



Self-viewing with Structured Viewing Guides.

First Results of an Intervention Study

Paper presented at the *International Symposium Research on the Use of Video in the Professional Development of Mathematics and Science Teachers*,
Lausanne, Switzerland, 23-25 June 2011

Niels Brouwer,
Eindhoven School of Education, the Netherlands
Email: c.n.brouwer@tue.nl

Eric Besselink,
Iselinge Teacher Education College, Doetinchem, The Netherlands

Gert Muller,
freelance educational designer, The Netherlands

Self-viewing with structured viewing guides

CONTENTS

1. Introduction	3
2. Context and method	4
2.1 Context	4
2.2 Data collection	5
2.3 Data analysis	9
3. Results	10
3.1 Student-teacher competence development in experimental and control groups	10
3.2 Qualitative explorations of student teachers' visual learning	16
3.2.1 Expert ratings of video fragments from student teaching	16
3.2.2 Retrospective interview with student teacher and mentor	19
3.2.3 Learner reports about peer consultation	21
4. Conclusion	21
References	23

1. Introduction

Since about 2000, the use of digital video (DV) for teacher education and professional development is rapidly gaining popularity in the Netherlands. A variety of DV uses has sprung up such as Didiclass, a collection of authentic video cases about classroom management which is available both online (<http://portal.rdmc.ou.nl/casusbank/>) and offline (www.didiclass.nl) and Colevi, a collection of scripted teacher-parent conversations (Bakx e.a., 1999). Video coaching of teachers, already longer in existence, has gone digital (www.svib.nl) and more recently, teacher peer coaching with DV is being developed (Brouwer, 2009). An important difference between such applications is whether the teachers involved view footage from others' or their own lessons (cf. Tochon, 1999 about "other-viewing" and "self-viewing" respectively).

Nationally and internationally, both practical experience and research suggest that DV is a promising medium to encourage prospective and experienced teachers to link practical experience with theoretical study. Learning environments in which DV plays a central role may support teachers in modifying and expanding their teaching competence. In the Netherlands, the infrastructure for DV use in education is vigorously being developed. Local and regional initiatives have begun to build collections of video material which are subsequently made available nationally, e.g. the project Leoned about language teaching (http://content-e.ou.nl/content-e/pub_RDMC/Leoned_Kennisbasis_1219911781328/index.htm). The ministry of education has launched a web site with video documentaries about education (www.leraar24.nl) and publishers have pooled resources to make videos of teaching available (www.teacherstv.nl). It is to be expected that this development will continue.

So far, empirical evidence about the conditions and effects of video use in teacher education and professional development has been produced more abroad than in the Netherlands itself (cf. the preliminary review of research in the US, Germany, Switzerland and other countries by Brouwer, 2011). It is therefore fortunate that Kennisnet (Knowledge Net), the Dutch national agency for ICT in education, has contributed funding to the study about DV use in preservice teacher education to be reported here. It is time for systematic research that helps us understand and underpin the steadily increasing use that is being made of DV in Dutch teacher education.

Both studies focus on the outcomes of DV use by teachers and how these outcomes are produced. We conceive of "outcomes" as the acquisition, elaboration and diversification of instructional and pedagogical insights and skills by teachers in interaction with learners, fellow students and colleagues. DV lends itself well to representing teachers' interaction with learners concretely and authentically. Their interaction with learners – particularly the content-focused interaction in group settings – is an important point of reference in our research, as it is ultimately the learning results in learners that should benefit from teachers' competence development. Teacher learning should therefore be studied in conjunction with the learning by their clients.

The study to be reported is directed at self-viewing practices taking place in collegial cooperation among student teachers. In the intervention studied, student teachers used a "portable video tool kit" for examining and discussing their lessons in reading comprehension in primary schools.

The overarching *aim* of the research reported here is to identify firstly learning effects of DV use in prospective teachers in relation to their pupils' learning and secondly conditions that promote or hinder teacher learning with DV. Evidence-based knowledge about such conditions is relevant for designing, implementing and upscaling video use in teacher education.

Self-viewing with structured viewing guides

The following broad *research question* about the effectiveness of DV use for teacher education serves as our starting point.

In which respects and in which ways can collegial learning with DV help student teachers to improve the quality of their instruction?

In chapter 2, the context and the research design of the studies is described. Chapter 3 contains the findings and chapter 4 the conclusions.

2. Context and method

In this chapter, the contexts and methods involved in the preservice and the in-service studies are described.

In both contexts, quantitative as well as qualitative data were collected.

The quantitative data consist of pre- and post-intervention measures produced online by the participating teachers. Besides information about background characteristics, self-assessments were collected about their competence development in terms of specific teaching activities.

The qualitative data consist of video recordings of teachers' interaction with pupils on the one hand and of peer consultation sessions with colleagues on the other. During these sessions, they analysed and discussed together excerpts from the video footage of their lessons.

In both studies, criterion variables were used derived from the literature about effective teaching behaviours. In addition, questionnaire data were collected from the pupils in the classes of the teachers participating in the in-service study.

2.1 Context

In this study, two cohorts of student teachers participated from a college of primary teacher education, Iselinge Hogeschool in Doetinchem, the Netherlands.

The intervention studied took place before and during the student-teaching period in the first year of the preservice programme. It was meant to engage student teachers in filming their own and each others' lessons with "portable video tool kits" (PVTks), i.e. lightweight simple-to-use recording and playback equipment. In combination with this hardware, the students received "structured viewing guides" (SVGs) to analyse and discuss their video recordings. Structured viewing guides are lists of "viewing points", i.e. observation items regarding effective teaching behaviours, subdivided in categories.

Each cohort was divided in an experimental and a control group. The approach taken was to enable the student teachers in the experimental groups to generate instant visual feedback on their own and their peers' teaching by means of PVTks and discuss it together using the viewing points offered in the SVGs. These viewing points were selected from research-based literature about effective teaching behaviours in teaching reading comprehension to 4-5 year olds. The students were required to study articles selected from this literature and derive their own viewing points from them. The points chosen by the teacher education programme and those chosen by the students were compared in a "confrontation meeting", where also mentors were present from the schools where the student teaching took place. All viewing points were compared and discussed and on this basis, a final version of the structured viewing

Self-viewing with structured viewing guides

guide was agreed. The latter was used during the six-week student-teaching period, in which the student teachers cooperated in mostly two- or three-person groups with their mentor teachers and each other.

Before student teaching, the student teachers were also trained in the use of PVTks. They used this equipment during their student teaching to record, capture, edit and distribute video footage from their own lessons. The resulting footage was used in post-lesson conferences with mentors. After the completion of student teaching, all students in the experimental groups selected and edited fragments from their footage to illustrate how they had used the teaching behaviours targeted in their personal viewing points. Before each lesson fragment, they inserted the relevant viewing point as a caption in the video. These video productions were shown to and discussed with their peers and some of their mentors during plenary sessions shortly after the student teaching period. These discussions were meant to yield concrete intentions for further teaching action.

In sum, the students in the experimental groups generated instant visual feedback on their own teaching and discussed it during peer consultation using the viewing points provided in the structured viewing guides focusing on personally relevant effective teaching behaviors. In the control groups, the intervention described above did not take place. The students in these groups did not study literature specifically about reading comprehension and during their student teaching, they received only verbal feedback from their mentors on their lessons.

2.2 Data collection

The research design was directed at evaluating learning results of the use of portable video tool kit for encouraging competence development in student teachers as implemented in our sample.

The experimental groups had a high-school graduation one level higher than the control groups. This is because the experiment was carried out in a separate stream of the teacher education programme introduced in the school year 2009-2010. The creation of this stream is due to a national policy trend involving efforts to raise the academic level of primary teacher education. In other respects, the experimental and the control groups were similar where the amount and nature of prior teacher education courses taken was concerned.

Table 1 shows the distribution of respondents over the two cohorts of student teachers. It also shows how they were distributed over the experimental and control groups as well as how men and women were distributed.

	<i>Cohort 1</i>			<i>Cohort 2</i>			<i>Total</i>		
	N	men	women	N	men	women	N	men	women
Experimental group	13	15,4%	84,6%	10	20%	80%	23	17,4%	82,6%
Control group	40	14,9%	85,1%	100	16,5%	83,5%	140	17,4%	82,6%
Total	53	14,8%	85,2%	110	16,8%	83,2%	163	17,4%	82,6%

Table 1 Participants in preservice study

Self-viewing with structured viewing guides

The distribution of men and women in the total sample is 17,4% vs. 82,6%. This is quite skewed, representing the feminisation in primary teacher education found in many countries. The two experimental groups together comprise considerably fewer students than the two control groups. Compared to the first cohort, the second cohort has relatively few students in the experimental group. The distribution of men and women over the experimental and control groups hardly differs between the cohorts.

At the beginning and the end of the student teaching period during the first year of the programme, *quantitative data* were collected in both groups by means of online questionnaires regarding background characteristics, notably gender and level of high school graduation. The remainder of these questionnaires concerned the students' prior knowledge of and affinity with the subject of reading comprehension and self-assessments of their teaching behaviour. Table 2 shows the items administered. In this study, we use the self-assessments of teaching behaviour as criterion variables.

<i>Variables</i>	<i>Items</i>
Prior knowledge of and affinity with reading comprehension	
Liking for reading comprehension	When I was a pupil in primary school, I liked the subject of reading comprehension.
High notes as pupil	As a pupil, I always had high notes for reading comprehension.
Teaching experience	During student teaching, I already made a lot of experiences with reading comprehension.
Mentor	I have critically observed instructions for reading comprehension by my mentor.
Quality of own instructional behaviour	
Clear expectations	When I teach reading comprehension, I make clear what I expect from pupils.
Motivation	During my reading comprehension lessons, I succeed in motivating pupils to do the best they can.
Involving pupils	I succeed in motivating my pupils to participate actively in my reading comprehension lessons.
Predicting	During my lessons, I regularly let pupils predict the text content.
Illustrations	During my lessons, I often use illustrations, photos or video clips.
Recapitulating last lesson	At the beginning of a lesson, I always let pupils tell what the last lesson was about.
Making concrete	If possible, I make the meaning of difficult words concrete.
Achieving learning goals	In my lessons, I succeed in having the children achieve the learning goals within the time given.
Cognitive activation of learners	
Examples	During reading comprehension lessons, I always let pupils present their own examples.
Think all	While questioning, I always take care to give all children enough opportunity to think for themselves.
Multimedia as trigger	In my lessons, I regularly use multimedia sources that trigger children.
Asking higher-order questions	I find it easy to find ways of asking questions that challenge children to think.
Encouraging text analysis	During my reading comprehension lessons, I encourage children to ask questions about the text themselves.
Speaking in whole class	I take care to give many children opportunities to speak in whole-class settings.
Giving compliments	During my reading comprehension lessons, I give task-oriented compliments like "That's a clever solution, I think".
Constructive response from learners	
Enthusiasm	When I introduce the lesson, children are always enthusiastic to tell their own stories about the theme.
Topics	During my lessons, pupils often present topical examples.
Finding out more	After my lessons, some children have become so interested that they want to find out more about the topic.
Main issues	Through my questions, I achieve that children can distinguish well between major and minor issues.
Original solutions	During my reading comprehension lessons, children often contribute original solutions.
Thinking aloud	During my lessons, children are willing to demonstrate while thinking aloud how they arrived at a

	solution or answer.
Promoting anticipatory reading	
Asking about pictures	At the beginning of a lesson, I often ask questions about pictures alongside the text, so that children can predict a little in which direction the text will go.
Predicting remaining text	I always have children make predictions about how the text will continue.
Promoting cooperative learning	
Sharing ideas	I often use the opportunity to have children share opinions and ideas in groups.
Discussion	I encourage children to arrive at different solution strategies through discussion.
Strategy	I deliberately ask children "how" they solve problems and challenge them to have a dialogue together about those solutions.
Dialogue and discussion	My lessons are mainly lessons in which I have dialogues and discussion with the children.

Table 2 Pre- and post-intervention measures

In addition to the measures in Table 2, the following *qualitative data* were collected.

For the first cohort, senior teacher educators *rated* video clips produced by the students on whether and how well the teaching behaviours they wanted to practice were actually displayed in the lesson fragments shown. For this purpose, video clips were chosen in which students' interaction with children was clearly visible and audible. From a validity viewpoint, these ratings constitute an important complement to the students' self-assessments, because they provide an independent perspective on the outcomes of teacher learning with video. Students may feel that they learnt, but whether and in which respects this is really the case can be more validly determined when an additional data source is used. Secondly, an *interview* with one student teacher from the first cohort and her mentor was recorded on video, in which they explain how they used video to record and analyse the student's teaching.

In both cohorts, different types of qualitative data were collected during the plenary sessions which took place in the teacher education institute shortly after the student teaching period. These sessions were held on the 26th of May, 2010 in the first cohort and on the 24th of May, 2011 in the second cohort. On these occasions, *video recordings* were made of conversations in both plenary and small-group settings. At the end of both sessions, students wrote *open comments* in reaction to the following two statements:

1. The video helps me develop a command of the teaching profession.
2. Self-viewing challenges me to think about how I design my lessons.

In addition, they wrote brief *learner reports* by completing the following sentences:

- The peer consultation has given me the idea to
- Through the peer consultation I have discovered that I
- Because of the peer consultation I am now better able to.....
- The peer consultation has given me the feeling that
- To develop my instruction, my new personal learning goal(s) is/are.....

2.3 Data analysis

The quantitative data were analysed as follows. Response and non-response data were generated separately for each cohort and for both cohorts together. These data were also generated for the experimental and control groups separately. Because the composition of the experimental and control groups in both cohorts was not notably different (see Table 1 in section 2.1.2), they were pooled in the substantive analyses.

The pre- and post-intervention measures from both cohorts were analysed first by calculating descriptive statistics for the experimental and control groups separately. Then, difference scores between the pre- and post-intervention measures and means for these difference scores were calculated. Finally, the mean difference scores in the experimental and control groups were compared by means of t-tests for independent samples.

The qualitative data were analysed as follows.

The video clips produced by the students from the first cohort were rated by the two experts using the following questions.

0. Are the clips suited for expert analysis, i.e. are the pupils and their (learning) activities visible and are their utterances reasonably comprehensible?
1. Which viewing points were selected by the students?
2. Is the teacher and/or pupil behaviour described in the viewing point chosen visible in the clip or not, i.e. has the student really displayed in her/his lesson the behaviour to which (s)he refers?

Self-viewing with structured viewing guides

3. What – in the experts’ opinion – is the quality of the teacher behaviour that the student wants to show in her/his video clip?
 - 3a. Which teacher and/or pupil behaviour shown in the video clip is relevant for the viewing point chosen, i.e. what kind of teacher behaviour do we see exactly?
 - 3b. In which respects is the teacher behaviour displayed suited to encourage substantive learning by the pupils, i.e. what is the pedagogical and instructional quality of the teacher behaviour that we see?
4. What is the technical quality of the video clips?
5. In which respects are the video clips suited or unsuited for editing as model videos?

Cross-case analyses were performed for both cohorts on the open comments collected in reaction to the two statements offered to the student teachers and on the learner reports they completed. The statements made by the student from the first cohort and her mentor during the interview with them were summarised in the form of English subtitles to a 7-minute video clip.

3. Results

In this section, findings are reported first from the quantitative analyses (section 3.1), then from the qualitative analyses (section 3.2).

3.1 Student-teacher competence development in experimental and control groups

Table 3 shows the response achieved for both cohorts.

	Cohort 1			Cohort 2			Total			Pairs of pre-post measures			
	N	Res- ponse	%	N	Res- ponse	%	N	Res- ponse	%	Response			%
										Cohort 1	Cohort 2	Total	
Experi- mental groups	13	13	100	10	9	90	23	22	95.6	8	9	17	73.9
Control groups	40	34	85	100	60	60	140	94	67.1	6	55	61	43.6
Total	53	47	88.7	110	69	62.7	163	116	71.2	14	64	78	47.8

Table 3 Response to pre- and post-intervention measures

The response rates are satisfactory for both cohorts, although slightly lower in the second cohort. Not all respondents completed both pre- and post-intervention measures, so that for calculating difference scores, fewer complete pairs of measures were available. Even so, the response rates for these pairs of measures are acceptable, especially in the pooled experimental groups.

Self-viewing with structured viewing guides

Table 4 shows the means found for the pre- and post-intervention measures as well as for the differences calculated between them. These values are displayed for the control and the experimental groups separately. The mean differences are shown in separate columns for decreases and increases. Mean differences larger than one half scale point are shown in italics. The last column to the right of the table contains the results of the t-tests. When these are statistically significant, the variables involved are printed in bold.

Variable (cf. Table 2)	<i>Control groups</i>				<i>Experimental groups</i>				<i>Comparison</i>
	Pre mea- sure mean	Post mea- sure mean	decrease	increase	Pre mea- sure mean	Post mea- sure mean	decrease	increase	p < 0,05 * < 0,01 **
Prior knowledge of and affinity with reading comprehension									
Liking for reading comprehension	2.57	2.5		.054	2.91	2.94		.062	n.s.
High notes as pupil	3.44	3.17	-.127		3.73	3.88		.187	n.s.
Teaching experience	2.70	2.90			2.39	3.41			
<i>Mentor</i>	2.77	2.94		.291	2.39	2.88		.941	n.s.
Quality of own instructional behaviour									
Clear expectations	3.61	3.67		.057	3.33	3.88		.441	n.s.
Motivation	3.43	3.48	0		3.02	3.71		.500	p = .032 *
Involving pupils	3.56	3.22	-.286		3.78	3.65	0		n.s.
<i>Predicting</i>	3.58	3.47		.038	2.91	3.71		.588	n.s.
<i>Illustrations</i>	3.23	3.64		.192	3.23	3.88		.765	n.s.
Recapitulating last lesson	2.94	3.19		.137	2.73	3.18		.375	n.s.
<i>Making concrete</i>	3.03	3.14		.154	2.91	3.71		.706	n.s.
Achieving learning goals	3.56	3.49	-.020		3.57	3.65	0		n.s.
Cognitive activation of learners									
Examples	3.16	3.21		.038	3.00	4.18		1.118	p = .001 **
Think all	3.96	3.59	-.309		3.35	3.76		.471	p = .002 **
<i>Multimedia as trigger</i>	3.38	3.20	-.231		3.13	3.59		.353	n.s.
Asking higher-order questions	3.33	3.14	-.278		3.04	3.24		.176	n.s.
Encouraging text analysis	2.99	3.16		.075	2.77	3.06		.187	n.s.
Speaking in whole class	4.43	4.29		.019	4.20	4.29		.206	n.s.
Giving compliments	3.94	3.86	-.274		3.83	4.06		.118	n.s.
Constructive response from learners									
Enthusiasm	3.68	3.63		.038	3.83	4.06		.118	n.s.
Topics	3.47	3.34	-.135		3.17	4.00		.765	p = .003 **
Finding out more	2.92	2.77	-.098		2.82	2.88	-.062		n.s.
Main issues	3.13	3.16	0		2.77	3.47		.687	p = .010 *

Variable (cf. Table 2)	Control groups				Experimental groups				Comparison
	Pre mea- sure mean	Post mea- sure mean	decrease	increase	Pre mea- sure mean	Post mea- sure mean	decrease	increase	p < 0,05 * < 0,01 **
Original solutions	3.13	3.31		.163	3.09	3.47		.294	n.s.
Thinking aloud	3.48	3.35	-.128		3.57	3.76		.294	n.s.
Promoting anticipatory reading									
Asking about pictures	3.70	3.74	-.073		3.61	3.94		.118	n.s.
Predicting remaining text	3.10	3.45		.358	3.14	3.35		.062	n.s.
Promoting cooperative learning									
Sharing ideas	3.15	2.93	-.231		2.59	2.88		.375	n.s.
Discussion	3.12	2.97	-.176		2.74	3.18		.471	p = .022 *
Strategy	3.34	3.27	-.120		3.17	3.53		.471	p = .029 *
<i>Dialogue and discussion</i>	2.95	2.99	-.021		2.78	3.35		.471	n.s.

Table 4 Comparison of control and experimental groups

Comparison of the pre- and post-intervention measures indicates that the students in the experimental groups reported greater improvements in their teaching than those in the control groups. This pattern is found for almost all variables. For seven variables, the differences between the experimental and control groups are statistically significant, four on the .05 level and three on the .01 level. The mean gains found in the experimental groups differing significantly from those in the control groups are visualised in Figure 1.

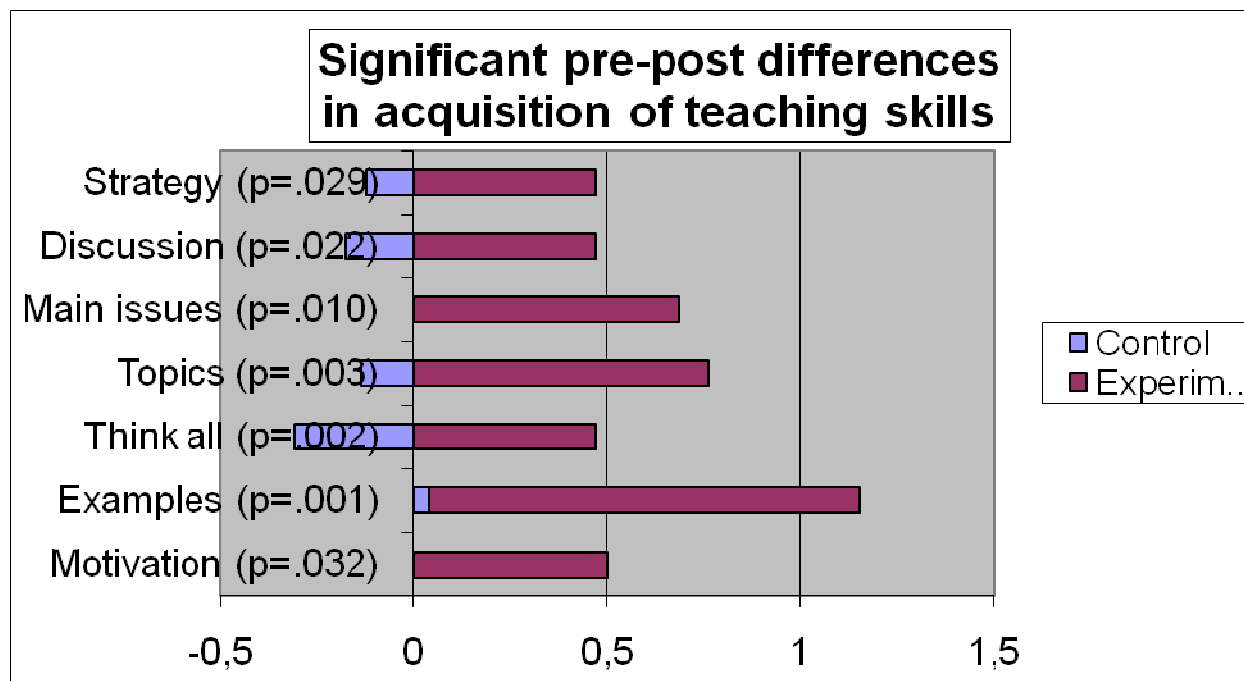


Figure 1. Mean gains in experimental groups significantly differing from control groups

The mean gains found in the experimental groups differing from those in the control groups by more than one-half scale point are visualised in Figure 2.

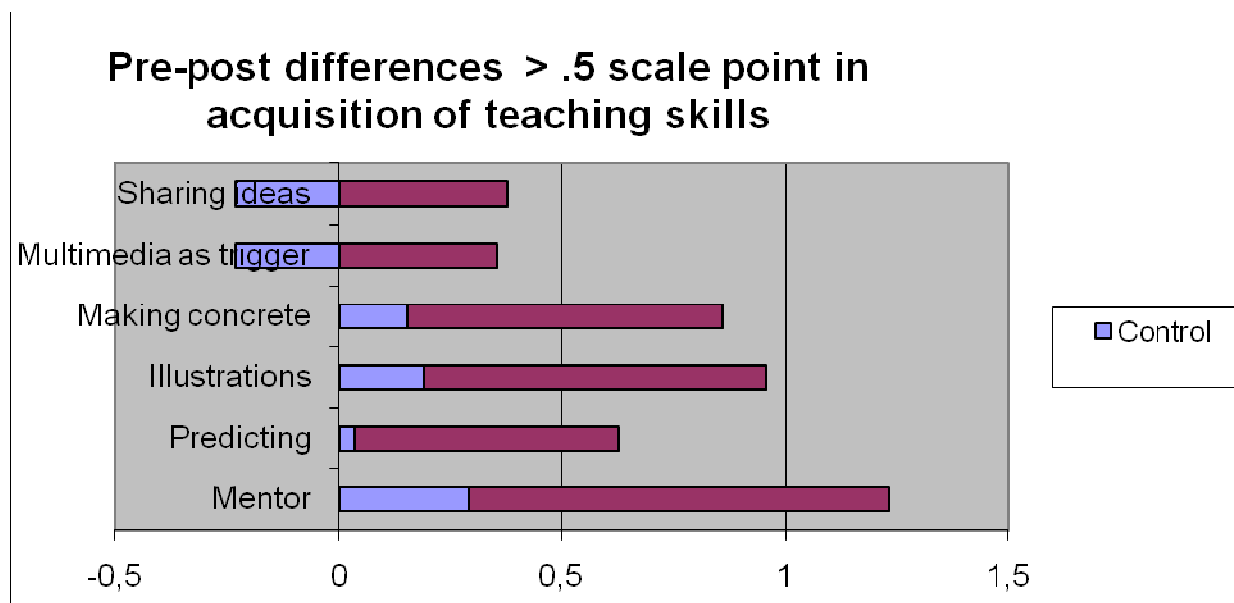


Figure 2. Mean gains in experimental groups differing from control groups by more than one half scale point

It is interesting to trace in which areas the experimental groups have achieved the greatest gains. This can be seen in Table 5, in which the variables with the largest gains have been ranked.

Variable (cf. Table 2)	Mean gain in experimental groups	Item
Examples (p=.001)	1.118	During reading comprehension lessons, I always let pupils present their own examples.
Topics (p=.003)	.765	During my lessons, pupils often present topical examples.
Illustrations	.765	During my lessons, I often use illustrations, photos or video clips.
Making concrete	.706	If possible, I make the meaning of difficult words concrete.
Main issues (p=.010)	.687	Through my questions, I achieve that children can distinguish well between major and minor issues.
Predicting	.588	During my lessons, I regularly let pupils predict the text content.
Motivation (p=.032)	.5	During my reading comprehension lessons, I succeed in motivating pupils to do the best they can.
Think all (p=.002)	.471	While questioning, I always take care to give all children enough opportunity to think for themselves.
Discussion (p=.022)	.471	I encourage children to arrive at different solution strategies through discussion.
Strategy (p=.29)	.471	I deliberately ask children "how" they solve problems and challenge them to have a dialogue together about those solutions.
Dialogue and discussion	.471	My lessons are mainly lessons in which I have dialogues and

Self-viewing with structured viewing guides

		discussion with the children.
Clear expectations	.441	When I teach reading comprehension, I make clear what I expect from pupils.
Sharing ideas	.375	I often use the opportunity to have children share opinions and ideas in groups.
Recapitulating last lesson	.375	At the beginning of a lesson, I always let pupils tell what the last lesson was about.

Table 5 Ranking of gains in experimental groups

Table 5 yields indications that those students who used the portable video tool kits for recording their lessons and the structured viewing guides for analysing them in consultation with their peers felt they succeeded better than their fellow students in the control groups in:

- making the content of their lessons concrete (see the variables Examples through Making concrete),
- bringing their pupils to engage actively with the subject matter (see the variables Main issues through Dialogue and discussions),
- clarifying their expectations as teachers (see the variable Clear expectations) and
- encouraging cooperative learning (see the variables Sharing ideas through Exchanging opinions and ideas).

It is equally interesting to find that in teaching behaviours having to do with the cognitive activation of pupils and with encouraging cooperative learning, the students in the control groups were not only outperformed by the students in the experimental groups, but actually felt that their skills in these areas fell behind over time.

3.2 Qualitative explorations of student teachers' visual learning

In this section, the results of the qualitative analyses are presented.

3.2.1 Expert ratings of video fragments from student teaching

In the experimental group in the first cohort, eleven out of the thirteen students produced video clips about the lessons they had given during their student teaching period. Fragments from these students' video clips were distinguished and analysed by the expert raters in the series of steps described in section 2.1.3. The results of this analysis are presented below following the order of these steps.

0. Suitability for analysis

To begin with, the analysis focused on whether the clips fulfilled two minimum conditions. The pupils and their (learning) activities had to be visible, if only they were filmed from the back. Also, the pupils' reactions and input should be reasonably comprehensible. It was also registered whether the images in the clips had been recorded from a fixed position directed at the whiteboard and the student teacher or from a camera position moving between student teacher and pupils.

Self-viewing with structured viewing guides

Eight of the eleven available clips were edited from footage with a fixed camera position and three from footage with a moving camera position. In all, five clips fulfilled the minimum conditions mentioned above. Among these were all three clips produced with a moving camera position.

1. Selection of viewing points

Table 6 contains an overview of those viewing points which the students incorporated in their video clips. The viewing guide about reading comprehension that was used in Iselinge College contains 39 viewing points divided over six categories. The second column shows how often the different viewing points were incorporated in all eleven available clips.

READING COMPREHENSION VIEWING GUIDE	Total out of N = 11	Totaal out of N = 5 XX	Totaal out of N = 5 X0
1. I DISCUSS THE GOAL OF THE LESSON.			
1. The pupils feel challenged by my introduction of the lesson.	1		
2. The pupils can name what kind of text is on the agenda.	1		
3. The pupils are clearly motivated to read the text.	0		
4. The pupils are willing to start the activity in a goal-directed way.	1		1
5. The pupils actively thinking during the lesson.	0		
2. I ACTIVATE PUPILS' PRIOR KNOWLEDGE.			
1. The pupils can tell what the last lesson was about.	2	1	
2. The pupils can give their own useful examples in relation to the text.	1	1	
3. The pupils feel challenged by and react to my questions.	6	3	
3. I LET PUPILS PREDICT THE TEXT CONTENT.			
1. The pupils can tell what they expect from the title.	3	2	
2. The pupils can tell what they expect from seeing the pictures.	2	2	
3. The pupils are curious about the new information in the text.	0		
4. The pupils feel accepted when they have their own view on the text.	0		
5. The pupils are supported by my thinking aloud and accept my model behaviour as a workable strategy.	0		
6. The pupils feel encouraged to give more precise explanations because they are asked elaborating questions about what they exactly mean.	0		
7. The pupils feel understood and appreciated when their input is phrased anew.	0		
4. MY LESSON IS RELEVANT FOR THE PUPILS.			
1. The pupils can connect the text to elements from their own world of experience.	2	1	
2. The pupils can connect current events to the text.	3	1	1
3. The pupils can master the (technical) reading level of the text.	2	1	
4. The pupils are triggered because I use the right multimedia sources in my lesson.	0	1	
5. Some pupils are so enthusiastic that they want to find out more about the topic, for example by searching the Internet, giving a talk or doing a project.	0		
5. I ASK QUESTIONS THAT CHALLENGE THE PUPILS TO THINK FOR THEMSELVES.			
1. The pupils feel challenged to answer questions about the text.	1		
2. The pupils are challenged to answer questions about the text.	0		
3. Through my questions, I achieve that children can distinguish well between major and minor issues.	0		
4. The pupils feel encouraged to ask themselves: 'Do I understand what I read?'	1		
5. The pupils react to solution strategies suggested by the teacher or other pupils in questions like: - How would you go about this? - Who ever tried this in a different way? - Who knows another clever way?	0	1	
6. I ENCOURAGE INTERACTION BETWEEN MYSELF AND THE PUPILS AND AMONG THE PUPILS THEMSELVES.			
1. The pupils know what is expected from them.	1	1	
2. All pupils are attending to the lesson.	1	1	
3. Many pupils get an opportunity to speak in whole-class settings.	2		

Self-viewing with structured viewing guides

4. Pupils give each other turns while speaking in whole class.	0		
5. Pupils react to me and to each other.	1		
6. The pupils find that they have a good chance of answering questions successfully.	0		
7. The pupils value the feedback they get.	0		
8. The pupils find that they get sufficient time to react.	1		
9. The pupils are enthusiastic and keep focused on the lesson.	1		
10. The pupils participate actively in activity formats such as making a word web or word scheme..	4	1	
11. During the activity formats used, the pupils exchange with each other.	2	2	
12. Due to my interactive instruction and support, the pupils can start doing learning tasks with confidence.	2	1	
TOTAAL	41	20	2

Table 6 Student teachers' selection of viewing points by students

The students most often chose those viewing points falling in the categories 2. Activating prior knowledge, 4. Relevance for pupils and 6. Interaction. These points concern the extent to which the student teacher succeeds in involving pupils actively in the lesson. The students were apparently less interested in categories 1. Goal of the lesson and 5. Asking thinking questions. These are more concerned with the content of the lesson and what can be learnt from it.

2. Visibility of teacher behaviour

The third and fourth columns in Table 7 show which viewing points occur in the clips rated by the experts and with which frequencies. These frequencies have been split referring to teacher behaviour that the experts considered evident in the student's teaching in accordance with the viewing point (s) he had selected (code *XX*) or teacher behaviour for which the experts judged the selected viewing point relevant, but which was actually not displayed during the lesson (code *XO*).

In all, the group of students whose clips were analysed by the experts selected 16 different viewing points. Comparison of the third and fourth columns in Table 7 shows that in all but two fragments, the student teachers actually displayed the teaching behaviors they had selected for practicing. In the two fragments where this was not the case, different behaviours were visible and/or students had labeled the behaviours shown incorrectly.

3. Relevance of teacher behaviour displayed

The experts not only analysed *whether* the teacher behaviour that the students pinpointed with the help of the viewing points was actually visible in the clips, but also *what kind* of behaviour they showed in their clips.

The clips of four out of the five student teachers show how they activated their pupils' prior knowledge (viewing point 2). They did so by giving instructions for reading and writing tasks, asking for word meanings, using external representations of the learning content (such as a word web on the whiteboard and a reading text) and asking questions elaborating on pupil answers to earlier teacher questions or reactions from other pupils.

Where predicting text content was concerned (viewing point 3), two out of the five students showed their pupils a reading text and asked them about its contents.

Where the relevance of the lesson for the pupils and challenging pupils to think for themselves were concerned (viewing points 4 and 5 respectively), the experts noted that the student teacher behaviour consisted of asking starting questions and elaborating questions.

Self-viewing with structured viewing guides

In addition to the above teaching behaviours, the experts noted in connection with interaction with and among pupils (viewing point 6) that four out of the five students activated their pupils by using forms of cooperative learning.

The experts also judged the pedagogical quality of the student teachers' behaviour, i.e. to which extent it was suited to encourage pupils' substantive learning.

For one student, the experts noted that she was too emphatic and lengthy in stating the lesson goal (viewing point 1), causing the pupils' attention to wander. Regarding activating prior knowledge and predicting text content (viewing points 2 and 3 respectively) the experts noted that especially asking starting and elaborating questions raised the quality of the lesson. On the other hand, they found that one student did too little about this and challenged the pupils less to think for themselves (viewing point 5) than was actually possible.

In four out of the five students, the experts noted that their interaction with pupils (viewing point 6) was characterised by forthcoming behaviour and an inviting attitude. In their judgment, this had a positive impact on the quality of the lesson.

4. *Technical quality*

From the perspective of lesson content, the experts noted that in three out of the five clips two lesson fragments could be distinguished. Their judgment of the technical quality of the clips was therefore based on eight homogeneous lesson fragments. They gave a predominantly negative rating of the video recordings concerned. This had mainly to do with the audibility of the teacher and the pupils, but also with unsteady holding of the camera and filming against sources of light. These aspects hinder comprehension and interpretation of the clips produced by the students.

5. *Suitability for editing as model video*

Out of the eight lesson fragments distinguished, the experts judged three suitable for editing as model videos. Whether they considered a fragment suitable or unsuitable depended mainly on two aspects: first the extent to which the clip offered a view of the student teacher's interaction with pupils and her or his own part in this interaction, and second the extent to which the sequence of the lesson parts concerned could be reconstructed from the images.

Finally, the experts noted that for student teacher clips to be used as model videos, their consent will always have to be asked.

3.2.2 *Retrospective interview with student teacher and mentor*

One student teacher from the first cohort and her mentor gave the following interview about their experiences with using video and structured viewing guides for analysing her experiences during student teaching. This interview was edited under the title *Mentoring with video, an interview. Iselinge College of Primary Teacher Education. Doetinchem, the Netherlands*. The conversation shown in this clip is reproduced below with permission.

M = Mentor
S = Student
I = Interviewer

M She should discover things for herself.
I How did you reflect using video?

Self-viewing with structured viewing guides

- S I discovered new things all the time. We fill out the evaluation form we get step by step and discuss those points. That's how you pick up things you can use the next time you teach. It helps. You shift your points of attention.
- I You filmed a series of four lessons. In the course of reflecting on that material, do you feel you developed in certain respects?
- S Again and again, you wonder: Did I succeed this time? Last time, I noticed something, now did I improve? That's how you progress, by paying attention for instance to how you give turns to pupils.
- M This kind of thing has worked out well. There's always room for improvement, but she definitely used the viewing points on her agenda for improvement. Then, a film comes in handy to retrieve this whole lot of different things happening in a lesson.
- I Were you present each time a lesson was filmed?
- M Yes.
- I Did you discover new things when you watched the video?
- M I'm not sure, really.
- S I think there's a difference. I'm involved in my lesson, while Angelique is in the back of the room. Then you have a better overview. That's quite different.
- M I do think, if I were to view the film again and the camera would have focused on her, I could find out more. Yes, I think, then it would have an added value. I didn't do that, but it could be.
- I It's good to explore the possibilities.
- M Of course, it was new to me too, but yes, if we do this again, I'd like to see another film.
- I You now worked with video in language teaching. Would you apply what you learned also in other domains?
- S Yes, questioning for instance is something you have to deal with also in other areas. You should ask not only closed, but also open questions. That's a general thing in all of your instruction.
- I Of course, it's a good thing when students can make such links by themselves.
- S+M Yes, yes.
- I I wonder, how did you go about the post-lesson conferences? Did you list all of your findings and compare them or did you tell about your lesson and did your mentor then join in?
- S Yes, I usually began, didn't I. I had watched the video in advance and had in mind what struck me. That's what we began with and then, with the information sheet at hand, you get a conversation automatically. So many topics pop up! How you can do it the next time.
- M Yes. "So much!!"
- S No, but there are always things that went quite well and things that went less well. And you get good tips on how to solve things or do differently, for instance with a dice game.
- I What strikes me is: you mention a lot of things that didn't go well.
- S No, but also what went well.
- M Yes, exactly.
- I Video is a wonderful way to show that too.
- M+S Oh, yes, sure.
- M But when we worked through the evaluation sheet step by step, I would also draw upon the tips and tops that I had noticed and written down and then, the conversation just goes ahead. Then, when I want to know more, I ask questions. I do think Kim has moved forward since she came here. She has begun to think more about things and wondered: How can I do things the next time? She also has her own ideas. And especially, she now also looks at what is going well. Because in the beginning, she had this slightly negative outlook and felt uncertain.
- S Correct. Yes.
- M Then I'd say: Come on, what were all the things that did go well?
- I How did you feel about looking into that in such a way?
- S Yes, I had to get used to that. When I got that question, I had to stop and think and admit that quite a few things went well. You know, the things that go well often seem normal to you and what doesn't go well stands out. That's the whole point.
- M Yes, that's what we all do.
- I Yes, we're always being so critical.

M+S Yes, that's right.

3.2.3 Learner reports about peer consultation

All students in the experimental groups wrote open comments in reaction to the two statements "The video helps me develop a command of the teaching profession" and "Self-viewing challenges me to think about how I design my lessons" (cf. section 2.1.2). Responses were received from 15 out of 23 students, i.e. 65% in total.

The cross-case analysis of these responses showed that all students agreed with both statements. The main reason they gave for this was that using video enabled them to analyse the strong and weak points in their teaching behaviour and to formulate points for improvement. The points for improvement they mentioned most often had to do with how they positioned themselves towards groups of pupils, how they designed their lessons and how they involved pupils in those lessons.

The students in the experimental groups also completed the following sentences:

- The peer consultation has given me the *idea* to
- Through the peer consultation I have *discovered* that I
- Because of the peer consultation I am now better *able* to.....
- The peer consultation has given me the *feeling* that
- To develop my instruction, my *new personal learning goal(s)* is/are....

19 out of 23 or 83% of the students noted that the peer consultation with video had given them the idea to film their own lessons more often, discuss these lessons with their fellow students and look for specific points for improvement while doing so.

The same number of students wrote that the peer consultation with video had made them discover that they had a better command of (specific aspects of) teaching than they had previously thought. They also – again – noted that through this approach, they could identify points for improvement in their teaching.

Also 19 out of 23 or 83% of the students felt that by means of peer coaching with video, they had become better able to reflect on their teaching, in the sense that they could analyse the strong and weak points in it.

The peer consultation had given 18 out of 23 or 78% of the students the feeling that the quality of their teaching had improved. They also noted – again – that they had a better command of (specific aspects of) teaching than they had previously thought.

Finally, 19 out of 23 or 83% of the students formulated new personal learning goals for improving their teaching. These goals fell under three broad categories, i.e. presentation, instruction and interaction.

4. Conclusion

This intervention study was aimed at finding out if and what effects occur on the development of teaching competence, when student teachers use digital video recordings of their lessons and structured viewing guides in a peer consultation setting to generate instant visual feedback on their teaching.

Self-viewing with structured viewing guides

In this study, two cohorts of student teachers participated from a college of primary teacher education, Iselinge Hogeschool in Doetinchem, the Netherlands. In each cohort, students in an experimental group filmed each others' reading comprehension lessons with "portable video tool kits" (PVTks), i.e. lightweight simple-to-use recording and playback equipment. In combination with this procedure, they used "structured viewing guides" (SVGs) to analyse and discuss the teaching behaviours they recorded. Structured viewing guides are lists of "viewing points", i.e. observation items regarding effective teaching behaviours, subdivided in categories.

Students in control groups did not engage in these activities, but received only verbal feedback on their lessons from their mentors. Pre- and post-intervention criterion measures were collected in the experimental as well as control groups. In addition, qualitative data were collected in the experimental groups, i.e. reactions to statements about the effectiveness of video use, brief learner reports and an interview with one student teacher and her mentor.

Comparison between the experimental and control groups yielded clear indications that the students in the experimental groups experienced greater progress towards mastering skills in teaching reading comprehension than those in the control groups. Seven out of 31 measures showed statistically significant gains for the experimental groups. For a further five measures, the experimental groups showed non-significant gains half a scale point larger than the differences found in the control groups. The experimental groups experienced progress notably in making the content of their lessons concrete, bringing their pupils to engage actively with the subject matter by means of questioning, clarifying their expectations as teachers and encouraging cooperative learning.

Expert ratings of the video clips that student teachers in the first cohort produced about their lessons indicate that the students actually displayed in their lessons almost all the teaching behaviours which they had selected with the help of the viewing guides for practicing and showing in their video clips. This means that not only did the students experience progress in acquiring specific teaching skills, but this was also corroborated by independent expert judgment.

The analysis of the qualitative data indicated that by generating visual feedback on their teaching the student teachers participating in the intervention discovered that they had a better command of (specific aspects of) teaching than they had previously thought and that they could analyse strong and weak points in their own teaching enabling them to determine and focus on targets for improvement. Moreover, the work with the portable video tool kits and the structured viewing guides encouraged them to film their own lessons more often and discuss them with their fellow students with an eye to improving their teaching.

The interview conducted with one student teacher and her mentor reveals how the use of video can introduce changes the process of mentoring. A benefit of video use appears to be that it can help both student teacher and mentor in making their lesson analyses and post-lesson conferences more concrete and specific. At least in this case, it also appears to have encouraged the student teacher to make discoveries about her own teaching behaviour and to take initiative during the conversation with her mentor.

The students' video clips and the expert ratings of them clearly show that the viewing guide introduced as part of the intervention was extensively used by the student teachers. This means that it contained a considerable number of viewing points which they experienced as useful for improving their teaching. It is interesting to find that the student teachers selected particularly such skills for practicing that shape teacher initiative in classroom interaction with pupils, i.e. giving clear instructions, asking starting and elaborating questions and organising cooperative learning. This means that pinpointing effective

Self-viewing with structured viewing guides

teaching behaviours on the basis of scientific literature, as was done here, has the potential of promoting personally relevant practice of teaching skills.

Finally, the expert ratings of the students' video clips led to some valuable insights about the content that should be shown in student-produced video and the technical quality it should possess, if it is to enable students themselves and others to really learn from it. To be understandable and interpretable for colleagues who were not present, video clips of lessons should in any case make clear the sequence of activities. Also the interaction between teacher and pupils should be clearly visible and audible. However, even then, the amount of context information available to viewers from other sources than the video itself is probably an influential factor in what they will notice and interpret. Producing model videos that clearly show other teachers how specific lessons – such as in reading comprehension – can be taught effectively probably requires more sophisticated hardware and editing than was used in this intervention, especially where it comes to the audibility of pupil utterances. At the same time, it is encouraging that low-tech video, used explicitly as a tool of teacher education pedagogy, can lead to types of learning results as shown in this study.

References

- Bakx, A., Berg, E. van den (2005). *Van onderzoek tot leermateriaal. Coöperatief leren met video's in lerarenopleidingen*. Fontys: Eindhoven.
- Brouwer, C.N. (2009). *Teacher Peer Coaching with Digital Video. Evaluation of a Four-year Professional Development Program. Paper presented at the Annual Meeting of the American Educational Research Association in San Diego*. Nijmegen: ILS Graduate School of Education, Radboud University Nijmegen.
- Brouwer, C.N. (2011). *Imaging Teacher Learning. A Literature Review on the Use of Digital Video for Preservice Teacher Education and Professional Development. Paper presented at the Annual Meeting of the American Educational Research Association in New Orleans*. Nijmegen: ILS Graduate School of Education, Radboud University Nijmegen.
- Tochon, F.V. (1999). *Video Study Groups for Education, Professional Development, and Change*. Madison, WI: Atwood Publishing.