Editorial: Considering Experience to Advance Research in Video-Enhanced Teacher Learning

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Recent literature reviews in the field of video-enhanced teacher learning show that video viewing has been increasingly used over the past 15 years in teacher education and professional development in all subject areas, at all grade levels, and all over the world (Gaudin & Chaliès, 2015; Major & Watson, 2018; Marsh & Mitchell, 2014; Tripp & Rich, 2012). Gaudin and Chaliès (2015) identified three main reasons: (a) video is an "artifact of practice" that helps create a link between the traditional theoretical education at the university and classroom practice, (b) video viewing has been greatly eased by technical progress (e.g., digitalization, storage, edition, and annotation), and (c) video viewing is a means to facilitate the implementation of institutional reforms. Video viewing may, therefore, potentially improve pre- and in-service teacher educational programs.

Our understanding of teacher learning with video viewing has been regularly summed up in handbooks (Brophy, 2004; Calandra & Rich, 2014; Rossi & Fideli, 2017). Recent special issues have further examined various areas: "Video as a Tool in Teacher Learning" (Baecher & Connor, 2016), "Design and Facilitation of Video-Based Professional Development Programs" (Tekkumru-Kisa & Stein, 2017) and, "Striving for Change: Video-Based Teacher Education Programmes and Related Research" (Janík, Minaříková, & Gröschner, 2015). While the use of video viewing, its guidance, and its effects have been examined at length, teacher *experience* in video-enhanced educational situations has not yet been well-considered as a research object.

The various conceptualizations available of video-enhanced teacher learning have not taken into account the experiential dimension (Blomberg, Renkl, Sherin, Borko, & Seidel, 2013; Brouwer, 2011; Santagata, 2014; Yung, Yip, Lai, & Lo, 2010). Driven by the instructional perspective, they mainly sought to derive design criteria (e.g., learning goals, instructional approaches, learning activities, limitations, and assessments).

Thus, the effects of video viewing on the development of teachers' motivation and abilities (selective attention, knowledge-based reasoning, and classroom practice) are well documented, but little is known about teacher experience in video-enhanced educational situations and about how to develop *user/learner experience design* for video-enhanced teacher learning. In this special issue, experience is examined as an object to advance research in video-enhanced teacher learning. Experience is a research object that requires qualitative inquiries into trainees' point of view, concerns, appraisal, feelings, understanding, and expectations. To account for experience, we have to know more about (a) how trainees make sense of what they notice in educational videos, (b) how trainees relate what they notice in videos with their own teaching situations, (c) what links are created between the analysis of relevant elements observed in videos and plans to transform professional practices or capacity to perform effective teaching, and (d) what characteristics of video-enhanced educational environments can stimulate, guide, and scaffold these processes.

Improving the field's knowledge about (a) how to better design video-enhanced programs to enable teacher trainees to have constructive experiences and (b) how to enact more efficient educational practices both hold promise for the design of new programs and together seem to be a valuable and innovative research and design area. This special issue addresses such questions within different disciplinary and content-related contexts, using a variety of focus and methods to elicit teacher experience in video-enhanced educational settings.

Types of Experience

Seven types of experience can be derived from the contributions of this special issue and are each discussed as follows:

1. The experience the trainer/instructional designer wants the teachers to have. Scholars are in broad agreement about the inability of video artifacts to enable teacher learning without being systematically embedded with appropriate instructional strategies and structured protocols. Numerous studies have concluded with the need for strong guidance and scaffolding (e.g., Blomberg et al., 2013; Santagata & Guarino, 2011; Star & Strickland, 2008; van Es & Sherin, 2008). Thus, design-based research seems to be a suitable approach to determine how to improve teacher video-enhanced learning, and user/learner experience in video-enhanced programs seems to be a relevant research and design topic.

In their article, Barnhart and van Es question the difference between video and artifact. Artifact is defined not only as a video of classroom or students, but as a video that is enriched with other information (e.g., about student work) and with a specific aim (e.g., providing models of students' evidence-based reasoning and classroom interactions). They propose a rich and complex methodology of case studies that mixes different sources of data to elicit teachers' experiences.

Seago, Koellner, and Jacobs designed and tested a video-enhanced professional development program that follows an explicit learning trajectory in which a video clip is

used in the middle of an online teacher learning experience composed of mathematical problem solving, video analysis of classroom practice and students work, and pedagogical reflection. It is designed so that teachers experience a consistent set of activities and engage in activities designed to immerse them deeply in both the mathematics content and the focal instructional components.

Following a design-based experiential approach to teacher learning, Gaudin, Chaliès, and Amathieu designed an induction program consisting in an "ostensive teaching of rules" and showed that can it be efficiently supported by video observation, under determined instructional conditions. Lussi Borer, Flandin, and Muller suggest to prefer authentic designs that preserve the richness of teaching situations portrayed in video excerpts rather than those that aim at closely focusing on elements of direct instructional importance. Enhancing the ethnographic dimension of a video excerpt allows teacher trainees to observe not only for what is expected to be observed, but also anything that can stimulate novice teachers' propensity to link together many formative experiences that initially seemed unrelated.

2. The resonance and the reenactment of past teaching experiences. Following Goldman (2007), Seidel, Stürmer, Blomberg, Kobarg, and Schwindt (2011) used the term *resonance* to express the propensity of teacher trainees to experience what they are observing in others' teaching situations in relation to their own teaching situations. This phenomenon enables trainees to make sense of what they are observing by a direct anchorage in their practice. With favorable facilitation conditions, observing one's own teaching may foster another phenomenon: reenactment.

Reenactment enables trainee teachers to live their past teaching experience again as if it were happening at the moment. It consists of a strong experiential commitment that can have interesting learning outcomes. Hamel, Viau-Guay, Ria, and Dion-Routhier show that self-confrontation interviews help teacher trainees to make sense about their classroom activity and their experiences during the educational program, but also support their professional growth. The forms of media used for the reenactment matter: Calandra, Brantley-Dias, Yerby, and Demir note that preservice teachers wrote significantly higher quality papers on several indicators (*what*, *emotions*, and *perspectives*) of critical teaching incidents when prompted by video experience than when prompted by audio experience.

3. The experience of immersion or connection to the teaching situations observed on video. Teacher immersion is known to be facilitated by the observation of authentic, plausible lessons (Gaudin, Flandin, Ria, & Chaliès, 2014; Goldman, 2007; Seidel et al., 2011). Authenticity of the teaching portrayed is a robust design principle for instructional strategies based on typical situations and teaching actions. Providing a rich, state-of-the-art review of French research concerning the use of video for teacher education and professional development, Leblanc focuses on the effects of four video-based mentoring situations (self-viewing, self-confrontation, other-confrontation, and professional-trajectory follow-up) on engagement, reflection, and change among teachers. He suggests a model to help rethink the use of video for teacher education and professional development following three original axes: Axis 1. Learning Teaching Skills and/or Analyzing Teaching Practices; Axis 2. Analysis of One's Self-Image and/or Verbalizing One's Experiences; and Axis 3. Professional Development Based on What Teachers are Teaching, and/or on What Pupils Are Learning).

Santagata and Taylor show how images of lessons provide unique, immersive opportunities for novice teachers. They can understand how experienced teachers make space for student thinking to become visible, probe student thinking to move learning forward, engage

students in classroom discourse and learn about students' individual ideas while they teach.

4. The experience of linking and making sense of different teaching references together ("referentiality"). As Brouwer and Robijns (2014) proposed, the teachers do not only attempt to understand what goes on during the situations viewed, but simultaneously form different kinds of value judgments depending on their past experiences: about what is at stake in the situation, about the teaching actions identified, about the perceived relevance to enact these actions, and so forth.

Lussi Borer et al. name "referentiality" all the links made by teachers between what they observe on video and the past experiences recalled by video observation. They highlight new accountable categories of teacher video observation by mobilizing Peirce's Semiotic and by distinguishing eight items of referentiality.

In a normative approach of teacher instruction, Gaudin et al. show that preservice teachers understand the rules they are taught by creating meaningful links between experiential features combined from the video-enhanced program *and* from other learning contexts. Preservice teachers appropriate the rules they are taught by transforming them in the classroom while adapting to circumstances.

5. The experience of student perspective. Accessing students' point of view to understand their learning or difficulties is a key skill for making relevant decisions on instructional strategies. Teachers may learn to focus their attention on student experience if some form of guidance for reflecting on videotaped instruction is provided to guide their viewing (Santagata, Zannoni, & Stigler, 2007; van Es & Sherin, 2006).

Barnhart and van Es show that teachers engaged in a professional development program succeed in focusing on student's disciplinary thinking in video club meetings, but encountered difficulties to keep doing so in their classroom. Santagata and Taylor designed a video-enhanced course based on the analysis of teachers' own lesson: Teachers who attended to it during teacher preparation outperform their counterparts in both the quality of evidence they drew upon and their attention to individual or subgroups of learners. Authors stress that attending to individual students' thinking and understanding is a skill that needs time to develop and is not prevalent in novice teachers.

Seago et al. offered teacher trainees opportunities to experience a dual student perspective, first trying to solve mathematical problems as if they were students, then, observing through video how the students experienced the mathematical activity. The added value is the comparison between these two experiences that broaden trainees' mathematical thinking.

6. The collective inquiry experience. Considering the fact that teachers' goals, prior knowledge, and beliefs frame what they notice in artifacts ((Llinares & Valls, 2010; Yadav & Koehler, 2007), video clubs are worthy educational programs to enable teachers to share, discuss, and reconsider their understanding of teaching situations (e.g., Sherin, 2007; Sherin & Han, 2004). From an instructional perspective, Barnhart and van Es stress four requirements for video club effectiveness: align personal goal for participation in the video club with the goals of the video club; take into consideration the constraints of teaching contexts; foster practice change as an incremental process made with small and manageable changes; require a long-term facilitation and duration of a video club to have time to explore new approaches in practice and analyze them with colleagues.

Through videos such as those on the Néopass@ction platform, Leblanc shows that novice teachers can experience the dual belonging to novice and experts working communities (Leblanc & Ria, 2014). Viewing alternating videos of novice and experienced teachers allows novice teachers (a) to experience two perspectives on work issues and (b) to integrate in a progressive way the working community from the periphery (with novice activity) to the center (with more experienced activity and professional standards).

7. The influence of video-enhanced education on teaching experience. Recent research has mainly sought to identify the effects of video on the development of teachers' ability to notice relevant features in the classroom (e.g., Sherin & van Es, 2005), on their ability to reflect (e.g., Rosaen, Luneberg, Cooper, Fritzen & Terpstra, 2008), and on the interplay of these abilities (e.g., Sherin & van Es, 2009). Less empirical evidence is available, however, on video-enhanced acquisition of professional experience, that is, concrete and usable teaching actions in the classroom (Gaudin et al., 2014; Kersting, Givvin, Thompson, Santagata & Stigler, 2012).

Considering effective teaching as a set of vocational rules, Gaudin et al. studied preservice teachers' appropriation of the rules they were taught in a video-enhanced program. Rules are learned when teachers managed to transform them in their classroom while adapting to circumstances.

Santagata and Taylor provided compelling arguments for the idea that video-enhanced experiences of lesson analysis during teacher preparation tend to support future competence once teachers enter the profession, even if different novice teachers think differently about their lessons. Hamel et al. studied the "course of experience" of novice teachers during "self-confrontation" interviews in which they were prompted to elicit their experience (especially concerns and expectations). They find that it helped novice teachers produce knowledge on their own classroom activity and experience, which contributed to supporting their professional growth.

Taking Experience Into Account When Designing Video-Enhanced Programs. Seven types of teacher video-enhanced experience are summarized here but trainer/facilitator/instructor experience is missing. Indeed, trainer/facilitator/instructor experience in educational settings is rarely studied. Occupational sciences have long stressed that designing usable work systems (such as video-enhanced educational programs for instructors) requires close consideration of the user experience.

The contributions of Seago et al. and of Leblanc emphasize the importance of the facilitators' moves to make video-enhanced programs work. Barnhart and van Es advocate for a long-term facilitation and duration of a video club in order to dedicate enough time to the collective exploration of new teaching approaches and methods. Lussi Borer et al. show that encouraging novice teachers to mobilize different classes of signs and items of referentiality during video observation serves to multiply their modes and means of interpretation of teaching and thus maximizes their learning opportunities. While this special issue links the experience of teacher trainees with facilitation moves, it does not directly address the experience of trainers in video-enhanced programs, a field that future research has yet to explore.

Overview of Contributions

Looking at how in-service secondary science teachers can improve science education by adopting more student-centered instructional practices, Barnhart & van Es designed a semester-long video club focused on honing attention to students' evidence-based

reasoning and creating opportunities to make students' reasoning visible in practice. The authors describe the experiences lived by four secondary science teachers as participants in professional development and as teachers experimenting (or not) instructional shifts. Although all participants expressed value in attending to students' ideas and shifting autonomy to students in the classroom, they experienced varying levels and types of integration in their practice. Analysis suggests that key to understanding the incremental ways in which participants integrated learning from the video club are their beliefs, goals, and commitments. The authors highlight that engaging and sustaining teachers in experiencing changes to practice requires professional development programs offering multiple cycles of shifting visions of what is possible, coupled with collaborative attempts to work through challenges of implementation.

The purpose of the study of Calandra et al. was to examine what happens when a group of preservice secondary science teachers uses different forms of media prompts during a guided reflective writing exercise about their critical teaching incidents. Using a counterbalanced research design, the authors compared the quality of writing participants produced when they have access to either their edited video clip of the incident, audio from the clip only, or their memory of the incident alone while writing. An analysis of variance among paper scores showed that teacher trainees wrote significantly higher quality papers on several indicators (*what*, *emotions*, and *perspectives*) when prompted by video experience than when prompted by audio experience. Although not significant, there was also a difference in mean scores between papers written while listening to audio and higher quality papers written from memory alone. Similarly, there was a nonsignificant difference in mean scores between papers written while viewing video and those written from memory alone.

In their article, Gaudin et al. show how video observation can support the "ostensive teaching" of the rules that need to be acquired in education — and then enacted in teaching — by preservice secondary physical education teachers. Video is used by teacher-educators to create meaningful links between a language experience of naming the rule, professional experiences selected and shown as exemplars (and that correspond to the rule named), and the experience of demonstrated results. Their findings show that the teacher trainees following of the rule is influenced by a personal combination of experiences from the video-enhanced program *and* from other learning contexts. Several kinds of experiences are identified, and opportunely echo the concept of referentiality developed by Lussi Borer et al. in this issue.

Based on the course-of-action semiological framework, the study of Hamel et al. aimed to better understand the experience of a novice elementary school teacher participating in an educational program aimed at supporting her professional development through the use of video. This mentoring project involved various modalities. She was observed giving a science lesson and then took part in two interviews involving self-confrontation with researchers at 1-week intervals, returning to the classroom between these interviews. The aim of the self-confrontation interviews was twofold, namely, to produce knowledge on teacher trainee's classroom activity and her experience during the educational program and to support her professional development. Results indicate that a research-design approach that focuses on the course of experience of a novice teacher through the use of video can influence participants' professional growth. By focusing on the participants' concerns and expectations, such programs can help them integrate new knowledge into their frame of reference and apply it in a concrete way in the classroom.

As part of a scientific approach labelled "course of action," Leblanc shows how the use of videos help to reveal novice teachers' experiences. Providing access to these experiences contributes to improving the design of video-enhanced programs. Such programs aim to

build professional skills by establishing more explicit links between university education and internships or practical work in the schools. Leblanc proposes a review of French research concerning the use of videos in teacher education by distinguishing the impact of four video-based approaches on teachers' experience and professional development. These approaches are valuable in designing progressive video-based professional development programs by providing ideas on how to use video resources in education to provide different learning experiences.

Within Peirce's Semiotic Theory framework, the study of Lussi Borer et al. represents a significant contribution to understanding of video-enhanced experience in educational settings beyond the usual research areas of noticing, interpreting, and reflecting. The authors present a study of individual video-based educational sessions with secondary novice teachers observing others' teaching. They used facilitated think-aloud protocols, transcribed the teacher trainees' verbalizations, and coded the data using semiotic schemes.

The analysis enables a better understand of referentiality by mobilizing five classes of signs and distinguishing eight items of referentiality. Their findings suggest the need to acknowledge the dimension of referentiality in video observation as a legitimate object of research, instructional design, and facilitation in the field of teacher video-enhanced education, especially during the induction period.

The exploratory study of Santagata and Taylor examined whether preservice elementary teachers' experiences with video analyses during teacher preparation have long-lasting effects on their practices once they enter the profession. Specifically, the authors examined whether teacher trainees who had opportunities to analyze student thinking and learning with the "Lesson Analysis Framework" during teacher preparation continued to do so when they reflected on their teaching effectiveness as full-time teachers. A group of elementary school teachers who attended a video-enhanced mathematics methods course (Learning to Learn from Mathematics Teaching) were compared to a control group at the end of their first year of full-time teaching. Teacher trainees were asked to assess two lessons they had just taught by describing lesson learning goals and providing a rating of lesson effectiveness and a rationale for their evaluation. Teacher trainees who attended the video-enhanced course during teacher preparation outperformed their counterparts on both the quality of evidence they drew upon and their attention to individual or subgroups of learners.

Within a video-based mathematics professional development environment labelled "video in the middle, Seago et al. describe how to design and sequence a professional development curriculum with videocases (selected video clips from teachers' classrooms sandwiched between pre- and postviewing activities) to support in-service secondary mathematics teachers' engagement in and learning from the video. First, the design asked teacher trainees to solve mathematical problems to put them in their students' shoes and live similar mathematical experiences. Then, it allowed teacher trainees to observe through video how the students experience the mathematical activity. It led them to make comparisons between their own experience and the ones of their students, between their mathematical thinking and the one of the students. These comparisons helped them to examine complex mathematical content, to establish a relationship between pedagogical decisions and practices, and to debate about mathematical issues for students' learning. The authors underscore the major role that facilitators plays in such a fruitful experience for teacher trainees.

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