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HOW CAN STUDENT TEACHERS ELICIT EXPERIENCED TEACHERS' PRACTICAL KNOWLEDGE?

TOOLS, SUGGESTIONS, AND SIGNIFICANCE

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In this article, two tools are described that student teachers can use to elicit their experienced mentor teachers' practical knowledge: stimulated recall and concept mapping. The additional value of systematically examining experienced teachers' practical knowledge by student teachers is that it, among other things, gives sight to the thoughts behind teachers' observable teaching. In addition, it provides opportunities to relate these underlying thoughts to theoretical and more abstract notions student teachers are confronted with in teacher education, and therefore it can lead to a more thorough understanding of other teachers' teaching and of their own (developing) practical knowledge. Suggestions are made as to how student teachers can use the tools in sessions with their mentor teachers.

STUDENT TEACHERS AND THEIR MENTOR TEACHERS' PRACTICAL KNOWLEDGE

Student teachers often experience difficulties in relating theories taught in teacher education institutes to what actually happens in their teaching practice. They indicate that the teaching of their mentor teachers is quite different from such theories and that what their mentors know is obviously more closely related and better suited to day-to-day teaching practice (e.g., Black & Halliwell, 2000; Meijer, Verloop, & Beijaard, 1999). Experienced teachers have, through (reflection on) experience, developed a practical knowledge that underlies their teaching (Carter, 1990).

Although they often observe their mentor teachers' lessons, student teachers are particularly interested in learning rules of thumb and tips for their own lessons. However, it is clear that sitting in the back of the classroom observing how experienced teachers behave does not

automatically help student teachers develop a deeper understanding of teaching (cf. Ben-Peretz & Rumney, 1991). Furthermore, simply copying the behavior of experienced teachers will most probably result in an inappropriate conservatism (Leinhardt, 1993; Putnam & Borko, 2000) and is limited to "imitation or cloning, devoid of insight and initiative" (Ethell, 1999, p. 2).

However, student teachers do not appear to be automatically interested in looking beyond the "how" of their mentor teachers' teaching (e.g., Zanting, Verloop, Vermunt, & Van Driel, 1998). Zanting, Verloop, and Vermunt (2001a) examined student teachers' perceptions of their mentor teachers' roles in school-based teacher education. They found that student teachers saw their mentor teachers' role mostly as a supporter or an information source for student

teachers. Based on these results, Zanting, Verloop, and Vermunt identified a “missing role” for mentor teachers—the role as an articulator of practical knowledge. This role was also reported missing in studies by Edwards and Collison (1995) and Elliott and Calderhead (1994). It is this role we want to elaborate on in this article. The purpose of this study was to find out whether student teachers can be stimulated to look beyond their mentor teachers’ behavior. After all, experienced expert teachers are, compared to novices,

considered to have a larger knowledge base from which to draw, their knowledge is organised more efficiently in complex interconnected schemata and is utilised more effectively. (Ethell, 1999, p. 3)

Thus, the goal was to find ways to involve (results from research on) teachers’ practical knowledge in the education of student teachers. In our view, student teachers’ investigations of their mentor teachers’ practical knowledge can result in (a) a deeper insight into the cognitive aspects of teaching, (b) an understanding of the complexity of teachers’ practical knowledge and how this is related to teaching practice (i.e., it is based on, develops in, and influences teaching practice), and (c) encouragement of student teachers to reflect on and elaborate their own developing practical knowledge.

TEACHERS’ PRACTICAL KNOWLEDGE

Teachers’ practical knowledge has been an object of study for several years (for reviews, see, e.g., Calderhead, 1996; Cochran-Smith & Lytle, 1999; Fenstermacher, 1994). In most of these studies, the importance of this type of knowledge for the education of new teachers is emphasized. Clark and Lampert (1986) argued that an important use of research on teachers’ practical knowledge is that it can provide student teachers “with a realistically complex picture of the cognitive aspects of teaching” and that teachers’ practical knowledge should be included in the knowledge base of teaching (see also Cochran-Smith & Lytle, 1999). Feiman-Nemser and Remillard (1996) indicated that research on teachers’ practical knowledge

further reveals the complexities and uncertainties of interactive teaching and the need for considerable thinking in action. (p. 76)

There are several aspects of research on teachers’ practical knowledge that can or should be incorporated in teacher education, and there are many ways in which this can be done. We will first describe three aspects of teachers’ practical knowledge that were investigated in recent studies and can be useful for the preparation of prospective teachers.

First, researchers have described the *contents* of teachers’ practical knowledge. These contents are often reflected in rich descriptions of (subject-matter-related) practical knowledge (e.g., Grossman, 1989; Gudmundsdottir, 1991; Van Driel, Verloop, & De Vos, 1998). Second, research has identified the *characteristics* of teachers’ practical knowledge and defined it as being personal (e.g., Connelly & Clandinin, 1985), situated (e.g., Putnam & Borko, 2000), based on reflection on experience (e.g., Grimmett & MacKinnon, 1992), mainly tacit (e.g., Korthagen, 1993), and content-related (e.g., Grossman, 1989; cf. Meijer et al., 1999).

Although extensive progress has been made in understanding teachers’ practical knowledge, Black and Halliwell (2000) found that it is still not clear what practical knowledge actually guides teachers’ decisions (see also Calderhead, 1996). They argued that

this may be because it is difficult to communicate this way of knowing through the formal, propositional language traditionally used to report research findings. (p. 104)

Finding ways to communicate practical knowledge seems vital. This issue relates to a third aspect of research on teachers’ practical knowledge, namely, a range of *instruments* serving to capture and represent this type of routinized and often tacit knowledge. These instruments are primarily based on the characteristics of teachers’ practical knowledge and value the personal, experience-based, tacit, and context- and content-related nature of practical knowledge (e.g., Kagan, 1990; Morine-Dersheimer, 1993).

Several studies indicate why detailed descriptions of the contents of teachers' practical knowledge are relevant for student teachers. Researchers and teacher educators have suggested ways of incorporating such descriptions, often as "cases," "narratives," or "stories," in teacher education (e.g., Jalongo & Isenberg, 1995; Kubler LaBoskey, 1999). We will not elaborate on these ideas here. Instead, we want to focus on the process of the elicitation of experienced teachers' practical knowledge by student teachers themselves. We consider learning about and from experienced teachers' practical knowledge to be an important mechanism in learning to teach, and we think this mechanism has to be regarded as adjoining and connected to other important mechanisms such as learning from theories about subject matter and child psychology, learning through reflection (e.g., Calderhead, 1989), or learning through practitioner inquiry (e.g., Cochran-Smith & Lytle, 1999). In the next section, we will describe how student teachers can elicit, examine, and work with experienced teachers' practical knowledge and how other mechanisms of learning can find a place in this process.

INSTRUMENTS FOR ELICITING TEACHERS' PRACTICAL KNOWLEDGE

Research on teachers' practical knowledge is characterized by a range of creative methods to elicit this type of knowledge (e.g., Black & Halliwell, 2000). In earlier studies, we experimented with several such instruments to find ways to elicit and describe experienced teachers' practical knowledge. Two of these instruments were the *stimulated recall interview* and *concept mapping*. In a stimulated recall interview, teachers explicate what they are thinking in response to a videotape of a lesson they have just given. In creating a concept map, teachers identify concepts they view as important to an anchored central concept and then organize them into a schema (the concept map).

We think these instruments are particularly interesting for involving the practical knowledge of experienced teachers in teacher education, as they can be tools to (a) structure sessions

between a student teacher and her or his mentor teacher, (b) allow student teachers to analyze the practical knowledge of an experienced teacher, and (c) stimulate student teachers to explicate and reflect on their own practical knowledge. For this reason, this article proposes the two instruments as tools to be used by student teachers when investigating their mentor teachers' as well as their own practical knowledge. In describing these two instruments, attention is also paid to the type of information brought to light when investigating experienced teachers' practical knowledge; the additional value compared to a student teacher's observations of, and discussions with, her or his mentor teacher; and how the instruments might be incorporated into teacher education.

SHORT DESCRIPTION OF THE STUDIES

The instruments were used in two studies. The first study focused on the practical knowledge of 20 experienced language teachers teaching reading comprehension to 16- to 18-year-old students.¹ Eight teachers taught Dutch (mother tongue), 4 English, 3 Latin, 2 French, and 3 German. Three teachers were female; 17 were male. These teachers all were linked as mentor teachers to the teacher education department of Leiden University in the Netherlands and supervised student teachers during teaching practice. Their years of teaching experience ranged from 8 to 33, which meant that their teaching was assumed to be routinized and difficult to make explicit. Therefore, an extensive investigation was done to develop instruments that would be able to capture these teachers' practical knowledge. Ultimately, it was decided that the teachers' practical knowledge was to be elicited with several instruments, including a stimulated recall interview and a concept mapping assignment.

Data from this study were analyzed using categories that were, in part, based on research on teachers' practical knowledge and teachers' pedagogical content knowledge but mostly found their basis in the contents of the data. The categories were developed and described using a phenomenographic approach, resulting in a

set of categories consisting of practical knowledge about (a) subject matter, (b) the particular class, (c) individual students, (d) students in general, (e) student learning and understanding, (f) curriculum, (g) goals, (h) instructional techniques, (i) teacher student interaction, and (j) process regulation. Patterns in teachers' practical knowledge were identified, resulting in a typology of practical knowledge that consisted of three types: practical knowledge with a focus on subject matter, practical knowledge with a focus on students, and practical knowledge with a focus on student learning and understanding (see Meijer et al., 1999). Also, the study yielded ways of making experienced teachers' practical knowledge explicit to make it accessible for student teachers.

Based on these outcomes, a subsequent study was conducted in which 120 student teachers experimented with various instruments to explore their mentor teachers' practical knowledge. These student teachers were following a 1-year postgraduate teacher education program at Leiden University. Of these student teachers, 79 were women (66%) and 41 were men (34%). They were being trained to teach students aged 16 to 18 in the area of languages (Dutch [mother tongue], English, German, French, Classics), science (mathematics, biology, physics, chemistry), or social sciences (history, art history, social studies). The experiment was a compulsory element in the teacher education program, so all student teachers in the program were included in the study.

Seventy of these student teachers chose to experiment with a specific version of the concept mapping assignment: 24 men and 46 women. Thirty-seven of them had studied languages; 22 social science; and 11 science. They, as well as their mentor teachers, made a concept map about "order." A procedure was developed in which student teachers, as a first step, explored and described the concept maps developed by their mentor teachers. The descriptions of the mentor teachers' practical knowledge as reworded by the student teachers were analyzed in a qualitative fashion using four categories based on two distinctions: (a) absolute versus situational and (b) descriptive

versus analytical (see Zanting, Verloop, & Vermunt, 2001b). In a second step, student teachers were asked to compare their mentor teachers' concept maps to the ones developed by themselves and to theoretical texts, and then to indicate and explain differences. Data were analyzed using categories derived from research on perceptions of knowledge and teachers' practical knowledge. Subsequently, we evaluated how the student teachers perceived the usefulness of this instrument for examining their mentor teachers' practical knowledge and for better understanding their own (developing) practical knowledge. These perceptions were analyzed in a qualitative way, which meant that they were combined and labeled in meaningful categories. These will be described further on in this article.

Additionally, in-depth case studies were conducted with 4 student teachers who had chosen to experiment with conducting stimulated recall interviews with their mentor teachers. Mentor teachers first gave a lesson that was videotaped by the student teachers, then explicated in response to the videotape what they were thinking or paying attention to during the lesson. As a next step, the student teachers reconstructed the mentor teachers' practical knowledge, which made it possible to compare the experienced teachers' practical knowledge to educational theories. The reconstructed practical knowledge was analyzed using the same categories used in the case of the practical knowledge derived from the mentor teachers' concept maps. In these case studies, we also explicitly evaluated the usefulness of this instrument as perceived by the student teachers, using the same procedure for analyzing these as described above.

METHOD OF DRAWING ON STUDY DATA

In this article, data from the first study, in which we examined the practical knowledge of experienced teachers, are mainly used to illustrate the *type* of data elicited by the concept mapping technique and the stimulated recall technique. Data from the second study, in which the focus was on how student teachers employed these two instruments in the context

of a teacher education program, are used in this article to illustrate student teachers' perceptions of the *usefulness* of the instruments when they are exercised to examine experienced teachers' practical knowledge.

Although the instruments can also be used in different designs or in other contexts with various purposes (for example, as tools for reflection by experienced teachers or as tools for enhancing discussions in groups of student teachers), in this article we focus on one specific purpose for using these instruments: as tools for having student teachers explore the thinking underlying their mentor teachers' teaching.

THE INSTRUMENTS, THE TYPE OF INFORMATION THEY ELICIT, AND THEIR USE IN TEACHER EDUCATION

In this section, we will describe in more detail how the stimulated recall interview and the concept mapping assignments were used in our studies. The instructions given to teachers for both instruments are given, as well as ways to employ the instruments in teacher education. Citations from both studies are given to indicate the kind of information these instruments elicit and to illustrate the usefulness of the instruments in teacher education.

Stimulated Recall Interview

The stimulated recall interview is, in fact, a substitute for the thinking-aloud technique (Shavelson, Webb, & Burstein, 1986). However interesting a thinking-aloud technique would be to capture a teachers' thinking while he or she is teaching, this technique is, for obvious reasons, not suitable as it would interfere with lessons. In a stimulated recall interview, teachers explicate their interactive thinking while watching a videotape of a lesson they have just given (Meijer, Beijaard, & Verloop, 2002). The videotape is used to aid a teacher's recall of his or her interactive thoughts at the time of the lesson and to stimulate teachers to "relive" their lesson (cf. Calderhead, 1981; Verloop, 1989). Teachers are asked to stop the videotape every time they recall what they were thinking or what was on their minds and encouraged to say

everything they can remember thinking at that point.

The stimulated recall interview can be used to make much of teachers' "tacit" thinking explicit and elicit cognitions underlying their observable actions, that is, teachers' *interactive cognitions* (Calderhead, 1981). Teachers' interactive cognitions are characterized by the following (Meijer, Beijaard, & Verloop, 2002):

- split-second thoughts
- tied to the specific context (i.e., the lesson)
- closely connected to teachers' knowledge and beliefs
- closely connected to classroom practice
- integrative in nature

These characteristics might be problematic when one wants to generate objective statements about the cognitions teachers in general have while teaching, but they make these kind of cognitions all the more interesting for student teachers who are in the process of trying to understand what is going on in the classroom.

Reasons for Using the Stimulated Recall Technique in Teacher Education

The value for student teachers to explore teachers' interactive cognitions can be illustrated with a small example. Student teachers often learn a rule of thumb in teacher education: To encourage pupil participation, you should not direct your questions to one pupil or a small group of pupils but equally distribute the questions among the whole group of students. Student teachers reportedly see this happen when they are observing their mentor teachers' lessons. But when conducting stimulated recall interviews with their mentor teachers, student teachers learn that experienced teachers not only distribute questions equally among students but appear to have very specific strategies in doing so. Such strategies are based on, for example, specific knowledge of each student, individually and in relation to other students in the class, including his or her capacities as well as more personal characteristics such as communication skills. For example,

I asked him [during a whole-class discussion], because I know he can come with an opposite opinion, and I felt glad that he did, and I hoped that some people felt one way, and the others felt the opposite.

I chose him deliberately because I felt that their attention was waning, as it was already their seventh hour today. And I noticed Colijn was paying attention and had strong opinions, so I asked him, hoping to provoke some reactions.

It is not far-fetched to state that teachers' strategies to distribute questions are of much more interest to student teachers than determining by observation that teachers distribute questions. Another additional value of examining experienced teachers' interactive cognitions is that these reveal how categories of knowledge are integrated and simultaneously accessed while teaching. For example,

Here I felt that it was getting boring, all this vocabulary; students were sitting there like burst balloons, and I thought we had to make it livelier. Let go of the boring translation thing, get away from the grammatical level and appeal to their empathy.

Here it was, "Hey, this text is simple!" and I enjoyed the fact that she saw it herself. I agreed with her, but I hadn't said it in advance. And I considered the nice part, that they realized that this trick [a way to unravel the text structure] can make difficult texts easier.

In this first example, the teacher combines his knowledge of students' behavior, his knowledge of the elements of learning a language, and his knowledge of how to motivate students. In the second example, the teacher combines her knowledge of student understanding and her knowledge of dealing with difficult texts.

Possibilities for Using the Stimulated Recall Technique in Teacher Education

There are several ways to use the stimulated recall technique in teacher education. For example, we had 4 student teachers experimenting with conducting stimulated recall interviews with their mentor teachers. They found that the stimulated recall interview added value to observing and deliberating on the lessons of other teachers (such as the mentor teachers). Teachers' interactive cognitions reveal thoughts beyond the "how" of teaching and into the "why." It is this point in particular that the student teachers saw as an advantage of this instrument. For example,

I found the teaching of my mentor teacher so very natural that it never raised any questions about the why's of his teaching. Using the stimulated recall method made me realize that he actually does think during his actions and behavior during his lessons.

We also found that student teachers mentioned they were more aware of the fact that behind someone's actions are underlying thoughts—not only behind their mentor teachers' actions but also behind their own. For example,

The [stimulated recall interview] yielded an awareness of the fact that my mentor teacher's action were in fact based on underlying principles . . . which can make you [as a student teacher] realize that instead of copying your teachers' behavior you can develop your own principles underlying your teaching.

In the experiments of Ethell (1999), another example of using the stimulated recall technique in a teacher education context can be found. She described a way in which the technique can be systematically planned in a teacher education context. Her experiments were based on the question, "How can the knowledge of expert classroom teachers be made available to student or novice teachers if such knowledge is, to a large degree, unarticulated, tacit in nature and grounded in experience?" (p. 4). Ethell developed the intervention titled "Making Explicit and Gaining Access to the Thinking Underlying Expert Practice," which involved a series of workshops with student teachers. The steps taken in these workshops are described in Appendix A.

Concept Map

The concept map explores issues that are more distant from classroom teaching. It is considered to be an excellent tool for discussions about more and less important aspects in teaching (e.g., Buitink, 1998; Martin & Kompf, 1996). Concept mapping as a procedure in research on teaching can be carried out in either a nonstructured manner (where there is a "brainstorming" session to generate concepts that are then organized and displayed on a concept map) or a more structured manner (where a fixed list of concepts is used to stimulate discus-

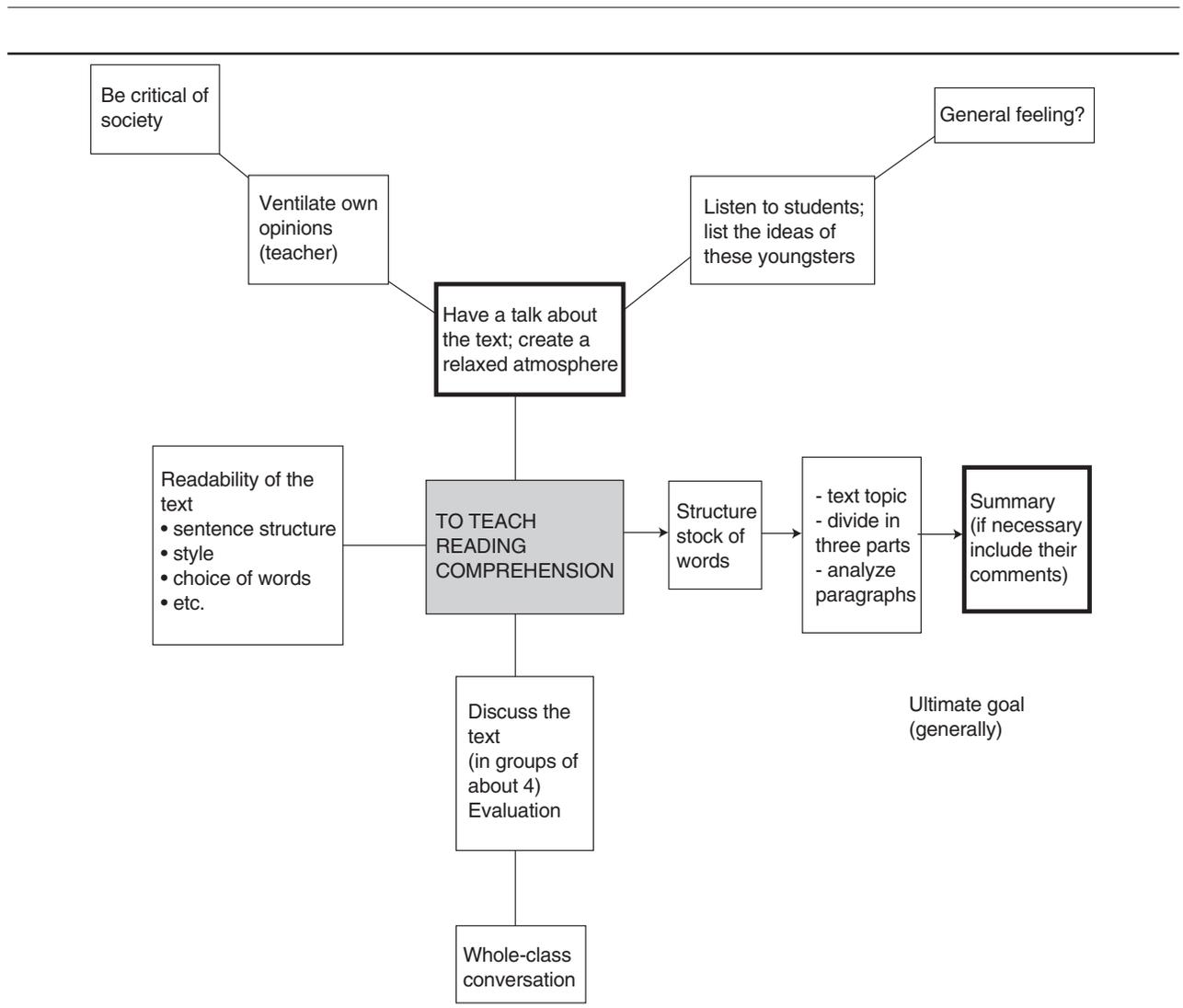


FIGURE 1: Concept Map of a Teacher of Dutch

sion and the subsequent organization of concepts).

An advantage is the free choice of concept the map should be about. This can range from organizational matters and subject-specific themes to pupil counseling—depending on the purpose in teacher education or the needs of the student teacher. We used a nonstructured procedure in which teachers were asked to generate concepts related to the topic “teaching reading comprehension” and organize these concepts into a map. The maps shown in the figures illustrate the variety of contents elicited with this tool, even when the maps are drawn around the same central concept. The first concept map

(Figure 1) was created by a teacher of Dutch (mother tongue). Note that the concepts with a thicker frame are indicated by the teacher as the most important ones. This map shows, in general terms, that the teacher sees two aspects concerning the teaching of reading comprehension as most important: First, the students have to learn to make a summary of a text (following the national curriculum); and second, the students should be able to discuss the topic of the text, preferably in the wider societal context.

The second concept map (Figure 2) was created by a teacher of English (foreign language) and is a neatly organized one. The teacher used four concepts to arrange a relatively large num-

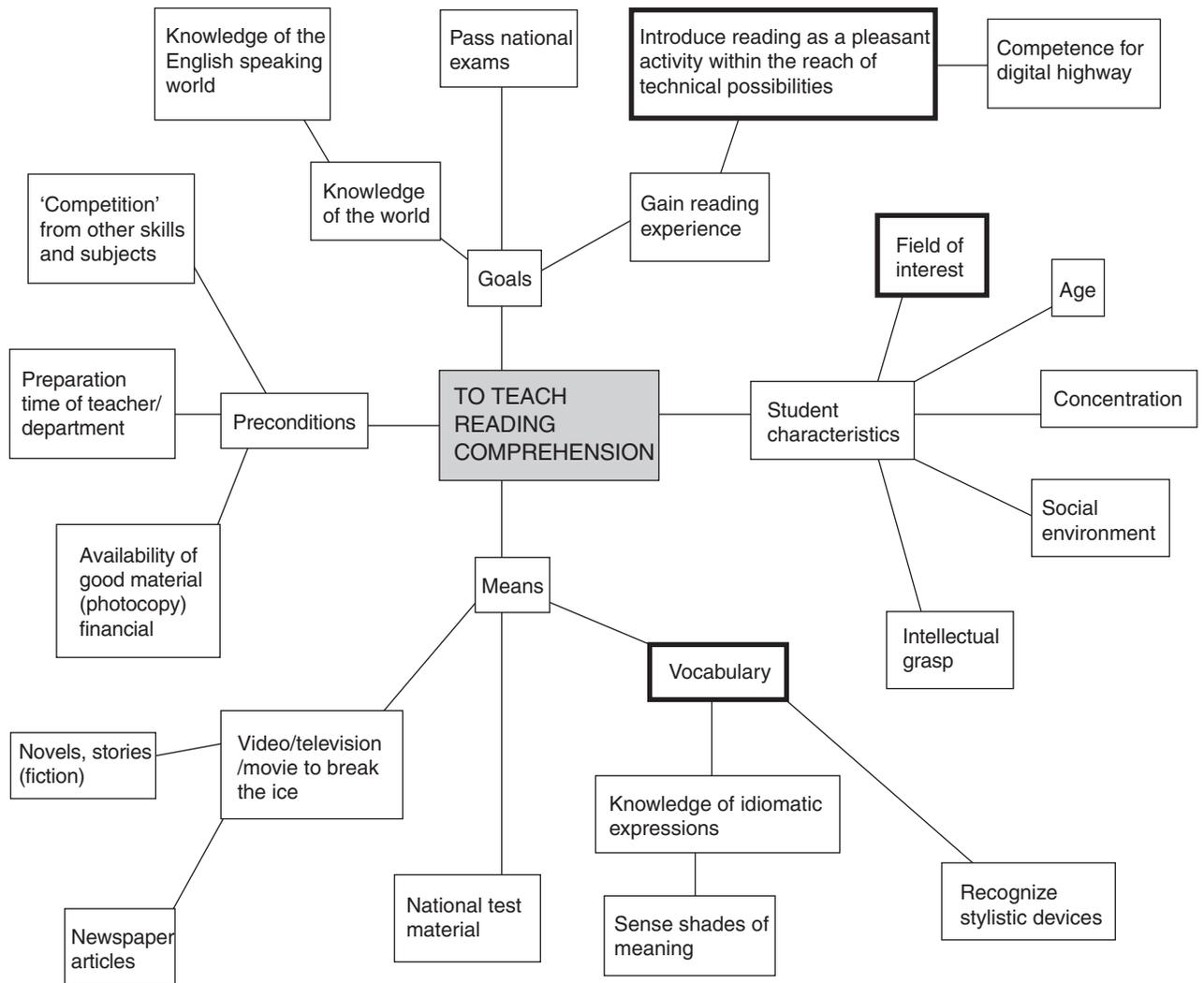


FIGURE 2: Concept Map of a Teacher of English

ber of other concepts, including the three concepts the teacher indicated as most important. Note, however, that it is hard to derive from the map exactly how the teacher designs his teaching to, for example, reach what he indicated as his most important goal: to introduce reading as a pleasant activity within the reach of students' technical possibilities.

Although many more remarks can be made about these two maps, we have presented them here as examples from our study to illustrate the type of information that is called up using this instrument. We will now discuss some of the

experiences of student teachers who used this instrument during their teacher education period.

Reasons for Using the Concept Map in Teacher Education

In this study, 70 student teachers investigated their mentor teachers' practical knowledge about "order" using a concept mapping assignment. We questioned the student teachers about their opinion regarding this instrument and found three dominating opinions. First, student teachers found the concept mapping assign-

ment beneficial to eliciting the thoughts behind their mentor teachers' teaching. For example,

The sound feature of this assignment is, in my opinion, that it actually shows what wells up spontaneously in your mentor teacher. The creation of a concept map assured that the mentor writes down his most important motives in a very compact way, without all kinds of elaborations that make things turbid.

Second, student teachers found the concept map useful for teachers to "muse" about their teaching. For example,

For an experienced teacher it's a good thing to reflect regularly about his or her field. When creating the concept map together with the student teacher a part of the knowledge and experience of the teacher is reflected and becomes visible.

Third, student teachers found the concept mapping assignment suitable for comparing their mentors' beliefs to their own:

When looking at the map, there are always things that are striking. As a student teacher I can ask questions about these. Especially things that are striking or unclear to me in the map indicate that there are differences in beliefs between my mentor teacher and me.

The student teachers had also asked their mentor teachers about their opinions about creating the map. We asked them to write a report about their mentor teachers' responses. A majority of the student teachers reported that their mentor teachers found the assignment valuable. The first argument most often reported by the student teachers (mentioned by 47% of the student teachers) specifically referred to the outcomes of the assignment, saying that it elicited reasons for teaching in a particular way. For example,

When creating a concept map, you have to justify your beliefs. [My mentor teacher said that] you can indicate all kinds of aspects and relationships a beginner will not immediately perceive.

My mentor teacher was positive about having to articulate things that he normally does in a routine way, and that the maps makes you think about things that you consider obvious.

Nineteen percent of the student teachers reported that their mentor teachers valued the concept mapping assignments because of its

characteristics, particularly the freedom to work the assignment out in one's own way and the spontaneous enumeration. For example,

The most powerful quality of the concept map is, in my opinion, that it shows what wells up in your mentor teacher spontaneously. Creating a concept map makes the mentor write down his most important motives in a very compact way without all kinds of elaborations that make matters turbid.

Another 9% of the student teachers reported that their mentor teacher valued the instrument because it creates an opportunity for discussion—discussions that are too rare in education.

Possibilities for Using the Concept Map in Teacher Education

In our study, the implementation of the concept mapping assignment in teacher education consisted of three steps: (a) student teachers create their own concept map about "order" (see Figure 3 for an example), (b) mentor teachers create concept maps about the same concept, and (c) student teachers relate their own concept maps to those of the mentor teachers and to theoretical texts about "order" and "interpersonal skills." The specifics about Step (c) are presented in Appendix B. In the context of teacher education, this step is an important one. By being confronted with their mentor teachers' practical knowledge, student teachers are better able to look critically at their own knowledge (cf. Clark & Lampert, 1986) and at theories offered by their teacher education institute.

Implemented in teacher education, the concept mapping assignment adds value to discussions between student teacher and mentor teacher, as it focuses on the concepts underlying teaching. Furthermore, it is relatively easy to compare concept maps and to relate them to more theoretical notions. The concept maps of several mentor teachers can easily be compared, as can the concept maps of several student teachers. This can make student teachers more aware of the concepts and beliefs of other (more experienced) teachers and of their own beliefs that underlie their teaching. This can help them to develop their own teaching style more consciously, as they are able to make choices that are more well grounded.

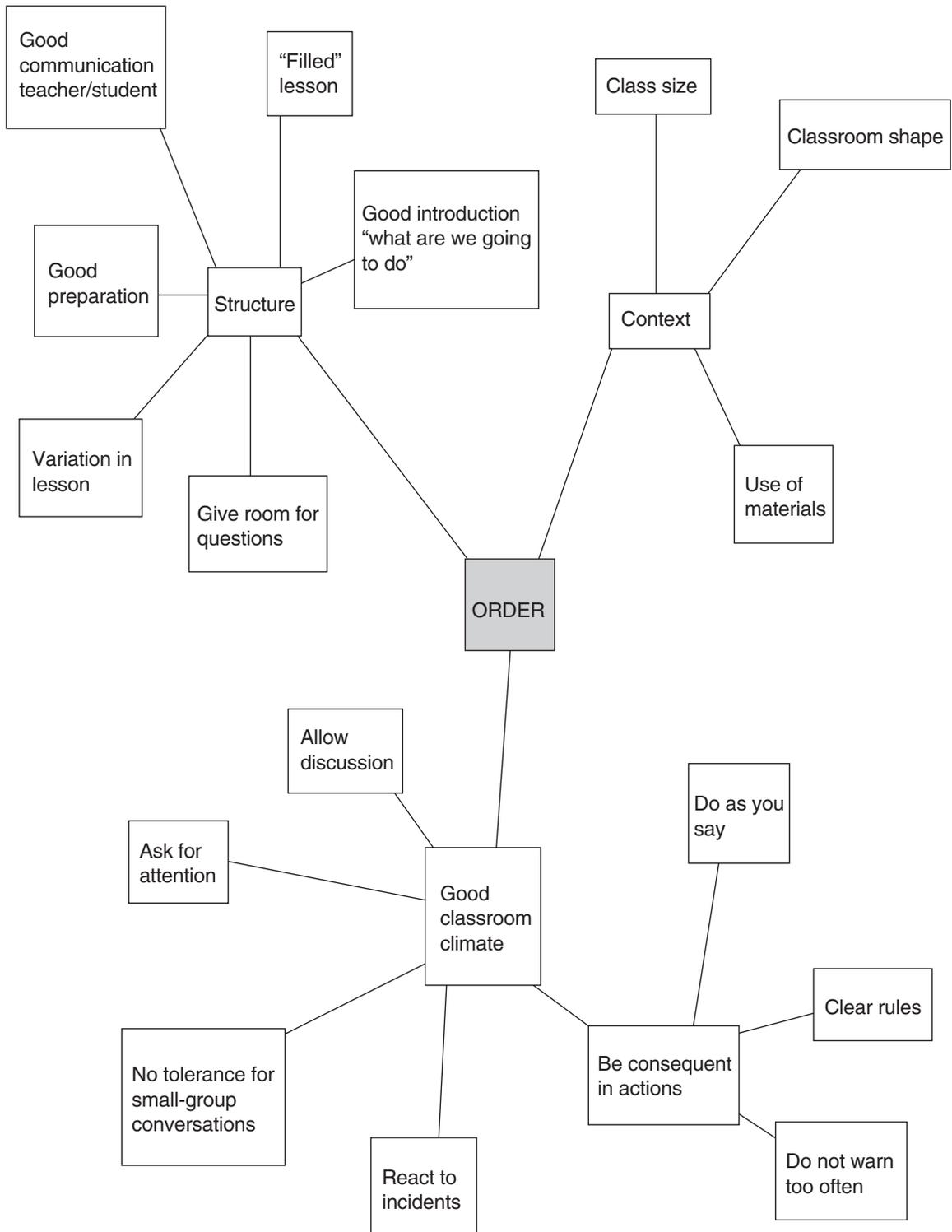


FIGURE 3: Concept Map of a Student Teacher About "Order"

Another possible application of concept mapping in teacher education is to use it as an instrument to capture and discuss change in student

teachers' practical knowledge, for example, when conducted at the beginning of a teacher education course or program and at the closing

TABLE 1 Characteristics of the Stimulated Recall Interview and the Concept Mapping Assignment When Used in a Teacher Education Context

	<i>Stimulated Recall</i>	<i>Concept Map</i>
Relationship to teaching	Closely related to teaching: Tied to actual classroom behavior	More distant to teaching: Relationship to classroom teaching not directly evident
Content	Depending on lesson Always different Situation-specific	Free choice: Ranging from practical to theoretical Around a central concept that can be anchored
Additional value	Creates opportunities to talk about teaching Looks directly beyond the “how” of teaching into the “why” of teaching Shows how categories of knowledge are integrated and simultaneously accessed while teaching Gives insight into the context-embedded nature of teaching and teacher knowledge	Creates opportunities to talk about teaching Focusing on the concepts underlying teaching and how these concepts are related Relatively easy to relate others’ concept maps to your own Makes students teachers think about the concepts underlying their own teaching Mentor teachers’ feedback to lessons can be better understood
Time	Time consuming Always tied to a lesson	Relatively easy and quick Can be made at any time
Practical requirements	Video and tape recorder, television	Pen, self-sticking notes, large sheet of paper

(e.g., Morine-Dershimer, 1993). Furthermore, the assignment can also be implemented as a group assignment, with groups of student teachers working together, discussing and ultimately arriving at consensus about concepts underlying a specific aspect of teaching.

CONCLUSION AND DISCUSSION

Table 1 shows the characteristics of the stimulated recall interview and the concept mapping assignment when used in the context of teacher education. We found that according to the student teachers, eliciting and exploring experienced teachers’ practical knowledge goes beyond the “how” of teaching and also infers an underlying “why” (cf. Tomlinson, 1995). Student teachers indicated that using the instruments provided insight into the thoughts or arguments that experienced teachers have concerning their teaching. This gives student teachers opportunities to better understand other teachers’ teaching and their own teaching by experiencing the relationship between a teacher’s practical knowledge and his or her teaching, learning about the relationship between other

teachers’ practical knowledge and their own (developing) practical knowledge, and exploring the relationship between (experienced) teachers’ practical knowledge and more theoretical notions they learn about in teacher education. This understanding can help student teachers develop their own teaching in a more conscious way, as they can underpin the choices they make in their teaching more thoughtfully. This relates to Ethell’s (1999) finding:

For the participants in this study, the opportunity to gain access to the thinking underlying the practices of expert practitioners represented a pivotal point in their understanding of the existence and nature of relationships between the theory and practice of learning to teach. (p. 16)

We presented some ways to incorporate the results from studies on teachers’ practical knowledge in teacher education. This attempt is based on the fundamental assumption that student teachers need to look beyond their mentor teachers’ observable behavior. Although Zanting et al. (1998) reported student teachers’ initial lack of interest in this type of knowledge, we can conclude that after researching their

mentor teachers' practical knowledge, they found this type of knowledge informative and useful for thinking about their own teaching. However, we would like to point out that the role of articulator of practical knowledge is only one role of mentor teachers and has to be seen as complementary to other roles such as supporter or information source.

We would like to point out that the designs described in this article to organize two instruments in a teacher education context to elicit and explore (experienced) teachers' practical knowledge have to be seen as *examples* that have proven to be worthwhile. Other designs, using the same or other instruments as a basis, can be quite as useful. However, we would like to make an additional remark concerning the *combination* of instruments. We think that the combination of instruments that reveal practical knowledge that is closely related to, as well as more distant from teaching can be particularly fruitful. Student teachers indicated that they considered the combination of a more "concrete" instrument (i.e., the stimulated recall interview) and a more abstract instrument (i.e., the concept map) as meaningful.

Specifically, the content of the instruments offers opportunities that can take account of the need to adapt to individual student teachers' needs. Although the design of the instruments can be more or less anchored, the content of, for example, the concept map, can vary simply by adapting the central concept to a student teacher's needs or interests. The same can be said about relating the content of the instruments to more theoretical ideas taught in teacher education, either by designing an instrument around a theoretical theme (as can be done fairly easily in the case of concept mapping) or by asking student teachers to relate outcomes of the instruments to theories about, for example, teaching reading comprehension.

Models of learning and models of knowledge application also have to be taken into account when including insight into teachers' practical knowledge in teacher education. Thus, gaining insight into teachers' practical knowledge is just one element in the process of learning to teach.

APPENDIX A

Steps in the Series of Workshops "Making Explicit and Gaining Access to the Thinking Underlying Expert Practice" (Ethell, 1999)

1. *Observation and inference.* Student teachers watched segments of an expert teacher's lessons and answered the following questions: What do you think are the objectives behind the teacher's practice? Can you infer what the teacher's objectives are? Is it apparent that the teacher is guided by any particular pedagogical theories?

2. *Making personal theories explicit.* Student teachers were asked to comment on how they would approach teaching the same topic to the same class level. They were asked: Given your understanding of the teaching of history, what would be similar and/or different in your approach to this lesson?

3. *Expert teacher's interactive thinking.* Student teachers watched the stimulated recall interview with the expert teacher that matched the segments viewed in Step 1. They were asked: In what way do the teacher's reflections demonstrate that this teaching practice is explained in terms of curriculum theory? Comment on instances when the teacher explains his practice in terms of theories of teaching and learning.

4. *Contrasting novice and expert reflections.* Student teachers were asked: Consider the reflections you recorded after watching the teaching episodes, the personal theories that you determined would guide your teaching of a similar lesson, and those comments you recorded after watching the teacher's stimulated recall of his thinking. In what way are they similar? In what way are they different?

APPENDIX B

Written Instructions for Student Teachers to Relate Their Own Concept Maps to Their Mentor Teachers' Maps and to Theoretical Texts

For this assignment you first need your own concept map on "order" and the map your mentor teacher created about this concept. Then:

1. Compare your concept map to your mentor teacher's and write down (a) correspondences between your views on the central concept and your mentor teacher's views, and (b) differences between your views on the central concept and your mentor teacher's views.
2. Read the chapters on "how to sustain and maintain order in classrooms" from your course book and

write down the author's most important views on this issue.

3. Compare your concept map to the theory described in your course book and write down (a) correspondences between your views on the central concept and the author's views, and (b) differences between your views on the central concept and the author's views.
 4. Compare your mentor teacher's concept map to the theory described in your course book and write down (a) correspondences between your mentor teacher's views on the central concept and the author's views, and (b) differences between your mentor teacher's views on the central concept and the author's views.
 5. You articulated your own views about sustaining and maintaining order, you tracked down your mentor teacher's views about this concept, and you read a text about the same concept. Subsequently, you compared these three 'sources' to each other. Now draw some conclusions.
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NOTE

1. For decades, policy makers in the Netherlands have paid explicit attention to foreign language education, specifically English, German, and French. The result is a well-developed educational tradition of teaching foreign languages. The teaching of reading comprehension in foreign languages is considered an important aspect of foreign language teaching to 16- to 18-year-old students who plan to go to university, where they need to master contents in a variety of languages. Reading comprehension is even the key element in the final foreign languages exams of these students.

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