

Learning with Classroom Videos: Conception and first results of an online teacher-training program

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***Abstract:** Within the framework of a yearlong teacher education program we examined the conditions and effectiveness of learning with classroom videos. In online phases and face-to-face sessions (blended learning), 20 teachers from two different countries (Germany and Switzerland) analyzed videos of their own math-lessons and math-lessons of other teachers. Using different instruments, the training program was evaluated from a scientific perspective. The evaluation aimed to obtain information about processes within the training, about the acceptance of the training by the teachers and about changes of the professional knowledge and the patterns of perception of teaching processes of the teachers.*

ZDM-Classification: B60, B50, C70, D40

1. Introduction

The project “Quality development of mathematics instruction at the lower secondary level using a video-based training program”¹ is examining the conditions and effectiveness of web-based

¹ The in-service teacher-training project was supported by the German Research Foundation, the Robert Bosch Foundation, the former Institute of Education of the State of Hesse, the Ministry for Youth, Cultural Affairs and Sport of Baden-Württemberg and the Swiss Ecoscientia Foundation for promoting special concerns in education and science.

learning with classroom videos. Over the duration of one year, in several online phases and face-to-face sessions, a total of 20 teachers from Germany and Switzerland looked at their own classroom videos and those of others. The teaching reflection and development carried out in this project was related to the quality of cognitive activation in one’s own teaching and was aimed at the professionalization of the teachers. Results from instructional research show that the ability to cognitively activate the learners makes a fundamental contribution to the quality of the instruction (cf. e.g. Klieme, Schümer & Knoll, 2001). Precisely because the two PISA studies carried out so far (2000, 2003) revealed very different performance profiles for the two countries of Germany and Switzerland, we deem a cross-national exchange to be highly important. The evaluation of the project is aimed at gathering information about the processes within the online phases from the point of view of the teachers, at fostering the acceptance of the training by the teachers, and at providing information about the effectiveness of the training with regard to the (subject-)didactical learning gain and the differentiated nature of instructional analysis.

This in-service training project ties in with the video-based study “Instructional quality and mathematical understanding in different cultures of instruction” (Klieme & Reusser, 2003).² The study examines how differences in the performance of German and Swiss students in mathematics can be explained, and what role is played by instructional and non-instructional factors in this regard. To be able to answer this question, in a first phase, a representative survey of German and Swiss mathematics teachers was carried out (Diedrich, Thußbas & Klieme, 2002; Lipowsky, Thußbas, Klieme, Reusser & Pauli, 2003; Pauli & Reusser, 2003). Here, the question was addressed of whether German and Swiss mathematics teachers differ in terms of their professional teacher knowledge and their expertise. In a second phase, in 20 German and 20 Swiss classes of the 9th and 8th grades, respectively, comprehensive video recordings of mathematics lessons were carried out, which were

² The project “Instructional quality and mathematical understanding in different cultures of instruction” was sponsored by the German Research Foundation (DFG) and is part of the DFG priority program “Educational quality in the school” (BIQUA).

evaluated according to various questions, e.g. what links are apparent between instructional features, instruction-relevant student features and target dimensions of instruction. Twenty teachers from the video study took part in the in-service training program voluntarily.

In this article, the concept of the teacher-training project will be substantiated and explained, and the instruments used for the project evaluation will be described. Finally, the first results from the online mood barometer will be presented and summarised with regard to conclusions to be drawn for the didactical arrangement and general conditions of online learning with classroom videos.

2. Theoretical background

The rapid development of technical possibilities in the area of data storage media, data transfer and online learning as well as findings from the psychology of learning and media (Petko & Reusser, 2005) are contributing to the new popularity of classroom videos for research and teacher education (cf. Brophy, 2004). Increasingly, the potential of classroom videos as a medium and an instrument of teacher training is being recognised or rediscovered and implemented in training concepts such as “video study groups” (Tochon, 1999), “lesson study” (Lewis, Perry & Hurd, 2004), “video clubs” (Sherin & Han, 2003) or “video-cases for mathematics professional development” (VCMPPD; Seago, 2004) (cf. Sherin, 2004). The web-based reflection and discussion on classroom videos offers, from the perspective of the psychology of teaching and learning, a high level of potential for the professionalization of teachers, and represents a suitable tool for implementing the demands of an effective teacher training.

2.1. Problem-based learning with classroom videos

As the basis of discussions about instructional processes, the classroom videos enable a link to be made between the discussions and observable phenomena, consequently linking theory with practice. In addition, they enable the development of a shared language on teaching (Sherin, 2004). The videos make the complexity of teaching and learning processes visible, and render structured observation accessible from different

perspectives. They are therefore an ideal point of departure for situated professional learning. The joint reflection and discussion of teaching and learning processes in instruction enables, based on authentic problems, the creation of awareness and reflection on the action-oriented cognitions and the co-constructive building up of professionally relevant knowledge in the sense of problem-based learning (Chan & Harris, 2005).

In the work with classroom videos, a great deal of value should be placed on the development of challenging tasks and activities, which are linked to the use of the classroom videos. Seago (2004, p. 263) points out that “it is important to realize that video is but a tool [...], they [the videos] do not in and of themselves produce learning – it is how they are used to promote specific learning goals that can allow for the opportunity to learn”. For this reason, the teachers in our training received selected discussion and activity impulses aimed at stimulating them to think about and exchange their views on instructional processes in the videos and the learning opportunities for the students.

Web-based learning platforms represent a suitable learning resource for mutual exchange, enabling a collaboration that is independent of time and place. Web-based platforms for exchange regarding classroom videos are used in diverse projects relating to the training and professional development of teachers.³ As noted with regret by Perry & Talley (2001), only a small amount of research results are available on the web-based learning with classroom videos in the training and professional development of teachers. First studies illustrate the potential of web-based reflection on teaching with mainly positive effects on the broadening of professional knowledge and

³ Some examples include:

- CaseNEX: <http://www.casenex.com/index.html>
- CTELL (Case Technologies to Enhance Literacy Learning): <http://ctell.uconn.edu/home.htm>
- DIVER (Digital Active Video Exploration and Reflection): <http://diver.stanford.edu/>
- ILF (Inquiry Learning Forum): <http://ilf.crlt.indiana.edu/>
- KNOW (Knowledge Networks On the Web): <http://know.soe.umich.edu/>
- STEP (Secondary Teacher Education Project): <http://www.wcer.wisc.edu/estep/>
- v-share (Video-based analysis and reflection of teaching experiences in virtual groups): <http://www.ph-freiburg.de/v-share/>

the emotional well-being of the teachers. Central to a mutual exchange regarding teaching, both online and face-to-face, is the establishment of a constructive culture of shared reflection and discussion (Krammer & Reusser, 2004). For an esteemed and respectful discourse regarding the classroom videos, it is important to guide the teachers in their collaboration and accompany them during the online phase. Particularly for getting to know one another, and the building up of a relationship and mutual trust as the basis for an open exchange regarding one's own teaching in the online phases, the combination of face-to-face sessions and online phases and the moderation and evaluation of the online phases plays an important role (cf. also Salmon 2000; Goodyear, 2001).

2.2. Conditions of effectiveness of teacher training

The conception of our training as a combination of online phases and face-to-face sessions (workshops) for the guided reflection and discussion of classroom videos as well as the planning of new lessons is oriented towards features that also influence the success of training programs according to the analysis of relevant studies. In addition to the readiness to make changes in one's teaching, important are also the long-term work on instruction-related beliefs with a close subject-didactical focus and the laying down of contents with a simultaneous scope for self-guided learning (Lipowsky, 2004).

From the perspective of expert-novice research, teachers' actions are influenced by features of their professional knowledge. This includes in particular the subject-didactical and curricular knowledge as well as the beliefs and attitudes of the teachers towards their own subject and the learning of the students (Bromme, 1997). Sustainable effects through teacher training programs should only be expected if they apply to the professional knowledge of the teachers, i.e. if the teachers are motivated to become aware of the (unconsciously action-orienting) beliefs about teaching and learning and to extend them (Hollingsworth, 1989). Through the deepened reflection and the intensive discourse of the teachers regarding the videotaped teaching situations, the explication of professional knowledge about teaching and learning processes is stimulated and made workable.

Professional learning communities (e.g. Hord, 1997) are seen as an effective instrument of school development and quality improvement of instruction. In everyday working life, teachers only rarely receive targeted and differentiated feedback on their teaching. Furthermore, there are hardly any opportunities for teachers to analyse and evaluate their own instruction and their own teaching behaviour. However, research results show that the mutual exchange and the shared reflection on one's own teaching or that of others play an important role for thinking over one's own teaching actions and extending one's expertise (Putnam & Borko, 2000; Wilson & Berne, 1999). For this reason, when conceiving this training, it was important to create structures that simplify and support mutual exchange, shared reflection and reciprocal analysis of instruction.

3. Conception of the training project

In the following, the structure and contents of the training and the learning platform used for the web-based work with the classroom videos are explained in more detail.

3.1. Structure and content of the teacher-training

The training was conceived as a combined online and face-to-face training program. In the one-year-long training, four online phases were planned, which were accompanied by face-to-face sessions in form of workshops in between (cf. table 1).

Table 1: Structure of the teacher training

Phase	Time period
1st Workshop	2-day kick-off event in May 2004
1st Online phase	May 2004 to September 2004
2nd Workshop	1-day event in September 2004
2nd Online phase	September 2004 to November 2004
3rd Workshop	2-day event in November 2004
3rd Online phase	November 2004 to February 2005
4th Workshop	1-day event in February 2005
4th Online phase	February 2005 to June 2005
5th Workshop	2-day windup event in June 2005

During the workshops and online phases, twenty teachers worked in professional learning communities. Each of these consisted of three to five teachers from Germany and Switzerland. The contents and work tasks in the face-to-face sessions and online phases were intertwined: New themes and stimuli were introduced in the workshops and were then continued in the online

phases. In the workshops, inputs were given in the form of lectures by project members or through selected subject-didactical or general didactical literature, which focused on the cognitive activation of the students in mathematics instruction (e.g. instructional quality in mathematics instruction, group work, support behaviour of the teachers in mathematical thinking processes). Following this, in the online phases, the teachers worked with their classroom videos with the help of a web-based learning platform. The work stimuli for instructional reflection in the online phases focused on identifying phases in the instruction in which the teachers cognitively activated the learners and on the development of further ideas for intensifying the cognitive activation in the instruction. The teachers were asked, for example, to look for sequences in their own instruction in which, in their opinion, they stimulate the thinking and learning of the students, and to give reasons why they assess these sequences to be stimulating. Their commentaries on their own lessons served as a starting point for the group discussions in the online forums on the lessons.

In the first two workshops and online phases, one's own instruction and that of others were reflected upon and discussed on the basis of the work impulses provided. From the third workshop onwards, parallel to this, the teachers began to plan their own teaching projects, which they would later carry out in their own instruction. In their small groups, they decided upon a joint project, e.g. for working on demanding mathematics exercises in group instruction. The teachers considered together which mathematics exercises could be possible in the instruction, what form the instructional arrangement should take, what difficulties could be expected in terms of mathematics or group dynamics, and how these could be circumvented. The researchers supported these projects by presenting the teachers with interesting theoretical considerations in the workshops, sending them selected literature, and supporting and commenting on their planning processes. The help in the planning of the teaching projects was mainly provided through e-mail and telephone contact. The teaching projects were again videotaped in several school classes and made available for all members of the small group over a learning platform. In this way, it was possible to reflect upon and discuss the implemented project and its effects on the

students in a concrete manner in the professional learning communities.

3.2. The web-based learning platform used

For the use of classroom videos in the framework of training programs, web-based learning environments provide particularly favourable conditions. In this way, teachers can engage in discourse with one another independently, flexibly and in a self-determined manner through videotaped teaching situations, and do not have to come together in central locations in order to reflect upon the observed instruction. Furthermore, a web-based learning environment fosters a quick communication between trainers and teachers, and through a corresponding didactical conception, facilitates the interactivity of the teachers undergoing the learning (Strother, 2002).

In the online phases, we employed the web-based learning software "VisibilityTM" of LessonLab Research Institute (LLRI, 2006). This learning environment was developed under the leadership of J. Stigler and R. Gallimore in order to use the classroom videos from the TIMSS Video Study 1999 (Hiebert et al., 2003) not only for research purposes but also for training purposes. VisibilityTM enables the web-based work with classroom videos. In addition to the videos, content-related information, tasks and discussion forums can be embedded in the software. Such hypermedia programs have been used in teacher training since the 1990s (e.g. Goldman & Barron, 1990; Lampert, Heaton & Ball, 1994).

4. Evaluation of the training

The effectiveness of training programs can be examined on four different levels of evaluation (cf. Kirkpatrick, 1979; Lipowsky, 2004). These refer to:

- Level 1: Acceptance of the training and the self-reported changes in teachers' thoughts and actions
- Level 2: Changes in teachers' cognitions about learning and instruction
- Level 3: Changes in teachers' competence of teaching and communication in the classroom
- Level 4: Effects on the students' learning outcomes

Our training project is aimed primarily at the changing of perception patterns and the building up of professional knowledge. From the four evaluation levels listed here, in addition to the first level (the acceptance of the training and the self-reported changes in teachers' thoughts and actions), mainly the second level (change in knowledge) will be examined. Our hypothesis is that through the training, the teachers can extend their knowledge with regard to the student-oriented, cognitively activating teaching and describe manifestations of such events in lessons in a more differentiated and better founded way. An examination of the effectiveness of the training on the third level, i.e. a measurement of actual changes of action and communication competence in the instruction, was not planned. Instead of this, with the help of a student survey, it was examined whether the behaviour of the teachers has changed in specific instructional situations from the perspective of the students. This is an interesting research question, as particularly in older studies on teacher professionalization, it has been stressed that teachers hardly change their practice (Cohen, 1990; Cuban, 1990). Recent findings have shown, by contrast, that training programs can indeed influence the practice of the teachers. Research on "cognitively guided instruction" (CGI) revealed, for example, that teachers change their instructional actions if the training program is focused on tracking the students' thinking patterns (Fennema et al., 1996). The instructional practice then becomes more strongly student-centred, e.g. the students are given scope to explain their patterns of thinking and to discuss different suggestions for solutions. A measurement of learning growth on the part of the students (fourth level) could not be achieved within a reasonable level of expenditure, as the teachers were, in the meantime, teaching different classes and it would have been necessary to repeat substantial parts of the main study.

Finally, the teaching-related theories and beliefs of the teachers, as they had already been measured prior to the main study (Klieme & Reusser, 2003), were re-examined. Based on this analysis, it was established whether the teaching-related theories and beliefs of the participating teachers had changed due to the one-year training program. Although research findings show how difficult it is to change beliefs about teaching and learning (Tillema, 1995; Thompson, 1992), at the

same time it is known from social psychology that the link between attitudes and behaviour is very close and therefore constitutes an important object of research if one is examining the effectiveness of in-service teacher training.

The following instruments were used in the evaluation:

- a) To examine the teachers' evaluation of our training program, we used a so-called "*mood barometer*" five times as an instrument accompanying the process in the online phases (Haab, Reusser, Waldis & Petko, 2003) and a *written final survey of the teachers* in the windup event. Both evaluation instruments contain open and closed questions, which are aimed, for example, at the following contents: work with classroom videos, contents of the training, working in the small group, self-perceived learning gains.

Through the teachers' feedback in the online mood barometers, the research team accompanying the program was able, even over the course of the training, to broach the issue of difficulties and progress, to provide the teachers with help, and to undertake changes in the didactical structure of the workshop. This mood barometer is therefore both an evaluation and a control instrument, as through it, the teachers had the opportunity to play a role in shaping the didactical structure of the training program.

- b) To examine the change in instruction-related teacher cognitions (second level), *two surveys with classroom videos* were implemented both at the beginning and at the end of the training: The first instrument comprised short video vignettes and a questionnaire referring to them, which asked about successful and non-successful instructional actions as well as continuation possibilities for the instruction observed. The instrument was conceived following the works on the BIQUA project of J. Baumert, M. Neubrand and W. Blum (Krauss et al., 2004). The second instrument contains two video clips from the TIMSS 1999 Video Study (Zobrist, Krammer & Reusser, 2004) and corresponding open-ended questions. The teachers noted which learning opportunities they recognised in the short teaching excerpts for the students and how they would optimise the instruction in that regard. As these surveys were carried out as

pre- and post-tests, it is possible to examine the extent to which the ability to reflect upon and the perception of one's own teaching and the teaching of others have changed. In addition, the instruction-related theories and beliefs of the teachers were examined with the help of a questionnaire, which had already been used in the video study (Rakoczy, Buff & Lipowsky, 2005) and was employed once again in the windup event.

- c) As noted above, an analysis of the effectiveness of the training on the third level (changes of action and communication competence in the instruction) was not planned. Instead, the school classes of the participating teachers were surveyed on the use of instructional measures and on selected quality dimensions of instruction. The *student questionnaire* (Rakoczy et al., 2005) was implemented in the middle and at the end of the training program.

Originally, it was planned to include teachers from the video study who were not taking part in the training as a control group, e.g. to compare the change of knowledge and thinking regarding instruction (level 2). However, due to the low return rate of the questionnaires sent out, we are unfortunately unable to take these data into account. It would also have been interesting to compare the teachers participating in the training with a group of teachers who only met in workshops, without online phases, but the expense in terms of both time and finance would have been too great to carry out such a comparison.

5. First results from the online mood barometer

At this point, we are reporting first results from the mood barometer, the instrument accompanying the process described above, which served purposes of evaluation and further control of the online phases. At five time points, the twenty mathematics teachers taking part in the training from upper secondary level (11 from Germany, 9 from Switzerland) filled in the mood barometer. The following questions formed the basis of the analysis of their answers to the open and closed questions:

- How satisfied are the teachers with this form of training?

- What reasons do the teachers give for their satisfaction or dissatisfaction?

The presentation of the results is structured accordingly. First of all, the general assessment of satisfaction and the reasons for this are reported. Following this, the focus is on the evaluation of the central activities in the online phase: Drawing up the commentaries on one's own lesson and discussion of the classroom videos with the group members. Finally, findings reported by the teachers during the online phases are compiled.

Due to the small number of participants and the incomplete participation in all online phases, the closed questions were evaluated in purely descriptive terms. To supplement the statistical evaluation of the closed questions, the answers to the open-ended questions were evaluated using content analysis with the aid of MAXqda.⁴ Answers to the open-ended questions on the mood barometer emerged from divers online-phases and there can be more than one answer per teacher per question. Therefore, both number of answers and number of teachers will be reported.

5.1. Evaluation of general satisfaction

Towards the end of each online phase, the teachers were asked to rate their *general satisfaction on a scale from 1 to 10* (1 = very low, 10 = very high). The average satisfaction of the teachers proved to be constantly positive over the whole year (cf. table 2). The mean values of the satisfaction assessments do not differ significantly, presumably due to the very small sample. Online phase 1 is characterised by the mutual introductions to one another and practising the online work with the help of classroom videos of others, and was evaluated at two time points (1a and 1b). From online phases 2 through 4, the teachers worked in small groups with their own videos.

Table 2: Mean values of the assessment of satisfaction on a scale from 1 to 10 (1= very low, 10 = very high)

	Phase 1a	Phase 1b	Phase 2	Phase 3	Phase 4
<i>N</i>	19	13	16	16	18
<i>M</i>	6.00	7.00	5.69	6.00	6.22
<i>SD</i>	2.03	1.22	1.99	2.50	2.41

⁴ We thank cand. phil. Claudia Lena Schnetzler, University of Zurich, for her great support in preparing and evaluating the data.

Reasons for satisfaction

In an open-ended question, the teachers were asked in each case to provide reasons for the satisfaction rating provided above. In the content analysis of all reasons cited, we evaluated the reasons for satisfaction (49 reasons) and the reasons for dissatisfaction (80 reasons) separately.

In a total of 49 answers, the teachers described reasons for their satisfaction. With answers like “I simply enjoy the professional manner of the training” or “limitation to the teaching principle (cognitive activation)”, 37% of the reasons for satisfaction (18 answers given by 11 teachers), refer to the *form and contents of the training*. Twenty-two percent of the teachers’ reasons (11 answers given by 6 teachers) refer specifically to the (web-based) *reflection on classroom videos* (“through the frequent watching of the teaching sequences, I keep discovering new aspects”); individual statements also emphasised the advantage of web-based reflection (“excellent working possibilities with the LessonLab Software, which even enables night-time sessions to be carried out that can proceed without outside interruption”). Twenty-nine percent of the answers (14 answers coming from 10 teachers) focus on the collaborative work in the form of a *reciprocal exchange and feedback* (e.g. “the reciprocal exchange about the videos became increasingly better and more effective”). Interestingly, 5 teachers also focus in their responses (10% of all the given reasons for satisfaction) on satisfaction with their own input and the fact that they have taken time for this work.

Reasons for dissatisfaction

In 80 comments, teachers described the reasons for their criticisms. A main reason for dissatisfaction is the *lack of time*. Thirty-six percent of the reasons for dissatisfaction (coming from 14 teachers) concern this problem. Statements such as “Only now in the holidays am I beginning the work on the lessons” or “question of time burden: After a demanding day at school, to then be alert in considering ‘other people’s’ lessons, to properly analyse partial sequences and to report on them; I didn’t always have the required energy for all this!” make it clear that in their everyday lives, the teachers frequently had too little time for the work with the lessons. *Lack of extent and intensity of participation* of the members of the small groups was cited by 8

teachers in 20% of the statements as a reason for dissatisfaction. Furthermore, *technical difficulties* caused dissatisfaction: In 14% of the answers, 7 teachers complained about difficulties with the handling of the software and 5 teachers (8% of the answers) reported problems with their own computer and the Internet connection. The other reasons mentioned related, for example, to criticism of individual learning tasks or the online discussion as a form of working (“I prefer to interchange with people directly about the video sequences we have seen, to discuss them and to consider the other opinions directly”).

5.2. Evaluation of online activities

Based on the information provided by the teachers concerning their general satisfaction in the online phases, advantages and limitations of web-based training with classroom videos can be discussed, which we will address in the following analyses. The teachers were asked in open and closed questions to provide their evaluation of individual activities and the reasons for this evaluation. The answers to the closed questions are summarised in table 3 and are explained in the following sub-chapters and illustrated with the answers to the open-ended questions.

Table 3: Mean values of the evaluation of online activities

Online-Phase		Drawing up the commentary was productive	High participation in discussion oneself	Discussion on lesson was productive
Online-Phase 2	<i>N</i>	14	16	16
	<i>M</i>	3.29	1.88	2.06
	<i>SD</i>	.47	.75	.93
Online-Phase 3	<i>N</i>	-	16	15
	<i>M</i>	-	2.06	2.80
	<i>SD</i>	-	.93	.94
Online-Phase 4	<i>N</i>	9	18	18
	<i>M</i>	3.22	2.33	3.00
	<i>SD</i>	.44	.77	.97

Notes: 1= Not at all true, 2 = Mainly not true, 3 = Mainly true, 4 = Very true.

Drawing up the lesson commentary

In the online phases 2 and 4, the teachers looked intensively at their own teaching and wrote a commentary on their lesson as the basis of the joint online discussion (cf. structure and content of the teacher training).

In the mood barometer, the teachers were asked in a closed question whether they benefited from drawing up the commentary. The teachers answered this question positively (cf. table 3). In

response to the question asking for reasons for this evaluation, in 19 of the total of 29 responses, the drawing up of the commentary was described by 13 teachers as very *stimulating for reflecting upon one's own teaching*, as illustrated in the following teacher statement: "I was forced to look closely and to question quite a few of my previous views and behaviour patterns". In the rest of the answers, further aspects were cited such as the sensitisation to the cognitive activation of the students (e.g. "The focus on one aspect of the evaluation, in this case the cognitive activation, has broadened my horizons") or general insights into reflection (e.g. "action research... has shown me that learning is related to reflection – I will encourage the students to reflect more on their own learning paths").

Participation in the discussions on the lessons

The commentary produced by the teachers on their own lessons formed the point of departure for the small-group discussions in the online forum. The teachers reacted to the commentary and referred to further teaching sequences. Generally speaking, participation in the discussion of the lessons in the three online phases was rather low (cf. table 3).

This problem is also apparent in the responses to the question about difficulties in the collaboration in the online phases. Eleven teachers (14 of the total of 18 answers) complained about the *lack of participation of other group members*. Once we had established this lack of participation, in online phases 3 through 5, we asked specifically about the reasons for this. Fourteen teachers (over 50% of the answers) stated the lack of time in addition to other school and extra-curricular obligations as main reasons for the lack of participation. Frustration due to the lack of reactions of other group members was mentioned by 8 teachers (almost 20% of the answers). The remaining answers cited technical difficulties as a reason for no or low participation, in spite of the intensive technical support provided. This indicates that the technical support, in spite of extensive enquiries on our part, was used too little, and individual members reached the limits of their computer skills.

When the teachers do take part in the discussions, these are experienced as productive. In 10 of the total of 27 answers to the question of benefit from the online discussion, it is confirmed by 7 teachers that they value the *mutual feedback* very

highly. It is particularly appreciated that the feedback does not originate from external persons, e.g. a lay authority, but rather from teachers with teaching experience in the same subject area. For example one teacher stated that "The colleagues carrying out the rating know the teaching situation exactly in terms of subject matter and didactically/pedagogically! They do the same work!" In 12 answers, 8 teachers emphasized the *stimuli for the teaching practice* and the *extension of one's perspective* through the feedback from colleagues: "Totally different perspectives come up, which I would never have thought of myself", "The reflection or the outside perspective into my classroom is always a motivation to consider my own teaching and then to reflect upon changes or else to gain acknowledgement for my own actions".

It is also apparent in the closed questions that the discussions about the lessons are experienced as increasingly more productive (cf. table 3). The increase over the different time points can be presumably explained through the greater familiarity with the technology and the other members of the small group and the consequently higher participation in discussions, as well as through a better coordination of time planning within the group. Conversely, for the increase in participation, we presume a greater compliance within the group and the experiencing of productive online discussions.

5.3. Content-related insights

In addition to the process-related questions, we also asked the teachers an open-ended question about their *content-related insights* in the online phase. The overall evaluation of the learning gain was measured through a concluding final survey and will be systematically evaluated elsewhere. The total of 67 answers (given by the 20 teachers) compiled here, provide an initial overview of the insights described by the teachers in the course of the training based on the web-based reflection and discussion of their teaching.

With 39 answers, almost 60% of the teachers' self reported insights refer in concrete terms to their *teaching practice*. Most frequently cited are findings regarding the arrangement of a student-oriented instruction (13 answers given by 10 teachers), on cooperative learning (10 answers given by 6 teachers) and on the cognitive activation of the learners in the instruction (8

answers given by 6 teachers). Sixteen percent of the teachers' insights (11 answers given by 7 teachers) relate to the *reflective scrutiny of one's own teaching* (e.g. "The reflection or the outside perspective into my classroom is always a motivation to consider my own teaching and then reflect on changes or also gain acknowledgement for my own actions"). In 4 answers (6%), three teachers described insights concerning the *activity of the video analysis* itself. The remaining almost 20% of answers regarding the insights come from 8 teachers and do either not report an insight and/or concern further questions ("I would be interested to know how one can evaluate instructional quality"), which we were able to address in the supplementary workshops.

6. Summary

The evaluation of the mood barometer data accompanying the process showed that the reflection on one's own classroom videos and the joint discussion about videos in small groups was indeed valued by the participating teachers and experienced as interesting and fruitful for their own teaching. However, it also became apparent that this form of training is very time-consuming and requires a good time management within the group as well as the active participation of all group members.

Within the limits of our possibilities, we reacted to the needs of the teachers and reduced our demands, made suggestions for the planning of the collaborative work, and offered intensive technical support. For an even better use of such an in-service training, it would be important that the teachers were able to schedule more free time and it would be advantageous if all teachers taking part in a web-based training program had the same technical preconditions as well as comparable computer knowledge.

We were able to address content-related concerns and questions individually and in the workshops. We rate the importance of the workshops as a supplement to the online phases as very high, an assumption that was not confirmed by the mood barometer data. We will explore the importance of the workshop as complement to online-phases when evaluating teachers' answers to the final survey.

The summary of the results of the mood barometer presented here will be supplemented in

the framework of a more detailed evaluation with case and process analyses, which will also provide an insight into the dynamics of individual small groups and the preconditions of productive work with the classroom videos. The ongoing evaluation of the final survey and the teacher survey will provide information about knowledge gained in the training and possible changes in the perception of teaching. Furthermore, we hope to obtain information about the effectiveness of the training based on the evaluation of the student survey.

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