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# Uncovering contents of mentor teachers' interactive cognitions during mentoring dialogues

Paul Hennissen [a,*], Frank Crasborn [a], Niels Brouwer [b], Fred Korthagen [c,d], Theo Bergen [b,e]

[a] Department of Teacher Education, Fontys University of Applied Sciences, PO Box 558, 6130 AN Sittard, Netherlands
[b] ILS Graduate School of Education, Radboud University, Nijmegen, Netherlands
[c] Vrije Universiteit, Amsterdam, Netherlands
[d] Utrecht University, Utrecht, Netherlands
[e] Eindhoven School of Education, University of Technology, Eindhoven, Netherlands

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ABSTRACT

In the context of developing mentor teachers' use of supervisory skills, two consecutive studies were conducted, using stimulated recall. Firstly, with eight participants, an instrument was developed to categorize contents of interactive cognitions. Secondly, with 30 participants, the instrument was applied to uncover contents of mentor teachers' interactive cognitions, before and after training in supervisory skills. After training, mentor teachers demonstrate an increased awareness of their use of supervisory skills. This indicates that mentor teachers not only seem to emphasize pupil learning and needs when conducting a mentoring dialogue, but simultaneously focus on their own supervisory behaviour.



## 1. Introduction

In teacher education, the availability of effective guidance by and cooperation with a mentor teacher is an essential condition for student teachers' learning at the workplace (Bullough & Draper, 2004). This is especially true for teacher education programmes that rely strongly on practical experience in schools. Central to the practice of mentoring are mentoring dialogues (Orland-Barak & Klein, 2005; Sullivan & Glanz, 2000). Through their dialogues with student teachers, mentor teachers have a considerable influence on how and what student teachers learn (Feiman-Nemser, 2000; Glickman & Bey, 1990). During mentoring dialogues, mentor teachers' focus is less on student teachers as learners, than on the pace at which student teachers covered the curriculum content and with how effectively the student teachers managed the children in the class whilst covering the curriculum (Edwards & Protheroe, 2004). This can be explained by the fact that most mentor teachers generally are selected on the basis of their expertise as a teacher (Riggs, 2000). Because expertise is domain-specific (Berliner, 2001), good teachers are not automatically good mentors (Zanting, 2001).

Apart from expertise as a teacher, it is important that mentor teachers develop attitudes, knowledge and skills in the specific domain of mentoring. Especially, to promote the learning of student teachers, mentor teachers have to perceive student teachers as learners too (Paris & Gespass, 2001). In fact, mentor teachers need a bifocal perspective in which both pupils *and* student teachers are seen as learners (Achinstein & Athanases, 2005). To achieve this, a conscious and gradual learning process is required: "…although the passage from being a teacher of children to becoming a teacher of teachers is shaped by strong emotional, and motivational dispositions, it is also a highly conscious and gradual process of developing communicative competencies, whereby the mentor learns to redefine his/her context of teaching in order to make sense of his/her context of mentoring…" (Orland-Barak, 2001, p. 53).

To facilitate mentor teachers' communicative competencies, many schools often in cooperation with teacher education institutions implement training programmes (Strong & Baron, 2004). Focusing on student teachers as learners, requires expertise in using supervisory skills to elicit student teachers concerns and to encourage reflection during mentoring dialogues

* Corresponding author. Tel.: +31 877879627; fax:+31 8778 75500.
*E-mail address:* p.hennissen@fontys.nl (P. Hennissen).

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(Norman & Feiman-Nemser, 2005). Training programmes for mentor teachers often aim at developing such skills (Timperley, 2001). The research reported here was conducted in the context of the development and implementation of such a training programme, entitled Supervisory Skills for Mentors to Activate Reflection in Teachers (SMART).

Development of mentor teachers' supervisory skills can be observed in terms of changing supervisory behaviour (Crasborn, Hennissen, Brouwer, Korthagen, & Bergen, 2008), but also in terms of changing cognitions, while they accompany an action or mediate behaviour (Chi, Glaser, & Farr, 1988; Sakai & Nasserbahkt, 1997). In research on teacher thinking, cognitions accompanying an action are called *interactive cognitions* (Clark & Peterson, 1986; Meijer, 1999). In the research reported here, specifically mentor teachers' cognitions are investigated because developmental stages in a specific expertise domain are reflected in distinctive cognitions during professional action (Berliner, 2001). In addition, cognitions can also point to a specific perspective or frame of reference that is guiding persons' actions (Meijer, Verloop, & Beijaard, 2002). Because of their strong interaction with actual behaviour (Clarke & Hollingsworth, 2002) interactive cognitions have a dynamic character. Consequently, they can be used to explore cognitive changes within a short period of time (Schepens, Aelterman, & Van Keer, 2007).

In an effort to add to our knowledge about how interactive cognitions (may) mediate the conscious use and acquisition of supervisory skills, two interrelated consecutive studies were conducted. In both studies, interactive cognitions are defined as mentor teachers' cognitions accompanying the use of supervisory skills during mentoring dialogues. Descriptions of *contents* of mentor teachers' interactive cognitions are required to observe and depict the development of mentor teachers' supervisory skills over short periods of time. Contents of interactive cognitions on the one hand can refer to a person's own actions and on the other hand to the actions of other people, events, topics, issues or situations (Mathijsen, 2006). As there is no empirical research on the contents of mentor teachers' interactive cognitions as indicators of conscious use and acquisition of supervisory skills, the aim of the present studies is to uncover contents of mentor teachers' interactive cognitions during mentoring dialogues, before and after training in supervisory skills.

### 1.1. Interactive cognitions as a linking-pin

To theoretically frame the two studies reported here, a model is presented which describes the linking-pin function of interactive cognitions. This model builds on theory about human memory (Baddeley, 1997) as well as about the relationship between human actions and interactive cognitions (Clarke & Hollingsworth, 2002; Vallacher & Wegner, 1987). The model's basic premise is visualized in Fig. 1 by means of two overlapping ellipses. Interactive cognitions form a link between mentor teachers' cognitions and their immediate actions. The left hand ellipse represents the relationship between two kinds of cognitions. In the right hand ellipse, the relationship between interactive cognitions and actions is visualized.

### 1.2. Stable and dynamic cognitions

The relationship between two kinds of cognitions, visualized in the left hand ellipse can be explained with the help of theory about human memory in which the connection with two types of memory is explicated (Baddeley, 1997). Cognitions are stored in memory. In long-term memory, cognitions such as "beliefs", "knowledge", "notions", "concerns", "ideas", "perspectives", "attitudes" are stored (Kagan, 1992; Thompson, 1992). Cognitions in long-term memory are rather stable. Interactive cognitions can be located in working memory, which consists of cognitions from long-term memory, called up to deal with specific situations. Interactive cognitions are more dynamic because of their direct relation with actions. Handling complex situations, for example conducting a mentoring dialogue, triggers cognitions from long-term memory and makes these temporarily active in working memory, which directly informs actual behaviour. Following this theory, it is assumed that mentor teachers' interactive cognitions in working memory on the one hand, and their cognitions in long-term memory on the other, are different in nature, but closely linked to each other. Dynamic interactive cognitions in working memory and stable cognitions in long-term memory are often seen as the two parts of teachers' "practical knowledge", accompanying teacher's actions (Meijer et al., 2002; Schepens et al., 2007; Shulman, 1987; Zanting, 2001).

For example, a mentor teacher has a relatively stable "belief" that the main purpose of a mentoring dialogue is to activate a student teacher to reflect and learn from teaching experiences. To meet with this belief, the mentor teacher tries to pose open questions during mentoring dialogues. Brief answers on behalf of the student teacher may then trigger an interactive cognition in the mentor teacher. For example, "Did my question start with how, when, where, or what?", indicating his or her knowledge about rules for formulating open questions. The knowledge about open questions, stored in long-term memory, is activated temporarily in working memory.

### 1.3. Interactive cognitions and actions

The relationship between interactive cognitions and a person's own actions, visualized in the right hand ellipse, is reciprocal,

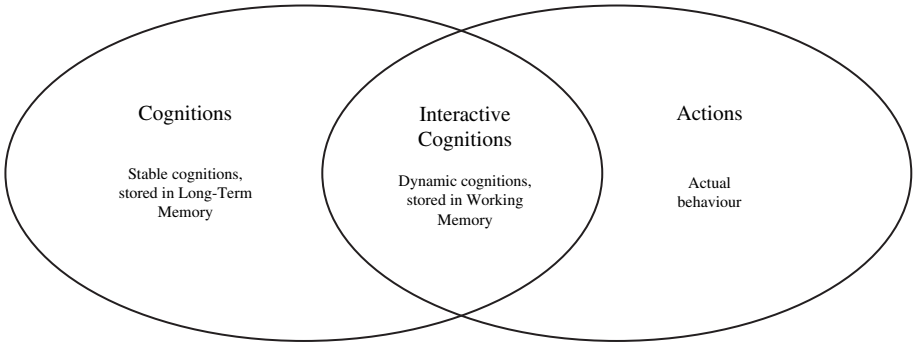


**Fig. 1.** Interactive cognitions as a linking-pin.

interactive and cyclic (Clarke & Hollingsworth, 2002; Eraut, 2004). An action may be an enactment of a previous interactive cognition. At the same time, an interactive cognition may be a reflection on a previous action. Interactive cognitions and behaviour mutually influence each other as they unfold and evolve over time. During this process, shifts in contents of interactive cognitions are reflected in shifts in overt behaviour and vice-versa. Interactive cognitions and behaviour are constantly attempting to get "in agreement" with each other (Vallacher & Wegner, 1987).

Following Vallacher and Wegner (1987), contents of interactive cognitions regarding a person's own actions, can be subdivided into a relatively abstract and a relatively concrete level of "act identification". More abstract identifications convey a more general understanding of the action, indicating why the action is done or what its effects and implications are. For example, conducting a mentoring dialogue could be identified by a mentor teacher as "instructing student teachers how to work to cover the curriculum", or "discussing student teachers concerns to stimulate reflection". These are both relatively abstract identifications. More concrete identifications convey the details of the action and thus indicate how the action is done. For example, "structuring the dialogue in three phases" or "asking open questions". Thinking about an act in a concrete manner is typical for novices in a particular knowledge and skill domain. In initial stages of acquiring expertise in a specific domain, a person is conscious of his or her behaviour and actions are divided in recognizable components (Dreyfuss & Dreyfuss, 1986; Vrolijk, 1991). It may be assumed that, within initial stages of acquiring expertise in using supervisory skills, the number of contents of interactive cognitions referring to one's own actions will increase as a result of training.

### 1.4. Research questions

Proceeding from the theoretical background outlined above, the following research questions concerning contents of mentor teachers' interactive cognitions during mentoring dialogues, guided both studies:

Study 1: what are the contents of mentor teachers' interactive cognitions?
Study 2: do contents of mentor teachers' interactive cognitions differ before and after training in supervisory skills and if so, in which respects?

## 2. Method

### 2.1. Context of the studies

Both studies were carried out in the context of the implementation of a training programme for mentor teachers entitled *S*upervision Skills for *M*entor teachers to *A*ctivate *R*eflection in *T*eachers (SMART). The programme has been developed and conducted since 1999 in cooperation with schools in primary and secondary education and is situated within the reflective-developmental paradigm (Pajak, 1993). The programme focuses on the development of supervisory skills which encourage reflection in student teachers. In the SMART training, the skills were linked to and practiced with help of the ALACT model (Korthagen, 2001), which describes a cyclical sequence of five steps constituting a complete reflection process. The steps were used to structure the mentoring dialogue. The programme consists of three main components; training, peer consultation and personal coaching. In total, the SMART training consists of nine sessions of half a day each, spread over a period of almost three months. The pedagogy used in the programme draws on principles of "realistic teacher education" (Koster & Korthagen, 2001) and micro-counselling (Ivey, 1971).

### 2.2. Stimulated recall

Achieving a genuine and valid registration of contents of mentor teachers' interactive cognitions during mentoring dialogues requires on the one hand the continuation of the ongoing mentoring dialogue, and on the other hand the registration of contents of interactive cognitions at the specific moments when they occur. To solve this dilemma, in both studies the stimulated recall method was used. This method was originally used by Bloom (1954) and consists of replaying a video or audio recording of an episode of action to enable the viewer to recollect and to report on his or her cognitions. In the present studies, this means that during the stimulated recall interview, mentor teachers had to verbalize the contents of their interactive cognitions in response to watching video recordings of their mentoring dialogues. Although the validity of stimulated recall has been questioned (Yinger, 1986), as has that of other retrospective methods (Veenman, 2005), the idea is that the cues provided by the tape can help a mentor to relive and remember thoughts during action. It is assumed that when a video of the mentoring dialogue is shown, mentor teachers are able to recall accurately their experience and to describe what they thought during the action (Calderhead, 1981; Ericsson & Simon, 1984; Kagan & Kagan, 1991).

### 2.3. Study 1: deriving content categories

#### 2.3.1. Participants

The first study was set up to develop content categories of mentor teachers' interactive cognitions. A group of eight mentor teachers from colleges in secondary vocational education in the south of the Netherlands who took part in the SMART training in the autumn of 2001 also participated in this study. All these mentor teachers – three woman and five men – were mentoring a student teacher in the context of pre-service teacher education. The participants' ages ranged from 30 to 56, and averaged 45. On average, they had slightly over 17 years of teaching experience and had not been trained as a mentor teacher in supervisory skills before. As a group, they had an average of eight years experience in mentoring student teachers.

#### 2.3.2. Data collection

To derive distinct content categories of mentor teachers' interactive cognitions during mentoring dialogues, sixteen mentoring dialogues - two of each participating mentor teacher - were recorded on video, one before the SMART training and one after this training. To realize a mentoring dialogue in an authentic setting, the mentor teachers were instructed to conduct the dialogue with their own student teachers, with whom they already had established rapport. The mentor teachers were asked to discuss a student teachers' concern which had arisen in the previous week and which had not been on the agenda earlier.

To register contents of mentor teachers' interactive cognitions, immediately after each mentoring dialogue a stimulated recall interview was conducted. All interviews were recorded on audio minidisk. During the interview, the mentor teachers were instructed to watch the video recording of the dialogue and to stop the video whenever they recalled an interactive cognition. To avoid confusion about the term "interactive cognition" the following sentence was used to instruct the participants: "Stop the video when during the dialogue, you had a conscious thought accompanying your conversational turn". Each time the mentor teacher stopped the video, the reported verbalized content of an interactive

cognition was literally noted by the interviewer. The verbalized contents were transcribed literally and checked on by listening to the recorded interview on the minidisk.

*2.3.3. Open coding process*

In total, 168 verbalized contents of mentor teachers' interactive cognitions were registered, 63 during the stimulated recall interviews conducted before the SMART training and 105 during the interviews after the training. All transcribed contents were mixed and printed in such a way that it was not possible to determine whether cognitions were registered before or after the SMART training. Subsequently, all contents were categorized using steps of open coding (Strauss & Corbin, 1998). Firstly, two researchers separately read the complete list of contents of mentor teachers' interactive cognitions several times. Independent of each other, both researchers formulated a number of possible content categories.

Secondly, both researchers exchanged and discussed their suggested categories. To place the verbalized contents of interactive cognitions in one of the content categories, the most important consideration was the "object" (the "what") of the verbalization, which is expressed by a noun. For example, in the interactive cognition "I want to stick to my role as encourager", the object aspect is "… my role as encourager". When it was not possible to place the content of an interactive cognition in one of the preliminary categories with certainty, action aspects in the verbalized contents of interactive cognitions were considered to help determine the placement in a content category. Verbalizations of contents of mentor teachers' interactive cognitions often include various types of action aspects. For example, in the interactive cognition "I want to stick to my role of encourager", the action aspect is "… want to stick to …".

Thirdly, using the object aspect of a verbalization as a criterion, both researchers formulated on the basis of consensus four major content categories: "discussed topic" (1), "use of supervisory skills" (2), "mentor teacher's role" (3) and "strategy during the dialogue" (4). Within each of these four content categories, five subcategories were defined, based on the action aspect of a verbalization as a criterion and typified by one of the following verbs: "name"(a), "want"(b), "doubt"(c), "account for"(d) and "evaluate"(e).

*2.3.4. Scoring guidelines*

From the open coding process, three scoring guidelines emerged. The first guideline to categorize contents is to read the "object" (the "what") of a verbalization and place it in one of the four content categories. The second guideline involves that, when it is not possible to place the contents of interactive cognitions in one of the content categories with certainty, the "action aspect" of the verbalization should be taken into consideration to help determine the placement in one of the four categories. For those situations in which the content category for the interactive cognition could still not be determined, a third scoring guideline is formulated. This guideline is based on the assumption that the (part of an) interactive cognition in which a mentor teacher explicitly accounts for his or her action, is an important key to identify the content. Hence, in cases of doubt, the action aspect "account for" is considered to determine the placement in a content category. When it is not possible with these three guidelines to place the interactive cognition in any of the four categories, the content of an interactive cognition is placed in a fifth category called "other".

An example can illustrate the use of the scoring guidelines. A mentor teacher reported the following interactive cognition, which had to be categorized in one of the four content categories: "I summarize that the student teacher is good at keeping order in his class, because summarizing is important to me in order to be able to follow the conversation". Following the first guideline, the content of this interactive cognition could be assigned to two categories, namely "discussed topic" ("… keeping order in his class …") and "use of supervisory skills" ("I summarize …"). Following the second guideline, the action aspect in this example is "account for" ("…, because …"). We need the third guideline to categorize the interactive cognition definitely. The mentor teacher's own account ("because summarizing is important for me to be able to follow the conversation") best fits the category "use of supervisory skills", so in this case the interactive cognition is assigned to that category.

*2.3.5. Inter-rater reliability*

To avoid that the researchers remembered the cognitions from their previous reading, the transcribed contents of interactive cognitions were mixed and printed. Subsequently, the two researchers, independently of each other, placed the contents in one of the defined content categories. The inter-rater reliability appeared to be amply sufficient (Cohen's Kappa = 0.85). The entire instrument '*C*ontent *C*ategories for *ME*ntor *T*eachers' *I*nteractive *C*ognitions' (CCMETIC) developed in study 1 is presented in the findings Section 3.1.

*2.4. Study 2: shifts in contents of interactive cognitions*

*2.4.1. Participants*

In the second study, a group of 30 mentor teachers from schools in primary education in the south of the Netherlands was involved. They were mentoring student teachers in the context of pre-service teacher education. All these 30 mentor teachers – 18 women and 12 men – took part in the SMART training. There were 13 participants in the spring of 2002 and 17 participants in the spring of 2003. In combination with their primary teaching tasks, they were all given sufficient release time to guide and support student teachers in their final year of teacher education and to participate in the SMART training, which is described in Section 2.1. The participants' ages ranged from 25 to 54 with an average age of 44. On average, they had slightly over 20 years of teaching experience and had not been trained as a mentor teacher in supervisory skills before. They had an average of almost 10 years of experience in mentoring student teachers.

*2.4.2. Data collection*

The second study is based on a pre-test post-test design with one group (Cook & Campbell, 1979). Audio and video recordings were made of 60 mentoring dialogues, which 30 participating mentor teachers carried out in authentic settings with student teachers under their guidance. Two recordings were made of each mentor teacher. The first was one month before the SMART training and the second one month after the training. Mentor teachers conducted the dialogues with their student teachers, with whom they had already established rapport. Analogous to the first study, mentor teachers were asked to discuss during the mentoring dialogue a student teacher's concern related to a situation that had occurred in the previous week during their teaching activities in school. To achieve ecological validity, the mentor teachers were instructed in the way of a work sample test (Straetmans, 1993). This means that the mentor teachers performed tasks in authentic settings, which are considered to be a sample of similar tasks in the regular work situation.

In order to ensure comparability of the data, the recordings of the dialogues were restricted to the first fifteen minutes. Geldens (2007) produced empirical evidence that analysing longer periods of time does not improve the assessment of the quality of a mentoring dialogue. Immediately after the dialogue, in a stimulated recall interview, the mentor teacher was asked to watch the video

recording of the dialogue and to stop the video whenever he or she recalled an interactive cognition. To avoid confusion about the term "interactive cognition", the following sentence was used to instruct the participants: "Stop the video when during the dialogue, you had a conscious thought accompanying your conversational turn". The reported contents of interactive cognitions were taped on audio minidisk and registered on a form by the interviewer.

*2.4.3. Data analysis*

All 60-recorded dialogues in the second study were transcribed literally. Table 1 shows an example of a transcription. Utterances were marked as separate using the principle of turn taking. The moment when a mentor teacher commences speaking, marks the beginning of a conversational turn. A mentor teacher's turn ends at the moment the student teacher commences speaking. In the transcriptions, contents of the interactive cognitions of the mentor teacher were literally visualized next to the utterances of the accompanying conversational turns of the mentor teacher.

The content of each interactive cognition was coded using the CCMETIC instrument developed in study 1. In order to analyse which shifts in contents occurred between the first and the second measurement, two tailed *t*-tests for paired observations were calculated and the standardized mean difference (*d*-index) effect size (ES) was used, which expresses the distance between two group means in terms of their standard deviation (Cohen, 1988).

## 3. Findings

### *3.1. Study 1: contents of interactive cognitions*

The result of the first study, a category system and scoring instrument (CCMETIC), can be found in Table 2. The contents of mentor teachers' interactive cognitions can be subdivided in four main categories. The first category regards contents of mentor teachers' interactive cognitions that involve aspects of situations or problems discussed during the dialogue, such as organization and instruction in the class, pupils behaviour or subject matter. This category is entitled "discussed topic". For example, "In the case of this child, I thought it would be a good idea to draw up a plan and to work with rewards when things go well." The second category includes contents of interactive cognitions about the use of specific supervisory skills during the mentoring dialogue. The category is labelled as "use of supervisory skills". For example, "I am summarizing, because that is how I grasp the core aspect". The third category holds contents of mentor teachers' interactive cognitions about his or her role, degree of directivity or input, during the mentoring dialogue. This category is entitled "mentor teacher's role". For example, "I want to encourage the student teacher." The fourth category includes contents of interactive cognitions about the sequencing and/or strategy during the

**Table 2**
Scoring instrument "Content Categories for Mentor Teachers' Interactive Cognitions" (CCMETIC).

| | |
|---|---|
| 1. Discussed topic | |
| *Action aspect* | *Example* |
| a. Name | I note the student teacher talking about an unruly pupil. |
| b. Want | I would do such and such in this teaching situation. |
| c. Doubt | I do no know what the right way to act in this situation. |
| d. Account for | I am summarizing, because that is how I can analyse the topic. |
| e. Evaluate | In the case of this child, I thought it would be a good idea to draw up a plan and to work with rewards when things go well. |
| 2. Use of supervisory skills | |
| *Action aspect* | *Example* |
| a. Name | I am asking what the student teacher is feeling. |
| b. Want | I want to summarize. |
| c. Doubt | I do not know which supervisory skill to use here. |
| d. Account for | I am summarizing, because that is how I grasp the core aspect. |
| e. Evaluate | I am putting my question the wrong way. |
| 3. Mentor teacher's role | |
| *Action aspect* | *Example* |
| a. Name | I am directive, the student teacher does not say much. |
| b. Want | I want to encourage the student teacher. |
| c. Doubt | I do not know if I should encourage or advice. |
| d. Account for | I am acting like this to encourage the student teacher to learn to do this himself. |
| e. Evaluate | I am to dominant in the dialogue. |
| 4. Strategy during the dialogue | |
| *Action aspect* | *Example* |
| a. Name | I am in the phase of looking back at what happened. |
| b. Want | I want to get to aspect X. |
| c. Doubt | I do not know how to go on from here. |
| d. Account for | I am going to the phase of thinking of alternatives, because we need to get a solution |
| e. Evaluate | I am now in the phase of thinking of alternatives, but I think it is too early. |

**Table 1**
Example of transcription of utterances of conversational turns and contents of interactive cognitions.

| Time, min | Interlocutor | Conversational turns mentor teacher (MT) and student teacher (ST) | Contents of MT interactive cognitions | Content IC code |
|---|---|---|---|---|
| 10.28 | MT | So actually you find it difficult to deal with her and her feelings of inferiority? | I am summarizing, because that is how I grasp the core aspect. | 2 |
| 10.37 | ST | Yes. | | |
| 10.38 | MT | So what would you like her to do? | | |
| 10.41 | ST | I wish she would be more positive. I wish she would not moan so much and shout at people and threaten to leave school. | | |
| 10.54 | MT | How would you deal with that, eh, negative self-image? | I am now in the phase of thinking of alternatives, but I think it is too early. | 4 |
| 11.04 | ST | Yes, if she has a good point, then I will encourage her extra by saying: "See, you can do it" or "Well done". I will tell her this every time. I want to show her 'you can do this'. | | |
| 11.19 | MT | Yes, that will give this pupil a positive feeling. Are there more options? | I want to encourage the student teacher. | 3 |
| 11.27 | ST | And when I say that, you can see she is happy. But that does not last very long and then she will start moaning again. | | |
| 11.35 | MT | Yes, yes. I am wondering what else you could do to help her? Look, you say, she does not shout so much, and that she is more positive. How else could you tackle that negative self-image? How could you influence her in a positive way? | In the case of this child, I thought it would be a good idea to draw up a plan and to work with rewards when things go well. | 1 |

The fifth column shows the code numbers assigned to the contents of MT interactive cognitions (IC) in the example: 1 = discussed topic, 2 = use of supervisory skills, 3 = mentor teacher's role, 4 = strategy during the dialogue.

mentoring dialogue. This category is named "strategy during the dialogue". For example, "I am now in the phase of thinking of alternatives, but I think it is too early."

Within each of the four main content categories, five subcategories concerning the action aspects in the verbalized contents are derived. The first action aspect is entitled "name". For example, "I am asking …", when the mentor teacher appoints what he is doing. The second action aspect is entitled "want". For example, "I want to …", when the mentor teacher tells what he wants or would like. The third action aspect is entitled "doubt". For example, "I do not know …", when the mentor teacher shows his uncertainty. The fourth action aspect is entitled "account for". For example, "I am going to …, because I think …", when the mentor teacher explains why he or she is doing or going to do something. The fifth action aspect is entitled "evaluate". For example, "I am putting the question the wrong way", when the mentor teacher assesses his or her action.

### 3.2. Study 2: shifts in contents of interactive cognitions

The results of the second study can be found in Table 3. For each participant, the table shows the frequencies of content categories of interactive cognitions before and after the SMART training. Most important are the frequencies of the group as a whole at the bottom of the table. Before training, 50% of the contents of interactive cognitions are allocated to the category "discussed topic", 24% to the category "use of supervisory skills", 17% to the category "mentor teacher's role", 6% to the category "strategy during the dialogue" and 2% to "other". After training in supervisory skills, the frequencies of contents of mentor teachers' interactive cognitions shifted to 21% in the category "discussed topic", 54% in the category "use of supervisory skills", 12% in the category "mentor teacher's role", 11% in the category "strategy during the dialogue" and 2% in the category "other".

The two tailed *t*-tests show that after the SMART training, there was a significant decrease in the number of interactive cognitions in the content category "discussed topic" ($p = 0.003$; ES = 0.83) and a significant increase in the content categories "use of supervisory skills" ($p = 0.000$, ES = 1.61) and "strategy during the dialogue" ($p = 0.046$, ES = 0.63). The effect sizes found are medium to large (Cohen, 1988).

## 4. Conclusion and discussion

### 4.1. Conclusion

In the context of developing mentor teachers' use of supervisory skills, two consecutive studies, both using stimulated recall, were conducted aiming at uncovering contents of mentor teachers' interactive cognitions during mentoring dialogues. In the first study, an instrument was developed to categorize contents of interactive cognitions. Four main content categories are distinguished, "discussed topic" (1), "use of supervisory skills" (2), "mentor teacher's role" (3), and "strategy during the dialogue" (4). In the second study, the instrument was applied to uncover contents of mentor teachers' interactive cognitions, before and

**Table 3**
Frequencies of contents of mentor teachers' interactive cognitions (IC), before and after SMART training.

| Participant number | Before SMART training | | | | | | | | After SMART training | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Discussed topic | Supervisory skills | MT' role | Strategy during dialogue | Other | Total number IC | Total # IC (in %)* | Total number conversational turns | Discussed topic | Supervisory skills | MT' role | Strategy during dialogue | Other | Total number IC | Total # IC (in %)* | Total number conversational turns |
| 1 | 5 | 1 | | | 1 | 7 | 16 | 44 | | 8 | 3 | 1 | 1 | 13 | 48 | 27 |
| 2 | 5 | 2 | | | | 7 | 14 | 51 | 2 | 2 | 4 | | | 08 | 20 | 40 |
| 3 | 4 | 2 | 3 | 1 | | 10 | 25 | 40 | 4 | 13 | | | | 17 | 30 | 57 |
| 4 | 4 | | | | | 4 | 11 | 29 | 1 | 5 | 2 | 1 | | 09 | 24 | 38 |
| 5 | | 1 | 1 | | | 2 | 07 | 29 | 4 | 0 | 4 | 1 | | 09 | 20 | 46 |
| 6 | 4 | 4 | 1 | | | 9 | 33 | 27 | 1 | 25 | 1 | 1 | | 28 | 61 | 46 |
| 7 | 3 | | | | | 3 | 12 | 26 | 4 | 5 | | 2 | | 11 | 19 | 57 |
| 8 | 5 | | 6 | 1 | | 12 | 41 | 36 | 1 | 10 | 5 | 2 | | 18 | 41 | 43 |
| 9 | 5 | 1 | 5 | 2 | | 13 | 36 | 36 | 7 | 16 | 1 | 3 | | 27 | 51 | 53 |
| 10 | 4 | | 1 | | | 5 | 17 | 30 | | 7 | 1 | 3 | | 11 | 28 | 39 |
| 11 | 6 | 1 | | | 2 | 9 | 24 | 37 | 3 | 7 | | 1 | | 11 | 22 | 49 |
| 12 | 1 | | | | | 1 | 03 | 39 | 3 | 10 | 3 | 5 | 2 | 23 | 46 | 50 |
| 13 | 2 | | 1 | 1 | | 4 | 12 | 34 | 4 | 1 | 2 | | 1 | 08 | 20 | 40 |
| 14 | 3 | | | | | 3 | 25 | 13 | 6 | 3 | 5 | 5 | | 19 | 40 | 48 |
| 15 | 1 | 3 | 7 | | | 11 | 50 | 22 | | 4 | 2 | 2 | | 08 | 16 | 49 |
| 16 | 0 | 8 | 0 | 2 | | 10 | 30 | 33 | 1 | 3 | 3 | 3 | | 10 | 59 | 17 |
| 17 | 4 | 3 | | | | 7 | 33 | 21 | | 11 | | 1 | | 12 | 18 | 65 |
| 18 | | | 2 | | | 2 | 04 | 49 | | 5 | 1 | 1 | | 07 | 20 | 35 |
| 19 | 1 | | 2 | | | 3 | 07 | 46 | 1 | 6 | 1 | 1 | | 09 | 21 | 42 |
| 20 | 2 | | 1 | | | 3 | 08 | 36 | 3 | 3 | 2 | 3 | 2 | 13 | 34 | 38 |
| 21 | 3 | 1 | | 2 | | 6 | 26 | 23 | 10 | 5 | 2 | | | 17 | 55 | 31 |
| 22 | 5 | | | | | 5 | 26 | 19 | 3 | 6 | 1 | 2 | | 12 | 39 | 31 |
| 23 | | | 1 | | 1 | 2 | 06 | 31 | 2 | 5 | | 1 | 2 | 10 | 30 | 33 |
| 24 | 4 | | 1 | | 2 | 7 | 10 | 69 | | 7 | | 1 | | 08 | 17 | 46 |
| 25 | 2 | 12 | | | | 14 | 40 | 35 | 5 | 7 | 2 | 3 | 1 | 18 | 30 | 61 |
| 26 | 2 | 4 | | | | 6 | 60 | 11 | 4 | 14 | 1 | 2 | | 21 | 48 | 43 |
| 27 | 1 | | | 1 | | 2 | 04 | 48 | 3 | 4 | 2 | | | 09 | 27 | 33 |
| 28 | 6 | 2 | | | | 8 | 26 | 31 | 5 | 15 | | 1 | | 21 | 42 | 50 |
| 29 | 9 | 1 | | | | 10 | 40 | 25 | 7 | 5 | 1 | 2 | | 15 | 39 | 38 |
| 30 | 7 | 2 | 2 | | | 11 | 58 | 19 | 6 | 17 | 1 | 1 | | 25 | 63 | 40 |
| Total | 98 | 48 | 34 | 10 | 6 | 196 | | 989 | 90 | 229 | 50 | 49 | 9 | 427 | | 1285 |
| Total in % | 50 | 24 | 17 | 6 | 2 | 100 | | | 21 | 54 | 12 | 11 | 2 | 100 | | |
| Total in % | 10 | 5 | 3 | 1 | 1 | 20 | | 100 | 7 | 18 | 4 | 4 | 1 | 33 | | 100 |
| SD | | | | | | 3.71 | 16.13 | | | | | | | 6.13 | 15.54 | |

*Total # IC (in %) = Total number of interactive cognitions as a percentage of the total number of conversational turns during a dialogue.

after training in supervisory skills. We found a significant decrease of contents of interactive cognitions in the category "discussed topic" (1) and significant increases of contents in the categories "use of supervisory skills" (2) and "strategy during the dialogue" (4). After training in supervisory skills, mentor teachers developed an increased awareness of their use of supervisory skills. This indicates that mentor teachers' frame of reference guiding a mentoring dialogue has become twofold. They not only seem to hold the picture of pupil learning and needs when conducting a mentoring dialogue, but simultaneously focus more frequently on their own supervisory behaviour. This can be seen as an important first step towards professional development in specific communicative competencies, appropriate for mentor teachers to focus overtly on student teachers as learners during mentoring dialogues.

### 4.2. Interpretation

The assumption, stated in Section 1.3, that within initial stages of acquiring expertise in using supervisory skills, the number of contents of interactive cognitions referring to a person's own actions will increase as a result of training, appears to be confirmed by the outcome of the second study. After SMART training, mentor teachers were aware of their newly acquired supervisory skills and were trying to put them consciously into practice. This situation concurs with initial stages of acquiring expertise in a specific domain, where a person is concerned with his or her own performance and, as a result, may become more conscious of his or her own behaviour (Dreyfuss & Dreyfuss, 1986). In the domain of interviewing skills, closely related with supervisory skills, Vrolijk (1991) identifies several developmental phases. The first phase is the "Technical Phase", which occurs directly after skills training. In this phase, during dialogues, mentor teachers more often examine consciously their (new) knowledge base regarding the use of supervisory skills. This can be considered as a first step towards a development of a competence in revising (supervisory) behaviour (Bögels, 1994).

After cognitions are processed and reflected on consciously, changes to new and maneuverable behaviours can come about (Lombardi, Higgins, & Bargh, 1987). In line with theories about expertise development (e.g. Dreyfuss & Dreyfuss, 1986) it can be expected that, after some time, when the mentor teacher has mastered the supervisory skills, the focus on their own supervisory behaviour will decrease. From that moment on the mentor teacher may focus more and more on the learning process of the student teacher by using newly learned supervisory skills to activate concerns and reflection in student teachers.

The shifts found in contents of mentor teachers' interactive cognitions indicate that mentor teachers who took part in the SMART training entered a new domain of expertise adding to their expertise as a teacher of pupils. Although the mentor teachers in the present study are novices in the use of supervisory skills which encourage reflection in student teachers, they are nevertheless experts as teachers. Entering the new mentoring expertise in the use of supervisory skills adding to their expertise as a teacher of pupils is typical for a professional learning process described by Orland-Barak and Yinon (2005) as the passage from teaching children to mentoring teachers. In this study, the SMART training was the catalyst to become aware of specific mentoring expertise within a short time, and in that way speeding up the passage from teaching to mentoring.

To be an effective mentor teacher, a mentor teacher needs knowledge about pupils and student teachers (Achinstein & Athanases, 2005). They identified four domains of knowledge and skills for mentors: Pedagogy, Context, Learners, Self. These domains should be of a bi-level nature, targeting pupils and targeting (student) teachers. The results of the present studies indicate that the knowledge base within the Pedagogy domain on the level of "targeting student teachers" has been extended and/or enacted. Also, as a basis for this enactment, mentor teachers seem to have developed a bifocal perspective on (student) teachers and pupils: "…Up close the mentor focuses on the new teacher, what (s)he knows and needs. The mentor simultaneously holds the big picture in view, which is the pupils, their learning, and their needs…" (Achinstein & Athanases, 2005, p. 856).

### 4.3. Limitations and further research

The findings reported here are of a tentative nature. One limitation of these studies is that, in view of the pre-test post-test design with one group, other variables outside the SMART training, such as individual characteristics of the participating mentor teachers and features of the workplace, could have influenced the shifts in contents of mentor teachers' interactive cognitions (Holton & Baldwin, 2000). Secondly, despite the advantages of the stimulated recall method mentioned in Section 2.2, it remains a retrospective method (Veenman, 2005) which relies on the respondents to recognize contents of interactive cognitions after the event, and it does not register these moments "on the spot". Yinger (1986) has noted that it is difficult to check to what degree the recall is an accurate description of what actually happened. Thirdly, a person's behaviour is not only accompanied by conscious cognitions but also by cognitions on subconscious levels (Dixon, 1981; Greenwald, 1992). Stimulated recall elicits exclusively mentor teachers' conscious cognitions.

Cognitions and behaviour mutually influence each other as they unfold and evolve over time. The "ellipse model", presented in Section 1.1 portrays this interactive process as constituted by three elements: stable cognitions, interactive cognitions and actions. In the present studies, one of these elements, namely "interactive cognitions", was investigated separately. To explore the ways in which mentor teachers' interactive cognitions during mentoring dialogues interact with stable cognitions such as beliefs and knowledge (left ellipse Fig. 1), in future research it would be relevant to study stable and interactive cognitions in an integrated manner, because together they constitute mentor teachers' 'practical knowledge base' accompanying actions (Meijer et al., 2002). Such an integrated approach could shed some light on domain knowledge used by mentor teachers in mentoring dialogues. This line of research could contribute to further development of a bi-level knowledge base for mentor teachers as formulated by Achinstein and Athanases (2005). The interaction between mentor teachers' interactive cognitions and actions during mentoring dialogues (right ellipse of Fig. 1) could be explored by studying interactive cognitions and actual behaviour simultaneously. This research could be theoretically framed by the "Act Identity Theory" (Vallacher & Wegner, 1987), which postulates that any action of a person can be identified by so called "act identities" specifying actions of a person on different levels of abstraction.

Taken together, despite the above mentioned limitations, this study created empirical findings in an area in which such findings have until now been scarce. It adds to our knowledge about the nature of mentor teachers' interactive cognitions while mastering new communicative competencies. The findings seem to underline Orland-Barak's (2001) opinion that becoming a mentor teacher does not emerge naturally of being a good teacher, but is a highly conscious and gradual process of developing communicative competencies. Insights gained from the present studies into contents of mentor teachers' interactive cognitions, are particularly relevant to the education of mentor teachers, because they illustrate cognitive activity that is involved in conducting mentoring

dialogues and, as such, can help mentor teachers to better understand their own current as well as future supervisory behaviour. Knowledge about contents of mentor teachers' interactive cognitions and shifts occurring in these over time can be helpful in designing and implementing training programmes for mentor teachers.

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