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2. MENTORING CONVERSATIONS AND STUDENT TEACHER LEARNING

To foster a mentee's learning, mentoring comes to aid as a 'helping' process to attain higher levels of proficiency but… the main lesson is that the high ground can not be approached hastily. Even the most difficult problems can be solved and even the most precipitous heights can be scaled, if only a slow step-by-step pathway can be found. Mount improbable can not be assaulted; gradually, if not always slowly, it must be climbed. (R. Dawkins (1996:365) *Climbing Mount Improbable*. New York: W.W. Norton Company)

Knowing how to proceed is one thing. Knowing what to address another….

Think of what a small proportion of thought becomes conscious, and of conscious thought what a small proportion gets uttered, what a still smaller fragment gets published, and what a small proportion what is published is used. (Campbell, 1987, p. 105 "Blind Variation and Selective Retention in Creative Thought as in Other Knowledge Processes". In: Radnitzky, G./Bartley, W. W., III. (eds). *Evolutionary Epistemology, Rationality, and the Sociology of Knowledge.* La Salle, IL: Open Court, 91–114)

Mentoring conversation is the mechanism through which both mentee and mentor get to know. We need therefore to understand how the mechanisms of conversation work.

INTRODUCTION

This chapter focuses on the mentor's conversational strategy during mentoring and its impact on what student teachers learn. The notion of knowledge productivity is put forward to highlight the nature of exchange between a mentor and a mentee as one of preparation for the profession and attainment of high(er) levels of proficiency. Using a case-design in the context of teacher education, twelve conversations between a student teacher and his/her mentor were video-analyzed with regard to the conversational moves of the mentor. An instrument for the description of conversational moves is described. Conversational moves were contrasted with respect to their resulting knowledge productivity (i.e., analyzed as behavioural intentions to change one's practice). The findings suggest that:

- A mentor's conversational approach consists of different conversational moves, signifying different strategies in conversation.
- Conversational moves, per se, do not significantly influence the student teacher's perceived knowledge productivity. We noted, however, three dominant types to occur in conversations: a scaffolding and prescriptive one, which in combination we called a 'high road' approach, and an exploring one which we called a 'low road' approach.
- Student teachers who were having a regular, closer and positive relationship with their mentor were associated with higher knowledge productivity.

Our findings indicate an overall small effect of differing conversational moves on student teacher's learning outcomes. To position this finding we have to bear in mind that almost 60% of conversational talk consisted of non-learning or goal related, but instead of relational remarks. Markedly, closeness in the relationship was found to positively influence student teacher's learning outcomes. Although no direct relation was found between specific mentor moves and perceived knowledge productivity, higher attainment scores were found for the 'low road' approach. This is discussed in relation to the aim of mentoring conversations as learning conversations.

Mentoring for Proficiency

Mentoring plays an important part in the professional education of a student teacher. It refers to the collaboration of a more experienced teacher with a novice teacher to provide 'systematic and sustained assistance' to the learner (Huling-Austin, 1990). Mentoring is believed to support and facilitate the professional development of student teachers (Loughran, 2003). Research suggests that mentoring is a highly effective method for supporting and facilitating student teachers in their professional development (Tomlinson, Hobson & Malderez, 2010; Orland & Yinon, 2005).

To a large extent, student teacher's professional knowledge is developed and framed within conversations with a mentor (Edwards, 1995; Hobson, 2004). The mentor's approach taken during mentoring conversations therefore might influence the learning outcomes profoundly. In a mentoring conversation a mentor can use different approaches to help the student teacher in his/her learning process (Huling-Austin, 1990; Smithey & Evertson, 1995). Analysis of mentoring conversations shows that a mentor predominantly determines the format and topics of conversation, its start, finish and flow (Strong & Baron, 2004). In the literature several ingredients of successful mentor conversational approaches have been outlined. According to Daloz (1986) support and challenge are key ingredients. Franke and Dahlgren (1996) point out the benefits of a reflective approach to mentoring. Edwards (20041995?) stresses the importance of relational and interpersonal skills in conversation. Garvey (2011) acknowledges the significance of meaning making and relevancy of conversation.

In their review Hennissen, Crasborn, Brouwer, Korthagen and Bergen (2008) constructed an explicit framework to categorise different approaches (styles they called them) that mentors may use in conversations. They distinguish especially between directive and non-directive approaches. A directive approach is characterized as informative, critical, instructive, corrective and advising. Its constituting conversational moves are: assessing, appraising, instructing, confirming, expressing one's own opinion, offering strategies, and giving feedback. An opposite non-directive approach is defined as reflective, cooperative, guiding and eliciting. The corresponding moves in the non-directive style are: asking questions, guiding to developing alternatives, reacting empathetically, summarising and listening actively.

Conversational moves, also known as speech acts (Seedhouse, 2004) serve the essential purpose of mentoring, that is, "systematically and sustainably assist" the learning and expertise development of the mentee. Mentoring comes to aid in the attainment of higher levels of proficiency. In line with Ericsson's (2002) theory on developing expertise, a mentor may accelerate the attainment process by giving feedback on the basis of knowing what aspects of performance are 'ready' to be improved at a next level of proficiency (Ericsson, 2007). Ericsson's work states that such deliberate practices lead to enhanced improvement in performance. A "mentored" deliberate practice in essence builds representations of desired performance goals, knowledge on how to execute the performance, and provides monitoring of performance. This interactive process is depicted in Figure 1.
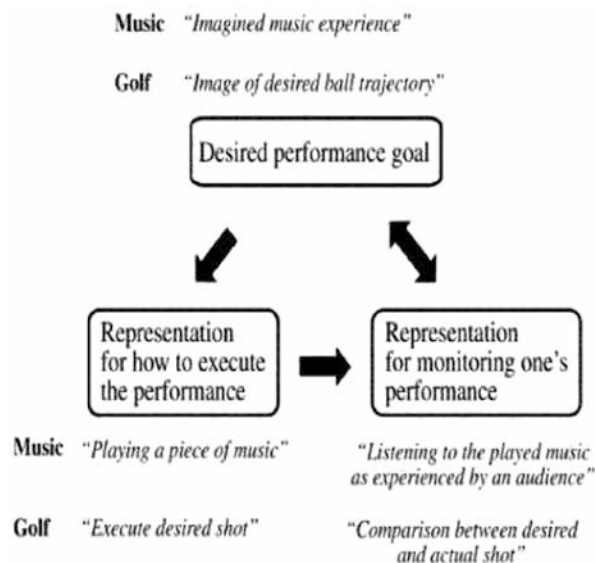

Figure 1. Model of deliberate practice by Ericsson (2002)

We can take this model of deliberate practice to gauge real mentoring conversations in order to establish what speech moves a mentor utilize to scaffold and support the learner in the attainment of high(er) levels of proficiency. In our view the purpose and function of mentoring can be depicted as "climbing mount improbable', to paraphrase R. Dawkins (1996), in such a way that a "skilled mentor' as described by Crasborn and Hennissen (2009) will bring the mentee up to a level of attainment previously believed to be hard or difficult to reach. This view of "mentoring for learning" is represented in a slight rearrangement of the model on deliberate practice and shown in Figure 2 to capture in a concise way by the phrase "Climbing the Mountain".

1=prescriptive move
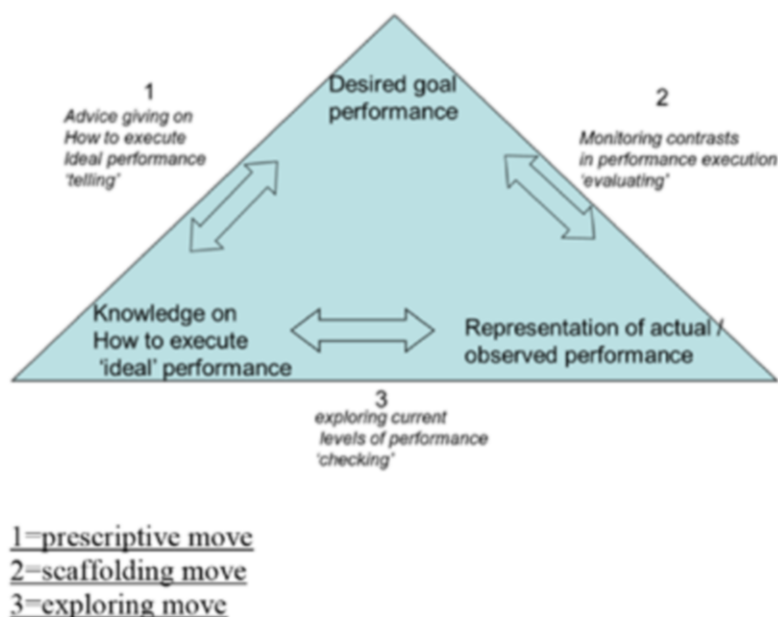2=scaffolding move
3=exploring move

Figure 2. Climbing mount improbable: relating three mental representations

The metaphor Climbing the Mountain stands for the idea that a seemingly complex goal becomes achievable by way of many, gradual, and supportive steps that point out the relevant paths to pursue which were most often previously unseen by the mentee. This metaphor may be of help to interpret mentoring conversations as vehicles of deliberate practice.

A mentoring conversation's purpose is to help to bridge the gap between the prior beliefs, unfamiliar theoretical knowledge, and the still unattained states of proficiency of the student teacher; and guide the student through the necessary or requisite knowledge on action (Edwards, 2011). Moves in mentoring conversation can be of different kinds:

- Moves that stay at the level of exploring (focus on 3 in Figure 2) i.e., talking about personal tacit beliefs as they relate to the existing knowledge base to be learned for a student, or
- Moves meant to be accommodating and supportive (focus on 2 in Figure 2) to scaffold learning i.e., starting from the student's position (in beliefs or performance) and aligning it with a learning goal perspective, or
- Moves that deliberately guide the student toward the to-be-attained end result, i.e., providing directed feedback on relevant knowledge functional to the performance goal (focus on 1 in Figure 2).

Typically, these three moves taken together resemble an instructional orientation, as Sadler (1995) has put forward, which is constituted of: 1: knowing where you are, 2: deciding where to go; 3: specifying the steps to get there.

Especially in teacher education, the mentors' position and role is to raise the level of proficiency of their students with conversation as their main vehicle. We are interested to learn how mentors select the conversational moves to "climb the mountain", i.e., to attain learning goals. Is a mentor aware of the risks of guiding the student teacher on a path that is steep (focus on 2)? Or alternatively, select moves to reach a certain level of attainment too brisk and early (focus on 1)? Or stay at length on the low road (focus on 3) of exploring one's positions without any new learning occurring? To reach the desired goal performance: i.e., the summit of 'mount improbable', the mentor may need to take a 'high road' in conversation from time to time. That is, to push forward in the right (goal) direction as is typical for mentoring in the professions (Garvey, 2011) as it is, also, for sustaining Ericsson's (2002) deliberate practice (Strong & Baron, 2004). Or alternatively, stay, for some time, at the 'low road' of exploring to get acquainted with held beliefs by a mentee.

We position this framework as helpful in detecting and interpreting mentoring approaches in conversations. For instance: a mentor who intends to help the student teacher to 'monitor his performance' by scaffolding and guiding towards the end goals set and by asking persistent reflective questions about the student teacher's performance in reference to the desired goal is in our view combining moves 1 and 2 (Figure 2). This "high road" approach or 'challenging approach' (Daloz, 1986) can be compared with a 'reflective approach' as mentioned by Franke and Dahlgen (1996) and also be related to the non-directive approach as described by Hennissen et al. (2008); in contrast to a mentor who stays on the 'low road', to build acquaintance and comfort; with moves that consist of discussing and eliciting comments.

Learning as a Result of Conversation

Mentoring in the professions (Garvey, 2004), as is the case in teacher education (Hobson, 2004), is directed toward attainment of (higher) levels of proficiency. In teacher education, mentoring aims to support and facilitate the professional development of student teachers (Loughran, 2004). New insights in the professional

development of teachers (Edwards, 2011) point to the interactional and collaborative nature of teacher knowledge which is developed and modified through shared understandings and gradual approximations in performance (Orland Barak & Hinon, 2006; Tillema & Van der Westhuizen; Chapter 1 of this book). Ultimately, professional development and knowledge advancement in the profession rests on the ability to gain insight from past performance and learn to create (improved) tools/ solutions for future practices (Tillema, 2006). In the study we report in this chapter, knowledge attainment for the profession, regarded as an outcome of conversation in mentoring, is analyzed from the perspective of knowledge productivity (Tillema & Van der Westhuizen, 2006). Knowledge productivity is defined as the creation of conceptual artefacts to improve professional practice (Bereiter, 2002). Conceptual artefacts (i.e., tools useful for professional practice) are the outcomes of shared understandings and (often) are collaborative approximations of practice that can be argued about and shared among professionals (Tillema & Orland Barak, 2006). These artefacts become productive (i.e., tangible and useful) through conversation (as laid out in plans, protocols and action schemes, for instance; see Tillema, 2005). Knowledge productivity is a notion which captures the 'learning' outcomes (see Bereiter, 2002). Challenging (or "climbing") conversations (Farr-Darling, 2001) can stimulate knowledge productivity (Baxter Magolda, 2004) which means they can lead to learning outcomes that evidence themselves in conceptual artefacts. The notion of knowledge productivity is used in this study to appraise outcomes of conversations, and is in more detail specified by three evaluative (perceptive) criteria:

• Raising problem understanding. This criterion relates to an increased awareness, better understanding and insights gained as a result of collaborative exchange, i.e., conversation. The most important question of this criterion is: is the dialogue related to the practice of the student and does the student acknowledge the issues spoken about as relevant?
• Shifting perspective. This criterion relates to a conceptual change in the beliefs of the student by listening to the viewpoints of the mentor. Most important question of this criterion is: does the student find the ideas, brought forward during conversation, important enough to adopt?
• Commitment to apply. This criterion relates to how the student was involved in the conversation and showed interest in the discussion. Engagement and participative interaction with the mentor is regarded as important for a subsequent follow-up of advice given and recommendations made. The most important question is whether the student is interested in actively following up recommendations (Tillema, 2005).

The central question we like to pursue is: to which extent does the mentor's moves in conversation relate to the perceived learning outcomes of the student teacher? More specifically:

- To what extent does the mentor's selection of three different moves during conversation relate to perceived "understanding", "perspective shift" and "commitment to apply"? Conceptually speaking: is taking a 'high road' approach in mentoring conversations leading to higher perceived learning outcomes?
- As a rival perspective: To what extent do student (prior experience based) expectations on (the mentor's approach to) conversations influence student teacher's learning outcomes? Conceptually speaking: do established relationships in mentoring have impact on the choice of conversational moves?

THE STUDY

Respondents

In the study we report on 12 dyads of student teachers and their mentors. Eight student teachers were enrolled in a teacher education program for secondary education and four attended teacher education for primary education. Students were between 18 and 28 years old and took courses in their first to their fourth year of education.

Four out of the 12 mentors were the regular mentors of the student teachers; both working together in teaching practice classes. Six mentors were involved as supervising teacher educators. They visited the students at their internship-schools and met for mentoring conversations. Two mentors were working as mentor coordinators; they regularly visit, observe, and evaluate student teachers at different sites. The twelve mentors differed in their experience and position as a mentor (on average 6.5 years). Relationships between a mentor and a mentee varied in closeness, i.e., the length or duration of the relationship. This circumstance was used as a framework for analysis.

Design of the Study

A comparative case design (Linn, 1998) was used in this study to explore within different school settings the nature of interaction in the dialogues between a mentor and a student teacher. In a case comparative design it is possible to explore framed contexts both in a qualitative and quantitative way (Druckman, 2005). The framing, i.e., selection of settings, consisted of varying the "closeness" variable i.e., the personal mentoring relationship established between the stakeholders over an extended period of time. The moderator variable in this study is the mentors' moves in the conversations, determined by analyses of propositions from the transcribed mentoring conversation, using content analysis methods (Bovar & Kieras, 1985). As outcome variable, student expectations with regard to the conversation as a learning event was measured using a questionnaire, as well as by in depth interviewing, using the Memorable Event method (Tillema, 2005). To determine the learning outcomes of mentoring the questionnaire on perceived knowledge productivity was used. (see Table 1 for an overview and instrument.)

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Table 1. Concepts, variables, instruments, and research expectation in this study

Concept	Variable	Instrument	Conjecture
Mentor's approach	Mentor's moves	Content analysis coding 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	Mentoring expectations	Adjusted Ideal Mentoring Scale (IMS)	High expectation is related to positive relationship
	Perceived Learning impact	Memorable events interview	High experienced effects are related to positive relationship
Learning outcomes	Knowledge productivity	Questionnaire on perceived knowledge productivity on – understanding, – perspective shift and – commitment to apply	High perceived knowledge productivity is related to high perceived learning outcomes

Procedure

The selected 12 pairs consisted of a mentor and a student teacher in a mentoring relationship. They were invited by mail to join the study and accepted on willingness to participate. Beforehand they received a short introduction to the nature of the study and its procedure. If both student teacher and mentor gave consent to the process, an appointment was made for videotaping their upcoming mentoring conversation. Before the mentoring conversation, students were asked to fill out the questionnaire on Mentoring Expectations. When the regularly scheduled mentoring conversation took place, the researcher visited the site (most often at the internship school) and gave a short repetition of the procedure and answered possible questions. With the camera was installed, the researcher left the room and waited outside during the conversation room not to interfere the process. After the conversation had ended, the researcher administered the questionnaire on perceived Knowledge Productivity and administered the Memorable Events interview.

Instruments

Student teacher's mentoring expectations. Student teachers' expectations represent the way a student teacher values a mentoring conversation as contributing

to his or her learning. For this purpose, a questionnaire was developed based on the Ideal Mentoring Scale by Rose (2000). The Ideal Mentoring Scale measures mentor abilities a student appreciates most in a mentoring conversation. Three scales evaluating the student's appreciation with the mentor are: Integrity, Guidance, and Relationship. The original questionnaire by Rose was adjusted to appraise the current expectations before conversation with the mentor took place. Therefore the opening question of the IMS was changed from 'My ideal mentor would …' to 'What I would like to occur in this conversation with my mentor is …' The items of the original IMS were not changed. The adjusted instrument was used to measure student's satisfaction with the existing mentor relationship. Before the mentoring conversation, the student teacher filled out the questionnaire that consisted of 34 statements on a five point Likert scale (ranging from not true at all to very true).

- Integrity consisted of 14 items l (e.g. 'What I see in my mentor is that he values me as a person').
- Guidance consisted of 10 items (e.g. 'What I see in my mentor is that he helps me plan a timetable for my research').
- Relationship consisted of 10 items (e.g. 'What I see in my mentor is that he helps me realize my life vision').

The internal consistency for these items in three categories was measured with Cronbach Alphas: for integrity $r = .87$, for guidance $r = .75$ and for relationship $r = .78$.

Interview: Memorable events.   After the conversation took place students received an open interview format with nine evaluative questions pertaining to their satisfaction with the conversation as a learning event. The interview questions asked to specify (by writing) the "memorable events" during conversation as instances of what was said that matters most or was highly relevant to the student on three aspects (with regard to the knowledge productivity of the conversation):

- Problem understanding: three questions evaluating whether the student teacher accepted and learned from the messages expressed in the discussions (e.g. 'what have you learned and gained from the examples your mentor expressed?').
- Perspective change: two questions evaluating whether the conversation led to insightful new knowledge (e.g. 'how the talk you had have changed your way of approaching matters in teaching?').
- Commitment to apply: four items evaluating whether the student teacher took active part in the process (e.g. 'what kind of consequences would you draw as a result of the mentoring conversation?').

The answers of the student teachers on each question were coded as positive, negative or neutral. The reliability of this instrument was tested by an inter-rater reliability test. This resulted in an agreement of 89%.

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Questionnaire of perceived knowledge productivity. Knowledge productivity represents the valuation of learning outcomes by the student teacher, i.e., did the mentoring support my professional practice? This variable is measured using a questionnaire developed by Tillema (2005; Orland Barak & Tillema, 2006). The questionnaire was administered to the student teacher after the mentoring conversation and consisted of 20 evaluation questions with respect to three categories on a five point Likert scale (ranging from not true at all to very true).

- Problem representation: seven items evaluating whether the student better understood the topic under discussion and gained insights from the conversation (e.g. 'I found the problems being discussed authentic and real').
- Perspective taking: seven items evaluating the ideas the mentor expressed that contributed to learning (e.g. 'my thinking changed during the discussion').
- Commitment: six items evaluating whether the student teacher was actively involved in the conversation (e.g. 'I took ideas to practice further').

The internal consistency for these items in the three categories was measured with Cronbach Alphas: for problem representation $r = .71$, for perspective taking $r = .64$ and for commitment $r = .97$. To increase homogeneity of the scale Perspective taking one item on the scale is deleted (I was able to grasp interesting ideas), rises Alpha to .71.

Data: Content Analysis

Mentor's moves during conversation were measured with a self-developed coding instrument. The instrument is used for a propositional analysis of the transcribed video registration of the conversation. The propositional method in a conversational analysis (Goodwin & Heritage, 1995: Holsti, 1968; Mazur, 2004) was chosen to increase rater reliability in scoring the unit of analysis, i.e., moves. Moves are speech acts used by the mentors during conversation which, following our conceptual framework, is categorized as either:

1. Prescription: a move containing a reference to the present or referenced knowledge base and directed toward a performance goal. Speech acts can be: explanation, referencing, guiding, remarking. A prescription is intended to give an advice based on previously taught or instructed content knowledge to warrant a recommendation for future action.
2. Scaffold: a move referring to present student performance linking it to a performance goal. Speech acts can be: giving hints, providing examples, prompting. Scaffolding is meant to monitor and highlight actions taken by the student in reference to possible improvements that could be made.
3. Exploration: a move referring to a knowledge base relating it to present student performance. Speech acts can be asking for explication, acknowledgments,

invitation. Exploring is meant to investigate actions performed and provide perspectives for future action.

A fourth category contained miscellaneous comments. A guideline was developed for raters to support a reliable scoring (Mazur, 2004). Definitions and examples of scoring are;

- Prescription: statement in which the mentor tells the student teacher how to act in a certain situation, how to execute, in order to reach the desired goal (e.g. 'the best option is sending him to his seat to reflect').
- Scaffold: statement in which the mentee by is invited to reflect on classroom behaviour in order to reach the desired goal (e.g. 'what can you do to prevent this?').
- Exploration: statement in which the mentor explores student teacher performance in a certain classroom setting (e.g. 'were all pupils focused on your instruction').
- Other: statement not typically fit into one of the categories (e.g. 'I liked your lesson I saw today').

The unit of analysis we worked with, is a proposition, i.e., a subject – predicate relation (Holsti, 1994). In case of unfinished sentences (because of interruptions or pauses), a group of adjacent propositions were used as unit of analysis. The video registration was transcribed into a meaningful enumeration of units of propositions in order to establish (i.e., score) whether a category has occurred in that particular unit. Only one category was assigned to one proposition.

Example:
To give an example on the coding of mentoring conversations in this study, part of a mentoring conversation's 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 into 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: assigning a category

The number of specific codes under each category is counted after coding the conversation. The frequency count for each category provides the 'footprint' of the conversation. This footprint indicates how many propositions in the conversation are 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.

The reliability of coding was tested by multiple raters. Initial coding agreement on 50 propositions was 46%. Raters then received training; two raters were employed afterwards resulting in inter-rater reliability of sampled transcripts of k = .86.

Data Inspection

Scoring of propositions of mentor moves consisted of frequency counts of the three categories to arrive at a 'footprint' of each conversation. A footprint consists of categories: scaffolding (n); prescription (n), and exploration (n).

Scores on questionnaire of Mentoring Expectations were obtained by calculating the mean scale score on the three questionnaire scales: Integrity, Guidance and Relationship.

Scores on Memorable Event interview are obtained by counting the amount of positive answers on the nine interview questions. Twelve student teachers answered the scale Problem Understanding with a positive instance of 30 out of the 36; Perspective Change were answered positive in 10 of the 24 cases, for Commitment to Apply the positive instances were 25 out of the 36 answers. In overview, student teachers answered more than half of the questionnaire items positively

The scores on perceived Knowledge Productivity are obtained by calculating the mean score on the three questionnaire scales. The questionnaire consists of scales: Problem Representation, Perspective Taking and Commitment to Apply. There were no missing values.

Analysis

To answer the first question on the relation between mentor's conversational moves and knowledge productivity, the knowledge productivity scale scores are compared on type of 'footprint" i.e., the combination of categories of mentor moves. Especially we were interested in the effects of a 'high road approach' or footprint and a 'low road' approach. A high road being dominated by prescription, and/or scaffolding vs a low road being dominated by exploring moves. Taking into account the small amount of conversations (n=12) a Mann-Whitney U-test was used.

   To answer the second question on the relation between mentoring expectations and knowledge productivity, two analyses were conducted. Firstly, scores on knowledge productivity are compared for the high and low expecting students and analysed with a Mann-Whitney U-test. Secondly, the influence of 'closeness' in mentoring relationships on knowledge productivity is contrasted for dyads that are unfamiliar or familiar in their relationships. The scores were analysed with a Mann-Whitney U-test.

RESULTS

Description

A descriptive account of findings shows the following findings:

Conversational moves.   Content analysis of the 12 conversations indicates that there is considerable variation in selected moves by the mentors; grouping them under footprints or type of approach it reveals that 3 conversations are considered to have a 'high road' approach and 9 are considered to have a 'low road' approach. Table 2 shows the frequencies for coded categories of all 12 conversations.

Mentoring expectations.   The questionnaire on student teacher's Mentoring Expectations 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 total mean is 3.71 (N = 11, SD = 0.46). Taking a scale mean of 3.50 to be high on expectations indicated that 7 out of 11 respondents had high expectations.

Knowledge productivity.   The Knowledge Productivity questionnaire contains three scales. The scale Problem understanding has a mean of 4.35 (N=12, SD=0.43), the mean of Perspective taking is 3.94 (N = 12, SD = 0.59) and the Commitment to apply scale 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 2. 'Footprint' for 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

* Table contains frequencies of propositions

Conversational moves and knowledge productivity. To answer the first question student teacher's scores on knowledge productivity are compared under a 'high road' approach (n=3) and 'low road' approach (n=9). Median score in the 'high road' approach was 3.94 and median score in the '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). There is no significant difference in knowledge productivity for students who had a 'high road' conversation or a 'low road' conversation.

Mentoring expectations and knowledge productivity. Based on their expectation score, student teachers are divided (around the scale median score) into two groups: high and low expectations. The knowledge productivity scores were compared for these two groups with a Mann-Whitney U-test. Mean score in the high group was 4.37 and mean score in the low group was 3.82. The distributions in the two groups differs significantly (Mann–Whitney $U = 3.00$, n = 11, $P = .04$ two-tailed). Student teachers having high expectations have higher perceived knowledge productivity.

With respect to closeness in the mentoring relationship, student teacher's scores on Knowledge Productivity were compared for a high closeness relationship (n = 6) and low closeness (n = 6). It was expected that students under a high closeness relationship would perceive higher knowledge productivity. For this analysis a Mann-Whitney U-test is executed. The median score in the high closeness group was 4.52 and the median score for low closeness was 3.92. The distributions in the two

groups differs significantly (Mann–Whitney $U = 5.00$, n = 12, $P = .04$ two-tailed). Student teachers under high closeness perceive higher knowledge productivity. Both analyses related to mentoring relationship indicate a positive relationship with higher knowledge productivity.

DISCUSSION

This study meant to explore the relation between mentoring conversation and student teacher's learning, taking into account the student's relationship with his/her mentor.

Mentoring Relationship and Learning Outcomes

Using a comparative case design we found support for the influence of student – mentor relationship on learning outcomes. The student's learning in a mentoring relationship was gauged with respect to: student teacher's expectations, and perceived knowledge productivity of the conversation. When knowledge productivity is compared for student teachers with high and low expectations our analysis showed a significant difference. Student teachers who were satisfied with their mentors had a higher mean perceived knowledge productivity. The same applies when comparing student teachers having a close (i.e., extended) relationship with their mentors.

Conversational Approach and Learning Outcomes

A clear relation between specific mentor moves and student teacher's learning outcomes was not found. We particularly gauged a 'high road' approach vs a 'low road' approach taken by the mentor; expecting that prescriptive and scaffolding moves (i.e., 'high road' or 'pushing' approach) by the mentor would lead to higher knowledge productivity compared to exploring moves i.e., 'low road' or 'laissez faire' approach. In fact, the mean knowledge productivity was higher for conversations with a 'low road' approach, although no significant differences were found.

In interpreting our findings several reasons can be mentioned why taking a 'low road approach' in mentoring conversations has higher knowledge productivity. A conceptual reason is that prescriptions and scaffolding by the mentor may not have been adequate, or accepted as stepping stones towards the desired goal. Exploring current performance, on the other hand, may have been considered informative to the student to orient them towards the desired goal. The results in our case-study show that exploring current performance had a high frequency of moves as well as miscellaneous moves, indicating that the conversations provided less time for guiding or prescribing routes, but invested ample time in monitoring performance, i.e., "covering ground".

It is also possible that the identified moves are incomplete in responsiveness to the mentee's intent to use the conversation as a vehicle toward a desired learning outcome. A crucial factor in mentoring that was not included in our selection of

moves is the need of the mentee (Garvey, 2011). It can be claimed that student teacher's learning outcomes will be determined by their motivational needs (Deci & Ryan, 2004). In this respect a conversation with low knowledge productivity would not have sufficiently addressed motivational needs of students. In our study, we did not cover for mentor moves that address different motivational needs or "background states" of students (i.e., "prior knowledge" could have been another), but then again the moves we identified did show a different footprint (a specific combination of three constituting categories), indicating different patterns of conversation affecting learning outcomes. It would seem that in a mentoring relation a mentor's intent to arrange the conversation in a certain way would imply a deliberate connection to the learner('s motivation or background). This would constitute an interesting line of study to pursue. One way of looking into this, i.e., to satisfy the needs of students, would be to take into account or differentiate between the phase or stage of conversation as it relates to the progression in learning needs of the student (Ormond, 2011) since it might have a positive impact on learning outcomes; i.e., needs of a more experienced student teacher required a different mentor's approach to maximize the learning outcomes.

Another reason for our findings is the sensitivity of our 'model' i.e., detecting moves in conversations. The instrument we used to measure moves can be improved; not only by training to improve reliability, but also by improving on the content analysis that was used. A propositional analysis converts a conversation as a speech activity into a transcript, which might lose intent and purpose, as well as interactional cues (Mercer, 2004). In favour of a propositional; analysis speaks rigor and control of coding but may be at the expense of information and relevancy. In addition, a propositional approach analyzes the smallest units possible but in a conversational analysis larger, i.e., meaningful units might be a better frame of analysis. In support of this we found that the frequent occurrence of sequences of propositions with a common tread or pattern of moves i.e., a scaffolding or a prescriptive proposition is often preceded by several exploring propositions. The coding we used in this study, however, counts only the number of propositions in each category; not their sequence or pattern. It might be of interest to look for patterns, for instance we found that exploring propositions are often introductory for scaffolding or prescription moves (see further extentions in Chapter 7).

Another observation with regard to our analysis of moves is the high amount of propositions that could not be assigned to one of the three categories recognized by our model. More than half of the studied conversations had 50% or more 'other', miscellaneous propositions. Mena Marcos, Sanchez and Tillema (2010) who distinguished in their study between learning oriented moves such as rules and artefacts which were low in frequency of occurrence also found a high amount of 'other or non learning related propositions which could be characterized as "positive appraisals", i.e., comments of reassurance. This might indicate that a considerable amount of time in conversations is needed to provide for emotional and interactional alliance. The "high road" moves (which were more seldom) include giving feedback,

providing information and suggesting practical advice, which only constituted a small (but we believe essential) part of the conversations. Emotional support was more predominant and includes the explorative moves characterized by giving sympathetic and positive support, attention and empathy.

In fostering the vital function of conversation as a vehicle to promote learning (Van der Westhuizen, Van der Merwe & Tillema, 2012) a mentor's approach, in our opinion, will need to have an impact on students' personal setting of standards (i.e., by the mentor's expression of high expectations) and on reassurance of the fruitfulness of discussion (to achieve knowledge productivity). This could imply that mutual understanding and a common interpretation on goals and attainment levels are of key importance in a talk between a mentor and a mentee. Zanting Verloop and van Driel (2007) point to the importance of 'explicating practical knowledge' as a common understanding in mentoring and argue that (in our words) "taking a high road" can be advantageous to student teachers for four reasons: student teachers obtain new information about teaching; they understand the nature of teaching better; they understand their mentor's mentoring better, and integrate theory with practice. There may be several approaches in conversation but some of them are better suited to make knowledge explicit than others. Our study indicates that at least three 'moves' are useful in capturing a conversation and analyzing its potential for learning.

IMPLICATIONS

It is of interest to note that the results of our case analysis of twelve conversations indicates that student teacher's relationship with his mentor highly influenced perceived learning outcomes. If this result can be generalized, it would indeed be recommendable to pay more attention to the matching process of students and to their mentors. What seems common practice now is that most student teachers and mentors are matched based on circumstantial considerations, e.g. availability, group composition, distance or class membership. Investing in a proper matching between mentor and mentee, for example established by using the Ideal Mentoring Scale by Rose (2000), could benefit the learning process.

Our study further shows that mentor's moves in a conversation influences the learning outcomes of the student teacher, but not significantly. Students who experienced a low road approach in the mentoring conversation have higher perceived learning outcomes. This probably has to do with the relative proficiency already attained by these students (all were in their 4th year of the program). It could imply that 'experience' has an impact on the relevancy of a particular approach. It would suggest that our 'low road' is beneficial for those student who already possess sufficient knowledge for practice and that a 'withholding', i.e., non prescriptive mentoring approach in these cases would be more beneficial to facilitate learning. If this finding can be generalized to mentoring programs, mentors can deliberately select combinations of moves as an approach to increase student teacher's learning outcomes.

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Appendix 1. Scores on Measured Variables per Conversation

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

Instruments

Instrument: Questionnaire on Student Teacher's Satisfaction With His/her 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: Questionnaire on The Experienced Learning Effect Of 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: Questionnaire On 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 understanding

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 shifting

I was able to grasp interesting ideas from my mentor	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 my mentor's contributions	1	2	3	4	5
The contributions my mentor made were very important	1	2	3	4	5
There were a lot of important ideas generated in this talk	1	2	3	4	5

Commitment to Apply

I let my mentor have the opportunity to air 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 the discussion	1	2	3	4	5
I participated to foster a process of mutual understanding	1	2	3	4	5
I sought to encourage an interactive communication at a high level	1	2	3	4	5
I think it is important to be understood in the discussion	1	2	3	4	5