Teaching and Teacher Education 33 (2013) 13–23

Contents lists available at SciVerse ScienceDirect

Teaching and Teacher Education

journal homepage: www.elsevier.com/locate/tate

What do teachers think and feel when analyzing videos of themselves and other teachers teaching?

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HIGHLIGHTS

- ► Other Video Group members are engaged in deeper analysis of problematic events.
- ► Deeper analysis is accompanied by emotional disappointment.
- ► Own Video Group members did not show stronger emotions and involvement.

ARTICLE INFO

Article history:
Received 26 March 2012
Received in revised form
30 January 2013
Accepted 1 February 2013

Keywords:
Teacher education
Teacher cognition
Video technology
Learning sciences
Observation
Professional learning

ABSTRACT

Despite the widespread use of classroom videos in teacher professional development, little is known about the specific effects of various types of videos on teachers' cognitive, emotional, and motivational processes. This study investigates the processes experienced by 10 eighth-grade mathematics teachers while they analyzed videos of their own or other teachers' classroom instruction. Findings indicate that teachers viewing videos of other teachers are more deeply engaged in analysis of problematic events. Counterintuitively, observing videos of others corresponds to higher emotional–motivational involvement. Results support the conclusion that observing one's own videos requires more prearrangement and scaffolding than observing others' videos.

In recent years, classroom videos have become an important reflective tool for teacher professional development (Borko, Jacobs, Eiteljorg, & Pittmann, 2008; Brophy, 2004). Video-based professional development (PD) can be designed in a number of ways, with variation in terms of learning goals, instructional approaches, and the video material selected (Blomberg, Renkl, Sherin, Borko, & Seidel, submitted for publication).

We assume that different video material enables different learning goals to be realized. However, there is little empirical evidence about how different types of videos influence teachers' cognition, emotions, and motivation. Specifically, there is a lack of experimental work that systematically varies and investigates a single dimension (learning goals, instructional design, or videotaped material) and controls for the other dimensions. Our study focused on the effects of different videotaped material on teachers' cognitive, emotional, and motivational processes. We used a quasi-experimental approach to

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distinguish between two groups of subjects, i.e. between teachers analyzing videos of themselves and teachers analyzing videos of others. Teachers of both groups individually analyzed their own or other teachers' classroom instruction in a computer-based environment. They were guided with the same instructions and questions.

We paid particular attention to emotional and motivational processes that have received little systematic investigation in the literature. In the following sections we will discuss (1) the potential of classroom videos as a learning tool; (2) the cognitive, emotional, and motivational processes that take place during the observation and analysis of video; and (3) the presumably differential effects on teachers of analyzing their own videos and analyzing videos of other teachers.

1. The potential of classroom videos in teacher education

Several studies have reported that using video aids reflection on teaching and learning (e.g. Borko et al., 2008; Sherin, 2007; Sherin & van Es, 2009) and positively impacts teaching and student

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0742-051X/$ – see front matter © 2013 Elsevier Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.tate.2013.02.002

learning (Kersting, Givvin, Thompson, Santagata, & Stigler, 2012; Sherin & van Es, 2005). Classroom videos activate prior knowledge and experience, and they foster an analytical view of teaching situations that enables teachers to build practical knowledge through the integration of theory and practice.

First, video has the potential to capture reality in an authentic and relevant way (Spiro, Collins, & Ramchandran, 2007). Observers of videos are able to draw multiple connections to their own practice and to achieve a deep level of engagement and involvement (Goldman, 2007). From this point of view, observing videos provides a vivid secondhand experience, because viewers can immerse themselves individually in situations (Miller & Zhou, 2007). Research has shown that preservice and in-service teachers experience the analysis of videos as motivating and compelling (Areglado, 1999; Roth, 2007).

Second, observers of videos have the opportunity to examine situations from a distance. Nonparticipants observing videos can analyze teaching systematically, relieved of the need to interact with teacher and pupils (Sherin, 2004; Sherin & van Es, 2009). In addition, observers can pause videos or replay scenes to reflect on situations from different perspectives. In this way, complex situations can be observed in manageably sized chunks (Le Fevre, 2004). Thus, observing videos enables a theory-based analysis of complex situations, which leads to practice-oriented scientific knowledge based on the integration of theory and practice (Orland-Barak & Yinon, 2007). Current video projects aim to develop teacher competencies in a systematic way. Key concepts and objectives of video-based teacher PD, as well as the lack of research on affective factors, are described in the next section, which focuses on the multifaceted processes activated during video-based PD.

2. Cognitive, emotional, and motivational processes taking place during video-based professional development

The observation and analysis of classroom videos is seen as a cognition-driven process (Sherin, 2004, 2007). It is likely that the ability to analyze situations is a prerequisite for the ability to act adaptively in these situations (Berliner, 1991, 2001; Kersting et al., 2012; Sherin & van Es, 2009). Sherin defined the cognitive processes taking place during analysis (2007) by building on work by Goodwin (1994). She identified the capacity for noticing, which includes processes of selective attention and of knowledge-based reasoning. *Selective attention* refers to a teacher's spontaneous and selective perception; it is assessed in empirical studies through the use of verbal or written stimuli. Teachers may, for example, be asked to pause a video if they see something interesting or relevant to a certain topic (Jacobs & Morita, 2002). *Knowledge-based reasoning* refers to the ability to reflect on and interpret that which is perceived. By observing students' learning processes, Sherin (2007) identified three main aspects of knowledge-based reasoning: quotation, exploration of meaning, and synthesis of student ideas. Other authors have divided the reasoning process into the following categories: (1) a description of what has been selected; (2) an explanation based on prior knowledge of teaching and learning; and (3) an evaluation and prediction in which the explanation is used to assess the situation and prompt alternative courses of action (Borko et al., 2008; Santagata, Zannoni, & Stigler, 2007; Schwindt, 2008; Sherin & van Es, 2009). In empirical studies, these processes can be revealed using content analysis of teachers' written or oral comments on the videos (e.g. Santagata & Guarino, 2011; Sherin & van Es, 2009).

Evaluations of video-based PD have focused primarily on the cognitive processes of selective attention and knowledge-based reasoning. They have shown that video-based PD allows pre- and in-service teachers to improve their ability to notice and interpret important features of classroom interactions (van Es & Sherin, 2008; Santagata et al., 2007; Sherin & van Es, 2009; Star & Strickland, 2008). For example, teachers participating in 7 or 10 video-club meetings learned to analyze students' mathematical thinking in an in-depth manner (Sherin & van Es, 2009). In contrast, noncognitive aspects of teachers' interactions with video are far less developed theoretically and less operationalized empirically. To capture perceived motivational experience, Seidel, Stürmer, Blomberg, Kobarg, and Schwindt (2011) differentiated between an immersion and a resonance effect. According to Goldman (2007), immersion refers to teachers' degree of engagement and involvement, and resonance refers to the extent to which teachers make connections to their own practices. Both aspects were surveyed with seven standardized items on immersion and two on resonance (Seidel et al., 2011).

Research on teachers' emotional experience has investigated the interplay of emotions and cognition during classroom teaching (Frenzel, Goetz, Stephens, & Jacob, 2009), and research in other areas of adult education has addressed the coherence of emotions and cognition during *reflection* on video or text cases (Koehler, Yadav, Phillips, & Cavazos-Kottke, 2005; Yadav et al., 2011). Results showed that video cases activated more engagement and sympathy with the people depicted than did text cases, whereas the cognitive effects of video and text were similar. Koehler et al. (2005) argued that video as a medium does not foster specific learning processes but influences viewers motivationally and emotionally in ways that text does not.

Despite the presumed strong influence of emotions on cognitive processes, concepts and empirical methods have not yet been adapted for research in the field of video-based PD. To our knowledge, only two studies have explored noncognitive processes in the context of reflection on videos. Lefstein and Snell (2011) examined the politics of video-based learning in a collaborative setting (e.g. power relations in the workshops), and Seidel et al. (2011) examined emotional–motivational processes in an individual setting.

3. Learning with videos of teacher's own and other teachers' classrooms

The differential effects of observing videos of one's own or others' teaching on various cognitive, emotional, and motivational processes remain unclear.

To our knowledge, only two studies have systematically compared experiences of teachers who watched various types of videos (including videos of themselves and of others). Seidel et al.'s (2011) study was conducted in an individual setting, and Zhang, Lundeberg, Koehler, and Eberhardt (2011) study was conducted in a collaborative setting. Other research has focused on approaches using videos of either the teachers' own instruction (Borko et al., 2008; Sherin & van Es, 2009; Sherin & Han, 2004) or that of others (Goldsmith & Seago, 2007; Hatch & Grossman, 2009; Lampert & Ball, 1998; Rosaen, Schram, & Herbel-Eisenmann, 2002; Seago, 2004) in a collaborative setting. Moreover, only a few studies have focused on the individual reflection of teachers in response to videos of their own teaching (Brouwer, 2012; Krammer et al., 2006; Rosaen, Lundeberg, Cooper, Fritzen, & Terpstra, 2008) or in response to videos of others' teaching (Goeze, Schrader, Hartz, Zottmann, & Fischer, 2010).

Our review is divided into two sections, one about learning with videos of oneself and one about learning with videos of others. In each section we draw first on research focused on approaches that use only one type of video (of either oneself or others) and second on research that compares findings related to videos of oneself to findings related to videos of others (Seidel et al., 2011; Zhang et al., 2011).

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视频更能激活教师的参与性，但在认知影响上和文本形式是差不多的

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3.1. Videos of oneself

When teachers observe videos of their own teaching, it is likely to activate their prior knowledge and experience. Teachers observing their own teaching can probably empathize with situations depicted by and participate emotionally in the videotaped events (Borko et al., 2008; Sherin & Han, 2004). They may also draw upon information about the class and individual students as well as their own teaching approach and principles. Programs in which teachers observe videos of themselves, e.g. video clubs (Sherin & van Es, 2009) or PD utilizing the Problem-Solving Cycle (PSC, Borko et al., 2008), are often designed to be adaptive; i.e. their goals are learner oriented, and resources emerge from participants (Borko, Koellner, Jacobs, & Seago, 2011). Research on such approaches has shown high emotional and motivational involvement of participants and positive changes in teachers' noticing abilities (e.g. Borko et al., 2008; Sherin & van Es, 2009). Some studies provided evidence of the benefits of allowing teachers to analyze their videos multiple times (Sherin & van Es, 2009; Zhang et al., 2011). For example, Sherin and van Es (2009) showed that teachers initially did not attend to student ideas, but that they learned to focus on those ideas upon repeated viewings of their videos. With regard to collaborative settings, researchers have found that teachers were at first disinclined to comment critically on the videos of their peers. However, they developed a critical and constructive discussion culture in further meetings (Borko et al., 2008; van Es, 2012; Zhang et al., 2011). Against this background, researchers and teacher educators have suggested that guidelines should be established for discussing video to inspire confidence among group members (Borko et al., 2008; Zhang et al., 2011). Other researchers have emphasized the role of adaptive facilitation, e.g. modifying questions to explore student thinking (Santagata, 2011).

Seidel et al. (2011) conducted an experimental study in which they compared the experiences of a group of teachers individually observing their own videos ("Own Video Group") and a group individually observing videos of other teachers ("Others' Video Group"). They found the expected positive motivational effects of observing videos of one's own teaching. Teachers in the Own Video Group rated their work with the videos as more authentic, activating and motivating than teachers in the Other Video Group. Similarly, the content analysis of teachers' comments on the videos showed that teachers in the Own Video Group were able to selectively focus their attention on more relevant learning aspects (Seidel et al., 2011). Using the framework of a problem-based PD program, Zhang et al. (2011) examined the benefits and challenges of analyzing one's own videos, the videos of colleagues, and published videos in group sessions. The authors' analysis of data from multiple sources showed that teachers evaluate videos of their own teaching as most suitable for their own learning and the published videos as least suitable (Zhang et al., 2011).

3.2. Videos of others

Videos of other teachers may allow for more detached reflection. Programs using others' videos, e.g. Learning and Teaching Geometry (Seago, Callahan, Driscoll, Jacobs, & Nikula, 2012), are carefully structured; i.e. their goals are specified and task-oriented, and they provide detailed resources for facilitators (Borko et al., 2011). Presumably, selected video sequences were "emotionally distant enough to create a safe place to scrutinize practice carefully" (Seago, 2004, p. 263). Research findings have shown that observers can learn to reflect analytically, e.g. on the mathematical potential of students' ideas (Goldsmith & Seago, 2007) or on perspectives of teachers and learners (Goeze et al., 2010). Similarly, in the analysis of others' videos, fewer situations should arise in which teachers activate self-related knowledge structures (Fiske, 1995). Teachers who observe videos of others may be less influenced by strong negative emotions like shame, anger, or guilt.

Seidel et al. (2011) produced empirical evidence that teachers who observed others' videos in an individual setting were able to select key incidents and analyze them objectively. However, they could not confirm that teachers watching their own teaching were affected by more emotions or that they tended to be defensive about their own actions (Seidel et al., 2011). Based on teachers' work in a collaborative setting, Zhang et al. (2011) identified two disadvantages of using published videos: first, videos of other teachers often did not provide sufficiently rich information about the context (e.g. lesson plan, teacher's instructional goals); second, such videos often did not conform to the prior knowledge and experience of the teachers in the study. It is possible that the teachers were unable to empathize with the observed actions of the teachers and pupils in the videos, which might in turn have led to a less engaged knowledge-based reasoning process.

Despite the initial empirical findings of Seidel et al. (2011) in the context of an individual reflection setting and those of Zhang et al. (2011) in the context of a collaborative setting, the processes initiated when teachers analyze videos of their own teaching or that of others is still underexplored. In particular, not enough is known about the interplay of cognitive, emotional, and motivational processes.

4. Research questions

This study compared the reactions of individual teachers viewing videos of their own instruction to the reactions of individual teachers viewing videos of others' instruction. Three main research questions were investigated:

1) What cognitive processes are activated when teachers observe videos of their own or others' teaching?
2) What emotional and motivational processes are activated when teachers observe videos of their own or others' teaching?
3) How are cognitive and emotional–motivational processes related while teachers are observing videos?

Assigning teachers to observe either an "Own Video" or "Other Video" in a quasi-experimental design allowed us to derive conclusions about the effect of the type of video. Although our brief intervention did not occur in a learning setting, we think our conclusions are applicable to practice-based PD in individual settings and group settings.

We assumed that observing one's own videos would activate prior knowledge and experience. Teachers observing themselves teaching may be more emotionally involved and better able to link their observations to their own typical practices (Borko et al., 2008; Sherin & Han, 2004). We also assumed that they would be capable of enriching their analysis with information specific to the class and individual students (Zhang et al., 2011). In contrast, because there may be less emotional involvement when observing other teachers' videos, there may be greater opportunity for detached reflection. The observer may be able to notice negative events more easily and assess them in a more neutral manner (Seidel et al., 2011). Teachers observing videos of others teaching may be less influenced by strong negative emotions (Seago, 2004; Seidel et al., 2011).

5. Method

5.1. Participants and quasi-experimental design

Ten eighth-grade mathematics teachers with between 2 and 30 years of teaching experience took part in this study. They were

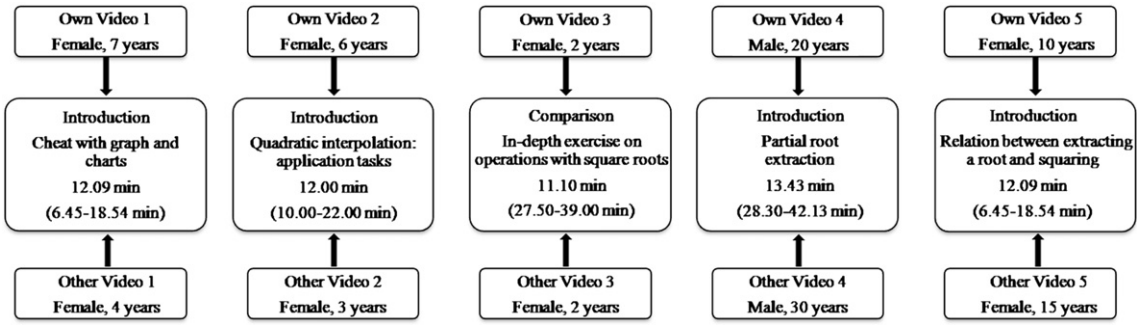

Fig. 1. Design of the study: Gender and teaching experience of participants (Own Video Group and Other Video Group), type of video (introduction or comparison), duration of video.

divided evenly into an Own Video Group and an Other Video Group. The five teachers in the Own Video Group had already been recorded in a previous video-based classroom study on the use of cognition-activating tasks and questions during everyday lessons (Bohl, Kleinknecht, Batzel, & Richey, 2012). The five teachers in the Other Video Group were recruited to match the Own Video Group with respect to gender, subject being taught, and duration of teaching experience. Five pairs of teachers were created, such that each pair consisted of one person from the Own Video Group and one from the Other Video Group who commented on the same video. Fig. 1 illustrates the matching of participants observing their own and others' teaching.

The two individuals within each pair matched moderately well with respect to both gender and teaching experience. To obtain additional information about the participants, we asked them about their experience observing videos of classroom teaching and their knowledge and use of the concept of cognitive activation. Table 1 shows items, means, and standard deviations for both groups.

We compared the composition of the two groups and found no systematic differences between them regarding teaching experience ($Z = -.736$, $p = .461$), experience with video observation ($Z = -.447$, $p = .655$), and knowledge ($Z = .000$, $p = 1.000$) and use ($Z = .000$, $p = 1.000$) of the concept of cognitive activation.[1]

As illustrated in Fig. 1, five video sequences were presented. In a previous study (Bohl et al., 2012), we video-recorded a lesson featuring different algebraic contents for each teacher of the Own Video Group. From each lesson, we selected a 9- to 14-min video sequence showing one of two different types of classroom dialogue: an introduction to new tasks before seatwork on them or a comparison of task solutions after seatwork. Coding of the quality of teachers' questions and requests in our previous classroom study enabled us to select similar scenes from each teacher's lesson. Based on the coding, we selected scenes that show various complex questions and requests. Each sequence included at least one question or request that had been coded as more complex (e.g. a deep-reasoning question).

5.2. Data collection

Each of the selected scenes was presented in a computer-based environment that integrated a video tutorial and information about lessons and the concept of cognitive activation as well as focused and unfocused questions. We used a flexible online survey tool to create this environment as a web-based interface. For data collection, we invited the teachers individually to the university or visited them in their schools. Each session included two observation stages with additional surveys and lasted about three hours. Teachers were guided solely by the computer-based environment, and they were not accompanied additionally by a coach or mentor. During the intervention one of the two authors was present and helped the teachers with technical difficulties.

Participants progressed through the web-based environment in sequential fashion. After finishing a webpage, they clicked the "next" button at the bottom of the page to proceed. First, in a short video tutorial (7.52 min), participants were shown how to pause the video and how to use the two comment boxes to express what they were thinking or feeling while viewing the sequence. For the analysis of the videos, the video player was located on the left side of the screen, whereas the two comment boxes were located on the right. Each comment box was accompanied by three questions formulated to guide the teachers in their responses. The questions accompanying the first comment box were related to the cognitive processes of selective attention and knowledge-based reasoning. Teachers were asked: *What did you notice about the situation? How do you judge the situation? What alternatives do you see?* The questions accompanying the second comment box were aimed at eliciting emotional and motivational processes: *How did you feel while watching the scene? To what extent could you put yourself in the situation? To what extent could you make connections to your own teaching practices?* The video tutorial offered examples of how the questions were to be addressed and illustrated comments on a teacher's classroom management. Next, teachers were given a timeline that briefly described the phases of the lessons and provided information about what had happened before and after the selected sequence. The information included notes on the content covered and teaching methods used. In addition, participants had access to the task sheets that students worked on during the lesson. Empirical studies have shown that teachers rely on such contextualization to analyze others' videos meaningfully (e.g. Zhang et al., 2011). 给支架

Subsequently, all participants individually observed the sequence in two stages. In the first observation stage, no specific instructions were given regarding what to focus on while analyzing the video. Teachers were encouraged to pause the video and comment whenever a scene of interest occurred. Each time they paused the video, they were asked to answer the six open-ended questions on their cognition (comment box 1) and their emotions and motivation (comment box 2) in relation to the scene of interest. In the second observation stage, teachers were asked to identify situations in which the teacher in the video demonstrated behavior that cognitively activated the students. Before completing this task, the computer-based environment offered the teachers an explanation of the concept of cognitive activation and informed them about various types of responses to it. Participants were asked to identify and

[1] We used the Wilcoxon test to examine the differences.

Table 1
Sample description ($N = 10$): Teaching experience (in years), experience observing videos (hours spent observing), knowledge of concept of cognitive-activation (scale: 0–3).

	Item	Own Video Group M (SD)	Other Video Group M (SD)
Teaching experience	Professional experience (in years)	11.00 (11.00)	8.80 (8.17)
Experience observing videos	Time spent analyzing lessons (in hours)	.89 (.44)	.20 (.44)
Knowledge and use of cognitive-activation concept	I understand the concept of cognitive-activation (min = 0 [“disagree”], max = 3 [“agree”])	1.20 (1.30)	1.20 (.84)
	I have analyzed videos regarding the concept of cognitive activation (min = 0 [“never”], max = 3 [“always”])	.60 (.89)	.60 (.89)

comment on scenes in which teachers' questions and responses activated students' deep thinking (e.g. by using deep-reasoning questions). Likewise, they were asked to explore critical incidents in which an activation opportunity was missed and alternatives were conceivable. As in the first stage, participants were asked to answer the six open-ended questions each time they paused the video. At any point during the observation period, participants could reread the six key questions on a printout.

In addition to the six open-ended questions, rating items with fixed responses were used to evaluate the emotions and motivations evoked by the videos after each of the two stages of observation. The items captured the positive emotion of enjoyment and the negative emotions of anxiety, anger, boredom, shame, and guilt, as well as the degree of immersion and resonance. The items for emotions were adapted from Frenzel et al. (2009), and the items for immersion and resonance were drawn from Seidel et al. (2011). Immersion is the degree to which teachers are involved in videotaped situations; resonance is the extent to which teachers are able to link videos of other teachers to their own experiences or to typical practice (Goldman, 2007; Seidel et al., 2011). Table 2 shows examples of items and the values of Cronbach's alpha for each scale at the two observation stages.

The values of Cronbach's alpha for these measures ranged from .430 to .889. For the scales of enjoyment, boredom, and immersion (first observation stage), no satisfactory reliabilities were achieved; therefore, analysis was conducted at the individual item level. These items permitted comparison to teachers' written comments, allowing emotions and motivation to be examined using different methods.

Table 2
Rating after two observation stages: Emotions, immersion, and resonance.

	N	Example item	α 1st observation stage	α 2nd observation stage
Enjoyment	4	“I was joyful while observing this video sequence”	.436	.430
Anxiety	2	“I was tense while observing this video sequence”	.698	.906
Anger	2	“I was annoyed while observing this video sequence”	.750	.876
Boredom	2	“I was bored while observing this video sequence”	.521	.889
Shame	1	“I was ashamed while observing this video sequence”	–	–
Guilt	1	“I felt guilty while observing this video sequence”	–	–
Immersion	6	“I felt as if I was inside the lesson”	.574	.757
Resonance – own instruction	1	“I had my own instruction in mind”	–	–
Resonance – typical instruction	1	“I had typical instruction in mind”	–	–

5.3. Data analysis

Teachers' written comments were analyzed using a coding system that focused on the cognitive processes of selective attention and knowledge-based reasoning processes, as well as on emotional and motivational processes. The coding system was developed based on data from a pilot study with two preservice and two in-service teachers. These teachers individually observed the sequences in two stages, as described above. We adapted dimensions and coding categories from the literature and identified pertinent examples for each category. Coding for the data of the main study was carried out by four coders. To measure inter-coder reliability, a subsample of 20 percent of the teachers' comments was used. Differences were resolved through discussion. The remaining 80 percent of the comments were evaluated by only one of the four coders.

Table 3 provides an overview of the six dimensions of the coding system, their subcategories, and the inter-coder reliability for each dimension. The values for Cohen's kappa ranged from .63 to .78 and showed satisfactory to good accordance for two coders.

The cognitive dimensions were based on work by Seidel et al. (2011) and Sherin (2007). We adapted the dimension of selective attention to reflect the focus of the comment, distinguishing between *focus on teachers'* and *focus on pupils' activities*. Raters also determined whether the observer made an attempt to *focus on the learning process* itself. For the dimension of knowledge-based reasoning, we separated *describing*, *explaining*, and *evaluating* processes. Further, we were interested in determining whether the observers *perceived* or *rated* positive or negative events without any further explanation, on the one hand, or reflected on possible *consequences* and *alternatives*, on the other. We adapted these categories from Schwindt (2008) and Seidel et al. (2011), who considered “articulating critical incidents” (p. 259) to be part of the knowledge-based reasoning process. Kersting et al. (2012) called this category “suggestions for improving” (p. 572) and showed that this type of reflection has a positive influence on student learning.

The emotion dimensions were inspired by Frenzel et al.'s study (2009) on teachers' emotions experienced during classroom teaching. We coded for whether the observer expressed *positive feelings* (enjoyment, interest, well-being) or *negative feelings* (disappointment, anger, boredom, shame) about anything they commented on.

For motivational aspects, we investigated whether the teachers were involved in the situations they observed. The concept of *immersion* (Goldman, 2007) was operationalized by evaluating the extent to which the teachers made efforts to analyze the video on a deep level rather than attending only to surface features. Deep analysis involved assuming the perspectives of the *teachers* and *pupils* and speculating about their inner states, such as their emotions or motivation. We also examined whether the teachers'

Table 3
Content analysis of teachers' comments: Dimension, category, and inter-coder reliability (Cohen's kappa and percentage).

Dimension	Categories	Percentage	Cohen's kappa
Selective attention	No Focus/Focus on teacher's activities/Focus on pupils' activities	90.48%	.74
	No Focus on learning processes/Focus on learning processes	80.95%	.63
Knowledge-based reasoning	Reasoning process: Describe/Evaluate/Explain/ 3-step analysis	88.10%	.73
	Dealing with negative events: No negative event/ Perceive negative event/ Evaluate/Reflect on consequences/Reflect on alternatives	78.57%	.69
	Dealing with positive events: No positive event/Perceive positive event/Evaluate/ Reflect on consequences/ Reflect on alternatives	80.95%	.66
Emotion	No emotions/Negative emotions/Positive emotions	85.71%	.78
Motivation	No immersion with teacher/ Immersion with teacher	83.33%	.65
	No immersion with pupil(s)/Immersion with pupil(s)	88.10%	.75
	No Resonance/Resonance with own practice – negative/ Resonance with own practice – positive	83.33%	.64

reasoning involved *resonance* with their *own practices* (Goldman, 2007). Hence, the comments were coded according to whether the teachers drew parallels to their own teaching experiences. In addition, we were interested in whether the teachers expressed negative or positive connections to their own practices.

Within each dimension, we calculated the percentage reflecting the frequency of codes in each dimension (totaling 100 percent). To examine differences between the Own Video Group and the Other Video Group, nonparametric tests were conducted. In addition, we compared coding for each of the five pairs. Qualitative analysis of illustrative comments clarified these differences in more detail. Finally, the relationship between cognitive and emotional–motivational variables within each group was examined using statistical correlation analysis and qualitative analysis of illustrative comments.

6. Results

6.1. Cognitive processes: selective attention and knowledge-based reasoning

The first research question explored what kind of selective attention and knowledge-based reasoning processes were activated when teachers observed videos of their own teaching or that of other teachers. Our analysis was based on 94 comments from members of the Own Video Group and 106 comments from members of the Other Video Group in two observation stages. Because analyses did not show major differences between the two observation stages, we focused our analysis on total values. Table 4 shows the relative frequencies of codes in the two dimensions of selective attention and three dimensions of knowledge-based reasoning.

区别1：关注教师和关注学生

Results showed slight differences between the Own Video Group and the Other Video Group in terms of the noticing processes of *focus on teacher's or pupils' activities* and *focus on learning processes.* Teachers in the Other Video Group focused slightly more attention than teachers in the Own Video Group on the pupils and on pupils' learning processes. Greater variance was found in knowledge-based reasoning processes. Whereas teachers in the Own Video Group only evaluated events more frequently, teachers in the Other Video Group more frequently engaged in evaluation and the other steps of description and explanation. There were no strong differences between the groups in terms of *dealing with positive events.* In *dealing with negative events,* members of the Other Video Group reflected on considerably more alternative actions than did members of the Own Video Group. We conducted significance tests on different levels of data (nominal, ordinal) to demonstrate obvious differences. Results showed that there was a tendency for the two groups to differ in terms of *dealing with negative events* ($Z = 1.841$; $p = .066$).

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A closer look at the values for *dealing with negative events* revealed that teachers in the Other Video Group did not differ from teachers in the Own Video Group regarding the relative number of comments on negative events. Own Video Group members did not address negative events in 29.8 percent of their comments, and Other Video Group members did not do so in 30.2 percent of their comments. This implies that in about 70 percent of their comments,

Table 4
Content analysis of teachers' comments: Relative frequency of selective attention and knowledge-based reasoning codes for Own Video Group (1) and Other Video Group (2). Values in percentage of $n = 94$ (Own Video Group) and $n = 106$ (Other Video Group).

Selective attention	No focus	Focus on teacher's activities		Focus on pupils' activities	
	(1) 1.1%	(1) 75.5%		(1) 23.4%	
	(2) .0%	(2) 67.9%		(2) 32.1%	
	No focus on learning processes	Focus on learning processes			
	(1) 61.7%	(1) 38.3%			
	(2) 55.7%	(2) 44.3%			
Knowledge-based reasoning	Reasoning process				
	Describe	Evaluate	Explain	3-step analysis	
	(1) 4.3%	(1) 34.0%	(1) 5.3%	(1) 56.4%	
	(2) 3.8%	(2) 24.5%	(2) .9%	(2) 70.8%	
	Dealing with negative events				
	No negative event	Perceive	Evaluate	Reflect on consequences	Reflect on alternatives
	(1) 29.8%	(1) 28.7%	(1) 17.0%	(1) 4.3%	(1) 20.2%
	(2) 30.2%	(2) 7.5%	(2) 10.4%	(2) 6.6%	(2) 45.3%
	Dealing with positive events				
	No positive event	Perceive	Evaluate	Reflect on consequences	Reflect on alternatives
	(1) 63.8%	(1) 2.1%	(1) 11.7%	(1) 17.0%	(1) 5.3%
	(2) 65.1%	(2) 0%	(2) 14.2%	(2) 16.0%	(2) 4.7%

participants in both groups described and reflected on negative events. The two groups differed in terms of *dealing with negative events*, primarily in the number of identified alternatives (Own: 20.2 percent; Other: 45.3 percent).

The comparison of coding for each of the five pairs confirmed predicted distinctions between the groups solely for the dimension *dealing with negative events*. In three cases, Other Group members reflected mainly on possible alternatives whereas Own Group members evaluated (pair 3 and 5) or reflected mainly on consequences for students' learning without drawing on alternatives (pair 1). In one case, the difference occurred on a low level of analysis: whereas the member from the Other Group evaluated primarily negative events, the Own Group member merely perceived them (pair 2). The members of the final pair commented similarly and reflected mainly on possible alternatives (pair 4). In sum, four out of five comparisons between pair members revealed deep analysis in the comments of Other Video Group members.

Two comments from video-pair 5 represented a typical example of differences in the way participants in the two groups dealt with negative events. This pair viewed a sequence showing the beginning of a lesson about "partial root extraction." The teacher in the video explained a multiplication algorithm using the example "square root of 27." The teacher who observed his own video commented, "This is a very strong teacher-guided instruction. Perhaps, next time one should have the courage to let the students find the solution themselves?" This teacher perceived and evaluated the situation as a negative event. However, he did not reflect specifically about the consequences of this overemphasis on teacher-guided instruction for student learning. Although the teacher suggested an alternative, he did not explain in detail how the students could be involved in finding a solution and how he could support this process.

The Other Video Group member's perception of the same negative event was reflected in his comment, "To activate all students the teacher could ask them to estimate the result of root 27. Many students probably would have estimated 5.1 or 5.2. It would have been nice to compare this result with the calculated result." This teacher proposed that students need to be asked about their prior knowledge (estimating square roots). In addition, he suggested a comparison of estimated results with the calculated result after the teacher's instruction (but without explaining the positive consequences of this action). Even though the teacher only partially described the consequences of his proposal, he explained a concrete alternative to the teacher's action in the observed situation. This comment provided a more in-depth discussion of the instruction as compared to the Own Video Group teacher's comment. Whereas the Own Group teacher mainly evaluated situations and reflected on alternatives only once, the Other Group teacher used six situations to reflect on alternatives.

The analyses show that teachers observing videos of other teachers' classrooms analyzed negative events in greater depth, whereas teachers in the Own Video Group often described or evaluated negative events in a more superficial way.

6.2. Emotional–motivational processes: emotions, immersion, and resonance

With the second research question we sought to establish which emotional and motivational processes were activated when teachers observed videos of their own teaching or that of other teachers. The analysis was based on the evaluation of comments and rating items. As for the cognitive responses, analyses did not show major differences between the two observation stages. For this reason, we focused our analysis on total values. Table 5 shows the relative frequency of codes in one dimension for emotions and three dimensions for motivation.

Table 5
Content analysis of teachers' comments: Relative frequency of emotion-, immersion-, and resonance-codes for Own Video Group (1) and Other Video Group (2). Values in percentage of $n = 94$ (Own Video Group) and $n = 106$ (Other Video Group).

Emotion	No emotions[a]	Negative emotions	Positive emotions
	(1) 58.5%	(1) 19.1%	(1) 22.3%
	(2) 28.3%	(2) 42.5%	(2) 29.2%
Motivation	No immersion with teacher	Immersion with teacher	
	(1) 45.7%	(1) 54.3%	
	(2) 54.7%	(2) 45.3%	
	No immersion with pupil(s)	Immersion with pupil(s)	
	(1) 80.9%	(1) 19.1%	
	(2) 65.1%	(2) 34.9%	
	No resonance	Resonance with own practice – negative	Resonance with own practice - positive
	(1) 63.8%	(1) 7.4%	(1) 28.7%
	(2) 67.9%	(2) 11.3%	(2) 20.8%

[a] Difference is significant when $p < .05$.

Table 5 shows obvious differences between the two groups in terms of *emotions*. Other Video Group members reported considerably more negative emotions and slightly more positive emotions. In terms of *immersion*, Own Video Group members commented slightly more frequently on *immersion with the teacher*, whereas Other Video Group members' comments more frequently reflected *immersion with pupils*. Results for the categories of resonance showed that Other Video Group members commented slightly more frequently on *negative resonance with own practice*, and Own Video Group members commented slightly more on *positive resonance with own practice*. Significance tests indicated a systematic difference between the groups in terms of *no emotions* ($Z = 2.023$; $p = .043$). Own Video Group members' comments contained significantly fewer expressions of emotion than did comments of Other Video Group members.

In addition, the comparison of coding for each of the five pairs confirmed predicted differences between groups for the dimension *emotions*. In four out of five cases, Other Group members commented more on negative emotions than did Own Group members (pairs 2, 3, 4, and 5). In terms of positive emotions, no notable difference was found between the groups.

An 'in-depth' analysis of the reported negative emotions indicated that disappointment (e.g. "It is a pity") and anger (e.g. "I'm annoyed that…") arose more often than boredom and shame. Other Group members' comments contained considerably more expressions of disappointment (Other Group: 33; Own Group: 4) and slightly more utterances of anger (Other Group: 10; Own Group: 8) than did comments from Own Group members. In terms of disappointment, Other Group members' comments focused almost exclusively on the teacher's action, whereas Own Group members' comments focused solely on students (e.g. students not participating) and external factors (e.g. lack of teaching time).

We identified three typical situations that were connected to Other Group members' expressions of disappointment. First, teachers expressed disappointment when a teacher did not react to a student contribution; e.g. one teacher commented, "I find it unfortunate that the student doesn't receive feedback. He should know if he was right in his reasoning. I think a teacher has to react in such a situation." Second, teachers expressed disappointment when situations were mainly teacher-centered, and the teacher did not activate students' thinking. For example, another teacher commented, "I find it sad that the teacher calculates it himself. It passes by the students." Third, teachers in the Other Group expressed disappointment in situations in which a teacher's

presentation of new content was poorly structured, incomprehensible, or unappealing; e.g. a third teacher commented, "I find it sad that the teacher doesn't introduce the subject in a more exciting way." In contrast, none of the teachers in the Own Group expressed disappointment in their own teaching activities.

To verify the results for emotional–motivational processes, we compared the content analysis and rating results. Table 6 shows the ratings of both groups at the two measurement points. Due to unsatisfactory values for Cronbach's alpha on the scales of enjoyment, boredom, and immersion, we also produced estimates for single items.

The responses to the rating items indicated that teachers in the Own Video Group were not systematically more emotionally or motivationally involved as compared to teachers in the Other Video Group.

Results for emotions showed that teachers in the Other Video Group perceived their *enjoyment*, *anxiety*, and *shame* to be higher and that teachers in the Own Video Group gave higher ratings concerning *guilt*. Boredom and anger during the observation were given almost equally low ratings in both groups.

Results for *immersion* showed that teachers in the Other Video Group were more involved in videotaped situations than were teachers in the Own Video Group. For five out of six immersion items, the Other Video Group gave higher ratings than the Own Video Group at both measurement points. For the immersion item "I became sleepy" (negative polarity) alone, there were slightly higher ratings in the Own Video Group (after reversing the negative values). Findings on the other dimensions showed minor differences between the groups.

Results for resonance revealed higher ratings for *resonance with own instruction* in the Own Video Group and slightly higher estimates for *resonance with typical practice* in the Other Video Group. Significance tests showed no systematic differences in ratings between the two groups in both observation stages.

The rating results were not in line with the analysis of teachers' comments in terms of differences between the groups in the expression of negative emotions. The experience of negative emotions was rated similarly in both groups. However, it should be noted that we did not ask the teachers to rate their perceived disappointment. Content analysis of the comments showed that the groups differ in terms of this negative emotion.

6.3. Relationship between cognitive and emotional–motivational processes

To answer the third research question, we analyzed the interplay between cognitive and emotional–motivational processes within the Own Video Group and within the Other Video Group. We examined the correlation between the cognitive dimension *dealing with negative events* and *emotion*, *immersion*, and *resonance*. We chose this cognitive dimension because the Other Video Group and Own Video Group differed notably regarding it. Members of the Other Video Group analyzed negative events more deeply and could reflect considerably more on alternative actions than could members of the Own Video Group. To perform these correlation analyses, we recoded the *dealing with negative events* variables into a single binary variable (reflection on alternatives vs. no reflection on alternatives).

Quantitative analysis revealed a significant correlation between *reflection on alternatives* and negative *emotions* for all participants ($r = .695$; $p = .026$) and high correlations between the two variables for the Own Video Group ($r = .734$; $p = .158$) and Other Video Group ($r = .648$; $p = .237$). These exploratory analyses suggest that the depth of cognitively driven analysis is positively associated with negative emotions.

A closer look at coding results showed correlations between emotional disappointment and reflection on alternatives for the Other Video Group. From a total of 33 comments containing expressions of disappointment, 27 contained reflections on alternatives. An example of a teacher observing a video of another teacher illustrated this association. The teacher analyzed by commenting, "Generalizations should come from the students. Here, the teacher intervenes too much. Student summaries could be written on the back of the board and checked for accuracy." In a comment about the emotions she experienced while observing the event, she expressed disappointment in the teacher's action: "I think it's a pity that the capacities of pupils were not sufficiently used." This example illustrated that disappointment with the teacher's action did not lead to constrained cognitive processes, i.e. to superficial negative evaluations. Rather, it appears that weak negative emotions like disappointment can be associated with an in-depth reflection on alternatives.

7. Discussion

This study explored teachers' cognitive, emotional, and motivational responses while individually analyzing videos of their own or others' teaching. We assumed that different learning goals could be realized through observation of videos of one's own teaching as compared to observation of videos of others' teaching.

Previous empirical findings led us to expect positive emotional and motivational effects for teachers analyzing videos of their own classrooms (Borko et al., 2008; Brouwer, 2012; Rosaen et al., 2008; Seidel et al., 2011). On the other hand, the observation of videos of other teachers has been shown to lead viewers to deeper reflection on negatively perceived events (Seidel et al., 2011). Regarding initial

Table 6
Rating results: Emotions, immersion, and resonance after two observation stages.

	N	1st stage		2nd stage		1st & 2nd stages	
		Group (1) *Own* Video M (SD)	Group (2) *Other* Video M (SD)	Group (1) *Own* Video M (SD)	Group (2) *Other* Video M (SD)	Group (1) *Own* Video M (SD)	Group (2) *Other* Video (M/SD)
Enjoyment[a]	4	1.7 (.74)	1.95 (.60)	1.15 (.67)	1.50 (.88)	1.60 (.67)	1.8 (.40)
Anxiety[a]	2	.3 (.45)	.6 (.82)	.5 (.87)	.6 (1.08)	.4 (.58)	.6 (.93)
Anger[a]	2	.5 (.71)	.7 (.76)	.8 (.97)	.5 (.5)	.65 (.80)	.6 (.63)
Boredom[a]	2	1.2 (.57)	1.1 (.42)	1.2 (.27)	1.3 (.27)	1.2 (.41)	1.2 (.27)
Shame[a]	1	.4 (.55)	.6 (.89)	.4 (.55)	.4 (.89)	.4 (.22)	.5 (.87)
Guilt[a]	1	.2 (.45)	.0 (.00)	.4 (.89)	.0 (.00)	.3 (.45)	.0 (.00)
Immersion[b]	6	2.13 (.30)	2.57 (.37)	1.50 (.53)	2.33 (.63)	1.82 (.39)	2.45 (.49)
Resonance – own instruction[b]	1	2.8 (.45)	2.2 (.84)	2.6 (.89)	2.4 (.55)	2.70 (.45)	2.3 (.67)
Resonance – typical instruction[b]	1	.8 (1.30)	1.0(1.00)	.8 (1.30)	1.0 (1.00)	.8 (1.30)	1.0 (1.00)

[a] Rating format: min = 0 ("disagree"), max = 3 ("agree").
[b] Rating format: min = 0 ("never"), max = 3 ("always").

meetings in collaborative PD settings in which teachers observe videos of themselves, research has demonstrated that teachers are reluctant to comment critically about their peers' practice (Borko et al., 2008; van Es, 2012; Zhang et al., 2011). Researchers have not yet investigated systematically how these two types of videos affect teachers' cognitive and emotional–motivational responses. First, many previous studies of video-based PD focused on group settings and collaborative reflection (e.g. Borko et al., 2008; Sherin & van Es, 2009), for which individual relationships to the videos are difficult to reconstruct. Second, few studies have compared experiences of teachers watching videos of themselves to experiences of teachers watching videos of others.

To investigate the differential effects of observing videos of oneself or of others teaching, we focused on individual reflection on videos using a quasi-experimental research approach. Emotional and motivational processes and their interplay with cognitive processes have thus far received little systematic investigation. Therefore, our research focused in particular on cognitive and emotional–motivational processes taking place during teachers' observations of videos. We provided teachers in the Own Video Group and Other Video Group with the same instructions and questions throughout the observation process. Our analysis was based on the evaluation of written comments made by the participants during the two observation periods and their answers to fixed-response rating items after each observation stage.

Our first research question dealt with the cognitive processes activated when teachers observe videos of their own teaching or the teaching of others. Our research confirmed the expected cognitive effects of observing videos of other teachers' classrooms. The knowledge-based reasoning processes of the Other Video Group members contained more frequent reflections on alternative ways of dealing with negatively perceived events. Likewise, members of the Other Video Group explicated situations and the consequences of the videotaped teacher's actions in greater depth than did members of the Own Video Group. By contrast, the Own Video Group members tended only to perceive, describe, and evaluate situations. These results confirmed the findings of a previous experimental study conducted by Seidel et al. (2011) using similar methods of data collection and analysis. Seidel et al. (2011) also found that teachers in the Own Video Group commented less critically and identified fewer consequences and alternatives than did teachers in the Other Video Group. Nevertheless, we suggest that results are influenced by our video-based approach, the individual setting, and the brevity of our intervention.

Our video-based approach presented participants with a selected video sequence and three reflection questions to be answered at their chosen time interval; meaning participants could stop, pause or rewind their video as they wished. In addition, in the second stage of observation, participants were asked to focus on specific pedagogical content (cognition-activating questions and requests). This approach does not take into account the individual learning goals and interests of the participants; thus, it follows a specific approach rather than the adaptive approach common in video-based PD (Borko et al., 2011). In specific-approaches goals, resources and facilitation materials are specified for a previously planned PD experience. In this context, videos of others' teaching may be the medium best suited for the careful, task-oriented analysis of classroom situations (Seago, 2004).

In addition to the influence of our video-based approach on cognitive processes, we considered the role of the individual, computer-based setting and the limited time for analysis of participants.

Compared to our approach, individual settings with a coach/mentor or collaborative settings with a facilitator offer multiple opportunities to support knowledge-based reasoning processes. For example, a coach or facilitator could scaffold teachers' analysis (Santagata, 2011), and collaborative approaches allow group members to contribute new, in-depth analysis of situations (Borko et al., 2008; Sherin & van Es, 2009). Furthermore, research on collaborative settings points to the importance of regular meetings and teachers' repeated observations of their own videos (Sherin & van Es, 2009; Zhang et al., 2011). We assume the transferability of our findings to situations in which teachers observe their own videos for the first time (e.g. in the first collaborative PD meeting) and have limited experience observing PD videos. The findings give us an idea about which cognitive processes might be elicited as a direct reaction to the video. However, in collaborative settings these cognitions may be interpreted from a different perspective or state of mind leading to different outcomes. Our findings suggest that teachers reflecting on their own videos are in such an extent accustomed to their own practice and their strategies of self-reflection, thus they are less able to reflect about alternatives to their own practices. Thinking about alternative teaching practices is likely to be more difficult for teachers observing themselves for the first time, likewise without adaptive scaffolding. In contrast, it appears that teachers observing videos of others' teaching are less guided by their natural teaching habits and self-reflection on their teaching behaviors. Teachers observing others' teaching are conceivably better able to concentrate on critical situations and analyze sequences in greater depth. Further research is needed regarding: 1) whether teachers observing themselves or others in individual settings with a coach/mentor are able to provide less/more in-depth analysis than the teacher in our individual, computer-based setting. Also more research is needed regarding 2) teachers observing themselves or others in a group setting with a facilitator and whether these teachers are able to provide less more in depth analysis than the teacher in our individual, computer-based setting. Similarly, future research should examine how the cognitive processes involved in teachers' observations of their own and others' videos change when teachers analyze a video sequence repeatedly.

The second research question sought to determine which emotional and motivational processes are activated when teachers observe videos of their own or others' teaching. Teachers' reported emotions and motivations contradicted our expectations about emotional–motivational processes. The results did not confirm that teachers observing videos of their own classrooms express more positive or negative emotions, nor did they confirm that these teachers are more involved or better able to link videotaped situations with events in their everyday practice. On the contrary, Other Video Group members reported notably more negative emotions, i.e. disappointment with teaching actions, as well as slightly more positive emotions. In addition, their comments revealed a higher level of immersion with pupils' activities. Answers to the fixed-response rating items also indicated that teachers in the Own Video Group did not show stronger emotions and immersion as compared to teachers in the Other Video Group.

What are the reasons for these unexpected and counterintuitive results? First, we assume that video observation in both the Own Video Group and Other Video Group has the potential to activate various emotional–motivational processes (Yadav et al., 2011). However, recent research has focused mainly on positive motivational factors (e.g. immersion and resonance) that arise when teachers observe their own teaching (Borko et al., 2008; Sherin & Han, 2004). Our findings suggest that videos of others' teaching activate negative emotions, mainly disappointment in the teaching performance of others. Second, observing one's own videos does not automatically activate emotional–motivational processes. Rather, the way those videos are presented may affect teachers' cognitive and noncognitive responses. Certain aspects of our video-

based approach might have been ill-suited to evoking positive emotional–motivational reactions from teachers observing their own videos. Zhang et al. (2011) argued that teachers benefit more from analyzing their own videos when they have control over the video and can observe it as many times as they wish. In our study, we confronted teachers with a preselected scene, the same set of questions to reflect on, and the request to observe the video only twice. Therefore, these limits could have led to inhibition or avoidance, which could explain the relatively restrained comments on emotions and motivations. It is possible that teachers who observed their own teaching were not entirely willing to deal with the specific instructions and questions. As an example of an inhibitory effect, one teacher mentioned in the debriefing that the preselected scene highlighted a bad practice as compared to his regular performance during lessons. Due to this participant's belief that he normally performs better, he was unwilling to reflect upon his teaching in the video sequence. Third, results revealed that differences between the groups were higher in cognitive processes than in emotional processes. Accordingly, the teachers' prior experience and knowledge may have exerted a stronger influence on their reflections on their own videos than on their emotional reactions. Fourth, we prompted the participants to provide written comments on their emotions, immersion, and resonance, in addition to their cognitive analysis of situations in the videos. We employed qualitative methodologies (content analyses) to investigate emotions. For internal validation, we carried out a quantitative approach by using a self-report questionnaire with rating items to evaluate certain emotions evoked by the videos. Analyses of written self-reports and self-report indicators are widely used methods in emotion research in education (e.g. Yadav et al., 2011). However, they are criticized for their external validity (Linnenbrink, 2006). For example, it is conceivable, that the study conditions interfere with the assessment of emotions in that teachers do not report their genuine emotional states (Schutz & DeCuir, 2002). We assume such effects for cases in which teachers observe themselves and perceive discrepancy between actual practice and their own self-perception. In such cases, teachers could estimate their self perceived identity as compromised and could conceive shame or guilt (Tracy & Robins, 2004). It is a debatable point whether these self-conscious emotions are to be recorded in written reports and rating items in context of a computer-based environment. For future research, we suggest to attempt more dynamic methods of data collection to elicit emotional processes during the observation (e.g. stimulated recalls, think aloud protocols).

To be able to generalize our findings to individual settings with a coach or collaborative settings with a facilitator, it would be necessary to explore how teachers react upon viewing their own videos. It would also be necessary to analyze their feelings associated with having those videos viewed and critiqued by colleagues (van Es, 2012). One could argue that the presence of others has a crucial effect on the teachers observing their own videos. However, research has not investigated emotional processes in group settings systematically. Based on current research on cognitive and motivational processes in group settings (Borko et al., 2008; van Es, 2012). We would assume that teachers' initial emotional reactions to their own videos are similar to the reactions in individual settings, but that they reinforced by dynamic processes in the group. We expect that emotional reactions would likely change as a result of facilitation and with experience in observation over time.

Our third research question asked how cognitive and emotional–motivational processes are related while teachers are commenting on videos. The exploratory analysis indicated that negative emotion was associated with cognitively controlled analysis processes when teachers observed videos of their own classrooms. We were able to reveal significant correlations between the cognitive process of *dealing with negative events* and negative emotional processes in both the Own Video and Other Video Group. Like the result of our second research question, these results contradicted some of our assumptions. For Own Video Group members, we expected negative emotions such as shame, anger, and guilt to negatively influence the in-depth analysis of situations, e.g. reflection on alternatives to negative events. However, the correlation analysis showed a positive association between negative emotions and in-depth reflection on alternatives within both groups. Based on our more detailed analysis of the teachers' comments, we conclude that, in particular, the emotion of disappointment may encourage teachers observing others' videos to reflect on possible alternatives.

Certainly, several limitations of the current study should be noted. First, its small sample size limited the generalizability of its results. Larger studies with more participants in the Own or Other condition would be necessary to obtain the additional evidence required to reevaluate our findings. Second, our study used a video-based approach with specified goals and instructions, as well as an individual, computer-based setting, and a brief intervention. Consequently, our data allowed for only a very modest conclusion about processes under different instructional conditions (e.g. long-term, collaborative PD). Further research should investigate the effects of Own and Other videos in various instructional approaches and settings. Third, regarding emotional processes, our results were based on the assumption that emotions can be reconstructed from teachers' comments written during the observation period. Further research on noncognitive effects should integrate different methods to collect and analyze data.

Our results revealed that, in the context of a specific video-based approach, an individual, computer-based setting, and a brief intervention time, there are benefits to teachers analyzing videos of other teachers' classrooms. Observing videos of others' teaching encourages deeper reflection processes and leads to emotional and motivational involvement similar to or higher than that which occurs while observing videos of one's own teaching. Our results suggested that videos of others' teaching may be valuable for initiating theoretically oriented, systematic reflection in teacher PD. However, as Shulman (1992) argued, the selection and contextualization (adding information about the lesson) of video sequences for teacher education may be important factors for realizing these advantages. We made sure to select video material that connected to the daily practice of the participants. It was important that the teachers observed a lesson at a grade level and in a subject similar to their teaching assignment at the time of the data collection. Further, all scenes were taken from everyday classroom lessons. In addition, emphasis was placed on the contextualization of the video scenes within the larger lesson. Teachers were given a timeline that explained the phases of the lessons with brief information about what had occurred before and after the selected sequence. In addition, participants could read the student task sheets. This information may have allowed the Other Video Group members to think along the same lines as the teacher in the video and to be emotionally and motivationally involved in the teacher's and pupils' activities. In order to enable in-depth analysis for teachers observing their own teaching in individual settings, one solution may be to thoroughly prepare them for the analysis. Questions or reflection tasks should probably be implemented selectively and more carefully than they are in settings in which teachers observe videos of other teachers.

Our study demonstrates the benefits of comparing teachers' analysis of their own and others' videos. We pointed out that the individual analysis of one's own and others' videos results in differential effects on cognition, motivation, and emotion that may not always be intuitive or easily observable in individual and group settings.

Acknowledgments

The preparation of this paper was supported by grant KL 2431/1-1 of the German Research Foundation (DFG) as part of the workshop for junior researchers "School and Classroom Research." We would like to thank the teachers for participating in this study, Alicia Alonso from Michigan State University for her recommendations and Alison Lowry and Wendi Boxx for proofreading this article.

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