satisfaction and the extent to which modelling actions can be recognised in the conversation (Cramer's V= .13) was weak (Garson, 2011).

Table 7

Statements related to Practical Knowledge Domains in Fragments Coded with PK

Separate domains			**Combination of two domains[a]**			**Combination of three domains[a]**		
	Team One[b] %	Team Two[c] %		Team One	Team Two		Team One	Team Two
PK.cd	17	16	PK.i; PK.sm	12	17	PK.i; PK.l; PK.sm	1	0
PK.i	37	44	PK.i; PK.l	1	10	PK.i; PK.l; PK.s	1	1
PK.l	17	16	PK.i; PK.cd	4	6	PK.i; PK.sm; PK.cd	0	2
PK.s	13	10	PK.i; PK.s	3	1	PK.i; PK.cd; PK.l	0	2
PK.sm	17	14	PK.l; PK.cd	0	3			
			PK.l; PK.s	4	2			
			PK.l; PK.sm	2	1			
			PK.cd; PK.sm	0	2			
			PK.cd; PK.s	0	1			

Note.

[a]Related to the small amount of fragments in which combinations could be recognized these are given in numbers instead of percentages.

[b]Team One (less satisfied): 95 out of 138 fragments with PK (69%).

[c]Team Two (satisfied): 144 out of 174 fragments with PK (83%).

As presented in Table 8, almost all modelling actions can be recognised in the conversations of both mentors (question 2). Telling and describing behaviour and ideas on teaching (M.tel) was the most frequently used modelling action. This method of sharing knowledge providing the student teachers with ideas regarding 'what works' without much grounding is regarded one of the pitfalls of modelling. But while Martha (Team One, less satisfied) often used "you should" or you "have to", Megan (Team Two, satisfied) used phrases such as "you might" or "maybe you can." Although Megan (Team Two, satisfied) put more modelling actions into practice, the diversity of actions she used was not significantly different from Martha's (Team One, less satisfied), (χ^2 (7) = 11.68, p= .112).

Showing teacher behaviour (M.sho) was not frequently mentioned, meaning these student teachers did not discuss their observations and the mentors did not bring their behaviour into discussion. Hence, discussing actual observed teacher behaviour and pedagogical thinking related to this behaviour appears to be overlooked (or not raised) when discussing ideas about teaching. Providing for feedback, based on the observations of the student teacher by the mentor (M.fb) is somewhat more identifiable. Especially discussing the video-taped lesson proved helpful for shared observations and reframing situations and behaviour. Based on these observations Megan also discusses new teaching behaviour with Selma and provides for feedback in the following lesson. Written reflections (M.wf), although used by both student teachers and mentors, were not shared and compared.

Within a very few fragments, mentors used more than one modelling action. Table 8 also shows the combinations the mentors used.

Table 8

Diversity of Modelling actions in Fragments coded with M

Separate actions			**Combinations of actions**[a]				
	Team One[b] (%)	Team Two[c] (%)				Team One	Team Two
M.ask	2	8	M.tel	M.ask		0	1
M.dis	1	5	M.tel	M.exp		0	1
M.exp	22	27	M.tel	M.sug		1	0
M.fb	4	7	M.exp	M.dis		1	2
M.ref	1	3	M.exp	M.sug		0	2
M.sho	2	2	M.exp	M.sho		0	1
M.sug	1	8	M.sug	M.ref		0	1
M.tel	36	33	M.sug	M.fb		0	1
M.wf	0	0	M.ask	M.exp		0	3
			M.ask	M.fb		0	1
			M.dis	M.sug		0	2
			M.ask	M.dis	M.sug	0	1

Note.

[a]Related to the small amount of fragments in which combinations could be recognized these are given in numbers instead of percentages.

[b]Team One (less satisfied): 95 out of 138 fragments with M (69%).

[c]Team Two (satisfied): 144 out of 174 fragments with M (83%).

Conclusion and discussion

With this small-scale study, we explored the assumption that the differences in mentor/student teams' appreciation of the learning opportunities offered by a collaborative mentoring approach aimed at modelling practical knowledge can be explained by the way the mentor-student conversations within this approach were enacted. In particular, we compared whether and how sharing practical knowledge through modelling was present in the lesson-based conversations of a team that saw no differences with their regular conversations (the less satisfied team) and a team that judged that the approach provided for better learning opportunities (the satisfied team). The findings of the study suggest that the mentor in the more satisfied team indeed better succeeded in implementing the mentoring approach than the mentor in the less satisfied team. However, the relationship between implementation as intended and appreciation for the approach is not very strong, meaning that the difference in the level of appreciation for the learning opportunities offered by the approach can not totally be attributed to these characteristics.

A review of the results from the enactment of the mentoring approach shows that the work-based modelling of practical knowledge can be better recognised in the conversations of the most satisfied team. Compared to the less satisfied team in the satisfied team a greater percentage of conversation fragments was devoted to actual classroom teaching. As a consequence more practical knowledge was shared and a broader range of topics was discussed. In the satisfied team student teacher's teaching was linked with effects of teaching in terms of pupil learning. By doing so, the student teacher was provided with opportunities to learn how to connect practical knowledge on teaching to promoting pupil learning (Desforges, 1995). The mentor in the satisfied team also used more different modelling actions.

Next to these quantitative differences in Team Two the language used by the mentor was more appealing instead of directive (for instance questions instead of statements) and more subjects were dis-

cussed that related teaching to pupils' learning. Mentors paying more attention to the relationship between teaching and pupils' learning can create a stronger learning environment for student teachers. This helps student teachers to learn to operate on two levels, one level related to the nature of the 'content' which must be learned and the other level related to the nature of the teaching which must be employed (Loughran, 2006, p. 7).

Both mentors spoke about what they valued and thought important within the context of actual practice (e.g., being happy in your own classroom, how to prepare a lesson) and the problems which arose (e.g., not being attentive to all pupils). In these conversations a process of re-assembling and (re-) constructing ideas on actual classroom teaching took place. The conversations of the less satisfied team could be characterized mainly as reflection on what the (student) teacher planned to do and what she did. The other team showed deliberative reflection on what might work in a particular situation and why, involving the emergence of new understandings of daily teaching problems and the relation with pupils' learning. As a result modelling became an opportunity for the mentor to associate learning to teach with working as a teacher using ideas and solutions built up over the years by her, being an experienced teacher (Guile & Young, 2003).

In order to make modelling a mentoring strategy we explicitly asked mentors to model their practical knowledge while talking about teaching with their student teachers. Practical knowledge is a multi-faceted concept and practical knowledge components are complexly interconnected and intertwined in ways related to teaching practice. For reasons of analysis practical knowledge here is presented as five independent categories related to five different aspects of teaching. However, we know these categories are interconnected and also overlap in their scope so in fact they cannot be separated. Further research could provide more insight on the *practical teaching knowledge base* that is available for experienced teachers.

Beside it, to make modelling an intentional mentoring tool mentor teachers also must have *a mentoring knowledge base* at their disposal. To make student teachers' learning effective, mentors have to know

how and when to discuss issues related to what student teachers' need and want to learn (Harrison, Dymoke, & Pell, 2006; Smith, 2005). Extending these knowledge bases must be an important professional issue in school-based teacher education.

In contrast with modelling by institute-based teacher educators in teacher education institutes showing and discussing actual experienced teacher behaviour in everyday practice is one of the possible mentoring actions in work-based modelling. Mentors and student teachers, hardly used this opportunity when discussing enacted lessons and their attention to the 'why' of the teachers' teaching behaviour was mainly based on the 'what works notion': what was done to realise at least some of the intended results (Gholami and Hussu (2010, p. 1526). In the second team teaching behaviour was also discussed in terms of a 'moral ethos': a professional commitment related to "professional responsibilities generally and care about pupils specifically" (Gholami & Husu, 2010, p. 1525). Further study is needed to understand whether and how during lesson enactment (also part of the collaborative mentoring approach) showing teaching behaviour as modelling action followed by critical discussion, is and can be used by mentors.

Student teachers' role during interaction is also important in making modelling possible. Their questioning can help mentors to become aware of their knowledge and make it explicit (e.g., Hagger & MacIntyre, 2006). Student teachers should be prepared to provide their mentors with opportunities to rethink what became obvious during their years of experience. In this sense work-based modelling is a collaborative (re)construction of practical teaching knowledge. Further research is needed on the impact of student teacher's actions both on their mentors as on their own development.

Concomitant research with additional teams could provide a more comprehensive view of the developed collaborative mentoring practice and the factors that influence its effectiveness. With better understanding, work-based modelling by mentor teachers can offer opportunities for sharing practical knowledge and make a profound contribution to educating student teachers.

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