Effects of mentoring on student teacher's perceived learning outcomes

How mentor's approach and mentoring relationship influence perceived learning outcomes

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Summary

This study focuses on the influence of the mentor's approach and the student teacher's relationship with his mentor on the student teacher's perceived learning outcomes, measured by his perceived knowledge productivity. In a comparative case-based design including 12 couples of student teachers and their mentors we compared the student teacher's perceived knowledge productivity for groups based on the experienced mentor's approach in the mentoring conversation and the student teacher's relationship with his mentor.

The findings of this study suggest that:

- The mentor's approach in the mentoring conversation does not significantly influence the student teacher's perceived knowledge productivity. We compared two approaches: a scaffolding and prescriptive 'high road' approach and an exploring 'low road' approach.

- Student teachers who have a positive relationship with their mentor have higher perceived knowledge productivity. The student teacher's relationship with his mentor was measured on three variables: student teacher's satisfaction with his mentor, experienced effect of the mentoring and closeness in the mentoring relationship.

Our findings indicate that the relationship between student teacher and mentor influences the student teacher's perceived learning outcomes. Therefore more attention in matching student teachers and mentors is desirable. A high closeness in the relationship also has a positive influence on the student teacher's perceived learning outcomes. It would be recommendable to reconsider the detached way a teacher educator is currently mentoring his student teacher.

Although no significant influence for mentor's approach to perceived knowledge productivity is found, we did see slightly higher scores for the group of student teachers who experienced a 'low road' approach. This suggests that our 'low road' might facilitate learning. If this finding can be generalized to all mentoring, mentors can deliberately use this approach to increase student teacher's learning outcomes.

We also found that the experimental model on mentor's approach used in this study might not be correct or complete. We suggest improving the instrument used to measure the mentor's approach by adding a category 'explanation of practical knowledge' and suggest changing the level of measurement from propositions to paragraphs or turns taken in the conversation.

Introduction

Mentoring plays an important role in the current education of a student teacher. Mentoring refers to the collaboration of a more experienced teacher with a novice teacher to provide 'systematic and sustained assistance' to the new teacher (Huling-Austin, 1990). Mentoring is believed to support and facilitate the professional development of student teachers. Research suggests that mentoring is the most effective method of supporting and facilitating novice teachers in their professional development (Tomlinson, Hobson & Malderez, 2010). Mentoring of new teachers has a lot of benefits, for example increased confidence and self-esteem, increased self-reflection and professional growth (Tomlinson et al).

Little research has been done on the effects of mentoring on learning outcomes for student teachers. Several factors in mentoring influence the outcomes of the mentoring, for example the mentor's approach in the mentoring conversation. The student teacher's professional knowledge is for an important part developed in the conversations with his mentor. In the constant 'zigzag' of action and discussion about the action with a more expert mentor, the student teacher learns how to translate his experiences in the classroom into frames provided by public knowledge and to speak the professional language (Edwards, 1995). The mentor's approach in the mentoring conversation is therefore an important factor in mentoring and may influence the learning outcomes. Another important factor in mentoring is the relationship the mentee has with his mentor (Strong & Baron, 2004). If a student is happy about his mentor this influences his learning outcomes in a positive way (Alebregtse, 2008).

In the current study we investigate whether the mentor's approach in the mentoring conversation influences the student teacher's learning outcomes. We also study if the student teacher's learning outcomes are influenced by the student teacher's relationship with his mentor. We expect to find that these factors in mentoring influence the learning outcomes of the student teacher.

The mentor's approach

The mentor plays an important role in mentoring. In a mentoring conversation a mentor can use different approaches to help the student teacher in his learning process. There is general agreement that because of the close interaction between mentor and student teacher, the approach of the mentor is very important (Huling-Austin, 1990; Smithey & Evertson, 1995).

An analysis of mentoring conversations between mentors and student teachers shows that most of the time the mentor determines the format and topics of the conversation, and when the conversation begins and ends (Strong & Baron, 2004). The mentor's approach is therefore very determinative for the course of the conversation.

In the literature several mentor approaches and their effects on professional development are described. According to Daloz's model of mentoring (Daloz, 1986) student teachers need support and challenge for their professional development. When the mentor is supporting the student teacher, he confirms the ideas and experiences of the student teacher. When the mentor is challenging the student teacher, he asks evaluative questions about the assumptions of the student teacher and introduces different ideas. This can stimulate progress and development (Martin, 1996). Other research on mentor's approach by Franke & Dahlgren (1996) describes a traditional and a reflective approach to mentoring. In the traditional approach the student teachers have to reproduce the professional knowledge and competence of the mentor. The conversations between mentor and student teacher are mainly incident-based and there is not much connection to theory and general ideas. In the reflective approach the student teacher's learning is central. These conversations go beyond the actual teaching by the student teacher and create opportunities for reflection, in order to develop professional knowledge and skills.

Hennissen, Crasborn, Brouwer, Korthagen and Bergen (2008) performed a literature study on mentor teacher's roles in mentoring conversations. They found that in several studies an explicit framework was used to categorise the different approaches (styles) the mentors used in the mentoring conversation. They distinguish a directive and a non-directive approach. In the studied literature the directive approach is defined as authoritarian, directive and informing, critical, instructive, corrective and advising. The skills used in the directive style are: assessing, appraising, instructing, confirming, expressing one's own opinion, offering strategies and giving feedback. In the studied literature the non-directive approach is defined as reflective, cooperative, guiding and elicitive. The skills used in the non-directive style are: asking questions, guiding to developing alternatives, reacting empathetically, summarising and listening actively.

Mentoring is about professional development and developing expertise with the mentee. According to Ericsson's (2002) theory on developing expertise having an expert coach or mentor makes a difference for the mentee in his development of expertise. The mentor can accelerate the learning process, gives feedback and knows what aspects of the performance need to be improved at the next level of skill (Ericsson, 2007). Ericsson states that deliberate practice leads to improvement in performance. In deliberate practice refined representations in the task domain are used. These are representations of the desired performance goal, representations of how to execute the performance and representations of the monitoring of one's performance. In Ericsson's model, a performer starts with a desired goal, then uses his representation of how to execute the performance, next uses the representation of monitoring performance and makes a new performance goal if he is not satisfied with his performance. This reiterative process is shown in figure 1.

Music *"Imagined music experience"*

Golf *"Image of desired ball trajectory"*

Desired performance goal

| Representation for how to execute the performance | → | Representation for monitoring one's performance |

Music *"Playing a piece of music"*   *"Listening to the played music as experienced by an audience"*

Golf *"Execute desired shot"*   *"Comparison between desired and actual shot"*
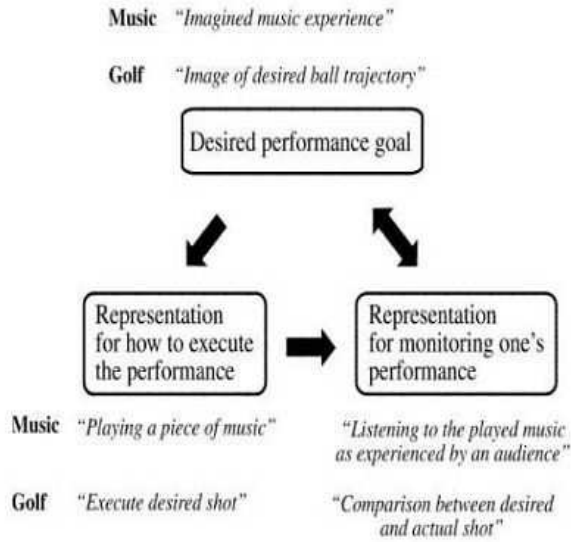
Figure 1

Model of deliberate practice by Ericsson

The current research is based on an experimental model that uses the elements of deliberate practice by Ericsson (2002) but the elements are not seen as in a reiterative cycle. The representation of how to execute the performance and the representation for monitoring one's performance are stepping stones in the mentoring conversation to 'climb mount improbable'. The experimental model used in this research is shown in figure 2.

Desired goal

Know how to execute

Monitoring performance

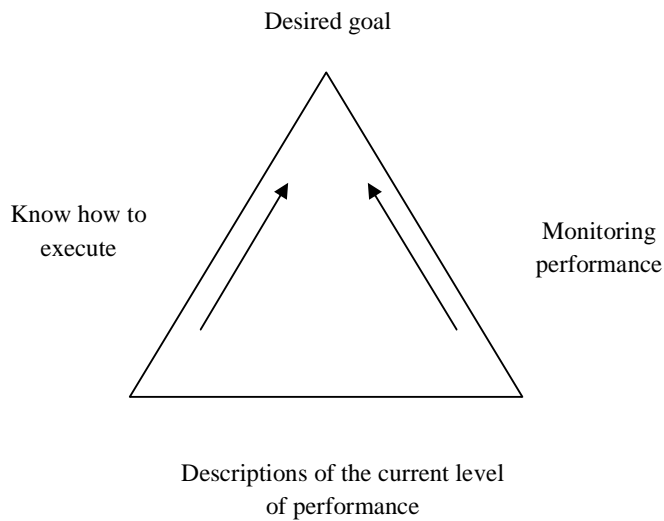Descriptions of the current level of performance

Figure 2

Model of 'climbing mount improbable' in the mentoring conversation

Climbing mount improbable is the title of a book by Richard Dawkins (1996) in which he explains his theory on evolutionary biology. Dawkins compares evolution to a geographical landscape with a high mountain. The mountain is very steep on one side but gradually climbing on the other side. Dawkins states that the summit can only be reached by ascending in a gradual way on one side of the mountain, and not by climbing the steep cliff on the other side of the mountain. This metaphor stands for the idea that a seemingly complex mechanism as evolution comes about from many gradual steps that were previously unseen. This metaphor can also be used for mentoring. As a novice it seems very complex to reach the expert level. Looking up to the summit of the mountain from the ground, the cliff is impossible to climb. But by taking the gradual climbing path on the other side of the mountain, it is possible to reach the top in many gradual steps.

One of the concerns of the mentor teacher in a mentoring conversation is to bridge the gap between the beliefs and theoretical knowledge of the student teacher and his knowledge in action. Professional beliefs should ideally reflect the practice of the student teacher, but this is not always the case (Pajares, 1992). The mentoring conversation can stay at the level of talking about tacit beliefs, but from a scaffolding and learning perspective it would be better if the mentor also referred to general espoused knowledge about what could constitute effective knowledge construction. Especially teacher mentors, in their role as educators, might feel the need to raise the level of the conversation by sharing validated knowledge. The mentor should be aware of the risk that he is guiding the student teacher on a path that is too steep. This can appear if artificial models of knowledge construction are overly and introduced too early, disconnected from the student teacher's previous experiences (Nespor, 1987). A mentor in education who takes his student teacher on a gradual path up to mount improbable, makes sure there is always a connection between the student teacher's knowledge in action and the theoretical knowledge.

In a mentoring conversation the mentor and the mentee try to make a gradual step on the path to climbing the mountain. The mentor is walking along the path leading to the summit and his approach in the mentoring conversation influences the route the student teacher takes on the mountain. To reach the desired goal: the summit of 'mount improbable', the mentor and the student teacher need to take the 'high road' in their mentoring conversation. This high road can be taken if the mentor uses the elements of Ericsson's (2002) deliberate practice theory in his approach: knowing how to execute and monitor performance.

It is part of the role of a mentor to give straightforward pedagogical advice (Strong & Baron, 2004). This approach can be categorized as 'know how to execute' and can be compared to the directive approach as described in the literature study by Hennissen et al (2008).

The mentor can also help the student teacher to 'monitor his performance' by scaffolding his learning process through asking reflective questions about the student teacher's performance compared to the

desired goal. This approach can be compared to the 'reflective approach' from Franke and Dahlgen (1996), the 'challenging approach' by Daloz (1986) and the non-directive approach as described by Hennissen et al (2008).

It's also possible that the mentor and student teacher do not succeed in taking the 'high road', they don't make a gradual step up. In this case, they stay on the 'low road', not coming any closer to the summit of the mountain. In our experimental model, the 'low road' consists of discussing the current level of performance. We assume this does not help the student teacher to reach his desired goal.

Discussing the current performance of the student teacher is the third approach a mentor can use. But if there is no connection to the desired performance, this approach reminds one of the 'traditional approach', described by Franke and Dahlgren (1996).

Based on the experimental model discussed above, it is likely that mentoring conversations in which a 'high road' approach is used, have higher perceived learning outcomes than 'low road' conversations.

The mentoring relationship

Besides the mentor's approach in the mentoring conversation, we believe another factor can also influence the outcomes of mentoring. The relationship a mentee has with his mentor can influence the learning process. Mentoring has been found more likely to be successful if mentor and mentee get along in a professional and in a personal way (Tomlinson, Hobson & Malderez, 2010). Rodger (2006) confirms this and states that a mentoring model works best when it is built on a secure personal relationship between mentor and mentee. Bibby (2009) found that the personal connection between a teacher and a learner affects the subject learning of the learner. If there is no personal connection between teacher and learner, it is possible that the learner is more focused on the need for a personal relationship than focused on the content of learning.

Hargreaves (2010) studied a mentoring and coaching service at a university in the UK. She investigated whether there is a link between the construction of knowledge and the personal relationship between mentors and clients and between mentors and co-mentors. Hargreaves interviewed eight clients involved in this coaching service at the university. In these interviews the clients confirmed the importance of a positive personal relationship as already stated by the researchers mentioned above. The clients stated that their learning was facilitated when they had a special connection with their mentor. Examples like already knowing a mentor before the coaching starts and having the same cultural background as the mentor were mentioned. The clients felt free to be knowledge constructive if they were in a safe, free, equal and supportive relationship with their mentor.

In the current study the concept mentoring relationship is measured on three variables: the student teacher's satisfaction with his mentor, the effects of the mentoring on the student teacher and the closeness in their relationship.

In her master thesis Alebregtse (2008) writes that the effect of having a mentor is a well-researched subject. Most of the time researchers look at the difference between people with and without a mentor. However, not much research has been done on the influence of the satisfaction of the mentee on the effect of mentoring. Alebregtse states that it is not presumable that all mentoring relationships have a positive effect. According to the theory of self-regulation (Leone, Perugini & Ercolani, 1999) a mentee who is not happy with his mentor's guidance and has a negative attitude towards the mentoring relationship, will have a less strong wish to practice the behaviour his mentor has taught him. If a mentee has a positive attitude towards the mentoring relationship, he will probably try to bring the learned skills into practice. This is confirmed in research executed by Ragins, Cotton and Miller (2000). They discovered that mentoring programs in which the mentee was happy with the relationship with his mentor were the only mentoring programs that had a positive effect on working attitude and career attitude. In mentoring student teachers a positive effect will show in more insight and better understanding of their practice, perspective change and commitment to apply the new insights in their practice (Rolfe, 2007). Mentees who were not satisfied with their mentoring program showed attitudes that were the same as or even more negative than people without a mentor. It is therefore likely that student teachers who are satisfied with their mentor and student teachers who experience effects of the mentoring will have higher perceived learning outcomes.

During his teacher education the student teacher often meets a few categories of mentors: the school-based mentor with whom the student teacher works together in the classroom, a mentor from teacher education and sometimes also a mentor who takes care of all the student teachers in the school. The relationship between the student teacher and his mentors can differ in closeness.

Research in social psychology (Zajonc, 1968; Bornstein, 1989) shows that people tend to develop a preference for things which they are familiar with, this also applies to other people. People who see each other more frequently, have a more positive relationship. This is called the mere exposure effect. If a mentor and a student teacher see each other more often they will probably like each other more compared to mentoring couples who don't see each other that often. It is therefore likely that a student teacher in a close relationship with his mentor will have higher perceived learning outcomes.

Learning outcomes

As mentioned before, mentoring is believed to support and facilitate the professional development of student teachers. Professional development can for example be seen in performance improvement. With the help of his mentor, a student teacher is climbing mount improbable and the higher he gets on

the mountain, the better his performance as a teacher will be. Professional development can also be seen in knowledge extension. The higher the student teacher gets on the mountain, the more knowledge he obtains. In this study knowledge construction as an outcome of learning in the mentoring process is studied. One of the ways to measure if the mentoring has contributed to more knowledge is to measure the perceived knowledge productivity.

Knowledge productivity is the creation of conceptual artefacts that may improve the professional's practice (Bereiter, 2002). Conceptual artefacts are the outcomes of deliberate thinking that can be argued about and shared with other professionals. These artefacts become tangible through conversation and can be exchanged in the form of plans, approaches and schemes (Tillema, 2005). Knowledge productivity can be reached when inquiry (Farr-Darling, 2001) and innovative thought (Baxter Magolda, 2004) lead to learning resulting in conceptual artefacts. The concept of knowledge productivity can be useful in finding a focus on desired outcomes in mentoring conversations, since the efforts put in knowledge construction should make a difference in the work situation (Huberman, 1995).

The construction of knowledge in dialogue has had a lot of attention in the last few years (Tillema, 2005). Serious conversations can be dialogic and dialectic processes in which participants insert, share and receive new knowledge that may lead to new understandings (Feldmann, 1999). Tillema (2005) investigated how professionals work together in a study team to become knowledge productive learners in their own working environment. The knowledge productivity of the study team was measured on three different evaluative criteria:

- Raising problem understanding: this criterion relates to an increased awareness, better understanding and more insights as a result of the collaborative inquiry. The knowledge base of the professional can be changed or expanded. Most important question of this criterion is: is the dialogue related to the practice of the professional and does the professional experience the issues spoken about as relevant?

- Shifting perspective: this criterion relates to a conceptual change in the views of the professional by listening to the viewpoints of other professionals. Most important question of this criterion is: does the professional find the ideas, brought in by others in the conversation, and the exchange of knowledge relevant?

- Showing commitment: this criterion relates to how the professional was involved in the group process and had interest in the group discussions. Social exchange and interaction with other professionals is seen as important for learning. Most important question is whether the professional is interested in actively participating in the process of mutual understanding.

These criteria are not only useful in measuring how professionals appraise their collaborative inquiry in the study team as knowledge productive, but can also be useful for measuring if the student teacher appraises the mentoring as knowledge productive.

Research question and hypotheses

The central question in this research is: to which extent does the mentor's approach and the student teacher's relationship with his mentor influence the perceived learning outcomes of the student teacher?

Based on the literature discussed above, the following research questions and hypotheses are posed:

- To what extent does the mentor's approach in the mentoring conversation influence the student teacher's learning outcomes? It was hypothesized that a 'high road' approach in the mentoring conversation would lead to higher perceived learning outcomes.

- To what extent does the student teacher's relationship with his mentor influence his learning outcomes? It was expected that a student teacher who has a positive relationship with his mentor, would have higher perceived learning outcomes.

Methods

Sample

In this study a convenience sample of 12 couples of student teachers and their mentors participated. Out of 12 student teachers 8 are studying to be a teacher in secondary education and 4 are attending the PABO to become a teacher in primary education. They are doing their practicum at schools in Zwolle, Nijverdal, Almelo, Rotterdam area, Leiden area and The Hague area. The students are between 18 and 28 years old and vary in their study progress from their first to their fourth and last year of education.

Out of 12 mentors 4 are mentoring the student teacher in their classes. They work together for one or more days a week. Six mentors are working as teacher educators. They visit the students at their internship-schools to observe their progress or meet them at the teacher education for mentoring conversations. Two mentors are working in a school as school-educator. They are assigned to mentor all the student teachers in an internship school. They regularly visit the student teachers to observe their teaching and evaluate with them. The mentors differ in their experience as a mentor of student teachers. Some have been mentoring student teachers for decades and others have just started.

Only existing couples of student teacher and mentor are allowed to join this study. The criteria to select the student teachers in this study are that they are studying to become a teacher and are doing an internship in teaching at the moment. The mentors are selected if they are mentoring a student teacher who is doing an internship. Within the acquaintances of the researcher, student teachers and mentors are actively approached and asked to join the study. A few couples are suggested by student teachers or mentors who have already participated in the study.

Design

This study examines whether the mentor's approach in the mentoring conversation and the relationship between mentor and mentee influence the learning outcomes of mentoring. A comparative and case-based design is used in this study. This design is chosen to explore the subject. At this time little research has been done on the effects of mentoring on learning outcomes and the used model on mentor's approach in this study is an experimental model. A case-based comparative design seems the best match to the explorative character of this study. In testing our hypothesis on a small group of cases, it is possible to explore cases in a qualitative and quantitative way. If certain associations are suspected after studying the cases in this design, they can be tested in a more elaborate study.

To answer the central question, we compared 12 couples of mentor and student teacher on the mentor's approach used in the mentoring conversation, the relationship between mentor and mentee and the student teacher's learning outcomes.

In this study four independent variables are measured. The mentor's approach in the mentoring conversation is determined by analysing the propositions the mentor made in the mentoring conversation using content analysis. The concept of the student teacher's relationship with his mentor was constructed by measuring three variables: the student teacher's satisfaction with his mentor, the effects of the mentoring the student teacher experienced and the closeness of the relationship. A high score on these variables indicates a positive mentoring relationship.

To determine the learning outcomes of mentoring the dependent variable perceived knowledge productivity is used. The student teacher's perceived knowledge productivity is measured with a questionnaire.

Instruments

To answer the central question in this research about the influence of the mentor's approach and the student teacher's relationship with his mentor on the learning outcomes of the student teacher, five instruments were used. A scheme on the instruments used in this study is shown in table 1.

Table 1

Concepts, Variables, Instruments and the Relationship between Instrument and Concepts

Concept	Variable	Instrument	Relationship
Mentor's approach	Mentor's approach	Content analysis on prescriptive, scaffolding and exploring propositions by mentor	Prescriptive and scaffolding propositions are related to high road approach and exploring propositions are related to low road approach
Mentoring relationship	Student teacher's satisfaction	Adjusted Ideal Mentoring Scale (IMS)	High satisfaction is related to positive relationship
	Effects of mentoring	Memorable events questionnaire	High experienced effects are related to positive relationship
	Closeness in the relationship	Grouping by social position	High closeness is related to positive relationship
Learning outcomes	Knowledge productivity	Questionnaire on perceived knowledge productivity	High perceived knowledge productivity is related to high perceived learning outcomes

Instrument 1: content analysis.

The variable mentor's approach represents the approach or style a mentor uses in his talking in the mentoring conversation with the student teacher. This variable is measured with a self-developed instrument. We therefore describe the development of this instrument, the process of coding and analysing with the instrument and the reliability of the instrument.

Development of the instrument.

The instrument is used for analysing a mentoring conversation. This method is chosen to measure the mentor's approach in an objective way. Research by Hawkey (1998) on the relationship between mentor pedagogy and mentoring in practice shows that the mentor's perception of the approach he uses in a conversation, can be different from the approach he actually uses. Hawkey examined the conceptions about mentoring of two mentors and their pedagogical practice. This research describes the mentor's thoughts about mentoring and the mentor's actual approach in the mentoring conversation. Hawkey aimed to show how much of the talking by the mentor in the conversation was 'showing' and 'telling' student teachers what to do and how much it was focused on stimulating the student teacher to reflect and to take responsibility. These two approaches were mentioned by the mentors in interviews before the mentoring conversations as their preferred styles in mentoring. The analysis of the conversations showed that the two mentors had a somewhat different characteristic approach of mentoring than they described in the initial interviews. This research by Hawkey pleas for analysing conversations in practice to determine the mentor's approach instead of using questionnaires or interviews because there can be a difference in what a mentor describes as his mentoring approach and the approach he practices.

There are several methods to analyse a conversation. A researcher can observe the skills used in a conversation, evaluate the conversation by judgmental rating of analyse the conversation by transcribing the talk. For this study we used an analysis of the conversation because we want to know precisely what the mentor says in the mentoring conversation. Conversation analysis is embedded in the broader field of discourse analysis. Discourse study is considered multidisciplinary: the fields of linguistics, social psychology, communication, educational psychology and sociology of communication are involved. Discourse analysis is the analysis of interaction between people. These interactions in their social context are studied in conversation analysis (Mazur, 2004). Our analysis is focused on the content of the conversations, on the level of propositions. This method is called content analysis.

Content analysis is method to analyse the content of communication. A broad definition of content analysis is: 'any technique for making inferences by systematically and objectively identifying

specified characteristics of messages' (Holsti, 1968). Content analysis has three important features: objectivity, system and generality (Holsti, 1968).

Objectivity means that another researcher, following the same procedures with the same data can come to a similar conclusion. This means that there have to be rules and procedures for the research process. System makes sure that objective and unbiased selection of content and categories is done. This implies that the researcher is not allowed to only select the material that supports his hypothesis. For generality the findings must have a theoretical relevance, and must be related to an established theory, so they have scientific value.

Coding a conversation.

In order to find out what approach the mentor uses in the mentoring conversation, content analysis was used. One of the regular mentoring conversations between student teacher and mentor was videotaped and transcribed. The transcription of the conversation is coded. According to Holsti (1968) three topics need to be addressed in deciding on appropriate coding.

The first topic is about the categories that will be used in the analysis. Holsti (1968) states that the categories should represent the elements of the investigator's theory and that they should be exclusive, so that no item can be scored in more than one category. In this study the mentor's approach in the conversation with a student teacher is investigated. Therefore only the mentor's part in the conversation is analysed. In the introduction the theory on which this research is based is presented. This theory is used to distinguish three categories for coding the mentor's talk in the conversation: prescriptive, scaffolding and exploring. All talk that does not fit into one of the three categories is coded as 'other'.

- Prescriptive: talking in which the mentor prescribes the student teacher how to act in a certain situation. He tells the student teacher how to execute, in order to reach the desired goal (e.g. 'the best option is sending him to his seat to reflect'.)

- Scaffolding: talking in which the mentor scaffolds the learning process of the mentee by inviting him to reflect on situations in the classroom and on his own behaviour in order to reach the desired goal (e.g. 'what can you do to prevent this?')

- Exploring: talking in which the mentor explores the current performance of the student teacher or a certain situation in the classroom (e.g. 'the pupils were all focused on your instruction.')

- Other: talking that does not fit into one of the categories mentioned above (e.g. 'I liked your lesson I saw today.')

The second topic that should be addressed according to Holsti (1968) is the unit of content that will be addressed. In this research the unit of content is a proposition made by the mentor. A proposition can be a full sentence or an unfinished sentence after which a new sentence starts (this occurs often in spoken language). The choice has been made to code propositions instead of for example timeframes because coding propositions is more precise.

The third topic is the system of enumeration. A decision has to be made if the system of enumeration is that a category has occurred in a particular unit or how often it has occurred in the unit. Because a proposition is chosen as unit of content, the system of enumeration is simply counting if a category has occurred in that particular unit. It seems unlikely that more than one category will be assigned to a proposition.

Example.

To show how the coding works out for mentoring conversations in this study, a part of a mentoring conversation is translated from Dutch to English and the process of coding is shown step by step.

Step 1: transcribing the conversation

Mentor: 'How could you prevent that for instance? You now say: at the start of the lesson I did not wait for the class to be quiet. You did not check if it was completely clear to the students what your intention was. What your goal for the lesson was, what you expected from the students.'

Step 2: dividing the conversation in propositions

- How could you prevent that for instance?

- You now say: at the start of the lesson I did not wait for the class to be quiet.

- You did not check if it was completely clear to the students what your intention was.

- What your goal for the lesson was, what you expected from the students.

Step 3: coding the propositions

How could you prevent that for instance?	Scaffolding (question to help the student reflect on the situation)
You now say: at the start of the lesson I did not wait for the class to be quiet.	Other (citation of the student teacher by the mentor)
You did not check if it was completely clear to the students what your intention was.	Exploring (exploring the current performance)
What your goal for the lesson was, what you expected from the students.	Exploring (exploring the current performance)

Step 4: making a footprint of the conversation

The number of propositions in each category is counted after coding the conversation. Together they form a 'footprint' of the conversation. The footprint shows how many propositions in the conversation were prescriptive, scaffolding, exploring or other. In the above example the footprint of this little part of the conversation is: prescriptive: 0, scaffolding: 1, exploring: 2, other: 1.

Reliability.

The reliability of this instrument was tested by an inter-rater reliability test. Therefore a second person coded 50 propositions. This resulted in an agreement of 46 %. The consistency of this instrument is therefore not satisfactory. An analysis of the inconsistencies in coding shows that the disagreements occur in every category. The second coder indicated that she thought the categories were clear to her, but the uncertainty started when coding a conversation and actually attributing a proposition to a category. We therefore recommend a short training for researchers who use this instrument. This training should contain a more elaborate explanation of the categories and practicing with coding a conversation.

Instrument 2: questionnaire about student teacher's satisfaction with his mentor.

The variable student teacher's satisfaction represents the way the student teacher values his mentor. To measure this variable an instrument based on the Ideal Mentoring Scale by Rose (2000) is used. To help students consider the qualities they value most in a mentor, Rose (2000) developed the Ideal Mentoring Scale. This instrument measures the abilities a student desires in a mentor. Three scales that

relate to the student's satisfaction with their mentor are used: integrity, guidance and relationship. The original questionnaire by Rose was adjusted and now asked for the behaviour a mentor showed towards the student teacher instead of the behaviour the student wishes to see. Therefore the opening question was changed from 'My ideal mentor would…' to 'What I see in my mentor is….' The items on the questionnaire were not changed, so that the questionnaire still measures concepts that refer to the student's satisfaction about his mentor.

Before the mentoring conversation the student teacher filled out the questionnaire that consisted of 34 statements about his mentor. The questionnaire measures items in the following categories on a five point Likert scale (ranging from not true at all to very true).

- Integrity consisted of 14 items that describe a mentor who exhibits virtue and principled action and can be seen as a role model (e.g. 'What I see in my mentor is that he values me as a person').
- Guidance consisted of 10 items that describe a mentor who provides practical assistance with the tasks and activities typical of graduate study (e.g. 'What I see in my mentor is that he helps me plan a timetable for my research').
- Relationship consisted of 10 items that describe a mentor with whom students can form a personal relationship that might involve sharing personal concerns, social activities, and life vision or worldview (e.g. 'What I see in my mentor is that he helps me realize my life vision').

The internal consistency for these items in the three categories was measured. This resulted in the following Cronbach Alphas values: for integrity $r = .87$, for guidance $r = .75$ and for relationship $r = .78$. The homogeneity of scales is therefore satisfactory.

Instrument 3: questionnaire about the experienced effect of the mentoring.

As discussed in the introduction, a student teacher who has a positive relationship with his mentor will be more likely to have the intention to practice the behaviour his mentor taught him. Therefore not only the student teacher's satisfaction with his mentor was measured with a questionnaire, but also the impact the mentoring had on the student teacher. This was measured with a questionnaire about memorable events in the mentoring conversation. The questionnaire consisted of nine open questions on three scales: problem understanding, perspective change and commitment to apply. These concepts refer to the effect of the mentoring. If the mentoring was effective, the student will show more insight and better understanding of his practice, has a changed perspective and is committed to apply the new insights in his practice.

- The scale problem understanding consisted of three questions that evaluated whether the student teacher accepted the knowledge expressed in the discussions as relevant and related to

his or her own knowledge structure (e.g. 'what have you learned and gained from the examples of the things that you expressed?').

- The scale perspective change consisted of two questions that evaluated whether the professional exchange led to insightful discussions and acceptance of new knowledge (e.g. 'what experiences in the talk have changed your way of approaching matters in teaching and how have they influenced you?').

- The scale commitment to apply consisted of four items that evaluated whether the student teacher took active part in a process of mutual understanding and was committed to apply this new understandings. (e.g. 'what kind of consequences would you draw as a result of the mentoring conversation?').

The answers of the student teachers were coded; an answer could be positive, negative or neutral. The more positive answers, the more effective the conversation can be considered.

The reliability of this instrument was tested by an inter-rater reliability test. Therefore a second person rated the answers of two questionnaires. This resulted in an agreement of 88.89%. The consistency of this instrument is therefore satisfactory.

Instrument 4: determination of the closeness in the mentoring relationship.

The closeness in the mentoring relationship can differ per couple. With closeness we mean for example the frequency in which student teacher and mentor see each other and if the mentor knows the working environment of the student teacher. For determining the closeness of the mentoring relationship, the grouping into social positions by Hennissen et al (2008) is used. Hennissen et al distinguish three social positions from which supervisory activities can be undertaken. In mentoring relationships the social position refers to the mentor's position in relationship to the student teacher.

The first position occurs when a member of the school staff who is working mainly as a teacher in the classroom is mentoring the student teacher. In this study four of the mentors are working in the classroom as a teacher together with the student teacher and are therefore appointed to the first social position. In the second position mentoring activities are undertaken by someone who is part of the school staff and is not working as a teacher in the mentoring relationship. In this study two mentors are working in the second position as school-educators. In the third position supervisory activities are carried out by a mentor that is employed at the teacher education institute. In this study six mentors are working in the third position as teacher educators on behalf of the teacher education institute.

The closeness in the relationship is determined by the social position the mentor has in the mentoring relationship.

The reliability of this instrument was tested by an inter-rater reliability test. Therefore a second person grouped the couples into one of the three social positions. This resulted in an agreement of 100%. The consistency of this instrument is therefore satisfactory.

Instrument 5: questionnaire about perceived knowledge productivity.

The variable perceived knowledge productivity represents the valuation of the learning outcomes of mentoring by the student teacher. Did the student teacher experience that the mentoring had improved his professional practice? This variable is measured with a questionnaire by Tillema (as described in Tillema, 2005) which measures the perceived knowledge productivity by the student teacher. This self-assessment questionnaire shows us how the student teachers evaluated the outcomes of the mentoring. The questionnaire was administered to the student teacher after the mentoring conversation and consisted of 20 statements on knowledge productivity in the current mentoring conversation. The questionnaire measures items in three categories on a five point Likert scale (ranging from not true at all to very true).

- Problem representation consisted of seven items that evaluated whether the professional had grown in understanding the topic and gained insights from the conversation (e.g. 'I found the problems being discussed authentic and real').

- Perspective taking consisted of seven items that evaluated the ideas the mentor expressed that contributed to the conversation (e.g. 'I often led my thinking change during the discussion').

- Commitment consisted of six items that evaluated if the student teacher was actively involved in the conversation (e.g. 'I refrain from pushing my own ideas too strongly').

The internal consistency for these items in the three categories was measured. This resulted in the following Cronbach Alphas values: for problem representation $r = .71$, for perspective taking $r = .64$ and for commitment $r = .97$. The homogeneity of the scale perspective taking is not satisfactory. If one item on the scale is deleted (I was able to grasp interesting ideas from others), Cronbachs alpha on the scale perspective taking rises to .71, so this item is deleted.

Data collection

In total 41 couples of student teacher and mentor were approached by e-mail. A short introduction to the research and the procedure were sent to them and they were requested to join in the research. In 12 cases, both mentor and student teacher agreed on joining in the research. If both student teacher and mentor consented, an appointment for videotaping their mentoring conversation was made.

Before the mentoring conversation, the student was asked to fill out the questionnaire about his satisfaction with his mentor.

On the day of the mentoring conversation, which was always a regular meeting and not especially planned for the research, the researcher visited the student teacher and the mentor at the internship school of the student teacher or at the teacher education institute. The researcher gave a short repetition of the introduction to the research and the procedure and answered possible questions. When the camera was installed, the researcher left the room and waited outside during the conversation. This was done to affect the conversation as little as possible.

After the conversation had ended, the researcher entered the room again and administered the questionnaire on perceived knowledge productivity and the questionnaire about the effect of the mentoring to the student teacher. The participants received a gift token for participating in the research.

The social position (Hennissen et al, 2008) of the mentor was determined after the meeting. As soon as all conversations had been videotaped, they were written out and coded based on content analysis.

Analysis

In this paragraph the data on the variables is inspected and the methods for analysing the data are discussed.

Mentor's approach.

The scores on the variable mentor's approach in the conversation are obtained by analysing the 'footprint' of each conversation. If a conversation contains more scaffolding and prescriptive propositions than exploring propositions, the mentor is considered to have used a 'high road' approach. If the conversation contains more exploring than scaffolding and prescriptive propositions, the mentor is considered to have used a 'low road' approach.

Student teacher's satisfaction.

The scores on the variable student teacher's satisfaction with his mentor are obtained by calculating the mean score on the questionnaire on student teacher's satisfaction with the mentor. The questionnaire consists of three scales: integrity, guidance and relationship. There are some missing values on every scale. An analysis of the missing values shows that one respondent did not score on 10 out of 34 items. This respondent is not taken into account in the further analyses.

Effects of the mentoring.

The scores on the variable effects of the mentoring are obtained by counting the amount of positive answers on the questionnaire on effects of mentoring. The questionnaire consists of three scales: three questions on understanding, two questions on perspective change and four questions on commitment to apply. There are six missing values on the scale commitment to apply, four on the same question. This question is therefore not taken into consideration in this research. The 12 student teachers answered the three questions on the scale understanding with a positive instance in 30 of the 36 answers, one of the instances was negative and five were neutral. The questions on the scale perspective change were answered with a positive instance in 10 of the 24 cases, negative in 11 of the cases and three of the answers were neutral. The student teachers answered the questions on the scale commitment to apply with a positive instance in 25 of the 36 answers, seven of the instances were negative, two were neutral and two answers were missing. Table 6 containing the descriptions of this variable are shown in the supplement.

Respondents who answered more than half the questionnaire positively, five or more out of eight questions, are considered positive on the effects of mentoring. Out of 12 respondents, 12 scored positive on the effects of mentoring.

Table 7 in the supplement shows that all respondents score five, six or seven positive answers on the questionnaire about the effects of mentoring. There can be several reasons for this minimal variance in the data. There may be a Hawthorn effect in the data, which means that the respondents improved or modified an aspect of their behaviour because they know they are being studied. Maybe the respondents gave more positive answers in the questionnaire because they wanted to give a positive impression of the effects of the mentoring because they were being researched. Another explanation is that there is a sampling bias. All student teachers and their mentors joined the study voluntarily and it might be possible that the student teachers in this research are more positive about the effects of mentoring than the average student teacher. Notable is also that the student teachers in this research score quite high in the appreciation of their mentor ($M = 3.71$). Based on the literature we assume these two variables are related. It is possible that the student teachers in our sample are not representative on the variable effects of mentoring. The third option is that the instrument we used is not valid. It is complex to code the answers to the open questions as positive, negative or neutral. Often student teachers do not really answer the question, or give several instances which the researcher needs to code with only one code. We expect that a more elaborate coding system or closed questions with a Likert scale would improve the validity of the instrument.

After analysing the data gathered with this instrument, the validity of the data is doubted. Therefore the data on this variable will not be used in this research.

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Closeness in the mentoring relationship.

The score on the variable closeness in the mentoring relationship is obtained by determining the social position of the mentor. In this study four mentors are in the first position in the relationship with their mentee, two mentors are in the second position and six mentors are in the third position. Mentors who relate to their student teachers in the first or second position are considered to have a high closeness because they observe the student teacher's teaching and work in the school at close quarters and have mentoring conversations with the student teacher regularly. Mentors in the third position are considered to have a low closeness, because they observe the student teacher's work less often and have less mentoring conversations with the student teacher.

Perceived knowledge productivity.

The scores on the variable perceived knowledge productivity are obtained by calculating the mean score on the questionnaire on knowledge productivity. The questionnaire consists of three scales: problem representation, perspective taking and commitment. There are missing values on the scale commitment for one of the respondents. This student teacher did not fill in the reverse side of the questionnaire and therefore didn't score on the scale commitment. Because the scores of only one student are missing it was decided to use the scale anyway.

Methods for analysing the data.

To answer the first question about the influence of the mentor's approach in the conversation on the perceived knowledge productivity by the student teacher, the scores on the variable knowledge productivity are compared for the student teachers who experienced a mentor's approach that is 'high road' and the student teacher whose mentor used a 'low road' approach. It is not possible to use a t-test, because of the small amount of conversations (n=12) in this study. The scores will therefore be analysed with a Mann-Whitney U-test. The Mann-Whitney U-test is used to compare differences between two independent groups. The Mann-Whitney U-test does not assume that the difference between the samples is normally distributed, or that the variances of the two populations are equal. Because the validity of the assumptions of the t-test is questionable in this study, the Mann-Whitney U-test is used.

To answer the second question about the influence of the student teacher's relationship with his mentor on his perceived knowledge productivity two analyses will be executed. First the scores on the variable knowledge productivity are compared for the students who are satisfied with their mentor and students who are not satisfied. The scores will be analysed with a Mann-Whitney U-test. Secondly the influence of variety in closeness in the mentoring relationship on the perceived knowledge productivity will be analysed. Therefore the scores on the variable perceived knowledge productivity

are compared for couples that are considered low on closeness and couples that are considered high on closeness. The scores will be analysed with a Mann-Whitney U-test

Results

In this chapter the results of this study will be presented.

Variables

First the results on the variables in this study are shown. Because the validity of the data on the variable experienced effects of mentoring is doubted, this variable is not taken into consideration in the rest of the study.

Variable: mentor's approach.

Content analysis shows that out of 12 conversations, 3 are considered to have a 'high road' approach and 9 are considered to have a 'low road' approach. Table 2 shows the footprints of all 12 conversations.

Table 2

'Footprint' of all Conversations

Conversation	Prescriptive	Scaffolding	Exploring	Other	High or low road
1	87	64	118	155	High
2	64	8	84	240	Low
3	13	20	38	60	Low
4	13	43	65	122	Low
5	56	19	132	127	Low
6	23	11	11	50	High
7	23	18	89	320	Low
8	10	15	36	112	Low
9	2	5	27	53	Low
10	16	16	39	25	Low
11	47	32	66	54	High
12	27	15	61	46	Low

Variable: student teacher's satisfaction with his mentor.

The questionnaire on student teacher's satisfaction with his mentor contains three scales. The scale integrity has a mean of 4.14 (N = 11, *SD* = 0.49), the scale guidance has a mean of 3.55 (N = 11, *SD* = 0.50) and the scale relationship has a mean of 3.27 (N = 11, *SD* = 0.61). The mean of the total score on satisfaction with mentor is 3.71 (N = 11, *SD* = 0.46). If a student scores a mean of 3.50 or higher, he is considered to be positive on the satisfaction with his mentor. Out of 11 respondents, 7 are positive on the satisfaction with their mentor. Table 8 containing the descriptions of this variable is shown in the supplement.

Variable: closeness in the mentoring relationship.

The analysis on the social position of the mentor closeness in the mentoring relationship shows that four mentors are in the first social position, two are in the second social position and six are in the third social position. Therefore six mentoring relationships are considered to have a high closeness and six mentoring relationships are considered to have a low closeness. An overview of the scores per respondent on this variable is shown in table 9 in the supplement.

Variable: perceived knowledge productivity.

The questionnaire on perceived knowledge productivity contains three scales. The scale problem representation has a mean of 4.35 (N = 12, *SD* = 0.43), the mean of the scale perspective taking is 3.94 (N = 12, SD = 0.59) and the scale commitment has a mean of 4.23 (N = 11, *SD* = 0.40). The mean score on all of the scales is 4.16 (N = 12, *SD* = 0.37). Table 10 containing the descriptions of this variable is shown in the supplement.

Analyses

In this paragraph the results on the analyses of the data on the research questions are presented.

Mentor's approach and perceived knowledge productivity.

To answer the first research question about the influence of the mentor's approach in the conversation on the perceived knowledge productivity by the student teacher, the student teacher's scores on knowledge productivity are compared to students who had a conversation in which the mentor used the 'high road' approach (n=3) and students who had a conversation in which the mentor used the 'low road' approach (n=9). It was expected that mentees who experienced a 'high road' approach, would have higher perceived knowledge productivity.

For this analysis a Mann-Whitney U-test is used. Median score in the group with a 'high road' approach was 3.94 and median score in the group with a 'low road' approach was 4.03.The

distributions in the two groups did not differ significantly (Mann–Whitney $U = 8.00$, n = 12, $P = .31$ two-tailed). This result does not support the hypothesis. There is no significant difference in knowledge productivity for students who had a 'high road' conversation or a 'low road' conversation. The descriptives of this analysis are shown in table 3.

Table 3
Descriptives of Mann Whitney U Test on the Relationship between Mentor's Approach and Knowledge Productivity

Approach	N	Median Knowledge Productivity	Mean Rank	Sum of Ranks
Low road	9	4.03	7.11	64.00
High road	3	3.94	4.67	14.00
Total	12			

Student teacher's relationship with his mentor and perceived knowledge productivity.

The student teacher's relationship with his mentor is measured on three variables: student teacher's satisfaction with his mentor, effects of the mentoring and closeness of the mentoring relationship. For each variable the score on knowledge productivity is compared for two groups of students. A high score on satisfaction relates to a positive relationship with the mentor and closeness in the relationship with the mentor relates to a positive relationship with the mentor. It was expected that students who have a score that relates to a positive relationship with their mentor, wouldl have higher perceived knowledge productivity.

The first variable that is related to the concept of mentoring relationship is the student teacher's satisfaction with his mentor. Based on their score, the student teachers are divided into two groups: satisfied and not satisfied. The score on knowledge productivity was compared for these two groups. For this analysis a Mann-Whitney U-test is used. Median score in the group with satisfied student teachers was 4.37 and median score in the group with not-satisfied student teachers was 3.82. The distributions in the two groups differs significantly (Mann–Whitney $U = 3.00$, n = 11, $P = .04$ two-tailed). This result supports the hypothesis. Student teachers who are satisfied with their mentor have higher perceived knowledge productivity than students who are not satisfied with their mentor. The descriptives of this analysis are shown in table 4.

Table 4
Descriptives of Mann Whitney U Test on the Relationship between Student Teacher Satisfaction and Knowledge Productivity

Satisfaction	N	Median Knowledge Productivity	Mean Rank	Sum of Ranks
Not satisfied	4	3.82	3.25	13.00
Satisfied	7	4.37	7.57	53.00
Total	11			

The second variable that is related to the concept of mentoring relationship is the experienced effect of the mentoring. Because the data on this variable is considered not valid, the analysis of the relationship between effects of mentoring and knowledge productivity is not executed.

The last variable is the influence of closeness in the mentoring relationship. The student teachers are divided into two groups. The student teacher's scores on knowledge productivity are compared for students who have a high closeness in the relationship with their mentor (n=6) and students who have a low closeness (n=6). It was expected that students who have a high closeness in the relationship with their mentor, wouldl have a higher perceived knowledge productivity. For this analysis a Mann-Whitney U-test is executed. The median score in the group with a high closeness was 4.52 and the median score in the group with a low closeness was 3.92. The distributions in the two groups differs significantly (Mann–Whitney $U = 5.00$, n = 12, $P = .04$ two-tailed). The results of this analysis are shown in table 5. The results support the hypothesis. Student teachers in a mentoring relationship with a high closeness perceive higher knowledge productivity than students who have a low closeness in the relationship with their mentor.

Table 5
Descriptives of Mann Whitney U Test on Closeness in the Mentoring Relationship and Knowledge Productivity

Closeness	N	Median Knowledge Productivity	Mean Rank	Sum of Ranks
Low closeness	6	3.92	4.33	26.00
High closeness	6	4.52	8.67	52.00
Total	12			

The hypothesis on the concept of mentoring relationship is confirmed. The analyses on both variables related to mentoring relationship indicate that students who have a positive relationship with their mentor, have higher perceived knowledge productivity.

Conclusions and discussion

This study was designed to explore the relations between the mentor's approach in the mentoring conversation, the student teacher's relationship with his mentor and the learning outcomes of mentoring.

Mentoring relationship and learning outcomes

In a comparative and case-based design of 12 student teachers and their mentors a relation between the student teacher's relationship with his mentor and his learning outcomes was found. The concept of mentoring relationship was measured on three variables: student teacher's satisfaction, experienced effects of mentoring and closeness in the mentoring relationship. The data on the variable experienced effects of mentoring were considered not valid; this variable was therefore not taken into account in the rest of the research.

The variables student teacher's satisfaction and closeness in the mentoring relationship are related to the learning outcomes of the student teacher. If the mean score on knowledge productivity is compared for student teachers who are satisfied with their mentors and student teachers who are not satisfied with their mentors, the analysis shows a significant difference in perceived knowledge productivity. Student teachers who are satisfied with their mentors have higher mean perceived knowledge productivity. The same applies to comparing student teachers who have a close relationship and student teachers who do not have a close relationship with their mentor. Student teachers who have a close relationship with their mentors have higher perceived knowledge productivity. This is clearly shown in table 11 in the supplement, in which all scores per student teacher are shown. The three respondents with the lowest scores on knowledge productivity all score low on closeness and are 'not satisfied' with their mentor. The four respondents with the highest scores on knowledge productivity all score high on closeness and are 'satisfied' with their mentor. These findings were expected, based on the studied literature.

Mentor's approach and learning outcomes

The expected relation between mentor's approach and the student teacher's learning outcomes was not found. The experimental model used in this research distinguishes a 'high road' approach and a 'low road' approach by the mentor. Based on the studied literature it was expected that the use of the prescriptive and scaffolding 'high road' approach by the mentor would lead to higher perceived knowledge productivity by the student teacher than the use of the exploring 'low road' approach. The results show that in the studied cases the mean perceived knowledge productivity is higher for students who experienced a 'low road' approach in their mentoring conversation, but not significantly. The results per respondent in table 11 in the supplement show that the three respondents with the highest

scores on knowledge productivity all have mentors who used a low road approach in the mentoring conversation.

There can be several reasons why student teachers who experienced a 'low road approach' in their mentoring conversation have higher perceived knowledge productivity. The model used in this study is an experimental model in which prescription by the mentor and scaffolding questions are considered to be stepping stones towards the desired goal. Descriptions of the current performance of the student teacher are considered not helping the student reach the desired goal. It is possible that this model is not correct because the results in our case-study show that describing the current performance leads to higher perceived knowledge productivity by the student teacher. But it is not necessary to reject the model based just on the findings of this study; therefore more research should be done.

It is also possible that our model was not complete. A factor in mentoring that was not included in our model is the need of the mentee. The student teacher's phase in learning determines what mentoring he needs. A student teacher who just started teaching in practice, may have different needs in mentoring than a student teacher who has already practiced teaching for four years and has almost finished teacher education. The approach a mentor needs to take in the mentoring conversation can therefore be different. For example: starting student teachers have specific needs in the areas of curriculum content, course planning, instruction and assessment, reporting, behaviour management, and school policies and culture (Ormond, 2011). A more prescriptive approach in mentoring might satisfy the needs in this phase of learning and have a positive effect on learning outcomes. For a more experienced student teacher, the needs and therefore the required mentor's approach to maximize the learning outcomes can be different. In our experimental model, the different needs of the mentee are not taken into account, but may have influenced the results of our study.

Instruments

The questionnaire with open questions used to measure the experienced effect of mentoring was considered not valid because of minimal variance in the data. Two improvements for this instrument are suggested: a more elaborate coding system and the use of closed questions with a Likert-scale.

We believe that the instrument used to measure the variable mentor's approach can also be improved. In any case there should be a short training for researchers using this instrument to improve the reliability. Besides that, another improvement can be made. In this study content analysis was used, in which propositions were assigned to four categories: prescriptive, scaffolding, exploring and other. A quick glance at the sequence of the propositions seems to indicate that a scaffolding or a prescriptive proposition is often preceded by several exploring propositions. The instrument used in this study counts the number of propositions in every category and therefore the propositions with a description

of a current situation followed by a scaffolding or a prescriptive proposition are assigned to different categories. It might be defendable to state that the exploring propositions are introductory for the scaffolding question or prescription. If categorizing at the level of propositions does not do justice to the mentor's approach, categorizing at the level of paragraphs spoken by the mentor or at the level of turns taken in the conversation by the mentor might be more appropriate.

Another striking observation is the high amount of 'other' propositions in the conversations, propositions that could not be assigned to one of the three categories based on our model. More than half of the studied conversations had 50% or more 'other' propositions. Crasborn and Hennissen (2010) distinguish two main areas of assistance in a mentoring conversation: task assistance and emotional support. Task assistance includes giving feedback, information and practical advice, asking questions and discussing topics concerning teaching. Emotional support includes sympathetic and positive support, attention and empathy. Our model distinguishes three approaches in task assistance; the approaches in emotional support a mentor can use in a mentoring conversation are not included in the model. Part of the 'other' propositions can therefore be explained by this distinction, these are emotional support approaches. But a closer look at the propositions categorized as 'other' shows that this category contains not only emotional support propositions, but also propositions in which mentors tell about their own experiences in teaching in order to help the student teacher learn.

Zanting, Verloop, Vermunt and van Driel (1998) studied this phenomenon as a mentor's role or style, called 'explicating practical knowledge'. They define this style as 'the explication of mentor teacher's knowledge base of learning and teaching in the presence of their student teachers'. Zanting et al argue that the explication of practical knowledge can be valuable to student teachers for four reasons: student teachers can obtain new information about teaching; they can understand their mentor's teaching and the nature of teaching better; they can understand their mentor's mentoring better and develop personal theories of teaching and they integrate theory with practice. There are several ways a mentor can make his practical knowledge explicit: by making his own beliefs on teaching explicit when discussing the student teacher's lessons, by reflecting on his own lesson in the presence of the student teacher and talk about what he did, how he did it and why he did it. He can also make the practical knowledge explicit by planning, giving and analysing lessons with his student teacher. Some of the mentors in our study use the explication of practical knowledge in their mentoring conversation (Zanting et al). These propositions can be seen as task assistant and 'explication of practical knowledge' might be a valuable addition to our model.

Score on knowledge productivity

The mean score on the complete questionnaire on knowledge productivity is 4.16. This is considerd to be a relatively high score. There can be several reasons for this high score. There may be a researcher effect, when the respondents improved or modified an aspect of their behaviour because they know they are being studied. Maybe the respondents gave higher scores on knowledge productivity in the questionnaire because they wanted to give a positive impression of the knowledge productivity because they were being researched. Another explanation is that there is a sampling bias. The student teachers in this research score quite high in the appreciation of their mentor ($M = 3.71$). A reason for this may be that the sample used in this study is not representative of the population of student teachers. Our sample may be more satisfied with their mentor than the average student. Based on the literature we assume that if a student teacher is happy with his mentor this influences his learning outcomes in a positive way (Alebregtse, 2008). The high scores on the variable student teacher's satisfaction with his mentor can be a reason for the high scores on the variable student teacher's perceived knowledge productivity.

Closeness in the mentoring relationship and satisfaction with the mentor

Table 11 in the supplement shows that all students who score high on closeness are satisfied with their mentor. Only one student with a high score on closeness has no score on satisfaction. Out of six students who score low on closeness, four are not satisfied with their mentor and two are satisfied. These results suggest a relation between closeness in the mentoring relationship and satisfaction with the mentor. The relation between these variables is not specifically measured in this study, but the studied literature about the mere exposure effect (Zajonc, 1968; Bornstein, 1989) suggests that these two variables can be related. The results of this study suggest that this relation is present in our study as well.

Mentor's approach and satisfaction with the mentor

The scores on the variables per respondent also show that out of three respondents who experienced a high road approach in the mentoring conversation, one is satisfied with his mentor, one is not satisfied and one has no score on the variable satisfaction. Out of nine respondents who experienced a low road approach in the mentoring conversation, six are satisfied and three are not satisfied with their mentor. In this study there seems to be no relation between the approach a mentor used and the student teacher's satisfaction with his mentor.

Closeness in the mentoring relationship and mentor's approach

The results per respondent show that out of six student teachers who have a close relationship with their mentor, four experienced a low road approach and two experienced a high road approach. Out of six student teachers who do not have a close relationship with their mentor, five experienced a low road approach and one experienced a high road approach. No clear relationship between these two variables can be concluded based on the results in this study.

Implications

The results of our case study show that the student teacher's relationship with his mentor influences his perceived learning outcomes. If this is the case for all student teachers, it would be recommendable to pay more attention to the matching process of student teachers to their mentors. At this moment, most student teachers and mentors are matched based on practical considerations, e.g. distance or class. A good match between mentor and mentee can for example be established by using the Ideal Mentoring Scale by Rose (2000). But before the relationship between mentoring relationship and perceived learning outcomes can be concluded, further research including more respondents should be done.

The results of this study also indicate that student teachers who have a close relationship with their mentor, have higher perceived learning outcomes. In this study we consider the relationship between a classroom mentor and a student teacher and between a school educator and a student teacher as close relationships. These relationships are characterized by regular observation of the student teacher's work at close quarters and regular mentoring conversations. These factors seem to have a positive influence on the perceived learning outcomes of the student teacher. If this finding can be generalized for all student teachers, it would be recommendable to reconsider the detached way a teacher educator is currently mentoring his student teacher. This way of mentoring might not give the best results in perceived learning outcomes.

Our study shows that the mentor's approach in the mentoring conversation influences the perceived learning outcomes of the student teacher, but not significantly. Students who experienced a more low road approach in the mentoring conversation have higher perceived learning outcomes. This suggests that our 'low road' is not really a low road but that it does facilitate learning. If this finding can be generalized to all mentoring, mentors can deliberately use this approach to increase student teacher's learning outcomes.

Further research

This case study suggests a relationship between the student teacher's relationship with his mentor and his learning outcomes. No significant relationship has been found between the mentor's approach and the student teacher's learning outcomes. Because this was a small study, it is difficult to judge the extent to which the findings are specific to the particular cases in this study or whether they may be more widely applicable . Therefore further research should be done. A few suggestions for further research based on our experiences in this study can be made.

The model on mentor's approach used in this study, may not be complete for all task assistant approaches a mentor can use in the mentoring conversation. We therefore suggest including the category 'explication of practical knowledge' in the model, before testing the model in new research. We also suggest improving the instrument used to measure the mentor's approach. The unit of content should be reconsidered. The measurement on the level of propositions might not do justice to the mentor's approach. For further research we suggest categorizing at the level of paragraphs spoken by the mentor or at the level of turns taken in the conversation by the mentor.

In this study there were no requirements set for the used mentoring conversations. Every conversation between mentor and student teacher was approved. This resulted in a variety of conversations, some based on a reflection report handed in by the student teacher, some based on the mentor's lesson observations and some about the student teacher's study progress. The length of the conversations was also very different, the shortest conversation was approximately 10 minutes and the longest conversation lasted almost an hour. The variety of properties in the conversations might have influenced our study. For further research we suggest using similar conversations to rule out the possible influence of deviating conditions on the results.

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Supplement

Tables

The tables 6 to 10 referred to in the text are shown in this supplement.

Table 6

Descriptions of the Variable Effects of Mentoring

	Positive	Negative	Neutral	Missing
Understanding	30	1	5	0
Perspective change	10	11	3	0
Commitment to apply	25	7	2	2

Table 7

Scores on the Variable Effects of Mentoring per Respondent

Respondent	Positive	Negative	Neutral	Missing
1	7	1	0	1
2	6	2	1	0
3	6	2	1	0
4	6	1	2	0
5	7	0	1	1
6	6	2	0	1
7	6	3	0	0
8	5	1	2	1
9	6	3	0	0
10	5	2	1	1
11	6	1	1	1
12	7	1	1	0

Table 8

Descriptions of the Variable Student teacher's Satisfaction with his Mentor

	M	*SD*	Min.	Max.
Integrity	4.14	.49	3.43	5.00
Guidance	3.55	.50	2.80	4.40
Relationship	3.27	.61	2.60	4.50
Mentor valuation	3.71	.46	3.09	4.53

Table 9

Social position of the mentor and closeness of the mentoring relationship per respondent

Respondent	Relationship	Social position	Closeness
1	Student and classroom mentor	1	High
2	Student and classroom mentor	1	High
3	Student and school educator	2	High
4	Student and classroom mentor	1	High
5	Student and school educator	2	High
6	Student and teacher educator	3	Low
7	Student and teacher educator	3	Low
8	Student and teacher educator	3	Low
9	Student and teacher educator	3	Low
10	Student and teacher educator	3	Low
11	Student and classroom mentor	1	High
12	Student and teacher educator	3	Low

Table 10

Descriptions of the Variable Knowledge Productivity

	M	*SD*	Min.	Max.
Problem representation	4.35	.43	3.71	5.00
Perspective taking	3.94	.58	3.00	4.67
Commitment	4.23	.40	3.67	4.83
Knowledge productivity	4.16	.37	3.71	4.75

Table 11

Scores on all Variables per Respondent

| Respondent | Mentor's approach | | | | | Relationship | | | | Learning outcomes |
| | Content analysis | | | | | Satisfaction with mentor | | Closeness | | Knowledge productivity |
	Prescriptive	Scaffolding	Exploring	Other	High or low road	*M*	Satisfaction	Mentor's social position	Closeness	*M*
1	87 (21%)	64 (15%)	118 (28%)	155 (37%)	High	No score	No score	1	High	3.94
2	64 (16%)	8 (2%)	84 (21%)	240 (61%)	Low	4.53	Satisfied	1	High	4.67
3	13 (10%)	20 (15%)	38 (29%)	60 (46%)	Low	3.53	Satisfied	2	High	4.75
4	13 (5%)	43 (18%)	65 (27%)	122 (50%)	Low	3.88	Satisfied	1	High	4.00
5	56 (17%)	19 (6%)	132 (40%)	127 (38%)	Low	4.21	Satisfied	2	High	4.72
6	23 (24%)	11 (12%)	11 (12%)	50 (53%)	High	3.38	Not satisfied	3	Low	3.71
7	23 (5%)	18 (4%)	89 (20%)	320 (71%)	Low	3.65	Satisfied	3	Low	3.98
8	10 (6%)	15 (9%)	36 (21%)	112 (65%)	Low	3.38	Not satisfied	3	Low	4.13
9	2 (2%)	5 (6%)	27 (31%)	53 (61%)	Low	3.09	Not satisfied	3	Low	3.86
10	16 (17%)	16 (17%)	39 (41%)	25 (26%)	Low	4.09	Satisfied	3	Low	4.03
11	47 (24%)	32 (16%)	66 (33%)	54 (27%)	High	3.94	Satisfied	1	High	4.37
12	27 (18%)	15 (10%)	61 (41%)	46 (41%)	Low	3.15	Not satisfied	3	Low	3.78

Instruments

The following questionnaires were translated into Dutch and administered to the student teachers in this study.

Instrument 2: questionnaire about student teacher's satisfaction with his mentor

Please indicate your view by means of a number next to each statement. Choose on scale 5 to 1:

True for me 5 – 4 – 3 – 2 – 1 Not true for me

What I see in my mentor is that he/she:

Treats me as an adult who has a right to be involved in decisions that affect me	1	2	3	4	5
Values me as person	1	2	3	4	5
Respects the intellectual property rights of others	1	2	3	4	5
Believes in me	1	2	3	4	5
Recognizes my potential	1	2	3	4	5
Generally tries to be thoughtful and considerate	1	2	3	4	5
Works hard to accomplish his/her goals	1	2	3	4	5
Accepts me as a junior colleague	1	2	3	4	5
Inspires me by his or her example and words	1	2	3	4	5
Gives proper credit to students	1	2	3	4	5
Is a role model	1	2	3	4	5
Advocates for my needs and interests	1	2	3	4	5
Is calm and collected in times of stress	1	2	3	4	5
Prefers to cooperate with others than compete with them	1	2	3	4	5
Provides information to help me understand the subject matter I am reflecting on	1	2	3	4	5
Helps me plan a timetable for my reflection report	1	2	3	4	5

Helps me to investigate a problem I am having with my reflection report on school experience	1	2	3	4	5
Helps me plan the outline for my reflection report on school experience	1	2	3	4	5
Helps me to maintain a clear focus on my reflection report	1	2	3	4	5
Gives me specific assignments related to my reflection report	1	2	3	4	5
Meets with me on a regular basis	1	2	3	4	5
Is generous with time and other resources	1	2	3	4	5
Brainstorms solutions to a problem concerning my reflection report	1	2	3	4	5
Shows me how to employ relevant teaching methods	1	2	3	4	5
Relates to me as if he/she is a responsible, admirable older sibling	1	2	3	4	5
Talks to me about his/her personal problems	1	2	3	4	5
Is seldom sad and depressed	1	2	3	4	5
Is a cheerful, high-spirited person	1	2	3	4	5
Rarely feels fearful or anxious	1	2	3	4	5
Helps me realize my life vision	1	2	3	4	5
Has coffee or lunch with me on occasions	1	2	3	4	5
Is interested in speculating on the nature of the universe or the human condition	1	2	3	4	5
Takes me out for dinner and/or drink after work	1	2	3	4	5
Keeps his or her workspace neat and clean	1	2	3	4	5

Instrument 3: questionnaire about the experienced effect of the mentoring

1.1 How do you evaluate your learning experiences in the mentoring conversation?

…………………………………………………………………………………………………….

1.2 What have you learned and gained from the examples of the things that you expressed?

…………………………………………………………………………………………………….

1.3 Can you identify some ideas expressed in the talk that you think contributed to your understanding of the issues in your reflection report?

…………………………………………………………………………………………………….

2.1 Can you think of examples of things that were talked about which challenged the beliefs about teaching you have?

…………………………………………………………………………………………………….

2.2. What experiences have changed your way of approaching matters and how have they influenced you?

…………………………………………………………………………………………………….

3.1. Have the points you mentioned above in 1 in any way affected your thinking? How?

…………………………………………………………………………………………………….

3.2 What kind of consequences would you draw as a result of the mentoring conversation?

…………………………………………………………………………………………………….

3.3. Describe what you regard as memorable in the conversation. Why was it memorable for you?

…………………………………………………………………………………………………….

3.4. If you were to think of a metaphor to describe the conversation you had with the mentor, what would you choose and why?

…………………………………………………………………………………………………….

Instrument 5: questionnaire about perceived knowledge productivity

Please indicate your view by means of a number next to each statement. Choose on scale 5 to 1:

True for me 5 – 4 – 3 – 2 – 1 Not true for me

Problem representation

I found the problems being discussed authentic and real	1	2	3	4	5
I think the discussion was fruitful and interesting	1	2	3	4	5
I could recognize from my own practice the issues that were dealt with	1	2	3	4	5
I found the discussion productive and leading to conclusions	1	2	3	4	5
I felt we dealt with problems that really mattered	1	2	3	4	5
I was cognizant and aware of the issues being discussed	1	2	3	4	5
I could contribute to the discussion in a productive way	1	2	3	4	5

Perspective taking

I was able to grasp interesting ideas from others	1	2	3	4	5
I think there were a lot of thoughts that set me thinking	1	2	3	4	5
I often experienced being confronted with new ideas in the discussion	1	2	3	4	5
I often led my thinking change during the discussion	1	2	3	4	5
I enjoyed listening to the other contributions	1	2	3	4	5
The contributions the others made were very important	1	2	3	4	5
There were a lot of important ideas generated in this group	1	2	3	4	5

Commitment

I let others have the opportunity to air their ideas	1	2	3	4	5
I refrain from pushing my own ideas too strongly	1	2	3	4	5
I experience great satisfaction partaking in group discussion	1	2	3	4	5
I participate to foster a process of mutual understanding	1	2	3	4	5
I seek to encourage an interactive communication of a high level	1	2	3	4	5
I think it is important to be understood in the group's discussion	1	2	3	4	5