An exploratory study of the influence of video viewing on preservice teachers' teaching activity: normative versus developmental approaches

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Abstract

Sono disponibili scarse evidenze circa l'influenza della visualizzazione di video sull'attività didattica di insegnanti in prima formazione. Questo articolo presenta uno studio esplorativo sull'impatto di due programmi progettati sulla base del medesimo quadro concettuale – un activity-based framework di analisi del lavoro (Durand, 2013) – ma con due diversi approcci teorici e didattici: quello "normativo" (Berducci, 2004; Nelson, 2008) e quello di "sviluppo" (Varela, 1989). In entrambi i casi i risultati evidenziano che la visualizzazione di video influenza l'attività didattica degli insegnanti in formazione, a condizione che: (i) gli interessi professionali degli insegnanti in formazione siano legati a ciò che essi visualizzano, e (ii) gli insegnanti in formazione adottino, adattino o inventino un nuovo modo di agire a partire da quello che hanno visto. Supportati da dati estrapolati da interviste di auto-confronto, sono presentati e discussi i vantaggi e i limiti di ciascun approccio.

Parole chiave: video; tirocinanti; formazione insegnanti; activity-based framework.

Abstract

Very little empirical evidence is available concerning the influence of video viewing on preservice teachers' teaching activity. This article presents an exploratory study putting into perspective the influence of two video-based vocational education programs on pre-service teachers' teaching activity. These innovative programs have been designed on the same conceptual framework – an activity-based framework for work analysis (Durand, 2013) – but using two different theoretical and instructional approaches: the "normative" one (Berducci, 2004; Nelson, 2008) and the "developmental" one (Varela, 1989). With both approaches, the results highlighted that video viewing influence pre-service teachers' teaching activity, provided that: (i) preservice teachers' professional concerns "resonate" with what they are viewing, and (ii) preservice teachers adopt, adapt or invent a new way to act from what they viewed. Supported by self-confrontation interviews data, benefits and limitations of each approach are presented and discussed.

Keywords: video technology; preservice teacher; teacher education; activity-based framework.

1. Introduction

1.1. The influence of video viewing on teacher education

Most studies underline the many benefits of video viewing in teacher education. Among the most significant benefits are heightened motivation, optimized selective attention and knowledge-based reasoning, and improved teaching activity (Gaudin, 2014).

1.1.1. Video viewing and preservice teachers' motivation

Studies showed the influence of video on teacher motivation (Barnett & Tyson, 1999; Moreno & Valdez, 2007). As Sherin (2004) pointed out, video tends to be similar to authentic experience in that it positively affects intrinsic motivation and interest. For instance, preservice teachers (PTs) level of satisfaction was found to be higher when teacher education courses use video rather than textual support or narrations of experience (Choi & Johnson, 2007; Moreno, Abercrombie & Hushman, 2009).

1.1.2. Video viewing and preservice teachers' cognition

Numerous studies showed that video use enhances selective attention. Using video, teacher educators can develop strategies to focus their attention on the most relevant classroom events (Brunvand, 2010). PTs develop and increase their ability to identify relevant events because, as they watch the video, they are not only able to focus on the teacher's activity, but also on the students' as well (Sherin & van Es, 2005; Yerrick, Ross & Molebash, 2005). For instance, Snoeyink (2010) showed the effectiveness of video self-analysis in helping PTs to identify relevant classroom interactions and, more specifically, to take students' perspective and to become better able to identify how well they have understood. Furthermore, other studies reported that video use enriches the ability to interpret observed events; it promotes the shift from partial, more or less detailed, descriptive analyses to more focused, specific, and interpretative analyses (Rosaen, Lundeberg, Cooper, Fritzen, & Terpstra, 2008; Star & Strickland, 2008). For example, Santagata and Guarino (2011), showed that, in training programs that use video, PTs learnt to better interpret the reasons for and consequences of the decisions made by the videoed teacher. Studies also showed that video viewing challenges PTs assumptions and helps them to critically examine their beliefs and values about teaching and learning (Scott, Kucan, Correnti, & Miller et al., 2013; Yadav & Koehler, 2007).

1.1.3. Video viewing and preservice teachers' classroom practice

Paradoxically, little empirical evidence has been presented on the benefits of video use on actual classroom practice (Seidel, Stürmer, Blomberg, Kobarg & Schwindt, 2011). However, very few studies showed that PTs redeploy in the classroom the abilities they first developed in video clips viewed in class (Flandin & Ria, in press; Leblanc, in press; Prusak, Dye, Graham, & Graser, 2010). Other studies showed that the main effect of video use is to prepare PTs emotionally and intellectually for the classroom (Koc, 2011; Wang, 2013) and improve their "withitness" (Snoeyink, 2010). For example, Karsenti and Collin (2011) documented the impact of online teaching videos on the development of self-efficacy beliefs in PTs. More generally, video use has been found to "inspire

habits of praxis" (Hewitt, Pedretti, Bencze, Vaillancourt & Yoon, 2003, p. 500) in three broad areas: (i) planning and preparation for differentiation, (ii) teaching and learning, and (iii) classroom management (Harford, MacRuairc, & McCartan, 2010).

In any case, the influence of a video-based program should not be reduced to the video artifact, and should also systematically take into account the instructional approach underpinning its design. Therefore, tracking this influence by putting into perspective two mainstream approaches to teacher education appears to be an important and relevant object of our study. Moreover, considering that research focuses most of the time on behavioral components like motivation and cognition, the study of the experiences lived by preservice teachers during teaching and during video viewing seems to be an innovative way to explore the reciprocal influence of these two activities, which remains a quite unknown research area.

1.2. Instructional approaches to video viewing in teacher education

Although institutional or technological constraints to using videos exist, the instructional approaches to video viewing generally depend on the learning goals of the teacher education programs (Blomberg, Renkl, Sherin, Borko, & Seidel, 2013; Rosaen, Lundeberg, Cooper, Fritzen, & Terpstra, 2010; Santagata & Guarino, 2011). The literature distinguishes different instructional approaches to video viewing in teacher education: (i) show examples of good teaching practices, (ii) show characteristic professional situations, (iii) analyze the diversity of classroom practices from different perspectives, (iv) stimulate personal reflection, and (v) guide/coach teaching (Fadde & Rich, 2010; Janík et al., 2009; Masats, Sormunen, Hacklin, & Ducos, 2007). The literature therefore reveals two main instructional approaches to video viewing to help PTs learn how to teach (Gaudin & Chaliès, 2012). The first one is designed from a "developmental" approach and its aim is to help PTs to elaborate action means by "interpret[ing] and reflect[ing] on classroom practices" (Sherin, 2004, p. 14). The second one is designed from a "normative" approach and its aim is to make PTs observe and learn "what to do" in the classroom (Brouwer, 2011).

1.2.1. Normative approach

According to this approach, the primary interest of video viewing is not its potential for developing PTs' reflective practices, but instead for presenting "best practices" in a variety of circumstances of the teaching profession (Andre, Schmidt, Nonis, Buck, & Hall, 2000; Merseth, 1994). Selected and shown from this perspective, videos show examples of good teaching practices (Marsh, Mitchell & Adamczyk, 2009; Seago, 2004) or typical classroom lessons (Clarke et al., 2008; Yung, Wong, Cheng, Hui & Hodson, 2007). For example, showing PTs videos of "best practices" raises their awareness of the diversity of approaches to teaching and learning (Oonk, Goffree, & Verloop, 2004; Rosaen, Degnan, VanStratt, & Zietlow, 2004) and avoids demotivating them (Wong, Yung, Cheng, Lam, & Hodson, 2006).

1.2.2. Developmental approach

According to this approach, video viewing is used to expose PTs to a wide variety of professional practices and to stimulate their professional reflection (Brophy, 2004; Meyer, David, Cantin, & Aubé, 2005). The aim is not to define "good" and "bad" teaching practices, that is, practices to reproduce or reject (Hewitt et al., 2003; Santagata

& Guarino, 2011). As an example, viewing a video of another teacher can help PTs to uncover, clarify and refine their personal theories on teaching and learning, challenge these theories, and develop new understandings about teaching and learning (Abell & Cennamo, 2004).

2. Conceptual framework

Our "activity-based framework for work analysis" (Durand, 2013; Durand & Poizat, 2014) has two complementary purposes: (i) understanding the social practices of work and training, and (ii) designing innovative vocational training methods based on this framework[1]. Its basic postulate is to give primacy to actor's actual activity, that is to say what one really accomplishes in everyday ecological contexts. Based on this conceptual framework, the programs studied in this article consist in three iterative phases: (i) modelling the typical features of actual teaching activity (e.g., beliefs, concerns, professional gestures), (ii) designing and implementing vocational training situations, and (iii) studying their influence on trainees' and trainers' activity[2]. The article aims at illustrating the third phase.

3. Research questions

Both conceptual framework and literature review raise two main research questions:

- Does video viewing influence PTs' teaching activity?

Most of the aforementioned studies have inferred such relationship from "indirect" evidences (e.g., questionnaires, written commentaries, transcripts of teacher discussions) and not from "direct" evidence, that is, the analysis of their actual teaching activity (e.g., self-confrontation interviews). Thus, the present study aims at investigating the influence of vocational education programs using video viewing on PTs' actual teaching activity.

- Do instructional approaches affect the influence of video viewing on PTs' teaching activity?

There are different instructional approaches of video viewing in teacher education; one might wonder which are the most effective and how to select and use them according to their potential influences. An exploratory study was therefore conducted to put into perspective the influence of two video-based vocational education programs on PTs' teaching activity: the former has been developed according to a "normative" approach, and the latter has been developed according to a "developmental" approach.

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[1] For more details on specific video-based design issues, see Flandin (2014).

[2] The data collected also provides information to improve these situations in detail, the whole training program and more generally principles for video-based teacher education (for more details, see Flandin & Ria, 2014).

4. Method

4.1. Participants

As opposed to teacher education in many European countries, the French system has two distinct steps that all teacher candidates undergo. The first step is a five-year curriculum at the university, including two or three internships lasting one or two weeks apiece; they take place in the public school system and are meant to observe experienced teachers' practices. Following their curriculum, as a second step, future teachers take a national examination and, if they pass, they are given the status of PT and undergo professional development for one year. This induction year is organized on an alternating basis: half of every week is spent at the university with the university supervisor (US), and the other half in the public school system working in a classroom under the supervision of a cooperating teacher (CT).

We present here two case studies conducted with secondary school PTs during their induction year. The first case study, focusing on the "normative" approach, was held at the University of Toulouse and involved two physical education PTs: a 22-year old woman and a 23-year old man. The second case study, focusing on the "developmental" approach, was held at the University of Lyon and involved six PTs (three men and three women, from 23 to 25 years old; five school subjects: English, Spanish, Chinese, communication and physical education).

4.2. Research design

In the present study, the influences of two video-based vocational education programs on PTs' teaching activity are put into perspective. These innovative programs have been designed on the same conceptual framework – "an activity-based framework for work analysis" – but using different theoretical and instructional approaches. Program #1 was designed from a "normative" approach, in which PTs' activities were guided by the trainers through an iterative course. Program #2 has been developed according to the "developmental" approach, in which PTs' activities are autonomous in an open video-based environment. In addition, both programs have been designed following a principle of continuity between video-based workshops and teaching activity in classroom.

4.2.1. Program #1 - "normative" approach

Program #1 was designed on the postulates of a "general theory of learning" (Berducci, 2004; Nelson, 2008) and collective action (Wittgenstein, 1996). This theoretical approach is based on three key assumptions.

1. Meanings of the rules[3] are taught so that PTs can make sense of their experience.

The first assumption is that PTs' ability to correctly attribute meanings to their teaching experience is conditional on prior learning (Williams, 1999). Based on the conceptualization of learning used in this study, this implies learning "rules" (Wittgenstein, 1996). When they are learnt, the PTs can construct the meaning of their

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[3] In this theoretical approach, the rules are defined as normative situated experiences accepted in the professional community. They thus have authority only if the PT decides to follow them or is encouraged by the CT and/or the US to follow them (Nelson, 2008).

teaching experiences and/or discuss these experiences in training situations (e.g., learn to notice). Within the framework of collective action theory, this learning occurs during "ostensive teaching" (Wittgenstein, 1996), by which trainers teach the meaning of professional acts and actions that are presented as exemplary. The trainers choose these acts according to what is observed or demonstrated (e.g., during a lesson in class or a video-based workshop at the university). For each stated rule, the trainers establish a "meaningful connection" (Wittgenstein, 1996) between the language experience (e.g., the verbal label "presents a situation of apprenticeship to the pupils") and the practical use of the stated rule and the experiential circumstances with which it is identified, described and/or ostensibly shown but rarely put into words (e.g., the teachers' activity is demonstrated by the CT in class or in a video at the university by the US). In new circumstances, the learning of a rule establishes a meaningful connection with the community of practice that supports the rule; therefore, learning becomes a "measuring rod" for interpreting experience and acting (Williams, 1999).

2. PTs need explanations on how the learnt rules can be used.

The second assumption is that, once rules are learnt through ostensive teaching, a period devoted to "explanation" (Wittgenstein, 1996) and "critical debate" (Williams, 1999) is important. This is the moment when PTs begin to question their trainers, CTs, or USs, or when the trainers themselves provide feedback on the PTs' first attempts to follow the rules. The trainers teach ostensibly by providing multiple examples of the rules (in class or a video) that have been agreed upon by consensus within the community and ought to be followed by members of the community. It is important that these first attempts be "monitored" by the CT and/or the US for (their) conformity (Nelson, 2008), because as learners, PTs are not able to associate the intention shared by members of the community about the rule during the first instances of rule following (Nelson, 2008). It is only through repeatedly following the rule in a wide variety of contexts and gradually coming to fully appreciate the rule's significance that PTs will progressively succeed in intentionally drawing upon and including the rule (Berducci, 2004) in their own practice. PTs do not become rule-bound but rather rule-guided in their practice.

3. PTs need help in following and interpreting the rules so that they have a broader understanding and range of activity in the classroom.

The third assumption is that when PTs decide to follow the rules learnt in teacher education settings, they extend the meaningful connections and the usefulness of the rules, as well as expanding their own understanding of the rules (e.g., the PT will adapt the follow-up of the rule according to their pupils: the delivery of the instruction being shorter and simplified with underachieving pupils). More specifically, they begin to identify "family likenesses" between unfolding circumstances and the teacher education circumstances in which they learnt the rule, and these circumstances function like a "measuring rod" (Wittgenstein, 1996). PTs use these meaningful connections to make sense of a complex network of resemblances and become able to understand the circumstances of the new situation.

Based on these theoretical assumptions, Program #1 consists of seven sequences (Figure 1, R=researchers).

Trainers' activity	Ostensive teaching and explanations				Help in following and interpreting the rules		
PTs' activity	Learning				Development		
Sequences of the program	Sequence #0	Sequence #1	Sequence #2	Sequence #3	Sequence #4	Sequence #5	Sequence #6
	Create, shoot and edit video clips	Video-based workshop	Construction of the lesson	Teaching activity	Video-based workshop	Teaching activity	Teaching activity
Video content		Videos of CTs			Videos of PTs		
Place	University CT's class	University	University	CT's class	University	PTs' classes	PTs' classes
Time	Day - 7	Day 0 Morning	Day 0 Afternoon	Day + 7	Day + 14	Day + 21	Day + 1 year
Partici-pants	CT, US, R	30 PTs, CT, US	2 PTs, CT	2PTs, CT	2 PTs, CT, US	2 PTs	2 PTs
Self-confronta-tion interview	CT, US	2 PTs, CT, US	2 PTs, CT	2 PTs, CT	2 PTs, CT, US	2 PTs	2 PTs

Figure 1. Device and data collection.

- Sequence #0: The aim of this sequence is to prepare the first video-based workshop. Guided by the researcher, US and CT created the scenario of the "fictitious" lesson, that is, voluntarily including both "exemplar" and "less well made" practices, as performed by the CT and videotaped in its class. This fiction illustrates the rules that will be taught. US and CT then selected and edited video clips of this lesson that will be used for the video-based workshop (Figure 2).

Figure 2. Selecting and editing video clips of CT's teaching activity.

- Sequence #1: Accompanied by the CT, US have first taught the rules based on a video clip that showed "exemplar" practices. CT also provided additional information about its recorded activity. Then, US and CT helped PTs to analyze video clips that showed "less well made" practices (Figure 3).

Figure 3. Teaching and analysis of CT's teaching activity.

- Sequence #2: CT helped PTs to plan a lesson, for the CT's students, in following the rules (Figure 4).

Figure 4. Lesson planning.

- Sequence #3: PTs taught a lesson in the CT' class (Figure 5).

Figure 5. PTs' teaching activity.

- Sequence #4: US and CT helped PTs to analyze video clips of their own practices (Sequence #3) in order to follow and interpret the rules properly (Figure 6).
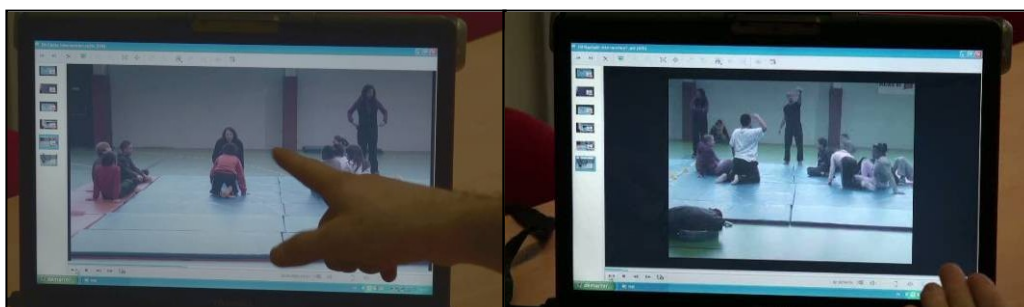

Figure 6. Analysis of PTs' teaching activity.

- Sequence #5: PTs taught a lesson in their own class during the following week (Figure 7).

Figure 7. PTs' teaching activity.

- Sequence #6: PTs taught a lesson in their own class one year later (Figure 8).

Figure 8. PTs' teaching activity.

4.2.2. Program #2 – "developmental" approach

The program #2 is based on the "theory of enaction" (Varela, 1989), which postulates that human activity consists in a dynamic coupling between an actor and his or her environment, that is "enacted" through the course of his or her actions[4]. In this framework, the aim of training is to design devices and situations making trainees live meaningful experiences resulting in the elaboration of professional knowledge. Being socially and culturally situated, learning is consequently conceptualized as the typification of perceptive, interpretative, cognitive, emotional, intentional and actional configurations (Ria, 2012; Rosch, 1978; Theureau, 2006). Different teachers engaged in the same typical situation mobilize different knowledge that do not have the same objective efficiency (e.g., in predicting students' learning) and subjective efficiency (e.g., in predicting well-being or enjoyment while teaching). Therefore, educational situations should be designed as "spaces for encouraged actions" (Durand & Poizat, 2014), that are "the arrangement of the environment in such a way that: (i) the trainees' usual or habitual activity is no longer fully adequate, (ii) they therefore perceive that shifts or reorientations are needed, and (iii) the long-lasting transformations likely to be found in the environment can be initiated". Following these principles, a video-based device dedicated to a typical professional situation (beginning the course and getting students to

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[4] This theory refutes the idea of cognition as a computation of symbols supposed to be available in an external, neutral environment and that training could help to perceive and decode.

work) has been designed and put online[5] by the French Institute of Education (Leblanc & Ria, 2014). Called NeoPass@ction (Figure 9), it is characterized by video exemplifications (classroom situations and interviews) of an ordered variation of different ways of acting in teaching (underlying different professional knowledge).
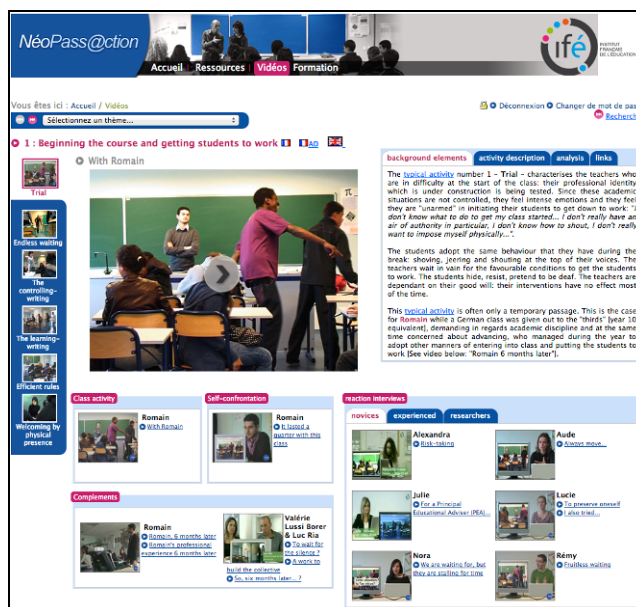

Figure 9. Website screenshot from the Neopass@ction platform (neo.ens-lyon.fr/neo).

Thus, the educational aim of this device is to create video-based spaces for encouraged actions by (especially) autonomous uses by trainees, making them (Figure 10): (i) project into fictional, typical teaching situations ("perturbation"), (ii) experience vicariously different teaching actions and their efficiency ("inquiry"), (iii) typify the affordable, most likeable and reachable ones, (iv) reflect if necessary on the way to "re-deploy" them into their own teaching activity, and (v) test their reliability, viability and sustainability with their own students ("transformation").

Based on these assumptions, Program #2 consists of four research-training sequences. The first and fourth are everyday teaching sequences (about 50 minutes), involving the same students for each trainee teacher, and separated by two months in the practicum. The second and third are video-based workshops (about 45 minutes), separated by three weeks, in which PTs, use alone and autonomously, the NeoPass@ction device (i.e. without any human mediation, tutoring or instructions). The research issue is to point out if the activity of the trainee has been transformed between the first and fourth sequence and if so, what is the underlying knowledge that has been elaborated by using the device and what process made it possible.

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[5] This part of the NeoPass@ction platform consists in 104 classroom and interview video recordings organized in a developmental perspective (vertical logic of the device – see Figure 8) documenting typical teaching actions by textual resources and multiple professional points of view (horizontal logic of the device): http://neo.ens-lyon.fr (an English interface is available. To obtain access, please contact: assistance.neo@ens-lyon.fr).
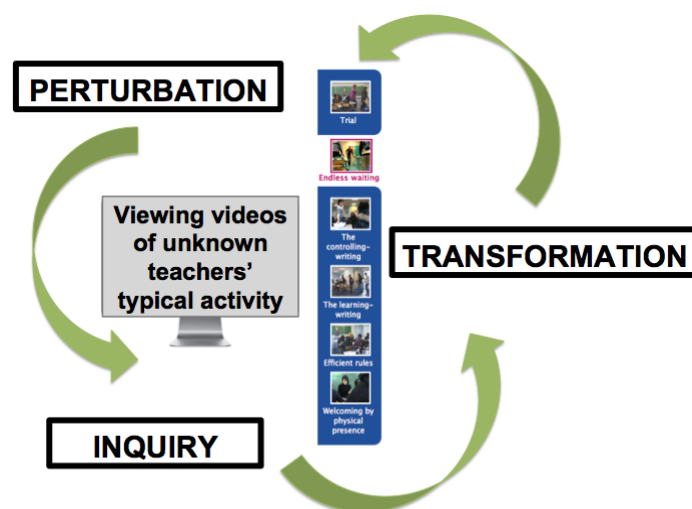
Figure 10. Model of a video-based space for encouraged actions.

4.3. Data collection

Each sequence of the programs was videotaped (video-based workshops and teaching activity in classroom). Then, self-confrontation interviews were conducted by the researchers with all participants after each sequence. The researcher thus prompted each member to describe and justify what he or she meant in the viewed situation. During these self-confrontation interviews, both the researcher and the interviewee had a remote control device so that they could stop the tape and rewind, depending on the meaning of the events being viewed.

In Program #1, self-confrontation interviews served to help reconstitute the rules followed by actors (PTs, US, and CT) during the different sequences (Figure 11). All followed the same protocol. With semi-structured questioning, the researcher sought to determine (i) the language used by each member to label the viewed events, and (ii) the corresponding experiential circumstances shown and/or described; that is, the meaning each actor attributed to their own or the other actors' actions. The researcher thus prompted each member to describe and justify what he or she meant in the viewed situation (e.g., "can you tell me what you are trying to do right here?"). He regularly asked questions or made remarks to obtain further detail on a judgment (e.g., "so here in the warm-up, you still have to accompany them, don't you?") or to start a critical exchange (e.g., "what's interesting here is that you don't tell her this as clearly as you just told me").

Figure 11. Example of self-confrontation interview.

In Program #2, self-confrontation interviews served to help understand the meanings emerging from trainees' activity and the related teaching actions mobilized, typified and/or transformed, during video viewing (Figure 12) and during teaching (Figure 13). To do this, the researcher helped trainees expliciting precisely the experiences lived in situ by focusing on particularly meaningful moments and not a posteriori justifying and rationalizing their actions. The typical questions that were asked were as follow:

- "What are you looking at, there? What is important for you at this moment? What do you take into account in this situation?" ("perceptive components").
- "What are you trying to do there? What are you thinking when doing this?" ("intentional components").
- "How did you know that? What led you to do that?" ("cognitive components").
- "Is that new for you? And that, did you already know that or did you understand it at that moment?" ("interpretative components").

This question list does not constitute a questionnaire: it is not exhaustive and only represents what is typically asked to the trainees, depending on what seems important to be explicited at each moment during the interview.

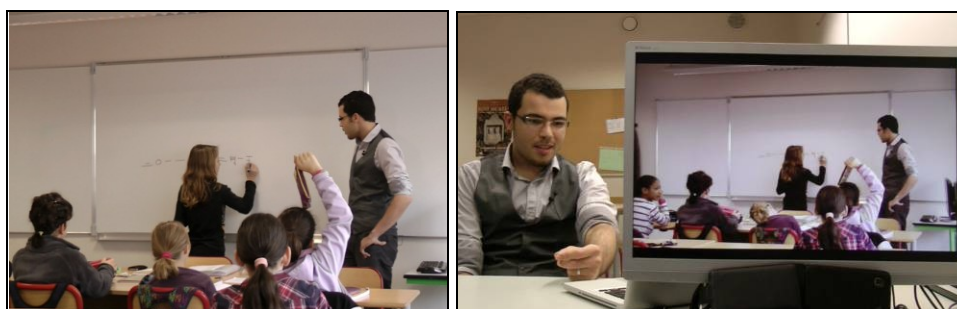Figure 12. Autonomous use of the NeoPass@ction platform and self-confrontation interview.

Figure 13. Teaching activity and self-confrontation interview.

4.4. Data analysis

The recorded data were transcribed verbatim and each actor's activity analyzed in two first steps: (i) the entire corpus was broken down into interaction units. These units were delimited by the meaning that each actor attributed to the events being viewed during the self-confrontation interviews. A new interaction unit was created each time the interviewee changed the object of meaning; (ii) for each interaction unit, the object of meaning was identified. The object was associated with the set of circumstances and the experience components the actor used to explain the way he or she gave meaning to the event.

Then, in Program #1, we sought to identify the rules that were followed by actors during the different sequences, using the procedure described by Chaliès, Bertone, Flavier and Durand (2008) as well as by Chaliès, Bruno-Méard, Méard and Bertone (2010). Thus, (i) the rule followed for each interaction unit was formalized. By convention, each rule was labeled from (a) the object of the meaning attributed by the actor, (b) the set of circumstances evoked by the actor to support the meaning, and (c) the observed and/or expected results. Each rule was labeled strictly, using the interviewees' vocabulary; (ii) the validity of the results was tested by comparing and contrasting the interpretation of the data by two researchers working independently. Less than 5% of the identified elements were a source of disagreement and these were removed from the analysis.

In Program #2, we sought to identify the teaching actions PTs experienced and the underlying processes making them evolve. Using the procedure described by Theureau (2006), (i) they were formalized for each interaction unit. By convention, each teaching experience was labeled from (a) meaningful perceptive components, (b) intentional components, (c) cognitive components (the professional knowledge that was mobilized to actualize the action), and (d) interpretative components (the inflection of the typification process that characterized learning—gain or loss of validity of the knowledge that was mobilized—and that results (or not) in new ways to act). Finally, (ii) at the beginning and at the end of the program, we put into perspective the different teaching actions deployed by trainees in their classrooms and the corresponding significant experiences, in order to highlight their evolution processes, especially regarding the learning that occurred during the uses of NeoPass@ction.

The use of two different methods to analyze the data was necessary to correspond to the two different instructional approaches. Nevertheless, the two ways of observing teaching activity and processing the verbatims were similar enough to highlight and put into perspective the nature and signification of the different experiences lived by PTs and their influence on their teaching activity.

5. Results

With both "normative" and "developmental" approaches, the results highlighted that video viewing influence PTs' teaching activity, provided that: (i) PTs' professional concerns "resonate" with what they are viewing, and (ii) PTs adopt, adapt or invent a new way to act from what they viewed. This section accounts for these exploratory results and exemplify them by presenting particularly significant cases.

5.1. Preservice teachers' professional concerns "resonate" with what they are viewing

In the study of "normative" approach, the results showed that PTs use, in their classrooms, what they learnt ostensibly through video viewing (Case #1). However, they sometimes use non-taught elements resulting from an autonomous activity, oriented by their concerns and unexpected by the trainers (Case #2).

- Case #1:

The first detailed case is based on data obtained, first, from the first video-based workshop at the university (Sequence 1), then on those of the second PT teaching activity in their own classrooms (Sequence 5).

In Sequence 1, the US teaches the rules to PTs with videos illustrations. At the time in question, the US orally teaches the rule ["Please explain" means "give students more explanations" and "multiply examples", which results in "get all students to succeed"] then asks PTs to "identify and interpret it" in the video showing the CT teaching activity.

- Excerpt 1. SCI[6] – PT/Sandra – Video-based workshop

Researcher: What are you doing here?

Sandra: *I'm watching the video*. That extract is a *good illustration*.

Researcher: When you watch a video, what do you do it for?

Sandra: *To watch what he has just taught us*; and *we get a lot of guidance on such occasions*.

Researcher: What's the point of watching a video?

Sandra: *It enables me to understand better and apply the theory in practical terms. It's very helpful to have someone pointing out to us the most important points and suggest links between what we see and what we have studied in theory*.

Researcher: What do you mean exactly?

Sandra: Thanks to it, I realized I had clearly understood the explanations dealing with legs and weight. *However, I had not made the connection with what she had taught us earlier, though she actually gave us clear explanations. I feel Severing (CT) tries ever harder with pupils the way Christian (US) had told us. I can identify perfectly what Sèverine does with what Christian had explained, and see whether what she does fits in well with the theory on explanations*.

Researcher: Do you have other things to point out to us?

Sandra: *She uses different ways to put across an explanation: she talks but she handles things, too*.

During her SCI connected to that point in training (Excerpt 1), the PT (Sandra) follows the rule ["Watching a video" means to "seeing what the US taught" leads to "better understand" and "being able to put it into practice"]. Sandra therefore manages to "clearly connect what the CT does with what the US had told her" in particular "to see whether what the CT does is right, i.e. corresponds with the theory on explanations". She is for instance keen on spotting the various forms of explanations" such as "manipulation" and that the CT "keeps trying ever harder with students". She mentions two sets of knowledge that allowed her to follow this rule. The first one has to do with the fact that the US "points out to her the important aspects" to observe in the video. The second relates to the fact that the US "make connections" between exemplary video and the training content previously taught orally. Sandra therefore stresses the importance of being "guided" while viewing the video.

During Sequence 5, Sandra teaches receiving a ball during the Baseball physical activity. At the time in question, she has explained five times to the same student how to use the glove properly when catching a ball. To achieve this, Sandra moves along with the student to teach her the right behavior exactly and precisely: "Keep your eyes on the ball and gradually back off".

- Excerpt 2. SCI – PT/Sandra – Teaching activity

Researcher: What are you doing?

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[6] SCI: self-confrontation interview.

> Sandra: Now, *I keep explaining until we both agree she has understood. I keep at it the time it takes*.
>
> Researcher: What's the point?
>
> Sandra: Well, I see she hasn't clicked yet, and if she keeps using her hand like this, the ball will stick in the glove.
>
> Researcher: So?
>
> Sandra: Here, I am in the position of the *theoretical frame*.
>
> Researcher: What's your opinion about it?
>
> Sandra: I think it's the right thing to do. Because we stick to a few relatively simple criteria and *harping on these criteria the way Sèverine was doing*, could also contribute to learning.
>
> Researcher: Is this the way it turns out?
>
> Sandra: *Indeed; the student has actually learnt the skill*. Therefore, I have met the objective I had set myself.

During her SCI (Excerpt 2), Sandra followed the rule ["Giving the student explanations until both agree he/she has understood" applies to "insisting on relatively simple criteria" and leads to "enabling students to learn"]. Meanwhile, she also mentions to the researcher what knowledge has enabled her to follow this rule. The first item Sandra formulated related to which video she had had the opportunity to watch during training, particularly the nature of the CT's teaching activity ("the way Sèverine (CT) was doing"). The second item she mentions has to do with the foundations of the "theoretical framework" taught by the US during the video-based workshop at the university.

Viewing the CT's teaching therefore influences PT's teaching activities with their students in class. This ability to exploit the activity that implements the training content after viewing is however dependent on the activity conducted by the US in training situation.

- Case #2:

The second detailed case is based on data extracted from PTs' second teaching activity in their own classrooms (Sequence 5). The PT (Antoine) helps students complete the duck diving technique in the Swimming & Rescuing physical activity. At the time in question, he accompanied one particular student trying to achieve it.

- Excerpt 3. SCI – PT/Antoine – Teaching activity

> Researcher: What is it you're doing?
>
> Antoine: I've just implemented *a student's regulation after his performing what was to be done. I'm trying to highlight what was positive, without going into details, and just suggest one or two points where there is room for improvement*.
>
> Researcher: That is?
>
> Antoine: Correcting the motor aspects of her way of diving and *as regards instructions*, too. To be sure, when I said "swimming below an under-water obstacle", I had instructed her to breast-stroke slowly but I realize I had not insisted enough on that point; and indeed, I noticed she was doing a lot of reflex leg-kicking while swimming under the obstacle.
>
> Researcher: What's your regulation meant to achieve?
>
> Antoine: *Get her performance to become even more efficient.*

Researcher: What's your opinion?

Antoine: It's interesting because the pupil gets feedback at once, and will therefore be able to apply advice practically with no delay. *I had seen Sèverine (CT) gave interesting and fast feedback to her pupils because she didn't spend too much time going into details: she tried to give all students a degree of feedback, so all them were able to improve at once when repeating the dive. I have arranged for a facilitating situation so students can take turns one after the other so I can quickly regulate their duck-dive.*

During SCI (Excerpt 3), Antoine follows the rule ["Regulating a student after his/her performance" applies to "pointing out the positive immediately" and "giving one or two aspects that need changing compared with instructions" leads to "helping them becoming even more effective in its implementation"]. When interviewed about his activity, he outlined the items of knowledge that enabled him to follow this rule. He indicated he had relied on what he could "see" in a video of the CT's teaching activity. Specifically, he justified the way he worked with his students and the working arrangement implemented with his class ("I built a facilitative situation so that students took turns one after the other so I can quickly regulate their duck dive"). He borrowed this approach from what has been observed in the CT's activity: "I had seen Sèverine (CT) gave interesting and quick feedbacks to her students by not necessarily going into detail but trying to give some advice to all so they could improve when repeating the action". This knowledge does not result from any contribution on trainers' part. Therefore, Anthony grasped it by himself and used it without trainers' stamp of approval as to its validity.

Hence, PTs sometimes reproduce in their own class aspects taken from the videos, though these have not been addressed in training. In other words, training activities that rely on watching videos might therefore necessarily be said to "leave room for improvement". Trainers are in fact unable to comprehensively control the significance of the PTs' activity. The wealth of information found in the videoed content could then be, paradoxically, said to constitute one of its limitations.

In the study of "developmental" approach, the results showed that an immersive process allows the PTs to live a vicarious and fictional experience (Case 3). The fictional experience allows a resonance between one's own professional concerns and professional issues perceived in the observed classroom situation. The resonance initiates an inquiry activity, oriented by and resulting in the elaboration of a new way to act.

- Case #3:

This case articulates the self-confrontation data from a video-based workshop and from the following teaching sequence, in the program in which another PT (Lucien) participated.

During the video-based workshop on the NéoPass@ction platform, Lucien viewed teaching activity performed by a teacher upon entering the classroom and getting pupils to start working.

- Excerpt 4. SCI – PT/Lucien – Video-based workshop

Lucien: *I can identify with* what she is trying to implement, *this is indeed the way of doing things that I would opt for myself.* Besides, I get the impression she takes it *even further* than I do, and she *tuned it more finely than me,* and consequently *I am eager to see the way she does it, to learn how she sets about it…*

Researcher: So, what does she do that you do too?

Lucien: Our decision *not to yell at students*. Later, they mention that point in other areas of study […], but in her case, she resorts to other clever tricks. *Using the way we look at pupils for instance and wait for them to calm down and stop chatting, not to mention our body language.* […] *I can relate to that.* […] It's all arranged systematically but it can't be said to be a… recipe; we get to see a teacher's profile, the way a teacher behaves *so as to succeed in getting her pupils to calm down.*

Researcher: How do you, personally, appropriate a teacher's presence, silences, ways of looking at pupils...?

Lucien: In my practice. That is, I try to streamline it, I rely on tricks I know I am proficient in, and *I intend to get rid of all the others practices I might use that may clutter the way I teach and that I don't feel comfortable with: calling students to order, things like that.* […] I try to do without a few things I currently do because, though they did help out at first, they are no longer the most effective ones, I feel, because they don't fit in with my personality and the way I think I can keep up my pupils' attention.

Documentation for the video experience:

Perceptive components:

  - The way the CT intervenes, where she can partly recognize what she does herself while teaching

  - The way she uses her eyes… so intently

  - The effective way she manages her class

  - The economical way she manages the class

  - The feeling that there is something professional at stake in that situation

Intentional components:

  - Finding efficient solutions that are directly applicable

Cognitive components:

  - Intervening by deliberately focusing on the group is more efficient than erratically telling off a few pupils individually

  - Teachers needn't yell to get their pupils to respect them

Interpretative components:

  Greater validity of the knowledge that was mobilized (cognitive components).

  Elaboration of new knowledge (three typifications):

  - Staring at pupils insistently might enable teachers to avoid having to confront them verbally

  - It is important to have the right body language and placement around in the class

  - Keeping silent and just wait might be more effective than intervening.

Thanks to viewing videos, Lucien vicariously experienced an activity he "relates to", i.e., that he deems similar to his own practice (Excerpt 4). It attracted his attention because it resonated with his own professional concerns at the time (finding ways to intervene effectively early on in class). This allowed him to identify with it as if it were his own, and measure the effects of the situation. Also, this way of intervening is considered as more efficient, more economical ("she takes it further than me", "it's more refined than what I do"), it generates a degree of desirability ("this is the way of doing things I would

quite readily opt for") and it initiated an inquiry to determine how to implement it ("so, I want to see how she sets about it, the method she uses..."). This led Lucien to develop new expertise on how to use one's voice, gaze and physical placement, and access renewed understanding of educational actions to be deployed in this typical teaching situation. At this point, Lucien was planning to change his own teaching ways in class, which have actually already been "virtually" transformed by the video experience.

Three weeks later, he had time to experiment with new teaching methods he developed during the video-based workshop. In self-confrontation mode, he recalls a teaching episode that was particularly significant for him.

- Excerpt 5. SCI – PT/Lucien – Teaching activity

Lucien: You see, here I think I am *somewhat more subtle when using times of silence, when I let off steam, and in the way I punish pupils. Gradually, by trial and error, I become aware of the times when it worked fine, and when I should have raised my voice to show I meant business; these are tricks I get to appropriate so they become second nature*, etc. I manage to bring variety to my behavior, choose the right attitude to fit the occasion, and it also depends on the mood I'm in before entering the class. That day, I didn't feel like yelling and screaming during the class. I felt like taking things slow.

Researcher: How did all this evolve, in your mind and in the way things turned out?

Lucien: I couldn't really say… *For one, seeing teachers doing their things on the platform / stage... That teacher, you know, Cécile, she was really good at it, she had charisma, she had a way of capitalizing on silent moments, it made me feel like going deeper into it, and that's what I increasingly do.*

Documentation of the video experience:

Perceptive components:

  - Feeling one has made progress to become a better teacher

  - Eagerness to teach in a quiet, relaxed atmosphere

Intentional components:

  - Working in a quiet and relaxed atmosphere

  - Keeping control over students' activity

  - Managing one's energy economically

  - Developing ever more economical ways and behaviors

Cognitive components:

  - Intervening by deliberately focusing on the group proves to be more efficient than erratically telling off a few pupils individually

  - Teachers needn't yell to get their pupils' respect

  - Staring at pupils insistently might make it possible to avoid having to confront them verbally

  - It is important to have the right body language and placement around in the class

  - Keeping silent and wait might be more effective than intervening

Interpretative components:

- Greater validity of the knowledge that was mobilized (cognitive components).

Therefore, Lucien has developed a new way to teach, resulting in increasingly non-verbal communication, a more economical physical presence, and it led to his implementation of the educational actions he had experienced via NéoPass@ction. What worked was viewing these behaviors and comparing them with his own: "For one thing, seeing the way teachers behave on the platform... That teacher, you know, Cécile, she was really good at it, she had charisma, she had a way of capitalizing on silent moments, it made me feel like going deeper into it, and that's what I increasingly do.. And then, of course, we get more and more experience..." (Excerpt 5). Therefore, after elaborating knowledge that is "virtually" likely to increase his own interventions effectiveness, Lucien tried to get them to work in his own practices, carrying over the inquiry of the video-based workshop into his own class: "I think I am somewhat more subtle when using times of silence, when I let off steam, and in the way I punish pupils. Gradually, by trial and error, I become aware of the times when it's worked fine, and when I should have raised my voice to show I meant business; these are tricks I get to appropriate so they become second nature." Gradually, teaching actions therefore get inside Lucien's own "repertory", and since he feels satisfied with them he tends to perpetuate them. This is an effective transformation of the teaching activity mediated by a video-based workshop.

5.2. Preservice teachers adopt, adapt or invent a new way to act from what they viewed

In the study of the "normative" approach, results showed that the accompaniment of the video-based workshops by trainers enables PTs to elaborate a singular and functional way to use what has been taught through video viewing (Case #4).

- Case #4:

The fourth detailed case is based on data extracted, firstly, from the second video-based workshop at the university (Sequence 4) and then from those in PTs' second teaching activities in their own classrooms (Sequence 5).

During Sequence 4, US and CT guide PTs' interpretations from viewing the videos of their first teaching activity with CT's students (Sequence 3). Faced with watching his first teaching activity, the PT (Nicolas) noticed one of his professional difficulties, "as you can see, with my difficult students, they say, "Sir, it takes so long!", and that's because I try set up the situation as best as can". To meet this challenge, US offered a solution: "to address your activity, which is a rapid actuation of your students, why not include as many situational elements in your teaching as possible?".

- Excerpt 6. SCI – PT/Antoine – Video-based workshop

Nicolas: This time, *I am listening to Christian (US) who is suggesting a solution regarding my own personal context.*
Researcher: How d'you mean?
Nicolas: *I've come to realize that, when preparing my lessons, I might try to plan them the way he does, and see how it goes. He tells me to change my teaching stage by bringing in elements from the context because, then, they (the pupils) remember things better and I save time when giving instructions.*
Researcher: What for?

> Nicolas: *This should help me with my students. The point is that it contributes to making me a better teacher.*
>
> Researcher: What's your opinion of it?
>
> Nicolas: It's interesting and *I totally go along with him because theory and practice get to be linked up that way; that's exactly what Sèverine (CT) says, about my teaching context.*

Asked about his activity by the researcher (Excerpt 6), Nicolas followed the rule ["Listening to US bringing me a solution" is to "consider changing how to plan my lessons" and leads to "improve my teaching" and "save time in issuing instructions"]. He underlines by following suit that he "agrees" on the US's proposed solution (i.e., "change the teaching phase (content delivered to students) by bringing in elements of context") to cope with this difficulty. To him, this solution looks all the more likely as US attempts in his remarks to link up "theory and practice, what Sèverine (CT) says" and his own teaching circumstances.

During Sequence 5, Nicolas taught the technique of "duck-diving" in the Swimming & Rescuing physical activity. At the time in question, he described and demonstrated the technique standing at the pool's edge.

- Excerpt 7. SCI – PT/Nicolas – Teaching activity

> Nicolas: Here, *in relation to what we had seen when watching the video together*, the positive point in my early teaching activity had been the great clarity of my examples, of what I taught them. On the other hand, *my weak point was precisely the way I presented the situation, how I issued instructions*. More particularly the way to *integrate situational elements within the teaching stage*; and this is what I am doing here.
>
> Researcher: That is?
>
> Nicolas: You see, *I placed myself laterally, in the same way as in the situation I met while teaching*.
>
> Researcher: What do you think about this way of placing yourself?
>
> Nicolas: Interesting, I'd say.
>
> Researcher: What did you do it for?
>
> Nicolas: *For pupils to quickly get "with it" in that situation; to enable them to get started quickly… actually, I save time and if my presentation of the situation is kept short, they're not likely to forget what I've just shown them, they find it easier.*

During her SCI (Excerpt 7) Nicolas followed the rule ["Incorporating elements from the educational situation in the teaching stage" is to "position oneself like in the situation at the teaching phase"; it leads to "students being quickly drawn into the situation (withitness)" and "get to practice quickly"]. By sticking to this rule, he seeks to "save time" and to "facilitate" his pupils' work ("actually, I save time and if my presentation of the situation is kept short, they're not likely to forget what I've just shown them, they find it easier"). He indicated also the knowledge that enabled him to follow this rule. It has to do with implementing a piece of advice "given during collective viewing" (Sequence 4): "Incorporating (organizational) elements of the situation in the teaching phase (contents)."Actually, Nicolas deems his "weakness was precisely his way of presenting the situation" and "of issuing instructions."

Watching a video of one's own teaching activity therefore influences PTs' ability to teach. This type of viewing indeed enable them to see by themselves some of their professional challenges and get answers, providing they are accompanied by trainers. It seems important however that the solutions put forward should take into account their class context.

In the study of the "developmental" approach, results showed that the technological mediation of the video device (videos of classroom, comments, and complementary textual resources) enables PTs to elaborate, directly and alone, a new way to act (Case #5). Nevertheless, PTs sometimes are challenged when having to elaborate by themselves a new way to act, which can generate frustration and hinder development (Case #6).

- Case #5:

This case presents self-confrontation data from a video-based workshop in the context of a program a PT called Aude has taken part in. During the video-based workshop on the NéoPass@ction platform, Aude viewed teaching activity performed by a teacher upon entering the classroom and getting pupils to start working; on that occasion, she brought the waste-paper basket to a student and asked her to throw her gum in it.

- Excerpt 8. SCI – PT/Aude – Video-based worshop

Aude: *Well, I'm stumped, this is something else again!*

Researcher: She gets the pupil to spit out the chewing-gum…

Aude: Yeah, *and she has chosen to bring the basket HERSELF* (*stresses "herself"*). I might not have done this spontaneously; *actually, the usual routine is that the pupil* (*speaking deliberately slowly*) *gets up from his chair, as slowly as he possibly can, strolls to the basket, showing he has all the time in the world, and ambles back to his chair…*

Researcher: That's because you choose to get the pupil to walk to the waste-paper basket and spit out his gum.

Aude: Exactly. So, from now on, I *think I'll try to make the effort and take the basket to the pupil: much simpler that way.*

Researcher: It would save quite some time, wouldn't it?

Aude: (*silently nods total agreement*).

Documentation of the video experience:

Perceptive components:

  - The effectiveness of the teaching action, observed to learn how to solve "chewing-gum issues" in no time

  - Remembered her own pupils' typical behavior to delay normal class resumption

  - Was well aware of the professional stakes involved in such situations

Intentional components:

  - Finding efficient and directly applicable solutions

Cognitive components:

> - Asking the pupil to go walk the basket and spit out the gum is a waste of time
>
> Interpretative components:
>
>   - Greater validity of the knowledge that was mobilized (cognitive components).
>
> Elaboration of new knowledge (two typifications):
>
>   - Teachers needn't send the gum-chewing pupil to the basket to spit it out
>
>   - Bringing the basket to the pupil saves a lot of time

In this example (Excerpt 8), Aude recognized a typical situation that caused her to waste time frequently: she remembered, and described in graphic detail, unsatisfactory past experiences of this kind (mimicking the pupil's behavior). This confers viewing the video greater importance as it proves to be a way of finding a new teaching action. In this case, the inquiry was very short because she identified it immediately "Well, I'm stumped, that's something else again!"; she chose to bring the basket HERSELF" (stress hers); Researcher: It would save you quite some time, wouldn't it …? Aude: (silently nods total agreement). This form is thus typified and results in developing new knowledge, i.e., a virtual transformation of the activity that could then get to be actualized practically in class during the educational activity, "So, from now on, I think I'll try to make the effort and take the basket to the pupil: much simpler that way".

- Case #6:

This case presents self-confrontation data on a video-based workshop, obtained with a PT named Emily. Chosen excerpts refer to times when she unsuccessfully investigated the issue of behaving economically with oneself on entering class and getting the pupils to get started; she watched a class situation, then a video testimonial.

- Excerpt 9. SCI – PT/Émilie – Video-based workshop

> Researcher: so, then you went and watched …
>
> Émilie: "Rules for self-economical behavior" (video title). *It IS interesting* because then… *I get to know how to economize my energy.*
>
> Researcher: so, the video is aptly titled, then?
>
> Émilie: *I feel it is rather long-winded*, I mean this is a video presenting rules to save time and energy. That she should insist on the "as usual", that's pretty good, but it drags on a bit, doesn't it?!… This is a far cry from what our trainers tell us: "you are supposed to speak as little as possible yourself".
>
> Researcher: Do you find this type of behavior satisfactory?
>
> Émilie: …Well, to be sure, her pupils do get on with it; she got what she was aiming at... *But the way she put it was rather bossy…*
>
> Some time later:
>
> Émilie: Then I watched… Jacinthe's video (the name of the teacher who reports her experiences in the video) […] *She is content with telling us we've got to economize ourselves but, this is self-evident, isn't it? She fails to tell us how to actually do it …*

> **Documentation of the video experience:**

Perceptive components:

  - Is well-aware that something professional is at stake in such a situation

Intentional components:

  - Finding effective and directly applicable solutions

Cognitive components:

  Not documented

Interpretative components:

  Not documented

In this excerpt (Excerpt 9), the perceived challenge of making students get on with it self-economically echoes one of Emilie's concerns; however, the video she has viewed does not enable her, as she sees it, to initiate a successful inquiry about effective teaching actions: "I think she drags on a bit, doesn't she?". "The way she put it was rather bossy"; "She is content with telling us we've got to economize ourselves but, this is self-evident, isn't it? She fails to tell us how to actually do it …". This might well be an example of a truly limiting factor in this type of device, as it gives rise to frustration, disappointment, or even feeling confused.

From the training point of view, PTs might end up moving out of the scheme or even of the whole program. As for trainees' teaching performance, they might return to class with an increased feeling of incompetence. These limits also highlight the limitations of autonomy when training and the need for trainers to take into consideration PTs' concerns when they air them.

6. Discussion

We presented an exploratory study putting into perspective the influence of two video-based vocational education programs on preservice teachers' teaching activity. This influence was tracked through teachers' experience, according to an activity-based framework for work analysis. The two approaches induced PT learning and influenced teaching activity under targeted contextual conditions that were documented, regarding especially the activation of professional concerns and the elaboration of adapted teaching actions.

Firstly, the two studies pointed out that the technological mediation of the video sometimes enables PTs to elaborate, directly and alone, a new way to act. LeFevre (2004) and Merseth (1994) showed that PTs sometimes copy some ways of acting directly from the videos and reproduce them in the classroom as identical as possible, with varying degrees of success and efficiency. Oriented by their concerns, the autonomous and self-directed activity that we documented was expected in the "developmental" program, but unexpected in the "normative" one, in which trainers tended to be destabilized. Some other studies also showed that PTs' video viewing activity does not only depend on what they know, but also on their concerns at the time of their education (Leblanc & Ria, 2014), their past experiences (Yost, Sentner & Forlenza-Bailey, 2000), and their beliefs (Llinares & Valls, 2010; Yadav & Koehler, 2007). These results call for designing adapted video content, likely to match PTs' capacity to identify and interpret classroom events (Kersting, Givvin, Sotelo & Stigler, 2010; Santagata & Guarino, 2011), nay to be

"within the zone of proximal development of the viewer" (Santagata & Guarino, 2011, p. 144).

Secondly, the results pointed out that the mediation of the trainers helped when it was available ("normative" approach) and missed when it was not ("developmental" approach). Besides, some other studies showed that human support is more effective than video feedback alone (Cuper, Gong, Farina & Manning-Osborn, 2007; Halter, 2006; Rich & Hannafin, 2009), even when it takes place online (Koc, Peker & Osmanoglu, 2009). For many authors, PTs' video viewing activity should be systematically guided and scaffolded (Calandra, Gurvitch & Lund 2008; Santagata & Angelici, 2010; Star & Strickland, 2008). Indeed, Dymond and Bentz (2006, p. 99) stipulate that "video instruction must be highly structured in order to positively affect their views, knowledge, and skills". In the study of the "normative" approach, results showed that the accompaniment of the video-based workshops by trainers enabled PTs to elaborate a singular and functional way to use what has been taught through video viewing. However, it seems important that this accompaniment take more into account their class context (Coles, 2013). In the study of the "developmental" approach, results highlighted the limitations of autonomy when training (e.g. when PTs' inquiries become fruitless) and the need for the trainers to provide an adaptative mediation. Results also showed that trainers are in fact unable to comprehensively control the significance of the PTs' activity. The wealth of information found in the videoed content can then become, paradoxically, one of its limitations.

Nevertheless, our findings should not raise higher expectations than their exploratory conditions of elicitation, calling for further investigations on teaching activity improvement and more systematic studies. Still, careful guidelines emerge. We can propose for example that vocational education programs take methodically into account PTs' professional concerns and their accompaniment in video-based workshops. To this end, it would be particularly appropriate to set up small working groups. Moreover, future studies should investigate whether different instructional approaches can be integrated in a single vocational education program or whether an intermediate vocational education program can be designed.

More generally, assessing the specific influence of video viewing on PTs' teaching activity is inherently complex (Brophy, 2004; Seidel et al., 2011), particularly because it is often associated with other elements (e.g., accompaniment by trainers), courses, and technology tools in vocational education programs. This methodological issue should also be examined in future studies. Then, the study of the influence of video viewing on PTs' activity may not focus exclusively on PTs' teaching activity but also on other dimensions of their work (e.g., lesson planning, working meetings) and/or on their pupils' activity (Kersting, Givvin, Thompson, Santagata, & Stigler, 2012). For example, the results of Allen and colleagues' study (2011) with 78 secondary school inservice teachers and 2237 students showed that the MTP program improved teacher-student interactions, which in turn, increases students' learning and development.

Finally, teacher education programs should institutionalize some times and spaces to encourage and help PTs investigate concrete work issues; to this end, videos have clearly shown they can deliver.

Acknowledgements

References

Abell, S.K., & Cennamo, K.S. (2004). Videocases in elementary science teacher preparation. In J. Brophy (Ed.), *Using video in teacher education: Advances in research on teaching* (pp. 103–130). Oxford, England: Elsevier Ltd.

Allen, J.P., Pianta, R.C., Gregory, A., Mikami, A.Y., & Lun J. (2011). An interaction-based approach to enhancing secondary school instruction and student achievement. *Science*, *333*, 1034–1037.

Andre, T., Schmidt, D., Nonis, A., Buck, N., & Hall, S. (March, 2000). Preparing tomorrow's teachers today: Using videos of technology-using teachers to enhance preservice teachers' technology skills. Paper presented at the society for information technology and teacher education international conference (SITE), San Diego, CA.

Barnett, C., & Tyson, P. (1999). Case methods and teacher change: Shifting authority to build autonomy. In M. Lundeberg, B. Levin, & H. Harrington (Eds.), *Who learns what from cases and how? The research base for teaching and learning with cases* (pp. 53–69). Mahwah, NJ: Erlbaum.

Berducci, D. (2004). Developmental Continuum Vygotsky through Wittgenstein: A New Perspective on Vygotsky's. *Theory Psychology*, *14*(3), 329–353.

Blomberg, G., Renkl, A., Sherin, M.G., Borko, H., & Seidel, T. (2013). Five research based heuristics for using video in pre-service teacher education. *Journal for Educational Research Online*, *5*(1), 90–114.

Brophy, J. (2004). *Using video in teacher education*. Oxford, UK: Elsevier.

Brouwer, C. N. (2011). Imaging Teacher Learning. A Literature Review on the Use of Digital Video for Preservice Teacher Education and Professional Development. Paper presented at the Annual Meeting of the American Educational Research Association in New Orleans. Nijmegen: ILS Graduate School of Education, Radboud University Nijmegen.

Brunvand, S. (2010). Best practices for producing video content for teacher education. *Contemporary Issues in Technology and Teacher Education*, *10*(2), 247–256.

Calandra, B., Gurvitch, R., & Lund, J. (2008). An exploratory study of digital video editing as a tool for teacher preparation. *Journal of Technology and Teacher Education*, *16*(2), 137–153.

Chaliès, S., Bertone, S., Flavier, E., & Durand, M. (2008). Effects of collaborative mentoring on the articulation of training and classroom situations: a case study in the French school system. *Teaching and Teacher Education*, *24*(3), 550–563.

Chaliès, S., Bruno-Méard, F., Méard, J.A., & Bertone, S. (2010). Training preservice teachers rapidly: the need to articulate the training given by university

supervisors and cooperating teachers. *Teaching and Teacher Education*, *25*(4), 767–774.

Choi, H., & Jonson, S. (2007). The effect of problem-based video instruction on learner satisfaction, comprehension and retention in college courses. *British Journal of Educational Technology, 38*(5), 885–895.

Clarke, D. J., Mesiti, C., O'Keefe, C., Xu, L. H., Jablonka, E., Mok, I. A. C., et al. (2008). Addressing the challenge of legitimate international comparisons of classroom practice. *International Journal of Educational Research*, *46*(5), 280–293.

Coles, A. (2013). Using video for professional development: the role of the discussion facilitator. *Journal of Mathematics Teacher Education*, *16*(3), 165–184.

Cuper, P., Gong, Y., Farina, L., & Manning-Osborn, M. (2007). Video Analysis as a Reflective Tool: Providing Pre-service Teachers a Gradual-Replay Lens on their Developing Practice. In R. Carlsen et al. (Eds.), *Proceedings of Society for Information Technology & Teacher Education International Conference 2007* (pp. 45–48). Chesapeake, VA: Association for the Advancement of Computing in Education.

Durand, M. (2013). Human activity, social practices and lifelong education: an introduction. *International Journal of Lifelong Education*, *32*(1), 1–13.

Durand, M., & Poizat, G. (2014). An activity-centred approach to work analysis and the design of vocational training situations. In L. Filliettaz, & S. Billett (Eds.), *Learning through and for practice: Contributions from Francophone perspectives*. Heidelberg: Springer.

Dymond, S., & Bentz, J. (2006). Using digital videos to enhance teacher preparation. *Teacher Education and Special Education*, *29*(2), 98–112.

Fadde, P.J., & Rich, P. (2010). Guerrilla video: A new protocol for classroom video. *Educational Technology*, *50*(1), 4–8.

Flandin, S. (2014). Three contrasted approaches of "video-training" in the Francophone community. Epistemological issues and effects in training. Consensus/dissensus conference of the UNESCO Chair : Issues in teacher "video-training" : Which theoretical choices ? Which scenarios ? For which effects ? IFÉ (French Institute of Education) - ENS of Lyon : 23 January http://www.ens-lyon.fr/chaire-unesco-formation/manifestations-scientifiques/video-formation/conference-sur-la-videoformation/conference-la-videoformation-dans-tous-ses-etats-1/video-in-english (ver. 30.06.2014).

Flandin, S. & Ria, L. (2014). Un program technologique basé sur l'analyse de l'activité réelle des enseignants débutants au travail et en vidéoformation. [A technological program based on the analysis of the actual activity of beginning teachers at work and during video education]. *@ctivités*, *11*(2), 172–187.

Gaudin, C. (2014). The "video-training" at an international scale: which new purposes ? Which potentials, which "blind spots"? Consensus/dissensus conference of the UNESCO Chair : Issues in teacher "video-training" : Which theoretical choices ? Which scenarios ? For which effects ? IFÉ (French Institute of Education) - ENS of Lyon: 23 January http://www.ens-lyon.fr/chaire-unesco-formation/manifestations-scientifiques/video-formation/conference-sur-la-

videoformation/conference-la-videoformation-dans-tous-ses-etats-1/video-in-english (ver. 30.06.2014).

Gaudin, C., & Chaliès, S. (2012). L'utilisation de la vidéo dans la formation professionnelle des enseignants novices. [Video use in beginning teachers' professional development]. *Revue Française de Pédagogie*, *178*, 115–130.

Halter, C.P. (2006). The reflective lens: The effects of video analysis on preservice teacher development. *Dissertation Abstracts International*, *67*(03). (UMI No. 3211280).

Harford, J., MacRuairc, G., & McCartan, D. (2010). Lights, camera, reflection : using peer video to promote reflective dialogue among student teachers. *Teacher Development*, *14*(1), 57–68.

Hewitt, J., Pedretti, E., Bencze, L., Vaillancourt, B.D., & Yoon, S. (2003). New applications for multimedia cases: Promoting reflective practice in preservice teacher education. *Journal of Technology & Teacher Educationn*, *11*(4), 483–500.

Janík, T., Janíková, M., Knecht, P., Kubiatko, M., Najvar, P., Najvarová, V., & Šebestová, S. (2009). Exploring Different Ways of Using Video in Teacher Education: Examples from CPV Video Web. In T. Janík, & T. Seidel (Eds.), *The power of video studies in investigating teaching and learning in the classroom* (pp. 207–224). Munich, Allemagne: Waxmann Publishing.

Karsenti, T., & Collin, S. (2011). The Impact of Online Teaching Videos on Canadian Pre-Service Teachers. *Campus-Wide Information Systems*, *28*(3), 195–204.

Kersting, N.B., Givvin, K.B., Sotelo, F.L., & Stigler, J.W. (2010). Teachers' analyses of classroom video predict student learning of mathematics: further explorations of a novel measure of teacher knowledge. *Journal of Teacher Education*, *61*(1-2), 172–181.

Kersting, N.B., Givvin, K.B., Thompson, B.J., Santagata, R., & Stigler, J.W. (2012). Measuring usable knowledge: teachers' analyses of mathematics classroom videos predict teaching quality and student learning. *American Educational Research Journal*, *49*(3), 568–589.

Koc, M. (2011). Let's make a movie: Investigating pre-service teachers' reflections on using video-recorded role playing cases in Turkey. *Teaching and Teacher Education*, *27*(2), 95–106.

Koc, Y., Peker, D., & Osmanoglu, A. (2009). Supporting teacher professional development through online video case study discussions: An assemblage of preservice and inservice teachers and the case teacher. *Teaching and Teacher Education*, *25*(8), 1158–1168.

Leblanc, S. (in press). Vidéo formation et transformations de l'activité professionnelle. [Video training and transformations of the professional activity]. *@ctivités*, *11*(2).

Leblanc, S., & Ria, L. (2014). Designing the Néopass@ction Platform Based on Modeling of Beginning Teachers' Activity. *Design and Technology Education: An International Journal*, *19*(2), 40–51.

LeFevre, D. M. (2004). Designing for teacher learning: Videobased curriculum design. In J. Brophy (Ed.), *Advances in research on teaching: Vol. 10. Using video in teacher education* (pp. 235–258). Oxford, UK: Elsevier.

Llinares, S., & Valls, J. (2010). Prospective primary mathematics teachers' learning from on-line discussions in a virtual video-based environment. *Journal of Mathematics Teacher Education*, *13*(2), 177–196.

Marsh, B., Mitchell, N., & Adamczyk, P. (2009). Interactive video technology: Enhancing professional learning in initial teacher education. *Computers and Education*, *54*(3), 742–748.

Masats, D., Sormunen, K., Hacklin, S., & Ducos. G. (2007). *The Use of Online Video Case Studies in Teacher Training Programs: A Literature Review*. Paper presented at the 32nd ATEE Conference,Telford (UK): 25th-29th August 2007.

Merseth, K.K. (1994). Instructional methods and conceptual orientations in the design of teacher education programs: The example of simulations, hypermedia, and cases. In K.R. Howey (Ed.), *The professional development of teacher educators* (pp. 139–174). Cincinnati, OH: Ablex Publishing.

Meyer, F., David, R., Cantin, J., & Aubé, M. (2005). A Web Based Application Using Videos of Practice to Support Teacher Education in Quebec. In P. Kommers, & G. Richards (Eds.), *Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications 2005* (pp. 4302–4305). Chesapeake, VA: AACE.

Moreno, R., & Valdez, A. (2007). Immediate and Delayed Effects of Using a Classroom Case Exemplar in Teacher Education: The Role of Presentation Format. *Journal of Educational Psychology*, *99*(1), 194–206.

Moreno, R., Abercrombie, S., & Hushman, C. (2009). Using Virtual Classroom Cases as Thinking Tools in Teacher Education. In I. Gibson et al. (Eds.), *Proceedings of Society for Information Technology & Teacher Education International Conference 2009* (pp. 2615–2622). Chesapeake, VA: AACE.

Nelson, K. (2008). Wittgenstein and contemporary theories of word learning. *New Ideas in Psychology*, *4*(3), 1–13.

Oonk, W., Goffree, F., & Verloop, N. (2004). For the enrichment of practical knowledge: Good practice and useful theory for future primary teachers. In J. Brophy (Ed.), *Using video in teacher education* (pp. 131-167). San Diego, CA: Elsevier, Inc.

Prusak, K., Dye, B., Graham, C., & Graser, S. (2010). Reliability of pre-service physical education teachers' coding of teaching videos using studiocode analysis software. *Journal of Technology and Teacher Education*, *18*(1), 131–159. Chesapeake, VA: AACE.

Ria, L. (2012). Variation des dispositions à agir des enseignants débutants du secondaire: entre croyances et compromis provisoires. In P. Guibert, & P. Périer (Eds.), *La socialisation professionnelle des enseignants du secondaire. Parcours, expériences, épreuves* (pp.107–125). Rennes: Presses Universitaires de Rennes.

Rich, P.J., & Hannafin, M.J. (2009). Video annotation tools: Technologies to scaffold, structure, and transfer. *Journal of Teacher Education*, *60*(1), 52–67.

Rosaen, C.L., Degnan, D., VanStratt, T., & Zietlow, K. (2004). Designing a virtual K-2 classroom literacy tour: Learning together as teachers explore "best practice". In J. Brophy (Ed.), *Using video in teacher education* (pp. 169–199). San Diego, CA: Elsevier, Inc.

Rosaen, C.L., Lundeberg, M., Cooper, M., Fritzen, A., & Terpstra, M. (2008). Noticing noticing: how does investigation of video records change how teachers reflect on their experiences? *Journal of Teacher Education*, *59*(4), 347–360.

Rosaen, C.L., Lundeberg, M., Cooper, M., Fritzen, A. & Terpstra, M. (2010). Interns' use of video cases to problematize their practice: Crash, burn and (maybe) learn. *Journal of Technology and Teacher Education*, *18*(3), 459–488.

Rosch, E. (1978). Principles of categorization. In E. Rosch, & B.B. Llyod (Eds.), *Cognition and categorization* (pp. 27–48). Hillsdale, NJ: Erlbaum.

Santagata, R., & Angelici, G. (2010). Studying the Impact of the Lesson Analysis Framework on Preservice Teachers' Abilities to Reflect on Videos of Classroom *Teaching. Journal of Teacher Education*, *61*(4), 339–349.

Santagata, R., & Guarino, J. (2011). Using Video to Teach Future Teachers to Learn from Teaching. *ZDM The International Journal of Mathematics Education*, *43*(1), 133–145.

Scott, S.E., Kucan, L., Correnti, R. & Miller, L.A. (2013). Using video records to mediate teaching interns' critical reflection. *Journal of Technology and Teacher Education*, *21*(1), 119–145. Chesapeake, VA: SITE.

Seago, N. (2004). Using videos as an object of inquiry for mathematics teaching and learning. In J. Brophy (Ed.), *Using video in teacher education* (pp. 259–286). Oxford: Elsevier.

Seidel, T., Stürmer, K., Blomberg, G., Kobarg, M., & Schwindt, K. (2011). Teacher learning from analysis of videotaped classroom situations: Does it make a difference whether teachers observe their own teaching or that of others?, *Teaching and Teacher Education*, *27*(2), 259–267.

Sherin, M.G. (2004). New perspectives on the role of video in teacher education. In J. Brophy (Ed.), *Using video in teacher education* (pp. 1–28). Oxford, UK: Elsevier.

Sherin, M.G., & van Es, E.A. (2005). Using video to support teachers' ability to notice classroom interactions. *Journal of Technology and Teacher Education*, *13*(3), 475–491.

Snoeyink, R. (2010). Using Video Self-Analysis to Improve the "Withitness" of Student Teachers. *Journal of Digital Learning in Teacher Education*, *26*(3), 101–110.

Star, J., & Strickland, S. (2008). Learning to observe: using video to improve preservice mathematics teachers' ability to notice. *Journal of Mathematics Teacher Education*, *11*(2), 107–125.

Theureau, J. (2006). *Le cours d'action. Méthode développée*. Toulouse: Octarès.

Varela, F.J. (1989). *Autonomie et connaissance*. Paris: Seuil.

Wang, X. (2013). A Potential Approach to Support Pre-Service Teachers' Professional Learning: The Video Analysis of the Authentic Classroom. *US-China Education Review B*, *3*(3), 149–161.

Williams, M. (1999). Wittgenstein, mind and meaning: toward a social conception of mind. London: Routledge.

Wittgenstein, L. (1996). In G.E.M. Anscomb & G. H. Von Wright (Eds.). *Remarques philosophiques* [Philosophical Investigations]. Oxford: Blackwell.

Wong, S.L., Yung, B.H.W., Cheng, M.W., Lam, K.L., & Hodson, D. (2006). Setting the stage for developing preservice teachers' conceptions of good science teaching: The role of classroom videos. *International Journal of Science Education*, *28*(1), 1–24.

Yadav, A., & Koehler, M.J. (2007). The Role of Epistemological Beliefs in Preservice Teachers' Interpretation of Video Cases of Early-Grade Literacy Instruction. *Journal of Technology and Teacher Education*, *15*(3), 335–361.

Yerrick, R., Ross, D., & Molebash, P. (2005). Too close for comfort: real-time science teaching reflections via digital video editing. *Journal of Science Teacher Education*, *16*(4), 351–375.

Yost, D.S., Sentner, S.M., & Forlenza-Bailey, A. (2000). An examination of the construct of critical reflection: Implications for teacher education programming in the 21st century. *Journal of Teacher Education*, *51*(1), 39–49.

Yung, B.H.W., Wong, S.L., Cheng, M.W., Hui, C.S., & Hodson, D. (2007). Tracking pre-service teachers' changing conceptions of good science teaching: The role of progressive reflection with the same video. *Research in Science Education*, *37*(3), 239–259.