Article III

Towards meaningful reflection and a holistic approach: creating a reflection framework in teacher education

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ABSTRACT

This study aims to find out how student teachers' meaning-oriented reflection can be enhanced with the help of video in a primary school teacher education programme. The study shows how student teachers (n = 10) and their supervisors (n = 9) followed the video-enhanced reflection procedure during one practicum period. The data were collected through focus group or individual interviews and audio recordings of supervisory discussions. Content and phenomenographic analysis were conducted. The results indicated that the reflection procedure was beneficial for the student teachers in their self- and peer reflection and in the supervisory process. Some supervisors lacked the necessary theoretical tools, and the student teachers did not reach the appropriate level of critical reflection in their discussions. The results suggest that to support deeper reflection, it is important to pay attention to the characteristics of the reflection procedures and the theoretical basis of supervision.

Keywords: video-elicited reflection; teacher education; reflective practice; holistic approach

Introduction

Teacher education programmes have widely adopted a reflective approach, aiming to educate teachers who are able to integrate theoretical knowledge into their practice and critically examine their experiences and actions (Dewey, 1933; Schön, 1983). In this article, reflective practice is defined as a cognitive process whereby student teachers reflect on their experiences individually and collaboratively with peers and supervisors. Reflective practice is promoted by activities that encourage reflection. The power of videos in enhancing reflection has been widely acknowledged, and research findings show its benefits in promoting more critical, social and student-led reflection (Calandra, Brantley-Dias, Lee, & Fox, 2009; Danielowich, 2014; Shepherd & Hannafin, 2008). The increasing use of video-analysis tools, especially mobile phones and tablets, necessitates further exploration of how these devices can be used as integral to reflective practice in teacher education.

Besides theoretical knowledge, factors that may remain subconsciously experienced, such as emotions and motivation, determine teacher behaviour (Korthagen, 2017). Therefore, there is a call for a broader approach that considers the multidimensionality of teacher learning. Korthagen (2001, 2004) argues that teacher learning occurs in the theory-practice-person connection and that learning from experience requires meaning-oriented reflection, which means awareness of the essence of the problem under consideration. To find a deeper meaning in their experiences, teachers need to reflect carefully on emotional and motivational dimensions and their self-identity.

The theoretical frameworks that have been developed for reflection often focus on technical matters, ignoring teacher identity, thus limiting their power to foster meaning-oriented reflection (Kolb, 1984; Liakopoulou, 2012; Santagata & Angelici, 2010). Previous video studies have usually focused on developing teacher practice, not

on promoting teacher awareness of personal strengths and developmental needs (Danielowich, 2014; Santagata & Angelici, 2010; Shepherd & Hannafin, 2008). A facilitator's important role in enhancing reflection has been recognised (Danielowich, 2014; Sherin & van Es, 2005). However, knowledge about the supervisor's role in supporting reflections on identity remains scarce and requires further research.

This study contributes to the existing educational field by investigating how student teachers' meaning-oriented reflection can be enhanced with the help of videos during one practicum period in a primary school teacher education programme. In this context, meaning-oriented reflection is understood as the result of a reflection that focuses comprehensively on areas of teacher learning. A student teacher's reflection on his or her professional identity, what kind of teacher he or she is or wants to be, and his or her mission, what he or she aims for as a teacher, is essential in this process; therefore, identity-related reflection is the special focus of this study (Korthagen, 2017).

The application (app) called video-enhanced observation (VEO) was used over a five-week practicum period. This study aimed to find out the student teachers' and their supervisors' perceptions of the video-enhanced reflection procedure and its usefulness in self- and peer reflection and supervision. The study reveals the nature of student teachers' reflection and indicates how supervisors enhance the reflection on student teachers' identity. Based on the research results, this article presents a reflection framework that considers a holistic approach to teacher education. The main research question is *how to enhance student teachers' meaning-oriented reflection with the help of video.* To answer the main question, the following sub-questions are presented:

(1) What kinds of perceptions do student teachers and supervisors have regarding the video-enhanced reflection procedure and its usefulness in self- and peer reflection and supervision?

(2) What are the main contents of identity-related reflection in supervisory

   discussions?

(3) What is a supervisor's role in enhancing reflection that is related to forming

   student teachers' professional identity?

(4) What are the key characteristics of a reflection framework?

Holistic approach to teacher education

To stress the roles of emotions and motivation and other less-cognitive factors of

teacher behaviour, as well as teacher personality, Korthagen and colleagues (Korthagen,

2004; Korthagen, Kessels, Koster, Lagerwerf, & Wubbels, 2001; Korthagen & Vasalos,

2005) developed the ALACT model, which combines thinking, feeling, wanting, and

acting. The ALACT model involves the following phases: 1) action, 2) looking back on

the action, 3) awareness of essential aspects, 4) creating alternative methods of action

and 5) trial (Figure 1). The idea is that by practising, teachers can apply the model

independently. However, undergoing the phases usually requires support from

supervisors or colleagues, who help teachers become aware of the meaning of each

situation (Korthagen & Vasalos, 2005). By emphasising less-cognitive aspects of

teacher learning, the ALACT model differs from other models of reflection, such as
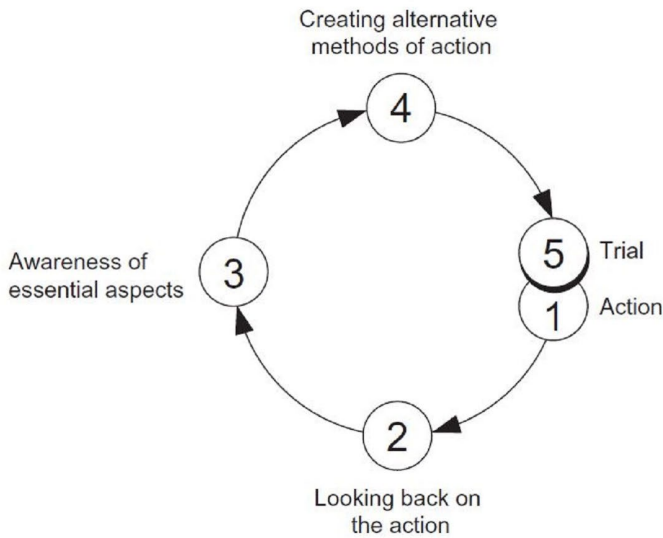
Kolb's (1984).

Fig. 1 The ALACT model of reflection (Korthagen et al., 2001) (Permission to reprint from Taylor and Francis Group LLC Books)

The ALACT model does not describe the issues that a teacher reflects on; therefore, Korthagen and colleagues (Korthagen, 2004; Korthagen & Vasalos, 2005) have developed the onion model (a variant of the so-called Bateson model; see Dilts, 1990), which examines teacher learning at different levels, similar to the layers of an onion. The layers, which interact with one another, are as follows, from the outside to the inside: 1) environment, 2) behaviour, 3) competencies, 4) beliefs, 5) identity and 6) mission (Figure 2). The onion model highlights the role of identity as a basis for professional growth. The heart of the onion model consists of core qualities, which are an individual's personal strengths, such as creativity, courage and kindness.

The ALACT and the onion models together represent a holistic approach to teacher education, which defines teacher learning as often subconsciously experienced, multidimensional and multilevel. Learning has cognitive, affective and motivational

dimensions and can occur at different layers of the onion model (Korthagen et al., 2001; Korthagen & Vasalos, 2005). According to Korthagen (2004), teachers can understand the true meaning of a situation only when their reflection touches them personally and includes pondering about themselves as teachers. *Core reflection*, which focuses on all the layers of the onion model, has the potential to support professional teacher development, which will result in favourable outcomes regarding teacher behaviour.
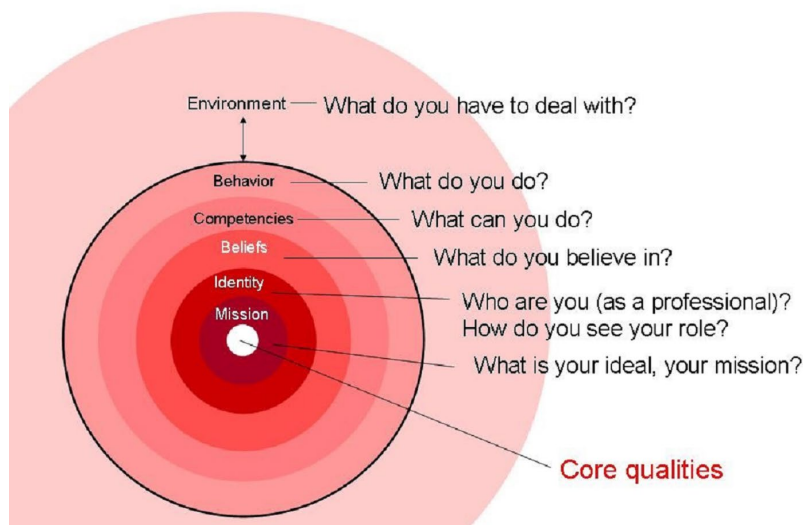

Fig. 2 The onion model (Korthagen, 2004) (Permission to reprint from Elsevier)

Enhancing reflection

When traditional tools, such as portfolios, have been shown as ineffective in fostering student teachers' ability to question their own actions as teachers (Körkkö, Kyrö-Ämmälä, & Turunen, 2016; Liakopoulou, 2012; Ward & McCotter, 2004), new methods have emerged. Previous studies show the benefits of videos for reflection by enabling teachers to observe their teaching better during their actions, notice things that they had not noticed before, make connections between their own behaviour and pupils'

learning, and improve their teaching (Calandra et al., 2009; Shepherd & Hannafin, 2008; Sherin & van Es, 2005).

Previous studies have indicated the essential role of external guidance and collaborative reflection in the development of teacher reflective skills (Calandra et al., 2009; Christ, Arya, & Chiu, 2014; Jaspers, Meijer, Prins, & Wubbels, 2014). Student teachers may struggle with noticing integral aspects of teaching and learning when reflecting on classroom situations because of their limited knowledge of teaching (Bryan & Recesso, 2006; Sherin & van Es, 2005). To support their noticing, they can be offered written guidelines for selecting critical incidents from their teaching (Calandra et al., 2009; Leijen et al., 2015). Supervisors' and peer students' questions and comments that challenge student teachers to think about their teaching play an important role in deepening their thinking (Christ et al., 2014; Korthagen & Vasalos, 2005; Sherin & van Es, 2005).

A critical viewpoint regarding student teachers' own teaching is the aim of the teacher education programme (Korthagen & Vasalos, 2005; Toom et al., 2010). Therefore, supervision should enhance comparative reflection, which includes making comparisons between theoretical insights and practice, considering multiple viewpoints and student teachers' personal perceptions and beliefs about teaching and themselves as teachers (their practical theories) (Beijaard, Verloop, & Vermunt, 2000; Jay & Johnson, 2002; Korthagen & Vasalos, 2005). Approaching critics of student teachers' teaching and considering social, cultural and ethical aspects of schooling are recommended to promote change and teachers' professional development (Jay & Johnson, 2002).

Methods

The context

The researcher conducted the study in the primary school teacher education programme at the Faculty of Education, University of Lapland (UoL), Finland. In Finland, primary teacher education is research based, which means that student teachers learn to integrate research, theory and practice during their studies; the five-year programme includes both academic studies and practical experiences (Toom et al., 2010).

In the teacher education curriculum of the UoL, theoretical studies, research method studies and practicum periods are linked both chronologically and by content; the study programme emphasises the construction of teacher identity and aims to educate experts of pedagogy and didacticism. The programme covers five practicum periods, one per year. Before each practicum period, student teachers attend seminars where they learn educational theories and familiarise themselves with various research methodologies. They apply this knowledge during practicum periods by investigating educational phenomena. After practicum periods, student teachers attend seminars where they evaluate theories in the light of their practical experiences. They write pedagogical diaries of their practicum experiences. These diaries form the basis for reflective journals that are used in supervisory discussions between student teachers and their supervising class teachers. After each practicum period, student teachers complete their pedagogical portfolios where they collect, document and reflect on their practicum experiences over the whole study programme. Pedagogical portfolios are used in supervision; moreover, peer students work as mentors of each other and read and comment on each other's portfolio texts.

The iPad-based VEO has been used as part of the reflective practice in the programme since 2016. This app allows users to record videos of classroom practices,

tag episodes of interest according to the focus of the observation, and rate instances as positive, negative or provoking questions. Videos are uploaded to an online portal where they can be commented on, tagged and shared with other users. Every user has a personal VEO account. Only users themselves are able to see their videos and choose the people with whom they want to share their videos.

The study was conducted during the student teachers' final practicum period, the five-week Advanced Practicum. Professional identity and growth is the focus of the studies in this period. Each student teacher teaches lessons alone and with a peer student in the Teacher Training School, UoL. The class teachers in the Teacher Training School and university lecturers and teachers from the faculty supervise the student teachers. This article refers to the supervision of student teachers' practice during the Advanced Practicum, carried out by university lecturers and teachers from the faculty.

In the spring term of 2017, the student teachers and their supervisors followed the guided reflection procedure during the Advanced Practicum. The original procedure (Leijen et al., 2015) was modified to fit the research context, highlighting the role of supervisors as facilitators of the student teachers' reflection and professional development (Appendix A). All study participants used the app for the first time during the practicum period.

Participants

The student participants comprised 10 student teachers who represented different ages and varied in the extent of their unqualified teaching experience outside of the teacher education programme. Nine supervisors participated in the study. They varied in the extent of former experience in supervising student teachers, with some lacking any previous experience. Each supervisor guided one or two student teachers who worked in pairs in the same classroom in the Teacher Training School.

Implementation of the video-enhanced reflection procedure

Before the Advanced Practicum began, the participants attended a short presentation about the app and its role in the research. Each student teacher had two teaching and two observation periods. Each period lasted for one week. The student teachers and their supervisors followed a five-stage reflection procedure: 1) creation of an individual tag set based on personal learning aims; 2) authentic lesson observation and feedback discussion (optional); 3) selection of a lesson for recording, recording and watching of the video; 4) a supervisory discussion; and 5) written reflection (Appendix A). The procedure included guidance for individual and peer reflection and for supervisory discussion. The student teachers created their personal tag sets with the help of their supervisors. The student teachers who observed the classroom lessons recorded two videos with the app, one video per teaching period, by using a peer student's personal tag set. The student teachers recorded the videos without their supervisors' help. They were guided to record the entire 45-minute lesson or part of it, holding the iPads with their hands because no tripods were available. After recording, the student teachers watched and discussed the videos together at the appropriate time. They uploaded the videos to the online portal where they could watch the videos of their teaching and reflect on their experiences, choosing instances for further discussion.

The student teachers shared all their videos with their supervisors on the online portal. The supervisory meetings were held at the end of the practicum period, usually during the final week, because it was the most optimal time for discussing the whole period and everything that the student teachers had learnt. In that discussion, the practicum period was reflected on, and the student teachers' videos were watched together, focusing on the critical incidents chosen by the student teachers. They wrote down their experiences with video recording in their pedagogical diaries. After the practicum period, they completed their pedagogical portfolios and practicum reports.

Data collection

The data were collected through focus group or individual interviews and audio recordings of supervisory discussions. The focus group interviews revealed the participants' perceptions of and experiences with the video-enhanced reflection procedure. They saved the participants' time during the busy period and offered an opportunity for common discussion. The audio recordings were used to study the contents of supervisory discussions and to probe deeper into the participants' perceptions and experiences. Each student teacher and supervisor participated in only one interview with the researcher, either the focus group or the individual type. The semi-structured interviews included particular themes, such as video-based reflection and supervision. Each interview lasted from 30 minutes to one hour and was audio recorded by the researcher.

Eight student teachers participated in the interviews that were conducted during the last two days of the practicum period in the Teacher Training School. There were three focus group sessions between two to three student teachers each, and a single interview due to time management problems between the researcher and the student teacher.

All nine supervisors participated in the interviews. The two focus group interviews, each with three to four supervisors, were held at the Faculty of Education a few weeks after the end of the practicum period. The researcher individually interviewed two supervisors who were unable to attend the focus group interviews.

Seven student teachers, five of whom were also interviewed, and four supervisors gave permission for the audio recording of their supervisory discussions. In three discussions, a supervisor and two student teachers were present. One discussion involved a supervisor and one student teacher. The discussions, each lasting from one to

one and a half hours, were authentic situations where the researcher was not present. The supervisors delivered the audio recordings to the researcher.

Some student teachers had held their supervisory discussions before participating in the research interview; others were waiting for the discussion. The researcher did not ask the student teachers whether they had held the discussions before the interviews.

Data analysis

The research material consists of 53 pages of interview transcripts and 58 pages of supervisory discussion audio transcriptions. The materials based on the interviews with the student teachers and their supervisors were analysed separately by applying the principles of data-driven content and phenomenographic analysis (Silverman, 2013) to explore the variance in the participants' perceptions and to obtain an overview of the data. The analysis progressed from formulating the research questions to thematising, coding, paraphrasing, looking for connections and categorising the data and ended with a summary of the main themes (see Appendix B). Phenomenographic analysis was used to complete the content analysis in order to reveal the personal perspective of the data.

The analysis of the supervisory discussions comprised three stages, all of which applied content analysis or the layers of the onion model (Appendix B) (Korthagen, 2017; Korthagen & Vasalos, 2005; Silverman, 2013). This three-step process made it possible to examine the main topics of supervisory discussions and identity-related reflection, specifically. The beliefs based the onion model were left out of the analysis because separating the beliefs from other thoughts could be difficult. In this analysis, *environment* meant the issues related to the classroom and school environment. *Behaviour* pertained to the student teachers' daily practices in classroom teaching. *Competencies* comprised the student teachers' successes and challenges during the

lessons. *Identity* included the issues related to the student teachers' learning and self-perception as teachers and the teacher role. *Mission* referred to those values and aspects that the student teachers considered important in their teaching. The references were coded under only one theme or category despite possible overlaps.

Ethical considerations

The Faculty of Education and the Teacher Training School of the UoL approved the study. All the student teachers and their supervisors participated voluntarily in the study after signing written consent forms, which included information about the study and its participant involvement, guarantees of anonymity in reporting and publishing and the assurance that they could withdraw from the study at any point. The consent for recording was not required from the pupils, their parents or the school personnel when filming was part of the student teachers' practicum assignments. The participants' anonymity was ensured by removing from the data all personal details and facts that might reveal their identities. In the research report, the participants are referred to by letters.

The following section describes the study's results.

Results

This section has three parts. The first part illustrates the findings from the interviews with eight student teachers and nine supervisors. As Appendix B shows, the analysis of the interviews with the student teachers and the supervisors generates five and four themes, respectively. The findings focus on the VEO in self- and peer reflection and the supervision process because they address the research questions and the aims of this paper.

The second part covers the findings from the audio recordings of the supervisory discussions by seven student teachers and four supervisors. The analysis focuses on six categories of identity-related reflection resulting from the analysis: *student teacher learning, teacher role, learning aims, theory and practice, pupil learning and teacher personality*.

The third part presents the reflection framework that was developed from the findings. It gathers the main results.

The supervisory discussions form the primary research data of this paper. The interviews are used as complementary materials. Therefore, the findings from the interviews are only briefly reported. The results include data-based quotations, anonymised according to the study's protocol and translated into English by the researcher. In the first part of the results section, the letters following the quotations identify the participant type: ST = student teacher and S = supervisor.

Perceptions of the reflection procedure

VEO in self- and peer reflection

All student teachers found the VEO app beneficial in their self-reflection. Through the videos, they could observe themselves through others' eyes, paying attention to their own and their pupils' actions and the teacher-pupil interaction, as one student teacher stated:

> It was nice to watch myself through an outsider's eyes…. I got valuable information about encountering pupils and giving feedback and how to be present in that specific moment. (ST)

One student teacher strengthened her self-esteem by watching a video of her teaching, as she said:

When I watch it from the outside, I look more confident than it felt inside my head…. When I watched the video, I looked very calm and confident. (ST)

Six student teachers used the videos in peer reflection after recording. The student teachers discussed the tags; sometimes, they disagreed about the tags, which raised further discussion, as one student teacher stated:

We discussed why [she] had tagged this and thought like this… then I was thinking why she had not tagged some other instances. (ST)

The results indicate that through the videos, the student teachers obtained new viewpoints about their own teaching (cf. Sherin & van Es, 2005; Tripp & Rich, 2012). Their discussions with peers provided the student teachers with further value for their reflections (cf. Christ et al., 2014; Danielowich, 2014). The positive effects of videos on student teachers' self-efficacy have been reported in previous research (Shepherd & Hannafin, 2008).

Four student teachers said that watching the videos of their own teaching evoked their negative feelings, especially at first. One student teacher shared her thoughts:

You can record all the lessons, but I am not so willing to watch them. (ST)

Negative self-critique is one of the obstacles related to video viewing, as recognised in previous research (see, e.g., Bryan & Recesso, 2006).

The student teachers found that personal tag sets helped them focus their attention when reflecting on the videos of their teaching and giving feedback to their peers. However, they found it difficult to create a tag set that would fit in a certain lesson. Three student teachers suggested that it might be ideal to create a tag set a few weeks after the practicum period had begun when the student teachers had already become familiarised with their classrooms. One student teacher said:

> It was difficult to create tags that would have served that certain lesson…. I do not know if it would help if we would create a tag set later, when [we] know what [we] are doing. (ST)

The findings suggest that the student teachers faced difficulties in setting their professional learning goals and observing from the videos if these goals were being achieved. Bryan and Recesso (2006) and Sherin and van Es (2005) found out similar results when examining the student teachers' video-based self-reflection.

Supervision process

The participants were satisfied with the supervision process. Three student teachers stated that the supervision had included a fair amount of discussion and relating practical issues to theories, which the student teachers found important. One student teacher stated:

> She [the supervisor] brought the research world into teaching practice…. She did not assess our performance but asked questions. (ST)

The supervisors found it valuable that the reflection procedure included different types of interaction and that the student teachers were at the centre, as one supervisor said:

> I think that the structure is good, that they [the student teachers] create their aims, and then, there is a tool and guidance for that…. They are at the centre, the student teachers. Then, there is face-to-face contact, observing in lessons, moreover, an online contact. (S)

The reflection procedure seemed to allow flexible practical solutions, and the participants were ready to modify it according to their needs.

Three supervisors stated that a supervisor's role was vague, both for them and for the student teachers. These supervisors found that supervision would need a stronger theoretical basis, which would improve the level of supervision. Two of them said:

I had not received education for this…. I constructed tools for the final discussion. (S)

I should have used this theoretical… some kind of [theoretical tool], which guides discussion. (S)

The results refer to the current situation where one becomes a university supervisor, usually without formal preparation, and there may be no support for integrating theory and practice when guiding student teachers' professional development (cf. Korthagen, 2001).

The main contents of identity-related reflection and the supervisor's role

The theory-driven content analysis of the supervisory discussions resulted in the following distribution of themes: environment (44%), behaviour (24%), identity (23%), competencies (7%) and mission (2%). For further analysis, the references concerning the mission theme were added to the identity theme. To answer this study's research questions, only the results stemming from the identity theme are reported in this paper.

The following six categories emerged from the analysis of the identity-related reflection: student teacher learning (30%), teacher role (26%), learning aims (15%), theory and practice (13%), pupil learning (8%) and teacher personality (8%) (Figure 3).
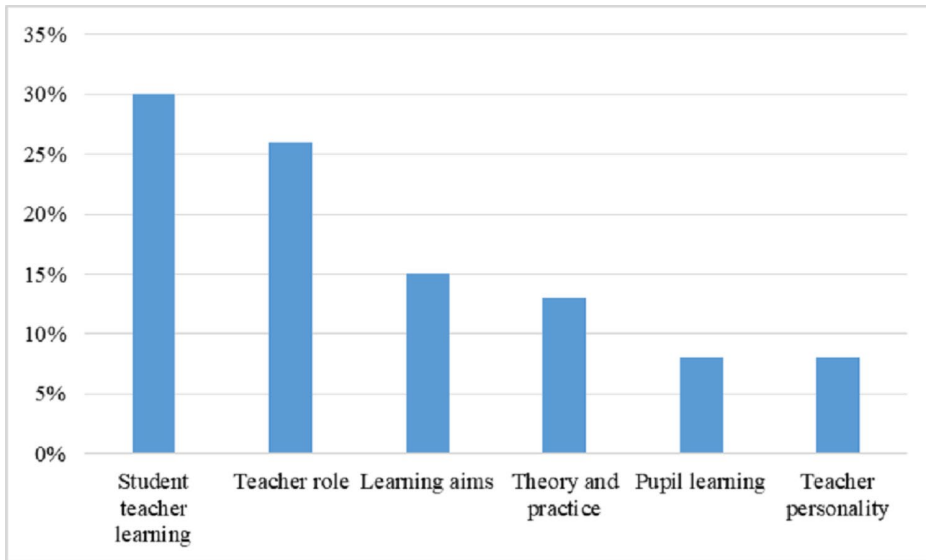
Fig. 3 The contents of identity-related reflection

The results of the analysis can be partly explained by the contents of the reflection procedure, which highlighted environmental and behavioural factors, as well as teacher role and integration of theory and practice. The distribution of the categories among individual discussions varied. Only student teacher learning and teacher role existed in all discussions. In the following subsection, the reflections under the categories are described in more detail by using the evidence from four supervisory discussions.

Student teacher learning

This category included the reflection on learning from experience during the practicum period, from recorded instances or during the entire teacher education programme. Learning dealt with a specific skill or oneself. In the following excerpt from a supervisory discussion, the supervisor asked the student teacher about her authority role, and the student teacher explained how she learnt to gain authority by watching videos of her teaching:

S: How about your experience of authority?

ST: I struggled with that, especially in the beginning…, but I made progress until the end when I watched the videos. [It was] very good that we recorded; I could see it from a different point of view.

S: Your experience of your authority or your perception changed – which one?

ST: I felt that after I watched them [videos], I realised that I lost some kind of presence or relaxedness with the kids…. Today, I tried to focus on them more consciously.

S: That is great to hear. It seems that video played an important part in this.

ST: It had a surprisingly important role.

As suggested by this excerpt, the videos enhanced the student teacher's self-reflection and promoted her professional change by showing contradictions between her beliefs and her teaching (cf. Beijaard et al., 2000; Bryan & Recesso, 2006; Korthagen, 2004). By asking a clarifying question, the supervisor helped her realise the videos' role in her self-awareness.

Teacher role

The teacher role focused on issues concerning different ways of working as a teacher, expressed by the student teachers themselves or their supervising class teachers. In the following discussion, the student teachers and their supervisor discussed a supervising teacher's role in the classroom, which could be called collaborative teaching. In the following excerpt, the student teacher reflects on how this role was present in the classroom activities:

S: Do you want to say something more about that [collaborative teaching]?

ST A: If pupils had had some conflict during the break, the teacher could handle that case for twenty minutes during the next lesson or the whole lesson until it was solved.

Later, the student teachers and the supervisor discussed caring teaching and how it

could be observed in the classroom:

> S: How was caring teaching seen there [in the classroom] concretely?
> ST B: It might take 40 minutes [to solve the conflict], and then the way she [the supervising class teacher] treated other people, she treated everyone the same way.

In these excerpts, the supervisor guided the student teachers to think about the teacher role more broadly and more deeply from the collaborative and the caring teaching perspectives. By doing so, the supervisor fostered the student teachers' understanding about the characteristics of those roles. At the same time, the student teachers revealed their pedagogical knowledge of the topic (cf. Beijaard et al., 2000; Maaranen & Stenberg, 2017).

Learning aims

The reflection on the learning aims consisted of thoughts concerning the student teachers' personal learning aims for the practicum period and how these aims were achieved. Sometimes, the discussions addressed the student teachers' strengths and developmental needs, as well as their goals for their future professional development. In the following discussion, the student teacher reflected on her goals for future development:

> S: Say a few developmental aims for the future.
> ST A: Developmental aims, getting to know pupils individually, finding a good authority.
> S: Some kind of natural authority?
> ST A: Yes, natural authority and natural presence in front of the classroom.
> S: What do you say? You were observing her.
> ST B: I have said that your lessons have become better all the time…. Your teaching has developed or it has come up better [over] the latest weeks.

Here, the student teacher pondered about her personal developmental needs, which were

supported by the supervisor's question and encouraged by her peer who had observed her development during the practicum period. However, the peer student did not present further justification for his thoughts. The supervisor could have encouraged him to share more about his observations to deepen his reflection (cf. Jay & Johnson, 2002).

Theory and practice

This category dealt with reflecting on practical experiences in the light of theoretical knowledge. In the following discussion, the supervisor asked student teacher to connect the practical experience seen in a video with a theoretical viewpoint.

> S: Could you rationalise it [selected instance] with some theoretical viewpoint?
> ST A: I have always been interested in studying individual potentiality and using it.
> ST B: Some kind of zone of proximal development might be there.
> ST A: Yes.
> S: Good, you already said that, zone of proximal development.

The student teacher was initially insecure about the theoretical idea behind the practice, but with his peer's help, he was able to realise it better. Moreover, this example suggests the student teacher's ability to make connections between the recorded situation and the broader principles of teaching and making judgements about the situation (cf. Jay & Johnson, 2002; Sherin & van Es, 2005).

Pupil learning

Pupil learning included the reflections on the pupils' learning because of teaching. In the following excerpt, the supervisor and the student teacher discussed a religious lesson. The supervisor asked the student teacher to reflect on learning during the lesson:

> S: What kind of learning has occurred, and how and why has it occurred?

ST: Because, according to their own words, the pupils had no previous experience of a church ceremony, they learnt how a church ceremony could look.

S: When a teacher is planning teaching, then mere planning is not enough, but the teacher needs to judge his or her actions; what issues improve interaction, understanding [and] learning; and how pupils get excited.

ST: Learning occurred during that lesson because the schedule was so strict and they had to do it.

S: It gives pupils a chance to practise self-regulation skills…. This kind of process is good for practising and learning self-regulation skills.

First, the student teacher only described his actions in the classroom, but after the supervisor's clarifying comment, he was able to justify his actions and think about the pupils' learning, thus showing his ability to reflect in a more analytical and productive way (cf. Jay & Johnson, 2002). In the end, the supervisor summarised the topic and related it to theory, at the same time revealing aspects of her own practical knowledge (cf. Zanting, Verloop, & Vermunt, 2003).

Teacher personality

The reflection on teacher personality included pondering on the student teachers' personal characteristics, strengths and developmental needs. In the following discussion, the supervisor and the student teachers focused on one instance where student teacher had given feedback to one pupil, while another pupil had caught the student teacher's attention. The peer student had tagged this moment as negative:

ST A: This can be partly explained by my personality.

ST B: No, this minus was more for that boy who was sitting there…. He wanted to get your [attention].

ST A: I react easily to stimulus. It is my personality; I need to develop it.

Here, the student teacher began to think about his personal characteristics when his peer student clarified the meaning of the situation. Thus, the peer reflection helped student

teacher become more aware of his personal aspects of teaching (cf. Danielowich, 2014; Tripp & Rich, 2012).

Reflection framework in teacher education

Figure 4 presents the reflection framework that was developed based on this study's results. The framework can be used individually or collaboratively with peer students or supervisors for whom it works as a theoretical guide. The framework includes seven parts that interact with one another. They are all essential for learning reflection skills and achieving meaning-oriented reflection (Korthagen, 2017). Some parts of the framework can be understood as integral to teacher identity but can also be perceived as separate from it. In the framework, personal and professional self-identity are not separated because it is not appropriate for this study's aims.

The heart of the framework is the persona that forms the core of teacher identity. It includes a teacher's strengths and developmental needs and one's perceptions of them, as well as one's mission, which means one's personal aims for the teaching profession. The teacher role guides one to ponder about one's role in different situations. Learning and learning aims encourage considering both teacher and pupil viewpoints. Besides the cognitive aspects, learning includes emotional aspects as well. Reflection occurs in a certain environment, as well as connects theory to practice and vice versa. Social, cultural and ethical issues of education were not emphasised in the reflection procedure used during the Advanced Practicum and were absent in the supervisory discussions. Therefore, it is beneficial to add these issues to the reflection framework.

The reflection framework is based on a holistic approach to teacher learning, highlighting both personal and emotional aspects of the teaching profession (Korthagen, 2004, 2017). Following the ideas on experiential learning (Kolb, 1984) and systematic

reflection (Dewey, 1933; Schön, 1983), reflection begins from the need to ponder on a teacher's own experience. The reflection framework includes ideas from social constructivist, sociocultural and situated perspectives of learning, emphasising the interdependence of individual and social processes in learning, as well as socially and culturally shaped contexts where learning occurs (Palincsar, 1998; Wenger, 1999). Supervisors and peers guide student teachers in broadening their reflection by asking questions and making connections between theory and practice. Supervisors need to match their guidance to the level of the student teachers' professional development and reflection skills (Korthagen & Vasalos, 2005). This is how the zone of proximal development, presented by Vygotsky (1978), can be applied.
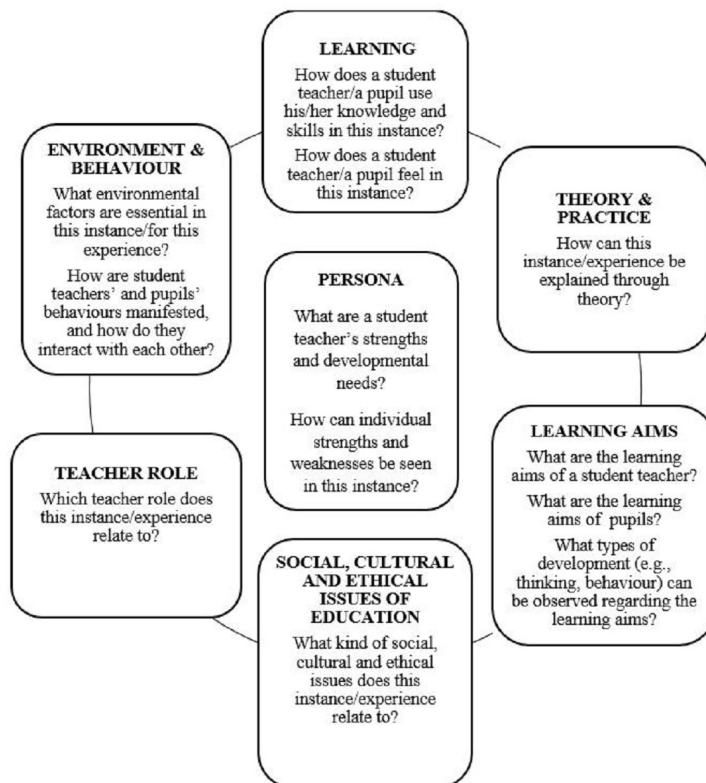

Fig. 4 The reflection framework in teacher education

Discussion and implications

This study aimed to identify how student teachers' meaning-oriented reflection could be enhanced with the help of videos. The results showed the benefits of using videos for student teachers' self-reflection, corroborating other studies' findings that video viewing offered student teachers a new perspective on their own behaviour and the teacher-pupil interaction (Bryan & Recesso, 2006; Shepherd & Hannafin, 2008). Peer reflections diversified the student teachers' reflections on their practice. The results resonate with previous studies, which reported peer discussions' positive influences on the diversity of teacher viewpoints (Christ et al., 2014; Danielowich, 2014). The use of tag sets helped the student teachers reflect on specific moments. However, student teachers would need more training in designing tag sets to use them effectively. Previous research also showed that student teachers must adapt to the tagging system to be able to tag while recording videos (Batlle & Miller, 2017).

Some student teachers' reluctance to watch the videos of their own teaching, a phenomenon that previous research recognised (Bryan & Recesso, 2006), may stem from negative feelings and be influenced by the fact that most of the student teachers in this study were watching videos of their teaching for the first time. The situation may change in the future, when participants in the Advanced Practicum will have used the VEO app from the beginning of their studies. Early familiarisation gives users more time for learning and may decrease their possible resistance towards video technologies (Fadde & Sullivan, 2013).

Some supervisors considered their role as vague when guiding student teachers. Jaspers and colleagues (2014) also found that supervisors might confront challenges when performing the roles of both teacher and supervisor. The use of videos seems to change the roles of supervisors and student teachers. Supervisors shift from reviewing

student teachers' actions to facilitating their reflections. The use of videos requires the activity of student teachers who need to take responsibility for their learning.

In the supervising discussions, the participants' reflections focused mainly on environmental aspects and the student teachers' own experiences. This emphasis was influenced by the contents of the reflection procedure, which highlighted the classroom situations and thus, focused the reflections on them. However, the results indicated that a video-enhanced reflection procedure promoted reflections on the complex aspects of teacher development, not only teacher behaviour. The findings corroborate previous research, which found that incorporating a reflection guide into video-elicited reflections facilitated broadening and deepening student teachers' reflections (cf. Bryan & Recesso, 2006; Calandra et al., 2009).

The supervisory discussions confirmed the participants' views of the supervisory process. The results showed the important role of the supervisors and the peers in broadening the student teachers' identity-related reflections by linking practice and theory with comments and questions and bringing the reflections beyond certain teaching situations (Bryan & Recesso, 2006; Christ et al., 2014; Jay & Johnson, 2002). Thus, the discussions included aspects of a reflective approach to supervision (cf. Franke & Dahlgren, 1996). However, in the supervisory discussions, the student teachers neither criticised their actions nor related their teaching to broader social, cultural or ethical factors (cf. Jay & Johnson, 2002). The student teachers' personal strengths and developmental needs were not discussed widely. Therefore, the reflection procedure was ineffective in fostering the student teachers' critical reflection.

The reflection framework was developed from the study's results in order to guide reflection. One of the limitations of the framework is that it does not describe the reflection process. However, it describes the reflection's contents and can be used

flexibly in different contexts, both with and without access to video technology when reflecting on teaching sessions and planning new actions (cf. Schön, 1983). Student teachers may find it difficult to focus their attention; therefore, it may be necessary to complete the framework with concrete guiding questions that focus noticing and encourage questioning one's teaching practice.

Limitations

One limitation of this study was its small sample size. The participants were student teachers and supervisors who were willing and able to talk about their experiences. Another drawback was that the study was conducted as part of teacher education studies, which might have affected the participants' comments in the interviews and the supervisory discussions. Because of these limitations, the findings should be cautiously interpreted.

Conclusions and directions for further research

Based on this study's outcome, it is beneficial to provide student teachers and supervisors with a ready-made procedure to follow when applying video-based reflection in the supervisory process. This study's results raise concerns of how to better support student teachers' critical reflection skills. Different analysis frameworks result in various kinds of reflections (Santagata & Angelici, 2010). Therefore, it is important to develop reflection procedures that foster a critical stance towards one's teaching practice and promote reflection on a teacher's own persona and broader aspects of the teaching profession. Some student teachers' struggles with watching videos of their own teaching highlight the fact that merely using a video does not guarantee learning from it. This case emphasises the role of supervisors and peer students in promoting reflection on videos (cf. Bryan & Recesso, 2006; Christ et al., 2014).

In this study, personal tag sets affected the issues that the student teachers noticed in their teaching. Self-reflection was only slightly guided by asking the student teachers to select critical incidents from their teaching. It is presumable that the student teachers varied in their reflection activities. These issues might explain why the student teachers did not report how their thinking of teaching and learning changed through video-based reflection or at all and if they changed their practice as a result. In the supervisory discussions, only one student teacher reflected on her professional development through the videos. The results indicate the need to provide student teachers with some kind of video-based problem-solving cycle, similar to the approach used by Calandra and colleagues (2009) and Bryan and Recesso (2006). Student teachers would not only record and watch their teaching, but they would also carefully analyse their developmental needs and document their development. This would increase the benefits of video viewing for student teachers' reflection and promote connecting video-based reflection to student teachers' practice.

Moreover, this study raises the question of how videos affect the roles of supervisors and student teachers. Some of the participating supervisors lacked the skills and the theoretical tools for effective supervision. Thus, supervisors' possibilities for professional development should be enhanced.

The author's forthcoming research will focus on empirically testing the reflection framework developed in this study and improving it further to strengthen the theoretical background of supervision. There is a need for a closer examination of the connections between video-based reflection and learning, that is, what student teachers actually learn when reflecting on videos and how this contributes to their practice. Finally, supervisors' professional development is a topic that requires further research.

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Appendix A: The reflection procedure

- *Stage one: Pre-supervision and creation of a tag set.* A student teacher (or student teachers) and a supervisor meet each other face-to-face and discuss the timetable and other practical issues. A student teacher thinks about his or her personal learning aims for a practicum period. Together, a supervisor and a student teacher design a tag set, usually including two tags, based on those learning aims. A student teacher writes down a tag set and sends it to a researcher, who publishes it in the video-enhanced observation application (VEO app).

- *Stage two: Lesson observation.* During the first teaching period, it is possible for a supervisor to observe one lesson (45 minutes in length) delivered by a student teacher at an appropriate time. The observation is followed by a brief feedback discussion.

- *Stage three: Selection of a lesson for recording, recording the lesson and watching it.* Two lessons (or parts of lessons) taught by a student teacher are recorded by using his or her personal tag set, one lesson per teaching period. Each student teacher has two videos. A student teacher selects the recording times. A peer student records a lesson and tags notable incidents. After recording the video, the student teachers watch it together and discuss it and the tags (for instance, how they perceived particular situations and why a peer student tagged certain instances). Each video is uploaded to the VEO portal, where a student teacher can watch the videos later. A student teacher watches his or her own videos and selects instances for further reflection. One incident must be positive; it is something that the student teacher is satisfied with. The

second incident should be challenging, something that the student teacher finds difficult and wishes to improve. After selecting those incidents, the student teacher shares the videos with a supervisor on the VEO portal. The supervisor watches the videos but does not comment or provide feedback.

- *Stage four: A supervising discussion.* An oral reflection between a student teacher (or both student teachers) and a supervisor takes place during the final week of a practicum period. In their discussion, the student teacher and the supervisor are guided by the following questions that have been developed based on the theoretical framework: 1. What is happening in the situation? 1a. What can a student teacher see/hear himself or herself doing? 1b. What can a student teacher see/hear the pupils doing? 1c. Is there a relationship between what a student teacher is doing and what the pupils are doing? 2. Why does a student teacher think that this is happening? 2a. What pupils' behaviours are caused by a student teacher's behaviour? 2b. Which behaviour of a student teacher is caused by the pupils' behaviour? 2c. What makes the incident critical for a student teacher? 3. What is invisible in the videos? 3a. Is there something that cannot be seen in the videos? 3b. Are there other elements in the videos? 3c. How does a student teacher feel during the incident? 4. How does the incident relate to theory? 4a. Which teacher role does the incident relate to? 4b. How does the literature support a student teacher's causal explanation (in the case of a positive incident)? 4c. What suggestions does the literature offer to solve a problem (in the case of a challenging incident)? 5. What has a student teacher learnt from this event so far? How will he or she make use of those lessons that he or she has learnt from this event?

- *Stage five: Written reflection.* This phase occurs during and after the practicum period. Student teachers reflect on the critical incidents in their pedagogical diaries during the practicum period and on their pedagogical portfolios and practicum report after the practicum period. Student teachers are guided by the following questions: 1. How do the incidents relate to theoretical principles? 1a. Which teacher role does the incident relate to? 1b. How does the literature support a student teacher's causal explanation in the oral reflection (in the case of a positive incident)? 1c. What suggestion does the literature offer to solve a problem (in the case of a challenging incident)? 2. What will be the student teacher's future action? 2a. What will be his or her future action regarding this incident? 2b. What does the student teacher hope to achieve by this action? 2c. What personal principles underline his or her choice of action? 3. How will the student teacher make use of the lessons that he or she has learnt from this event? 4. Has the student teacher achieved his or her personal learning aims for the practicum period? 5. How have the video recording and the reflection procedure helped the student teacher's thinking? 6. How can the reflection procedure be further developed?

Appendix B: Process of data analysis

Analysis of interviews with student teachers

Research question	Theme	Code	Paraphrased comment	Category	Summary
How did the trial succeed in general?	Success of trial	*When I used it [the app] for a while, I realised how it worked. It was simple and easy to use.*	She found the video application (VEO app) easy to use.	Ease of the VEO app	Summary of the theme
How did the VEO app work in self- and peer reflection?	VEO in self- and peer reflection	*I derived good ideas from a video, about encountering an individual and giving feedback. I got valuable information about my actions.*	He noticed issues about his teaching concerning encountering an individual and giving feedback. He obtained valuable information on his actions through a video.	New perspective on the classroom through a video	Summary of the theme
How were personal tag sets used for reflection?	Using and developing a tag set	*[My] tag set did not fit in that recorded lesson. I do not understand what my point was with this tag set.*	She found that her tag set did not fit in the recorded lesson. She did not remember what she had aimed for with her tag set.	Problems with personal tag sets	Summary of the theme
How was the supervision process?	Supervision process	*[The] supervision was different when compared with previous practicum periods; the supervisor did not assess our performance but asked questions.*	She found the supervision different from her previous experiences. The supervisor did not assess the student teachers' performance but asked questions.	Supervision including questions	Summary of the theme
How can the VEO app be used in the future as part of reflective practice?	VEO in the future	*Recording videos is a good thing; through a video, it is possible to notice issues that you do not want to do but you still do.*	He thinks that recording videos is beneficial; a video offers an opportunity to perceive issues that could not be observed.	Recommendations for continuing the use of the VEO app	Summary of the theme

Analysis of interviews with supervisors					
Research question	Theme	Code	Paraphrased comment	Category	Summary
How did the supervision succeed in general?	Success of supervision	*I find it good that this process included a lot of interaction [between the student teachers and me]; the student teachers got deeper in their thinking through their own experiences and could reflect on the process and set new learning aims.*	She appreciated the interaction between her and the student teachers. She found that the student teachers developed in their thinking and were able to reflect on the process and set new learning aims.	Interaction and support for the achievement of student teachers' learning aims	Summary of the theme
How was the supervision process?	Supervision process	*One student teacher had a very negative perception of herself as a teacher, but through watching a video, she realised that she succeeded well, which made her trust herself more.*	She told that one student teacher had a negative self-perception as a teacher. When she watched herself on a video and realised her success, she began to trust herself more.	Video as an essential part of the supervision process	Summary of the theme
How was the supervisor's role in the process?	The supervisor's role	*I was thinking about my role because the student teachers had a supervising class teacher; I was thinking if I could give them any additional guidance.*	She thought about her role as a supervisor and wondered if her guidance was meaningful for the student teachers.	Vague role of supervisor	Summary of the theme
How can the VEO app be used in the future as part of reflective practice?	VEO in the future	*Recording raised concerns among the student teachers; if the app was used earlier, it would feel easier for the student teachers.*	She found that recording raised concerns among the student teachers and believed that the app should be introduced earlier.	Introducing the app to student teachers in the early phase of their studies	Summary of the theme

Analysis of supervisory discussions		
Stage of analysis	**Example**	**Results**
Data-driven analysis	*Structuring the lesson means that I organise the components of the lesson for myself; I think when it is a good time to give pupils laptops or if I give them instructions first.* This excerpt was coded under the theme *teacher and pupil behaviour*.	19 themes, such as *teacher and pupil behaviour, personal development and learning*
Theory-driven analysis	*I tried to consider what a child was telling me; I stopped to listen and tried to give positive feedback to the child immediately* This excerpt was coded under the theme *competencies*.	5 themes: *environment, behaviour, competencies, identity* and *mission*
Data-driven analysis of identity-related reflection	Here, a student teacher argued why she thought that she had achieved her aim of recognising positive behaviours of children and giving them positive feedback: *I used methods of collaborative learning (e.g., group works). I made the pupils talk in small groups so that all pupils could participate; we had sessions where we discussed emotions, and the pupils interacted with one another* This excerpt was categorised as *learning aims*.	6 categories: *student teacher learning, teacher role, learning aims, theory and practice, pupil learning* and *teacher personality*