# Collaborative Lesson Analysis in Virtual Groups: The Impact of Video on Student Teachers` Analysis and Reflection Processes

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**Abstract:** Reflection on teaching experiences is considered to be an important element of teacher training. Given the increase of virtual or partly virtual seminars and related constraints, video is gaining relevance because it facilitates an analysis and reflection on teaching experiences, which is independent of time and place. Research indicates that the use of video-recorded lessons for collaborative analysis in virtual groups has a positive effect on student teachers' reflection processes regarding teaching situations. Following a field study by Ploetzner et al. (2005) on different applications of the learning environment "v-share", we conducted an experimental study to investigate the impact of video on student teachers` analysis and reflection processes in a more controlled way. At the conference the learning environment and our research findings will be presented.

## Introduction

The major goal of teacher training is to impart to student teachers the knowledge and abilities necessary to plan, carry out and evaluate teaching. Central to this is the ability to reflect on teaching experiences: student teachers are to relate theoretical concepts to real teaching situations and the underlying pedagogical content knowledge. By distancing themselves from their actions (cf. "reflection-on-action", Schön, 1987) they are able to analyse their teaching and to question their subjective theories. The analysis and reflection of experiences helps students to evaluate their teaching and to develop alternative - and theoretically sustained - instructional strategies for future teaching. With the growing number of online university courses and virtual or partly virtual seminars, the question arises as to how the need for reflection can be met in pre- and in-service teacher education, independent of time and place. On account of the distance between individual student teachers and the lack of time for reflection during face-to-face meetings, this cannot be done by the same means as in traditional face-to-face teacher training. Particularly, virtual groups lack the possibility to reflect cooperatively on shared teaching experiences by getting involved in a focused discussion with lecturers and fellow students.

In recent years several researchers (e.g., Van Es & Sherin, 2002; Petko et al., 2003) have investigated how video-recorded lessons can be used in teacher education to improve teaching skills. Among many other benefits, video is gaining importance because it facilitates analysis and reflection on teaching experiences, independent of time and place. Virtual learning environments like "LessonLab" (www.lessonlab.com) or "v-share" (Ploetzner et al., 2005) have been developed to support the video-based analysis and reflection in virtual groups. Research indicates that the use of video-recorded lessons for collaborative analysis in virtual groups has a positive effect on student teachers' reflection processes regarding teaching situations (e.g., Derry et al., 2002; Santagata et al., in press).

## Benefits of Using Video in Teacher Education

Compared to direct lesson observations, the video-based analysis and reflection on teaching experiences has various significant advantages: as a lasting external representation, video recordings enable a flexible and detailed lesson analysis. Video can be played repeatedly, it can be stopped and continued at any time, and moreover, jumping to a certain point in the video makes it possible to view specific scenes. With these options, video serves as an external memory (cf. Keil-Slawik, 2000) and helps to identify aspects, which might otherwise have been unnoticed during direct observation. Furthermore, video allows student teachers to observe and to analyze their teaching without the need for immediate reaction. The temporal separation of teaching and its analysis helps students to distance themselves from their actions and thereby facilitates reflection instead of action.

A special benefit results from the feature of marking certain sequences of a video. This allows student teachers to easily refer to a special part of the recorded lesson, which they otherwise would have to circumscribe

verbally. According to Clark' s (1996) theory on achieving common ground in communication, video thus serves as a shared external reference point and makes the process of grounding much easier and less susceptible to faults. In addition, the permanence of video permits one to observe the same lesson several times, focusing each time on a different aspect. This allows the adoption of multiple perspectives on a lesson (Van Es & Sherin, 2002), which is of great importance for the problem-based analysis and reflection on teaching. The theory of cognitive flexibility (Spiro & Jehng, 1990) states that the repetitive study of a subject matter under different perspectives and approaches promotes the acquisition of flexible and deep knowledge. Considering the diversity and complexity of teaching situations, such knowledge plays an important role for prospective teachers. Furthermore, if student teachers reflect cooperatively on shared teaching practices, they have to acknowledge and come to terms with their fellow students` perspectives. According to the socio-constructivist theory of learning (e.g., Doise & Mugny, 1984), student teachers learn from diverse stances by comparing, questioning and explaining them.

## Empirical Study

The study investigated the impact of video on student teachers` analysis and reflection processes using "v-share", a program for the cooperative analysis and reflection of video in distributed groups (cf. Ploetzner et al., 2005). The following research questions were addressed: (1) How does the availability of a video-recorded lesson in v-share affect student teachers` analysis and reflection processes? (2) In which aspects does a collaborative video-based analysis differ from a collaborative analysis without video?

### Design and Data Analysis

Overall, 30 first-year student teachers with little teaching experience participated in three video analysis sessions. During the first session students were introduced to v-share including how to use the video, to select subsequences of the video, to write contributions and to link them to subsequences of the video. In the second session student teachers watched a short videotaped lesson excerpt on a big screen while focusing their observation on the issue of giving instructions; afterwards they discussed the lesson in distributed groups of three by making use of v-share. All subjects could use the previously seen video in v-share for their analysis. This session served to distribute the subjects into two parallel test groups. For the third session the procedure stayed the same, but the analysis of another lesson now took place under two different conditions: subjects of the test group (video) could make use of the lesson video in v-share as before, while subjects of the control group (non-video) now had to discuss the lesson *without* the video, relying exclusively on written notes and their memories.

Data consisted of student teachers` written analysis and reflection contributions available in the bulletin board of v-share. Applying a coding-and-counting method for quantitative content analysis, the contributions were initially assigned to the following four coding categories, adopted from the field study by Ploetzner et al. (2005): 1. *Describing*, 2. *Explaining*, 3. *Critiquing*, 4. *Proposing Alternatives*. In addition, in order to measure qualitative differences within each category, they were further differentiated by partially adapting Ohlsson`s (1996) taxonomy of epistemic activities. Descriptions and explanations were rated within the dimensions *Particularity*, *Interaction* and *Sequence of Events*. Descriptions were subsequently rated within the dimension *Neutrality*, and explanations within the dimension *Theoretical Concepts*. In both categories each contribution was rated as either positive or negative in each of the four dimensions. Thus the ratings of descriptions and explanations could range from 0-4 and contributions were assigned to one of five levels ranging from low=1 to high=5. Critiques were rated within the dimensions *Number of Arguments* (0, 1, >1) and *Elaboration* (low, high). The combination of both dimensions resulted in a rating matrix whereby critiques were assigned to one of four levels ranging from low=1 to high=4. Similarly, alternatives were rated within the dimensions *Elaboration* (low, high) and *Justification* (none, low, high). The combination of both dimensions resulted in a rating matrix in which alternatives were assigned to one of four levels ranging from low=1 to high=4. Contributions that seemed to be unrelated to the lesson analysis were coded as off-task and were excluded from further interpretation. All data was coded by two independent raters. On a subset of n=116 contributions inter-rater reliability for the coding categories was $\kappa = .79$. On the basis of the corresponding ratings in the coding categories (n=102) inter-rater reliability for the different levels was $r = .76$.

### Results and Conclusions

Findings show that student teachers` analysis and reflection were more focused if they could use the video in v-share: on average, video-based analyses were more concise than analyses in the control group (Video: 254 words; Non-Video: 322 words) and contained significantly fewer off-task contributions (Video: 173; Non-Video: 784; $\chi^2(1) = 212{,}44$; $p < .001$). On the assumption that a focused and detailed analysis results in less extensive but

Table 1: Distribution of relative frequencies (%) of student teachers` contributions by category and level

| | Describing | | | | | | Explaining | | | | | | Critiquing | | | | | Proposing Alternatives | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Level* | *1* | *2* | *3* | *4* | *5* | ∑ | *1* | *2* | *3* | *4* | *5* | ∑ | *1* | *2* | *3* | *4* | ∑ | *1* | *2* | *3* | *4* | ∑ | |
| **Non-Video** | 0,5 | 2,25 | 3,75 | 2,25 | 0 | **8,75** | 1,5 | 3,25 | 2,75 | 0 | 0 | **7,5** | 39,5 | 22,75 | 2,75 | 0,5 | **65,5** | 7,5 | 9,25 | 1,5 | 0 | **18,25** | **100** |
| **Video** | 1,25 | 5,5 | 3,5 | 1,25 | 0 | **11,5** | 2 | 6,75 | 3,5 | 0 | 0 | **12,25** | 26,25 | 25,75 | 2 | 0 | **54** | 13,5 | 8,75 | 0 | 0 | **22,25** | **100** |

more meaningful contributions, this indicates that the video served both as external memory and reference point, which facilitated the process of grounding and thus shortened the contributions. Subjects of the test group (video) seemed to use more time for analyzing and reflecting on the lesson than for writing numerous and extensive contributions. Differences concerning the four categories were not significant, but it could be seen that using the video led to a more balanced lesson analysis and reduced student teachers` tendency to mainly critique the lessons. Results show that subjects of the test group tended to more often describe events of the lesson, explain certain teaching situations and propose alternative strategies, than to critique the recorded lesson (see Table 1). This might be due to the fact that the video allowed multiple perspectives on the lesson to be adopted and thereby promoted an analyzing rather than judging stance. Concerning the different levels of contributions, findings partly support the assumed benefits of video-based analyses: on average, descriptions in the test group reached lower levels, i.e. they were less elaborated. Video relieved students of the need to verbally describe a part of the lesson and thus led to shorter descriptions. The average level of explanations did not vary between test conditions. The most marked difference was found for critiques: subjects of the control group critiqued the lesson significantly more often without stating any argument ($t(27)= -2,59$; $p < .05$), whereas in the test group critiques more often contained an argument. Video thus seemed to promote students` deep analysis of the lesson and the process of reasoning. Unexpectedly the average level of alternatives was significantly higher for the control group (Video: AM=1,39; Non-Video: AM=1,68; $t(65)=2,02$; $p < .05$). One explanation might be that the details of the video impeded student teachers` process of generating alternative strategies. Though the students had very little experience in teaching and its analysis and despite the short testing period, nonetheless results show a number of desirable outcomes due to the availability of video. This encourages a further pursuit of this approach.

## References


Clark, H. H. (1996). *Using language.* New York: Cambridge University Press.

Derry, S. J. & STEP Team (2002). The STEP system for collaborative case-based teacher education: Design, evaluation & future directions. *Proceedings of computer support for collaborative learning (CSCL 2002)* (pp. 209-218). Mahwah, NJ: Erlbaum.

Doise, W. & Mugny, G. (1984). *The social development of the intellect*. Oxford: Pergamon Press.

Keil-Slawik, R. W. (2000). Gestaltung und Nutzung alltagstauglicher Infrastrukturen. In U. Beck (Ed..), *Learntec 2000* (pp. 411-418). Tagungsband Bd. 1, Karlsruhe: Koller Druck.

Ohlsson, S. (1996). Learning to do and learning to understand: A lesson and a challenge for cognitive modeling. In P. Reimann & H. Spada (Eds.), *Learning in humans and machines: Towards an interdisciplinary learning science* (pp. 37-62). Oxford: Pergamon.

Petko, D., Reusser, K., Noetzli, C., Krammer, K., Hugener, I. (2003). Collaborative video based teacher training in a virtual learning environment. *Proceedings of the 10th conference of the european association for research on learning and instruction* (p. 465). Padova: Cleup.

Ploetzner, R., Massler, U. & Huppertz, P. (2005). Learning by collaborative analysis of digital video in distributed groups. In T. Okamoto, D. Albert, T. Honda & F.W. Hesse (Eds.), *Proceedings of the second joint workshop on cognition and learning through media-communication for advanced e-learning* (pp. 140-145). Tokyo: Japanese Society for Information and Systems in Education.

Santagata, R., Zannoni, C. & Stigler, J. W. (in press). The role of lesson analysis in pre-service teacher education: An empirical investigation of teacher learning from a virtual video-based field experience. *Journal of Mathematics Teacher Education*, *Vol. 10.*

Schön, D. (1987). *Educating the reflective practitioner*. San Francisco, CA: Jossey-Bass.

Spiro, R. J. & Jehng, J. C. (1990). Cognitive flexibility and hypertext: Theory and technology for the nonlinear and multidimensional traversal of complex subject matter. In D. Nix & R. J. Spiro (Eds.), *Cognition, education and multimedia: Explorations in high technology* (pp. 163-205). Hillsdale, NJ: Erlbaum.

Van Es, E. A. & Sherin, M. G. (2002). Learning to notice: Scaffolding new teachers' interpretations of classroom interactions. *Journal of Technology and Teacher Education*, *10*, 571-596.