Video-based Reflection on Teaching: What Makes It Effective?

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Since the beginning of the new millennium, the use of digital video for teacher education and professional development (PD) has grown into a burgeoning and exciting field of research and development (R&D). The collection of empirical studies in this special issue clearly exemplifies this trend. I will begin this comment by pointing out the societal relevance of developments in this field. Then I will discuss the nature of the findings of the six studies and their implications for the design of video interventions as well as for theory and research.

The promise of visual teacher learning for fostering higher-order learning and teaching

The promise of video use in teacher education and PD lies in its potential to encourage a transfer between practice and theory. This potential can be attributed to a number of unique features of the medium. Because of its vividness, video can focus teachers' attention on the complex interactions between the content of learning, their learners' (re)actions and their own. The age-old metaphor of the "instructional triangle" retains its power. The concreteness of video images invites teachers to make the analysis of teaching and learning subject-specific. The user-friendliness of digital video enables repeated analysis from different perspectives without the need for immediate action. And last but not least, moving images invoke vicarious experience (Laurillard, 1993, p. 114) and emotional response. Together, these features can encourage teachers to connect intuitive and rational modes of thinking about their work or "thinking fast and slow", as Kahneman has aptly termed them (2011).

Recent reviews of the research into video use for teacher development have yielded indications that it can help teachers change their classroom behaviour (Gaudin & Chaliès, 2015, pp. 54–55) and specifically so in the direction of forms of teaching that are suitable for fostering higher-order learning. The nature of change in teachers' action after participating in what I call Visual Teacher Learning (VTL) has to do with firstly taking more initiative and a more activating role in the classroom. Teachers achieve this by acquiring, developing and/or sustaining basic teaching skills, by talking less oneself while simultaneously encouraging learners more to engage with and talk about the lesson content by using more open and probing

questioning. These behaviour changes in teachers result in more on-task behaviour in learners on higher levels of cognitive activation. A second effect of video-enhanced reflection on their work is that teachers give their learners more feedback with more focus. Thirdly, during classroom teaching they act and react more adaptively. Finally, video-enhanced reflection encourages teachers to target and try out effective teaching behaviours (Brouwer, 2014, pp. 183–187).

I think these review findings are extraordinarily relevant for any efforts to raise the quality of instruction throughout education. Quality of instruction is a key factor influencing the contribution a country's education system can make to its economic prosperity and cultural vitality (cf. OECD, 2005; Hattie, 2009). In this area, teacher education and PD have a multiplier function to fulfil. The greatest challenge currently facing them is to promote the shift from teacher-dominated and reproduction-oriented learning towards active, higher-order learning, in which pupils develop an understanding of foundational, transferable concepts. Such higher-order learning is increasingly being demanded by technological developments in industrialised as well as industrialising countries.

Overview of studies

The studies in this special issue show a similar diversity as found in most studies of visual teacher learning in the past fifteen years. They address both preservice and in-service applications. The duration of the interventions studied varies greatly, between weeks and one year. The number of teachers involved ranges widely, between one and 169. Some studies include control groups, others do not, i.e. four and two studies respectively.

The six studies also pertain to a multitude of factors influencing teacher learning. This is inevitable and desirable, as their objects of study are specific interventions in the real world of teaching and learning. Such relevant factors are:

a. in which *career stage* participants find themselves: preservice, beginning or experienced;
b. who is being viewed in the videos shown: the teacher him- or herself and/or colleagues (*self- vs. other-viewing*);
c. what *type of video* is used in the intervention: "action videos" showing everyday teaching, "model videos" intended to demonstrate exemplary teacher behaviour, "trigger videos" intended to elicit cognitive friction in and debate among viewers (cf. Fortkamp & Van den Berg, 2005) or no video, as in comparisons with written teaching cases;
d. how much and what kind of *structure* facilitators introduce into teachers' analysis and interpretation of video recordings;
e. from which source(s) teachers receive *feedback*: peers, experts and/or learners.

It is an important task for researchers to disentangle and evaluate the relative contribution that each of these factors may make towards effects on teachers' pro-

fessional learning. In this respect, primary studies such as in this theme issue provide the foundation for review studies.

What is characteristic of both the studies in this issue and the wider literature is that the dependent or criterion variables pertain more often to teacher perceptions and thinking than to (changes in) teacher behaviour and (its impact on) outcomes in learners (cf. in this issue: Minaříková et al., 2015; Vondrová & Žalská, 2015; Mohr & Santagata, 2015; and Krammer et al., 2015).

Finally, both quantitative, qualitative and mixed-methods studies are reported. Quantitative studies are strong in demonstrating the impact of interventions on teacher thinking and/or behaviour. Qualitative studies are strong in revealing the complex causation involved in VTL, i.e. clarifying the interplay of conditions and processes in how effects on teachers and learners come about.

What is also characteristic and encouraging at the same time is that the findings of most studies confirm that using video for teacher education and PD is more effective than not using video. This confirms what Elizabeth van Es once said: "We know that it works. Now we should know how and why."

Implications for intervention design

The findings of the studies in this special issue lend support to the critical features of effective PD interventions for teachers as explicated by Desimone: coherence with teachers' knowledge and beliefs, daily practice and school, district and state policies; content focus; active learning; duration and collective participation (Desimone, 2009; cf. Guskey, 1986, 2000; Borko et al. 2010; Van Veen et al., 2012). At the same time, the study findings suggest possible specifications and elaborations. In this regard, I would like to make the following remarks.

All studies confirm the need for *subject-specificity* of assignments and formats for the analysis and interpretation of video records of classroom teaching. For the design of effective VTL interventions this means that a productive line of work is to explicate on the basis of valid theory and research catalogues of effective teaching behaviours, not only on a generic level, but also specific to different school subjects. Such catalogues may be operationalised in the form of viewing guides that teachers can use to guide their professional learning (cf. Brouwer, 2011).

When comparing studies of VTL interventions it appears to me that their effectiveness may depend not only on the presence or absence of the critical features mentioned above, but also or even more on *how they are combined* in a specific intervention. Two exemplary large-scale studies (Kersting et al., 2012; Roth et al., 2011) have shown that carefully implemented video-based interventions can help teachers change their actions in the classroom in ways that demonstrably improve pupil achievement. For this to occur, apparently a host of necessary conditions needed to be fulfilled simultaneously, i.e. teachers received material support from school leaders and modelling from facilitators *and* participated in coaching activi-

ties in an atmosphere of community and trust *and* engaged in collaborative lesson planning *and* purposefully enacted over a prolonged period step-by-step changes in their classroom work. A similar conclusion can be drawn from another large-scale study including effects on pupil learning (Matsumura et al., 2013). This evaluation of a coaching intervention – without video – indicates that fidelity of implementation is an influential precondition for effectiveness.

From this perspective, it is interesting to see – most clearly in the interventions studied by Schindler et al. (cf. Pehmer et al., 2015; Schindler et al., 2015) and Berson et al. (2015) – that the challenge to teachers of translating thought into action crucially depended on opportunities to repeatedly collaborate on lesson planning and move rapidly through complete cycles of planning, teaching and reflection. This finding suggests the importance of designing PD activities as *consecutive cycles*. Different choices are possible here. Korthagen's ALACT model (Korthagen et al., 2001) emphasises retrospective reflection, often focusing on generic aspects of teacher behaviour. Central to Santagata's *Lesson Analysis Framework* (Santagata & Guarino, 2011) is the retrospective analysis of subject-specific student learning. The strategy of *content-focused coaching* introduced by West & Staub (2003) on the other hand, emphasises prospective reflection focusing on subject-specific learning. The *Problem-solving Cycle* developed by Borko et al. (2008) as used by Berson et al. and adapted as the *Dialogic Video Cycle* by Schindler et al. involve balancing prospective and retrospective reflection focusing on subject-specific aspects. I think it would be well worth the investment to consider – both in intervention design and in empirical evaluation – what consequences such different choices may have for teacher and pupil learning.

A recurring issue is what is more effective, other- or self-viewing (cf. Kleinknecht & Schneider, 2013). No clear-cut evidence of superiority of one over the other seems to emerge. From the study by Krammer et al., it rather appears that they have different merits. In particular, their qualitative findings suggest that other-viewing can foremost encourage teachers to recognise, name and elaborate on effective teaching practices, while self-viewing tends to foster foremost analysing one's own local teaching practice critically.

Implications for theory and research

Above, I already noted that explicating catalogues of effective teaching behaviours for different school subjects would be a fruitful endeavour in order to raise the effectiveness of video-enhanced reflection on teaching. Underpinning viewing guides or other forms of operationalisation with valid theory and research about subject-matter content and pedagogy is, I think, a necessary foundation for the drive towards higher-order learning. This requires enduring investments in educational R&D work, not only in science, technology, engineering and mathematics (STEM), but in all school subjects. There is also a risk here. The literature about pedagogical content knowledge (PCK) contains instances of semantic tournaments characterised

by little parsimony and even less practical relevance. What we need, rather, are concise and concrete descriptions of effective teaching behaviour, whose usability and merit for teachers is demonstrated by research.

The studies by Schindler et al. and Berson et al. illustrate the merits of research covering the *whole causal chain* of events from the design and implementation of VTL interventions through their effects on teacher thought and action to impact on pupils' learning processes and achievement. As noted, most VTL research until now takes teacher perception and thought as its end point, often under the heading of "professional vision". However, I think we should extend our operationalisations beyond teachers' perception and thinking to include their interaction with learners, its nature, its impact on pupil achievement as well as how its effectiveness can be enhanced.

Concluding remarks

Moving research into visual teacher learning in this direction requires a specific methodology. It is already quite productive that quantitative studies demonstrating outcomes and effects of interventions coexist with qualitative studies exploring how learning effects come about. Empirical knowledge about processes and conditions is indispensable for underpinning the design of effective interventions. The studies by Krammer et al. and Schindler et al. illustrate the merit of conducting mixed-methods studies, i.e. strategically combining qualitative and quantitative methods within one study or project. A causal-genetic research paradigm using mixed methods (cf. Brouwer, 2010) holds promise for scientific explanation and as such for designing interventions which demonstrably benefit the work of teachers.

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