

V-Share - Video-Based Analysis and Reflection of Teaching Experiences in (Virtual) Groups

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Abstract. Successful teacher education links methodological theory and teaching practice. Research further indicates that student teachers' development of pedagogical content knowledge can be fostered if they are supported in reflecting on teaching experiences individually and cooperatively. Time and place independent pre- and in-service teacher training is gaining importance. Due to long distances between individual student teachers and the limited amount of time for reflection during face-to-face sessions, analysis and reflection processes cannot be realized in blended learning arrangements with the same means available in traditional face-to-face teacher education. The project "v-share" therefore develops the methodological concept and technical support for video-based analysis and reflection on teaching experiences in (virtual) groups. The internet-based tool allows student teachers in blended learning arrangements to share videos of their own and their fellow student teachers' teaching lessons and to select sequences for joint online analysis, annotation and reflection.

Keywords: video-analysis and -annotation, teacher training, blended learning, reflective teaching

INTRODUCTION

Reflection on practice is of importance because it enables practitioners to assess, understand and learn through their experiences. A positive active process of reflection that reviews, analyses and evaluates experiences draws on theoretical concepts and previous learning and so provides an action plan for future experiences (Kemmis, 1985). Instructional measures that foster student teachers' reflection skills and develop attitudes which are considered necessary for reflection effectively seem to be, among others: teaching student teachers self-regulatory strategies such as planning, self-controlling and self-assessing activities, as well as allowing them to share their experiences and to articulate their reflective thinking processes with lecturers and fellow student teachers (Dewey, 1938/1986; Schön, 1987). Additionally, the lecturer's role is essential in focusing student teachers' reflection processes on teaching situations and reflection processes which may pass by without the participants' awareness (Hovelynck, 2000). Furthermore, several learning-to-teach studies indicate that student teachers who are required to structure and verbalize the pedagogical content knowledge underlying their teaching succeed in distancing themselves from their actions and are thereby able to reflect on them. The development of this capacity of reflection-on-action (Schön, 1987) seems to be enhanced by having student teachers carry out classroom research projects.

Time and place independent pre- and in-service teacher training is gaining importance. According to the concepts of experiential and inquiry-based learning, the planning and carrying out of lessons and the inquiry-based reflection on teaching experiences should be important learning activities of blended learning teacher training courses, too. Due to long distances between individual student teachers and the limited amount of time for reflection during face-to-face sessions, analysis and reflection processes cannot be realized in blended learning arrangements with the means available in traditional face-to-face teacher education. What lacks most of all is the possibility to reflect cooperatively on shared teaching experiences by engaging in a focused inquiry dialogue with lecturers and peers.

The research project v-share is developing the methodological concept and the technical support for video-based analysis and reflection on teaching experiences in (virtual) groups. The underlying assumption is that the purposeful observation and the guided sharing of analyses and reflections on video-recorded lessons foster student teachers' capacity for reflection-on-action and – in turn – improve teaching abilities.

In the first part of this paper we describe the pedagogical design of v-share considering the three main aspects of the research project: using video, collaborative learning and moderation. In the second part follows an outline of how v-share is used at the University of Education in Freiburg. Thereafter the technical realization of v-share is described. Finally the use of v-share as a research tool is put forward.

PEDAGOGICAL DESIGN

Using video

In the research project v-share, video-recorded lessons are used for analysis, annotation and reflection on teaching practices. In comparison with traditional teacher training methods which make use of direct observations followed by face-to-face discussions, video analysis has its own challenges. Unless a 360-degree video camera is available (cf. Roschelle, Pea & Trigg, 1990), video cameras can only capture a limited region of the whole classroom. Therefore, events taking place outside this region cannot be observed during the video analysis. This clipping can be minimized, however, by instructing the video grapher by means of a lesson plan that describes the different parts of the lesson and the main actors. Furthermore, the knowledge of being filmed can affect the behavior of pupils, teachers and student teachers (cf. Hiebert et al., 2003).

Although it is very difficult to detect all important classroom events and interactions in real time, the analysis of video-recorded lessons has several significant advantages in comparison with direct observation. For instance, without video lecturers and student teachers have to rely exclusively on written notes and their memories. Furthermore, video offers the possibility to view a lesson several times and to focus each time on different aspects of a lesson. This allows observers to adopt multiple perspectives on a lesson (Van Es & Sherin, 2002). Video-recorded lessons also make it possible for people to participate in the analysis and discussion who were not able to participate in the lesson itself. According to Clark's (1996) theory on achieving common ground in communication, video-recorded lessons may also serve as a shared external reference point for discussion. Instead of verbally circumscribing the part of a lesson student teachers like to refer to, they can easily refer to it by showing the corresponding video sequence.

Collaboration

In the project v-share, the analysis, annotation and reflection on video-recorded lessons take place in small groups. Collaborative analysis of teaching practices results in different perspectives on one and the same lesson. According to the socio-constructivist theory of learning (e.g., Doise & Mugny, 1984) student teachers learn from different perspectives when they identify and resolve them, present alternative views as well as provide and ask for explanations. Furthermore, the theory of cognitive dissonance (Festinger, 1957) states that the existence of different interpretations among the members of a group induces cognitive dissonance in the individuals. This encourages the individual student teachers to reduce dissonance by communicating with their peers and by revising his/her point of view. Research of Stevens (1997) using the video-analysis-tool "Video Traces" supports this theoretical background and underlines the importance of collaborative use of video.

In contrast to traditional teacher training seminars, the analysis, annotation and reflection on teaching practices take place by making use of a web-based bulletin board. While in synchronous face-to-face settings only one student teacher can contribute to an analysis at a time, a bulletin board allows for asynchronous communication as well as for several contributions to an analysis at a time. This might be of special importance during phases in which ideas need to be generated and collected and cognitive blocking of contributions due to waiting times are to be avoided (e.g., Diehl & Stroebe, 1991). In addition, Quinn et al. (1983) observed that contributions to asynchronous discussions are more detailed and elaborate than contributions to synchronous discussions due to the lower frequency of turn taking. Features such as the written elaboration of contributions, the reversibility of contributions and the lack of time pressure during the formulation of contributions should further increase the quality of contributions (cf. Clark & Brennan, 1991). Furthermore, cognitive resources bound to paraverbal and nonverbal behavior in face-to-face communication is freed and can be allocated to writing contributions in computer-mediated communication (cf. Matheson & Zanna, 1988).

Moderation

As described above, computer-mediated communication has several advantages compared to face-to-face communication but also poses specific difficulties. The missing synchronicity in computer-mediated communication can easily lead to a mixture of contributions, replies to contributions and the creation of new threads and thus produce a complex discussion structure that makes it difficult for the student teachers to construct a coherent view of the discussion and to reach shared understanding (e.g., Levin et al., 1990). Therefore, within the v-share project the lecturer assumes the role of a moderator. She or he assigns tasks to certain student teachers, encourages student teachers to resolve and to integrate different perspectives, raises stimulating questions when the discussion makes no further progress and provides summaries in order to foster coherence building, for example.

USING V-SHARE FOR ANALYSIS AND REFLECTION

Since the summer term 2004 v-share is being used in teacher training seminars at the University of Education, Freiburg. The seminar's methodological concept is based on the principles that favor the development of student

teachers' reflection competence, as described above. During the seminar, various teaching methods are discussed while taking student teachers' learning biographies into account. Student teachers devise criteria for specific teaching methods such as the sequence of teaching activities and the role of the teacher as well as the role of the learners. Based on the above-mentioned criteria student teachers develop lesson plans. They individually select a reflection focus for their lesson, which might derive from teaching theory, methodological or personal matters. Building on this, the lecturer and the student teachers jointly develop observation sheets, which help to focus the observation of the lesson in the classroom as well as the analysis of the video-recorded lesson on the student teacher's point of interest. The student teachers teach lessons individually or in pairs. Specific parts of the lesson are recorded by means of a digital camera and are archived in a discussion board. Following the principle of ownership this is done by the student teacher who taught the lesson in question. The selection is based on the observation sheet that the student teachers developed in a further step and on personal relevance of specific scenes for the student teacher. The participants are aided by a tutor who is an expert in using video-cutting software and has the ability to encode video for internet-streaming. The different video sequences are time-stamped in the video frame to make clear when a scene took place in the lesson. On the basis of theory-based feedback, first the student teacher, then his/her fellow student teachers comment on selected video sequences. Before the student teachers have to comment on the video sequences for a second time, the lecturer focuses the reflection process on points of relevance. The reflective process concludes with a synopsis written by the student teacher who taught the lesson in question.

All steps just described are supported by the internet-based v-share workspace that is used by the student teachers throughout the term. At the beginning of the seminar all student teachers register at the v-share workspace by entering their personal data (e.g. name, email-address, photo). Using name and password the student teachers are then able to access the workspace. All content created by the student teachers is now personalized with the data they entered in the registration process, which increases the degree of environmental and personal presence (Sadovski & Stanny, 2002). The student teachers use v-share to publish the documents they are writing throughout the seminar. This includes the writings on their learning biographies, their summaries of theoretical articles, the observation sheets and the lesson plans they develop and last but not least the synopses they write. v-share supports the self-creation of documents in the workspace as well as the uploading of existing documents as attachments. The self-creation is aided by a rich text editor which enables the student teachers to use different fonts, colors, listings, etc. The published content can also be re-edited by the author ex post which increases reversibility.

Analyzing and commenting on the recorded video-sequences are supported by a combination of a video-player and the bulletin board. The video-player on the left hand side (see Figure 1) allows the student teachers to play back the video-sequences and to select sub-sequences by choosing in- and outpoints. This enables the student teachers to specify parts of the lesson which they would like to comment on and link this comment to a video-sequence. After submission, the comment is shown on the right hand side of the page (see Figure 1). Every comment includes a button to show the corresponding video-sequence in the video-player which enables the student teachers to refer back to the situation in the corresponding lesson. Furthermore, student teachers can reply to each other's comments and quote comments of their fellow student teachers.

All entries are organized in a treediagram with comments as roots and replies as branches of the trees. The board offers the possibility of expanding certain trees of interest and collapsing all other trees. Every message shows the author's name and photo in order to personalize the comment at first sight. Video and bulletin board can be synchronized: In synchronization-mode the comments that belong to a video-subsequence are highlighted automatically while playing the video. This aids participants of the seminar who want to gain a first overview of the comments their fellow student teachers have already written. Furthermore, not only can the comments be linked to the video-sequences but also parts of the synopsis that the student teachers write as a conclusion of the reflection processes. This makes it easy for fellow student teachers to refer back to parts of the lesson which the student teacher who taught the lesson mentioned in his/her synopsis. Finally, the integration of



Figure 1: The v-share workspace (www.v-share.de).

teaching theory, lesson planning, video-linked comments and synopsis in one integrated workspace enables “third-party-students” to “replay” the process.

A main goal in future developments of v-share will be the realization of easy-to-use functionalities to link all content elements available. For instance, statements in comments could be verified by linking them to sentences in a theory article or the synopsis may be linked to comments written by fellow student teachers. This should encourage the student teachers to verify their propositions and reduce effects described in the messaging threshold approach (Reid et al., 1996).

TECHNICAL REALIZATION

v-share is integrated as a self-programmed extension in the open source application framework Typo3 (see www.typo3.org). Typo3 allows the creation of complex websites based on HTML-Templates. The pages can then be filled with different content elements such as texts and pictures without the need for HTML or other programming skills. Typo3 is based on the open source database MySQL and the popular scripting language PHP which simplifies the development of the v-share workspace. The Typo3 framework provides a pre-built administration environment (the backend) for content creation and distribution. Like any other content element that is provided by Typo3, the v-share bulletin board can be included on any page. Installation and configuration of the v-share extension is completely handled by the backend which makes it easy for lecturers to use a v-share workspace. By default, Typo3 already supports user and group authorization and authentication methods which can easily be used in self-programmed extensions like the v-share workspace. Creation of groups and mapping of users to groups can be done in the backend, too. There is a wide range of already developed extensions that can be seamlessly integrated in any Typo3-based web page available for use in the v-share workspace, such as tools for synchronous and asynchronous communication or for workspace awareness, for example.

The heart of the v-share workspace is the video-bulletin-board combination. It makes use of different web-technologies: JavaScript reads out the actual time stamp of the video-playhead when the user selects the in- and outpoint of the sequence he/she wants to comment on. When submitting the comment, the subject, the text, the attached files, user information and the corresponding in- and outpoint are passed to the MySQL database using PHP as a scripting language. This data is retrieved from the database when displaying the bulletin board.

The configuration possibilities include selection of the video-file that is used in the board, specification of user-groups with the rights to write, declaration of the moderator of the board who can edit, move and delete any post and the possibility to allow for replies. For instance, the lesson plan also relies on the v-share board file-upload functionality without inheriting the reply-function. For research purposes, the use of video is adjustable, so the board can be used with or without video.

The recorded video-sequences are coded in the RealPlayer-format for delivery over the web. Real is one of the most popular media codes and players are freely available for all major operating systems. The surestream technology provided by Real allows the delivery of videos that suit the bandwidth of the user. When detecting a high-bandwidth connection like DSL or direct connection in universities the server automatically delivers high-quality video while concurrently giving the student teachers the chance to show low-quality video over their low-bandwidth modem or ISDN connection at home. To distribute surestream-videos, the Helix DNA server is mandatory. It is available under open source license. RealPlayer also supports the Synchronized Multimedia Integration Language (SMIL). SMIL offers possibilities to combine audio, video, text and graphics in real time and to control dynamic web pages. In the current version of the v-share workspace SMIL is used for highlighting corresponding comments while playing the video in synchronization-mode. In future releases, SMIL might be used to show a combination of video and corresponding comments in one integrated view.

V-SHARE AS A TOOL FOR EMPIRICAL RESEARCH

Making use of v-share as a research tool, we are currently following three lines of research. In the first line of research, we analytically develop and empirically test criteria which allow us to describe and assess student teachers’ reflections on teaching experiences. On the one hand, these criteria indicate how well the student teachers observe their own behavior and the pupils’ reactions and how well they succeed in integrating theoretical, personal and contextual perspectives. On the other hand they illuminate to which extent the conclusions drawn by the student teachers are related to their reflection process.

On the basis of the developed criteria, in the second line of research we empirically compare different arrangements of using v-share. As a first step, we are currently running a three-term long field study (summer term 2004, winter term 2004/2005, and summer term 2005) at the University of Education, Freiburg. In this field study, v-share is employed in university courses on developing teaching practices. The three main goals of the field study are (1) to gather experience with v-share in everyday teaching, (2) based on the lecturers’ as well as the student teachers’ experiences, to adjust v-share’s design and (3) to enable the development and testing of the criteria mentioned above. In a second step, more controlled quasi-experimental studies will be conducted in order to empirically test various assumptions underlying the design and use of v-share. For example, it will be tested whether videos taken during teaching practices support student teachers’ reflection and communication

processes to the assumed degree. Furthermore, as is well-known from research on computer-supported collaborative learning, if computer-mediated reflection and communication is to be successful, it needs various forms of support (e.g., Hron, Hesse, Cress, & Giovis, 2000). This is especially true if the lecturers as well as the student teachers are not used to collaborating in a distributed setting. As v-share has been designed in such a way that it allows for the structuring of collaboration in different ways, it will be utilized to empirically compare the effects of different collaboration structures on the reflection and communication processes.

In the third line of research, v-share will not only be used to support reflections on teaching practices made within a small group of student teachers. Rather, v-share will be extended with a database accessible through the internet that consists of a library of – selected and rather short – teaching episodes classified according to specific pedagogical criteria (cf. Derry, Seymour, Lee & Siegel, in press). With respect to such a database, v-share serves two different purposes. Firstly, it provides a tool for demonstrating and collaboratively discussing teaching episodes in courses and seminars on teacher training. Secondly, by importing videos of teaching experiences taken during new teaching practices into v-share, pedagogically interesting video sequences might be suggested for closer review and – if approved – be classified and entered into the database.

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