The role of video material in teacher professionalization: Does it matter to observe your own videotaped lesson or the video of an unknown colleague?

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1 Introduction

In teacher education a growing interest to work with videotaped classroom situations can be observed (Brophy, 2004). A central purpose of the use of videos is to bring teachers into a situation where they can observe classroom situations and analyze aspects of teaching-learning processes. But through a lack of empirical findings concerning the way to use videos as well as the value they have for teacher professionalization there is a high heterogeneity in working with videos over the education field. Using videos we have to make a decision on several dimension: between best or good practice examples and common lessons, between whole lesson units and separate classroom situations, between different content subjects you can represent, between video material of high relevance for the teachers and material that offers the possibility for a more objective view, etc. In this paper we alight a corner of this complexity by taking a detailed look on the specific effects of video material in the teacher’s analysis of classroom situations. In the project “LUV – Learning from classroom videos”¹ we aim to investigate the role of the relevance of the video material (own vs. external videotaped lesson) in an experimental setting. LUV is a computer based learning environment offering the opportunity for teachers to work independently with videos of classroom teaching. Thereby, it is central that teacher are able to notice aspects of classroom teaching that are relevant for students’ learning processes. In this context the IPN Video Study served as a backbone of the LUV-project. The IPN Video Study, a four-year project to analyze teaching and learning processes in physics classrooms, provided a) a theoretical framework with regard to relevant teaching and learning components in science education, b) systematic analysis instruments to observe teaching-learning relevant classroom situations, c) empirical evidence with regard to typical teaching patterns and their effects on students’ learning processes and outcomes, d) video material that can be categorized with regard to its relevance for teaching-learning processes. The LUV-Project was a follow-up study in which teachers were asked to analyze videotaped lessons. Thereby, the design of LUV allows to take a look at the effects of the relevance of video material on the teachers’ analysis of videotaped lessons.

In this paper we will first outline the most important findings of the IPN Video Study, together with their relevance for the design of LUV. The second part of the theoretical background will cover the key assumptions that guided the design for taking a look at the effect of subjective relevance of video material. Afterwards we present the research

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questions, methods and the results of our study. We conclude with discussing our findings in the light of teacher professional development.

2 Theoretical background

2.1 The backbone: empirical evidence of a videotape classroom study
Video-based instruction research has been conducted for many years and thus provides an ample amount of experiences in this field (Fraser, Walberg, Welch, & Hattie, 1987; Seidel & Shavelson, 2007). At the Leibniz-Institute for Science Education (IPN) a video study on the teaching and learning of physics has been conducted. The major aim of the IPN Video Study was to systematically describe teaching patterns in physics instruction and their effects on the students’ cognitive and affective learning developments (Seidel & Prenzel, 2006; Seidel et al., 2007). Four components of physics teaching were shown to be especially relevant for student learning (Seidel et al., 2007):
1) goal clarity (e.g. clear and structured teaching)
2) learner orientation (e.g. teacher elicitation and guidance)
3) dealing with student mistakes and conceptual change (student’s belief and mistake-culture)
4) experiments and their role in scientific inquiry.

Figure 1: Linking the IPN Video Study with the LUV-project
The IPN Video Study analyzed physics instruction in Germany through data (videotaped instruction, teacher-/student-questionnaires) of 63 classes considering these components of effective instruction. For the following project LUV it seemed reasonable to direct the look at teachers. We were interested in the question: How observe physics teachers instruction and moreover how analyzed teachers in a depth way classroom situations before the background of components of effective instruction?

2.2 **The role of personal relevance of video material in teacher professional development**

With focusing teachers observation of classroom videos a main assumption must be taken into the look: the personal relevance of video material observed is perceived to play an important role in the process of in–depth analysis (Baumeister, 1995). Therefore, with regard to the effect of the subjective relevance of video material the design of LUV is guided by four theoretical assumptions:

1) **Domain specificity of teacher professional development**

Especially teacher professionalization programs which take into account the domain specificity of demands and therefore preconditions to deal with them have been successful (Borko et al., 2008; Brophy 2004; Seago 2004; Krammer et al., 2004). LUV is embedded (theoretical background, using classroom videos and participate teachers) in the recent work of the IPN Video Study, which focuses on the specific demands of physics instruction.

2) **Experience with video-based education research leads to a changed perception**

In different studies which evaluated interventions for teachers to foster productive discussions and learning to notice like in the problem solving cycle of Hilda Borko or the video club of Elizabeth van Es and Miriam Sherin, videos had been used and it could have shown that their use leaded to a changed (better/trained) perception of classroom situation (Sherin & Han, 2004; van Es & Sherin, 2008). To examine the effects of the subjective relevance of video material it seems to be promising to take a look at teachers without experiences in video-based research and teachers who have taken part in the IPN Video Study.

3) **Different points fostering the usage of teachers’own vs. external lessons**

We take into account that in research concerning videos there are different positions fostering the usage of teacher’s own vs. foreign teacher’s lessons. Working with teacher’s own videos should offer high personal relevance. It is assumed to focus mainly on the own person to verify self-schemas (Fiske, 1995). The observer disposes specific context information about the classroom. Furthermore a transfer of aspects, that in the video were exposed as critical, in own behavior routines seems to be easier. At the same time, working with an own video takes the risk to observe in a subjective way and to raise strategies of self-defense. Moreover, creating an own video implies higher costs.
An advantage of a foreign classroom video should be the more distant point of view. Observing a foreign teacher should raise more general concepts of teaching and learning which lay open to reflect. In the meantime there is a broad pool of public video lessons for an easy use. However it should be taken into consideration that a transfer of experiences while observing the video in the own teaching behavior could be judged as not necessary (Kersting, 2008; Reusser, 2005; Seidel et al., 2005).

4) Acceptance as precondition for perceived profit
Acceptances of programs/ videos build a main precondition to perceive profit. This in particular is an important point in the discussion to use own or external videos thinking on self-defense mechanisms. (Sherin & Han, 2004; Van Es & Sherin, 2002; Seidel et al., 2005)

Research questions

Based on the assumption outlined above and with the aim to investigate the relevance (own vs. external) of video material systematically, our project “LUV” deals (among others) with the following questions:
Does the subjective relevance of video material has an effect on...

(1) ... the quality of the analysis in observing classroom situations?

(2) ... the teacher’s acceptance of the video material?

(3) What’s the role of experiences in video-based research (pre-knowledge)?

Sample

The sample (see Figure 2) of the experimental study consists of three groups of teachers who differ in their degree of experience in video based research and in the condition “relevance of the material”. The two groups of teachers with experience in video-based research were drawn from the IPN Video Study, one of these groups watched an own lesson to analyze one watched an external lesson (age mixed, gender: 22% female, 78% male). The group of unexperienced teachers which could be won watched indeed external video material (age mixed, gender: 26% female, 74% male).
We would like to use the three sample groups to outline some of the common and differing characteristics of the sample: All of the teachers participating in this study are physics teachers. All samples the experienced as well as the unexperienced sample were gained by a stratified random sampling procedure. The participation quote in the IPN Video Study was 38 percent that means 38 percent of the schools we approached actually took part in the video study. After taking part in the IPN Video Study for a whole year 76 percent of the teachers agreed to also participate in LUV. For the unexperienced teachers 36 percent of the schools we approached send a teacher to take part in the study. A fact that should be noted is that the participation rate of the teachers just taking part in LUV was almost the same as for the teachers participating in the video study even though the effort for the video study was much higher than for the participation in LUV.

**Design of LUV**

In order to investigate teachers’ competence in observing videotaped classroom situations we created a computer-based learning environment called LUV (learning from classroom videos) (Seidel, Prenzel, Rimmere, Meyer, & Dalehefte, 2004) (see Figure 3).
In LUV we selected video clips as well as a representative recording of a 45-minute lesson of physics instruction. Furthermore, we developed rating scales for the video material and designed tasks on the basis of video analysis instruments which were developed in the IPN Video Study (Seidel, Prenzel, & Kobarg, 2005). The LUV learning environment was technically based on HTML pages and structured in three parts: The first part of LUV included video clips of short teaching sequences representing four selected teaching and learning components. Teachers were asked to rate the video clip (see Figure 2, picture 2). The rating items comprised the three dimensions a) descriptions, b) explanations, and c) evaluations of events with regard to their potential consequences for student learning.

The second part of LUV provided teachers with the opportunity to analyze a 45-minute lesson (their own or an external lesson). In a text window, teachers were able to take notes. Afterwards, LUV offered a structured setting for analyzing and reflecting upon the lesson. For example, teachers were asked to reflect upon the way in which goals were addressed and clarified, how teachers interacted with students, whether students were willing to admit a lack of understanding, misconceptions and mistakes, and the way in which experiments were embedded in the course of the lesson (see Figure 2, picture 3). To work the whole tool “LUV” it took the teachers around 5 to 6 hours, including breaks. The data has been collected in a one day workshop. Below (see Figure 4) you can see the whole design of LUV, structured in a pre-phase, main-phase and post-phase.

For the purpose to answer our selected research questions we focus on the main-phase. Doing this we can introduce to you the design including the instruments used to investigate the effect of different relevancies of video material.

Within the computer-based instrument each teacher observed a 45-minutes classroom lesson with the opportunity to describe, comment and analyze the observed instruction in several open format tasks.

(1) The comments in open format tasks of the teachers were further analyzed according to:

(a) The nomination of noticed relevant aspects of quality of instruction (quantity) (Kobarg, 2009).
(b) The quality of their analysis in general: the depth of elaborations and reflections in their written comments was analyzed (Schwindt, 2008).

(2) The open tasks were followed by ratings connected to the video, which builds the so-called process data.

(3) Two weeks after the participation in LUV the teachers rated their acceptance of the videos in a teacher questionnaire.

Figure 4: Design

Operationalizations

(1) Analysis of 45-minute lesson: To analyze the teachers’ written protocols in the second part of the learning environment LUV coding schemas were developed. Thereby two dimensions of analysis had been distinguished: noticing relevant teaching-learning components (quantity) and the quality of the analysis of instruction.

(a) Noticing relevant teaching-learning components (Quantity): Every teaching-learning component (goal clarity and coherence, teaching support, mistake culture and scientific inquiry) is presented by different count of aspects (Korbarg, 2009). These aspects were coded and counted. For example the component of goal clarity is presented by four aspects teachers could recognize: note the goal, note the learning demands, conclusion of contents and traceability of instruction.

(b) Quality of the analysis of instruction

Three aspects were coded: elaboration in the process of analysis, the degree of focus in the analysis and elaboration of evaluation (Schwindt, 2008). Elaboration in the process of analysis investigates to which extent the three components of description, explanation and valuation are visible. The degree of focus in the analysis concerns whether the analysis task...
is answered in a structured way. Finally, the *elaboration of the evaluation* means the quality of arguments (consequences, alternatives) which are used to explain the classroom situations. Each of these three aspects was described from a more global to a more differentiated level.

2) *The process data* assessed with 4-stepped (0(-) to 3(+) ratings impressions about the video through the scales the observers’ perspective, emotional activation and whether the observer had his own or an external instruction in his mind while watching the video.

3) *The teacher questionnaire* asked the teachers to rate their acceptance in 4-stepped (0(-) to 3(+) ratings forming the scales stimulation, mental effort and authenticity. The return quote for the evaluation questionnaire was high for the experienced teachers and still satisfactory for the unexperienced teachers.

Figure 4 gives an overview of the data sources of the analysis and the operationalizations grounding in them.

<table>
<thead>
<tr>
<th>Data sources</th>
<th>Operationalization</th>
<th>Example items</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Teacher Comments</em></td>
<td><em>Quantity noticing:</em> goal clarity, teacher support, dealing with mistakes, experiments/scientific inquiry</td>
<td>Open format (goal clarity): „Are the lesson goals made clear to the students?”</td>
</tr>
<tr>
<td></td>
<td><em>Quality of analysis of teaching-learning components:</em> degree of focusing, process of analysis, evaluation</td>
<td>Open format: „How would you describe this lesson?”</td>
</tr>
<tr>
<td><em>Process data</em></td>
<td>observer perspective, emotional stimulation, having own instruction in mind</td>
<td>Rating format: 0 (-) to 3 (+) „I watched the clip from the teachers’ perspective” „Watching the clip I was excited” „Watching the clip I had my own instruction in mind”</td>
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<td><em>Teacher questionnaire</em></td>
<td>acceptance of the videos, Stimulation (α = .86), Mental effort (α = .80), Authenticity (α = .72)</td>
<td>Rating format: 0 (-) to 3 (+) „The video was challenging” „The video was too complex” „The video was typical”</td>
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</table>

*Figure 4: Overview of the data sources and operationalizations*

**Results**

Now we want to present the findings with regard to the effects through differing subjective relevance of video material. Therefore we compared the mean values of the three groups of teachers who differ in their degree of experience in video based research and in the condition “relevance of the material” (own vs. external lesson) by ANOVA with post-hoc-analysis (see Figure 5-8).
(1) **Noticing relevant teaching-learning components (Quantity):**

The findings show that the combination of the conditions “experience” and “own video” appears to support noticing relevant teaching-learning components. Group one (experiences and own video) recognized the most aspects over all four relevant teaching-learning components. (But though these differences aren't significant, except in the field of experiments.)

![Figure 5: Noticing supporting teaching-learning components](image)

ANOVA; * p<.01; ** p<.05

(2) **Quality of the analysis of instruction:**

For the quality of analysis we also see no significant differences related to the conditions “experience” and “video material”. But the results build an indication for the assumption that in-depth video analysis is a stable ability, which doesn’t depend on the actually observed situation. Furthermore in the field of evaluation we assert that persons who observed their own videos and have experiences with video-based research do less evaluate their instruction as persons who have no experiences and observed an external video.
Figure 6: the quality of analysis

(3) Process data:
Over the process data we got an impression of teachers' individual perceiving process during the observation of classroom videos. The emotional activation of the videos is higher for persons who observed their own video and have experiences in comparison to persons who observed an external video and have no experiences. In the area of the perspective during the observation there are no significant differences, except for group three. Persons who observed an external video in combination to no experiences increase in their focus at the subject content in contrast to persons with experiences who observed their own video. But it is interesting to observe that during the observation all three groups mostly have their own instruction in mind even when watching an external lesson. For persons who observed their own instruction and who have experiences with video-based research this probability even increase.
Figure 7: process data

4) Acceptance of video material:
For video-based research the question of acceptance of classroom videos is very important. Our findings bring up that video material in general is very high accepted by teachers. Furthermore the findings show that the stimulation of videos is higher for persons who observe their own video and have experiences in video-based research as for persons without experiences in video-based research, who watched an external video.

![Figure 7: process data](image)

Figure 8: acceptance of the videos

In conclusion the combination of the conditions “experience” and “own video” appears to support noticing of teaching-learning relevant components. There are no differences in the quality of analysis of the teachers related to the conditions “experience” and “video”, as also in the observers’ perspective during the observation. Except that external videos drive persons without experience to a focus on subject contents. In general videos emotionally activate and tend to bring the own instruction to mind. Therein own videos are likely to be perceived as more stimulating and emotionally arousing.

Summary

In addition the evaluation of the learning environment LUV shows that the selection of video clips, the tasks to analyze videos, as well as the overall usability of the learning environment was rated very positive (Seidel, Prenzel, Rimmere et al., 2005). The results concerning the question of the effects through varied subjective relevance of video material (own vs. external) suggest differentiating the decision about the video material depending on the specific purpose of utilization.
References


## Appendix

### 1) Noticing supporting teaching-learning components

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ANOVA; *p<.1; **p<.0.5

### 2) The quality of analysis

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ANOVA; *p<.1; **p<.0.5

### 3) Process data

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scale 0 "never" till 3 "always"

ANOVA; *p<.1; **p<.0.5
4) Acceptance of the videos

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scale 0 "disagree" till 3 "agree"

ANOVA; *p<.0.1; **p<.0.5