The Impact of Preservice Teachers' Experiences in a Video-Enhanced Training Program on Their Teaching: A Case Study in Physical Education

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This case study documents the influence of preservice teachers' experiences in a Video-Enhanced Training Program (VETP) on their teaching. The conceptual framework of this VETP comes from a research program in cultural anthropology based on Wittgenstein's analytical philosophy. Influence was identified during self-confrontation interviews with preservice teachers ($n = 8$) in physical education with a video of their teaching. The findings indicated that this VETP program improved their ability to conduct a lesson. More precisely, these results showed the kinds of experiences PTs mobilized from the VETP (and others) when teaching, their number ($n = 6$), and the ways in which they drew on a variety of experiences. Two main avenues for modifying VETPs are then proposed: First, teaching should be viewed as both an object and a training situation, and second, VETPs should be integrated into a broad teacher-training path, which should be understood as a pool of experiences from which each teachers forge their own initial teaching practice.

Video-Enhanced Training Programs and Teacher Education

Literature reviews have highlighted that video viewing may potentially improve initial and in-service teacher-training programs (Gaudin & Chaliès, 2015a; Major & Watson, 2017; Marsh & Mitchell, 2014; Tripp & Rich, 2012b; Yousef, Chatti, & Schroeder, 2014). In fact, Video-Enhanced Training Programs (VETPs) enable preservice teachers (PTs) to immerse and project themselves into the act of teaching, which experiences then serve as a vehicle for learning and professional development.

Many studies have shown that the authentic nature of the teaching viewed facilitates PTs' education (Miller & Zhou, 2007; Spiro, Collins, & Ramchandran, 2007; Wang, 2013; Wong et al., 2006), including in physical education (Calandra, Gurvitch, & Lund, 2008; Colasante, 2011; Rekik & Bali, 2017). As Roche and Gal-Petitfaux (2012, p. 106) pointed out, "by allowing to see and hear, the video facilitates a kind of sensory immersion. It allows the student-teachers to take part in a real situation of classroom life with its physical, spatial and sound materiality and with its social dimensions of communication. (p. 106)"

Viewing teaching practice (that of an unknown teacher, a peer, or their own) enables PTs to make a connection between academic and classroom learning sequences (Kleinknecht & Schneider, 2013; Krammer, Hugener, Frommelt, Fürrer Auf der Maur, & Biaggi, 2015; Seidel, Stürmer, Blomberg, Kobarg, & Schwindt, 2011; Zhang, Lundeberg, Koehler, & Eberhardt, 2011). In other words, viewing a video allows PTs to link initial education and teaching experiences, whether those they have already experienced or those to come.

Viewing videos allows PTs, in certain circumstances, to approach the teaching experience, although it does not substitute for teaching (Gaudin & Chaliès, 2015b; Roche & Gal-Petitfaux, 2015). The confrontation with audio-visual evidence of classroom events results in a variety of experiences for PTs: mimetic ones based on the teachers' use of their body and voice in the classroom; participatory experiences from exchanging and reflecting on their teaching practice; language experiences that involve naming the professional experiences in the program; interpretative experiences, in which personal and shared meanings are constructed; and corporal experiences that are analyzed for future teaching practices (Roche & Gal-Petitfaux, 2012; 2014; 2015).

In a complementary way, Lussi Borer and Muller's (2014) research revealed PTs' "helical process of elaborating on the activity" when they mentioned and linked these different experiences during discussions. In the authors' descriptive model, each "loop of the helix" corresponds to an experience mentioned by the PT. Moreover, PTs identify and interpret viewed teaching activities differently according to their beliefs (Cho & Huang, 2014; Mohr & Santagata, 2015), their concerns (Flandin & Ria, 2014b; Leblanc & Ria, 2014), and their past experiences (Sydnor, 2016; Yost, Sentner, & Forlenza-Bailey, 2000).

PTs' video viewing experiences are also affected by the type of VETP in which that experience occurs: for example, "problem-based learning" (Zhang et al., 2011); "lesson analysis framework" (Santagata & Yeh, 2013); "microteaching" (Koc, 2011); "video clubs" (Sherin & Van Es, 2005); or "critical incident analysis," whether real (Calandra & Brantley-Dias, 2010) or virtual (Puvirajah & Calandra, 2015). Recently, in a study by Syring, et al. (2016) PTs felt greater immersion and increased pleasure in the "problem-based" rather than "direct instructional" case-based learning.

Seeing, therefore, allows student-teachers to immerse themselves in a process of anticipating, imagining,simulating, and renormalizing the act of doing (Flandin, Leblanc, & Muller, 2015). Thus, VETPs offer a privileged means of bridging the gap commonly noted

between university education and classroom training sequences (Darling-Hammond, 2006; Korthagen, Loughran, & Russell, 2006) and, ultimately, to link theoretical education at university with practical training in the classroom (Estapa, Pinnow, & Chval, 2016; Hatch, Shuttleworth, Jaffee, & Marri, 2016; Osmanoglu, 2016). To impact effectively PT's teaching, the video viewing experiences in these VETPs must be organized, connected, adapted, and accompanied by the teacher-educator (Blomberg, Renkl, Sherin, Borko, & Seidel, 2013; Brouwer, 2011, 2014; Gaudin & Chaliès, 2015a; Santagata, 2014a, 2014b; Yung, Yip, Lai, & Lo, 2010).

Video-Enhanced Training Programs and Teaching Practice

Assessing the specific influence of video use on teacher education is inherently complex (Brophy, 2004; Gaudin, 2014) because it is often associated with other technology tools (e.g., an online platform) and the support of teacher educators (e.g., discussions) in training programs (Kleinknecht & Gröschner, 2016; Masats & Dooly, 2011). With few exceptions (e.g., Yadav, Bouck, Da Fonte, & Patton, 2009), most studies have underlined the many benefits of VETPs (Marsh & Mitchell, 2014; Wang & Hartley, 2003). Among the most significant benefits are heightened motivation, optimized selective attention, knowledge-based reasoning, and improved teaching (Gaudin & Chaliès, 2015a).

Yet paradoxically, little empirical evidence has been presented on how a VETP influences PTs' teaching (Gaudin & Chaliès, 2015a). Some studies have, however, shown that in the classroom, PTs use abilities they first developed in a VETP (Santagata & Yeh, 2013; Tripp & Rich, 2012a), including when teaching physical education (Gaudin, Flandin, Ria, & Chaliès, 2014; Prusak Dye, Graham, & Graser, 2010). Most of these studies have inferred this relationship from indirect evidence (e.g., questionnaires, written commentaries e.g., Grant & Kline, 2010) rather than direct evidence (e.g., Leblanc, 2014), that is, by analyzing teaching practices (e.g., self-confrontation interviews).

More precisely, research by Gaudin et al. (2014) found that a VETP influences PTs' teaching activity provided that (a) PTs' professional concerns resonate with what they are viewing, and (b) PTs adopt, adapt; or invent a new way to act from what they have viewed. However, PTs' teaching practice is not only influenced by video viewing; in most cases, it is simultaneously influenced by other experiences such as training experiences (e.g., the advice of a teacher-educator) and past teaching experiences in their own classroom (Gaudin & Chaliès, 2015b). For example, Christ, Arya and Chiu (2014) found that PTs reported applying 40% of their learning: specifically, what they learned about methods and materials for instruction and what they learned from both video and discussion in almost equal proportions.

The objective of the present study is twofold: to supplement previous research by providing empirical evidence of a VETP's influence on PTs' teaching, and to show how and to what extent the PTs' experiences in these programs affected their teaching.

Theoretical Framework

The conceptual framework underlying this study takes its main premises from a broad research program in cultural anthropology (Bertone & Chaliès, 2015; Chaliès & Bertone, 2017), which in turn, is primarily inspired by Wittgenstein's analytical philosophy (1996). Two of these premises essential to the present study are explained in the following section.

First Premise

The first premise is that teaching and teacher education involve two orders of reflexivity. Within this theoretical framework, teaching or learning how to teach means that the person will learn to carry out actions "governed by rules" or actions that "follow the rules" (Ogien, 2007). These rules (Wittgenstein, 1996) are "situated normative experiences" (Lähteenmäki, 2003) accepted by the teaching community that render each person's actions intelligible, predictable, and evaluable (Livet, 1993). These rules carry the weight of authority as the standards of correct practice accepted in that community. However, the rules cannot dictate how, when, or even if they are applied, in that the person who follows them can at any moment deviate from them, decide to transgress them, or refuse to follow them (Descombes, 2004).

Whether when teaching or learning to teach, each teacher uses different registers of reflexivity in relation to these rules (Grammont, Legrand, & Livet, 2011). In certain circumstances, when referring to actions and meanings governed by the rules previously learned, teachers reflect at the register of "inherence" (Ogien, 2007), meaning that they act according to rules, which at that moment, they are neither conscious of nor can even state. They act in ways that they have implicitly learned within a community of practice through nonverbal interactions and informal alignments with the practices of others (Winch, 1990). In other situations, teachers use a register of reflexivity, termed "apprehending the inherent" (Ogien, 2007), meaning the practical ability learned previously in education to invoke a particular rule that they follow to justify what they have done, are doing, or would like to do. They then carry out actions that "follow the rules" (Ogien, 2007): They act in accordance with the rules and, therefore, rely on them to justify themselves. Indeed, they are conscious of the rules and can state them, because they were learned during prior training. With the help of one or more teacher-educators, they became aware of the rule; in other words, they made it intelligible through "dialogic re-elaborations" (Legrand, 2007).

Concerning the training of PTs, alternating between sequences of education at university and the sequences of teaching in the classroom in this VETP mainly uses this second regime of reflexivity (Chaliès, Gaudin, & Tribet, 2015). However, that is not to say that the inherent order of reflexivity is not involved in this type of alternating training. Some authors have shown, based on other conceptual frameworks, that implicit learning occurs through mimicry when watching videos of peers (Flandin, Leblanc, & Muller, 2015). This result was also found in cultural anthropology research, for example, in a study on the educational impact on PTs of training programs that incorporate internships observing the teaching practices of their school mentors (SM; Chaliès, Bertone, Flavier, & Durand, 2008). In this type of training, following the example of their SM, the PTs regularly learned tacit and observable facts in their teaching. In other words, the PTs benefited from the SMs' ostensible teaching of new facts to the PTs without them necessarily being fully conscious of that learning (Burbules, 2008). Nevertheless, today alternating education is still largely based on the primacy given to a "reflective conception" of training (Tardif, Borges, & Malo, 2013).

Second Premise

The second premise is that training preservice teachers requires teaching them the rules and then supporting them in following those rules.

Ostensive Teaching. PTs' engagement when teaching a lesson or in initial education, such as analyzing professional practices at the university via videos, requires that they first

learn the rules. These rules allow them both to adapt their actions to class circumstances and to identify and to name, to analyze, or even to suggest remedies for, the problems viewed and addressed during training. This learning requires that teacher-educators engage in ostensive teaching (Wittgenstein, 1996), in which they present certain professional experiences as exemplars (Laugier, 2009), in other words, as the rules. For each one of the rules, teacher-educators creates meaningful links (Bertone, Chaliès, & Clot, 2009) between (a) a language experience of naming the rule, (b) an exemplar demonstrated or shown that corresponds to the rule named, and (c) the results demonstrated or shown that result from correctly following the rule.

For example, the teacher-educator teaches the PTs what it means to assign a task to the students. To do this, the teacher names the rule and, by commenting on the video, links it to a professional practice considered to be exemplary. The video shows an expert teacher who gets the students' attention, delivers the instructions, and checks student understanding. Then the teacher-educator explains to the PTs that, if properly followed, this rule should lead to the result that the students complete the assigned task.

Support in Following the Rules. Once the rules have been ostensively taught by teacher educators, they can then become real benchmark experiences for the PTs to judge by (Williams, 2002). In other words, PTs can then observe, describe, and act like a given teacher, because the PTs are able to say and do in the same way that works for that exemplar person. Observing and acting in a university or classroom situation is, therefore, a matter of discernment; that is, of observing and acting based on an experiential grammar that is made up of rules and taught beforehand (Laugier & Chauviré, 2006). However, the benchmark experience taught should not be considered as a yardstick of normality (Le Blanc, 2004) that the PTs must apply. Rather, it is to be understood as a sort of canonical example that is initially an exemplar (Chauviré, 2010), but which the PTs can then identify in classroom or training circumstances that have a "family resemblance" (Wittgenstein, 1996) and act accordingly.

Teacher-educators cannot, therefore, limit themselves to ostensively teaching the rules in order for the PTs to learn them; they must support the PTs as they begin to follow the rules (Berducci, 2004) by training first in video exercises and then in classroom situations. In this way, teacher-educators can adapt the context of these training or classroom situations to help the PTs follow the rules previously taught. In other words, they put PTs in circumstances allowing them to *see* themselves as the exemplar, for example, when analyzing practice in videos but, above all to *act* like the exemplar in the classroom.

Teacher-educators need to make sure that when the PTs first begin to follow or apply the rules, the expected results are achieved. Indeed, only by observing these results can the PTs then relate a practical professional intention to the rule they have learned (Cash, 2009). It is, thus, by correctly following the rules taught and by observing the expected results in the classroom that the PTs complete their learning and can then professionally and subjectively develop within the framework of those rules (Nelson, 2008).

During these first attempts to follow the rules, teacher-educators check compliance with the rules taught and, if necessary, provide an ostensive explanation (Davis, 2009). To do so, they multiply the examples described, shown in videos or demonstrated so that the PTs can understand the meaning of the exemplar in them, see the core of resemblances (Laugier, 2009) in each of the exemplars and, ultimately, correct their misunderstandings of the rule.

Support in Interpreting the Rules. Once the rules have been learned, PTs are then able to free themselves from their teacher-educators. Gradually, they manage to construct

a system for interpreting the rules (Winch, 1990), which allows an extended application of the meaningful links constructed beyond the original situations in which they were learned. This extended use is made possible by identifying family resemblances between the circumstances of the current classroom situation and those of initial education. From these meaningful links, the PTs then manage to order a complex network of similarities, understand the new situation as it occurs, and act in line with the professional community's expectations, while gradually gaining autonomy from that community.

In this development activity, teacher-educators no longer sought to check whether or not the PTs' teaching practices were adequate; instead, they sought to support them as they appropriated the rules learned. In other words, they helped the PTs experiment with a rule's original meaning in order to better adapt it to their teaching in the classroom, in circumstances that were always shifting and unique.

As for the technology, the rules were defined by experienced teachers with the help of researchers. The protocol involved engaging experienced teachers in discussions about their teaching based on viewing classroom videos. The researchers, as facilitators, guided these discussions to help the teachers move beyond their personal teachings styles to be able to identify the rules inherent to their profession. These rules correspond to the way in which a professional community (here, the community of teachers) reflects on and discusses aspects of their profession (teaching). In a certain way, these rules form part of a professional genre common to teachers. The goal for this training was that the PTs appropriate this shared genre and construct their own teaching style, in other words, the unique way in which they will use these rules in their work as a teacher.

Research Questions

Thus drawing on the literature review and the theoretical framework, this study was guided by the following two research questions:

1. Does a VETP based on our theoretical assumptions nourish PTs' teaching practices? In other words, is the rule taught in this VETP followed by the PTs when teaching a lesson?
2. How and to what extent do the PTs' experiences in this VETP influence their following a rule in their teaching practice?

In particular, we sought to identify the influence of video viewing experiences by examining the PTs' point of view.

Method

Participants

We conducted the study with PTs ($n = 8$) in Physical Education. They were in their second year of a 2-year master's program that involves both preparing for the written, oral, and practical parts of the French competitive examinations for recruiting Physical Education teachers and professionally training teachers with alternating periods at the university with a University Supervisor (US) and periods in the classroom (student-teaching) with their SM. As part of this training, they participated in a VETP in April 2016. The purpose of the VETP was to support the teacher training of PTs, in other words, to enable them to learn and interpret the rules.

We had previously organized the voluntary participation of various people: PTs, USs and SMs. They selected a US who had experience using videos in teacher training. We taught the US about the theoretical bases underlying VETPs and the way to conduct one. Together as a group, we selected all the videos used in the PTs' training. As for the SMs, they did not receive any instructions from us other than about video recording the PTs' lessons.

Setting

Based on the theoretical postulates of this study, the VETP consisted of five sequences (Table 1). The US first taught a rule using a video that showed exemplar practices ("Give students instructions in a situation," meaning "give the objective, one [or more] criteria for achieving that objective, and organize those criteria in an understandable way and explain them as quickly as possible" in order to obtain the outcome that "the students follow the instructions"). In the second sequence, the US supported the PTs in their attempts to follow the rule by analyzing three videos with the help of a worksheet. These three videos showed practices of expert and novice teachers (men and women), from different contexts (middle school and secondary school, easy and difficult students, various physical activities), and some of the teaching practices were less successful than others.

Table 1
Description of the Video-Enhanced Training Program

University Supervisors' Activity	Ostensive Teaching	Support in Following the Rule			Support in Making the Rule Meaningful
Preservice Teachers' Activity	Learning				Development
Sequences of the Program	Sequence 1 Video Viewing	Sequence 2 Video Viewing	Sequence 3 Role Playing	Sequence 4 Teaching	Sequence 5 Video Viewing
Video Content	Video of Unknown Teacher Activity	Videos of Unknown Teacher Activity	Videos of Peer Teaching and One's Own Teaching		Video of One's Own Teaching
Place	University	University	University	PTs' Classes	University
Time	1st day	1st day	1st day	2 to 4 days after role playing	Within 1 week after teaching

In the third sequence, PTs engaged in a video-recorded role playing exercise in following the rule, accompanied by the US. PTs first planned the instructions for a lesson connected to an ongoing activity in their student-teaching. Then, they simulated what they had planned and their colleagues played the roles of the pupils. Last, the US gave them feedback using a video of their simulation. In the fourth sequence, PTs followed the rule when teaching a lesson in their own classes. In the fifth and last sequence, the US helped individual PTs make the rule meaningful by analyzing the video of their own teaching practice.

Data Collection

Two categories of data were collected for this study: extrinsic and intrinsic data. All the sequences were filmed using a camera and constitute the extrinsic data. Only the recorded videos (Sequence 4) of each PT were analyzed for the present study. The conditions for the PTs' internships were similar (supported by an SM, teaching in a secondary school) but the content of the lessons differed (the physical activities done).

Intrinsic data were collected during the self-confrontation interviews (SCI) of the PTs with the videos of their lessons. Before the SCIs, we informed each PT of several aspects: the legal conditions for using their images (e.g., forms giving the right to use their image); seeing oneself in videos can be challenging (e.g., physical tics, sound of one's voice); the particular mode of questioning, which may be unusual or surprising; and we could stop the tape whenever they wanted. The SCIs were conducted in such a way as to be able to reconstruct a posteriori the rules that the PTs followed during their teaching sequences.

Through semistructured questioning, we specifically encouraged the PTs to state the meaning they attributed to their actions and to evaluate them (e.g., "What are you doing here?" and "What are you thinking?"). It was sometimes necessary to repeat questions to get them to talk about the object to be judged, if it had not been stated earlier by the PT. By asking for clarification (e.g., "I do not understand why you consider this action interesting. Can you explain again?" Or "Why do you judge your action this way?") and by contrasting two statements (e.g., "You tell me that here is X, when you said just before it was Y"), we invited the PTs to provide reasons for the judgments they had made about the actions they had considered meaningful. Finally, we invited the PTs to talk about the results they expected (e.g.,"And here, what are you expecting?") and the results actually achieved (e.g., "And finally, what results did you get?").

To identify how and to what extent the PTs' experiences in the VETP influenced the rules they followed during their lesson (Sequence 4), we focused the questioning on judgments of the recording of the fourth sequence (e.g. "What are you thinking?" "Why do you judge that as being good?" "Is that all?" "Where does that come from?" "Is there anything else?" or "Are there other elements that allow you to make this judgment?" "Do these elements have the same importance?"). In the present article, only the SCIs with each PT after their lesson (Sequence 4) were studied.

These two categories of data were transcribed verbatim and only the excerpts related to the purpose of this study were selected for further analysis.

Data Analysis

The data were analyzed in order to identify first the rules followed by the PTs using the procedure in Chaliès et al. (2008) and Chaliès, Bruno-Méard, Méard and Bertone (2010), and second, to identify the experience(s) which enabled them to follow these rules using the VVE-TE-PTE explanatory model. The selected data were processed in five successive steps:

1. All the interviews were divided into units of interaction. The division was based on the action the PT identified as meaningful when confronted with their observed teaching.
2. For each interaction unit, the reasons given by PTs for the meaning they attributed to their actions were identified. These elements included all the

circumstances mentioned by the PT to explain how they arrived at the meaning of the events viewed.

3. For each interaction unit, the rule the PTs followed to understand and judge their teaching practice was noted. By convention, each rule was labeled based on (a) the meaning attributed by the PT, (b) all the circumstances mentioned by the PT to support that attribution of meaning, and (c) the results achieved and expected. Each rule was noted as follows: "Meaning attributed" means used in circumstances where "all of the circumstances referred to in order to support that meaning," which obtained the outcome "all the results achieved and / or expected". In order to minimize we interpretations, each rule was labeled using vocabulary as close as possible to the PTs' own words.

4. The grammar of the rules used was then analyzed over time. In so doing, we sought to retrace the history of the rules followed by the PTs throughout all the VETP sequences. Specifically, we started from the rules followed by the PTs when teaching the lesson (Sequence 4). We chose to begin with this activity because the aim of this training program was to modify their practices in the classroom. Moreover, teaching a lesson corresponded to the last activity in their learning to follow the rule and, therefore, in theory, to their completion of learning the rules taught at university. We first examined whether the rule followed by the PT in the lesson corresponded to the one taught in the VETP. By convention, we considered that the PT followed the same rule if the object they identified, the reasonings used to support that identification, and the results associated with it were identical to those taught. Then, in the self-confrontation data of the PTs' teaching, we looked for both explicit evidence, (i.e., when PTs clearly linked the rule that they followed with stated knowledge that led to its use, e.g., "as we saw in the video of Tom", and implicit evidence, (i.e.,when the PT did not mention these links but they can be found in their reasonings of why they followed that rule). We organized this stated knowledge in the VETPE-OE Explanatory Model (Figure 1): Video-Enhanced Training Program Experiences *(*e.g., video analysis); Other Experiences (e.g., student-teaching). This model originated in the larger collaborative research project that we have conducted for several years with researchers and teacher-educators who use video viewing in teacher education.
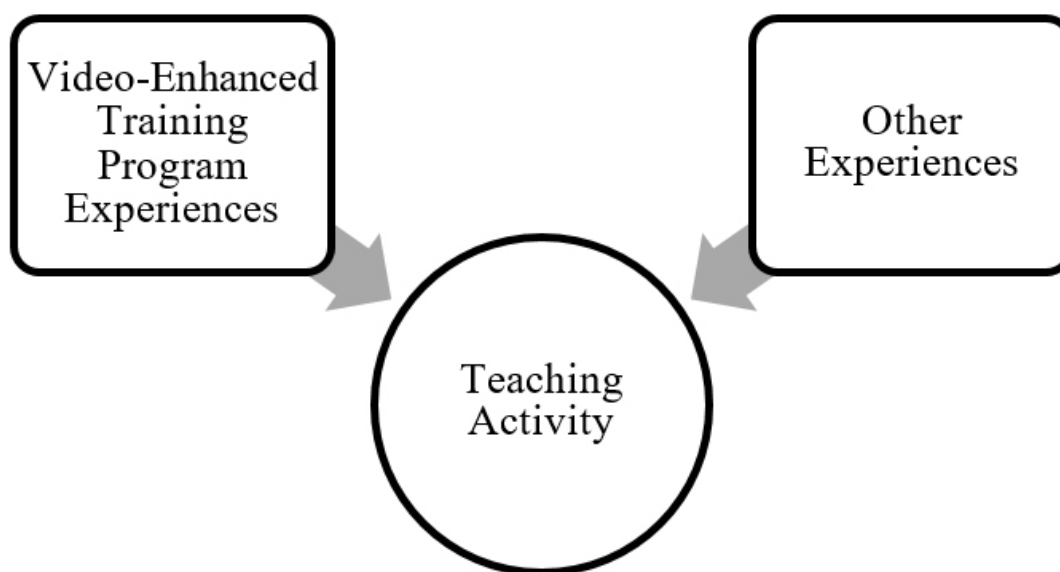
Figure 1. *The VETPE-OE explanatory model.*

5. The validity of the results obtained was tested. The entire corpus was analyzed separately by two researchers. All the results were then compared and discussed by the two researchers until agreement was reached. In the entire corpus analyzed, less than 5% of the elements identified were the source of disagreement between the researchers. They were rejected.

This study is qualitative; the quantified elements herein as a ratio have been added to facilitate comprehension and the replication of future qualitative studies.

Results

The presentation of the results is organized around the two main research questions.

Research Question 1

The results indicated that the rule taught in the VETP was followed by seven PTs in their teaching practice. Only one PT failed to follow this rule. These two results are illustrated by the following case.

Case 1. The first detailed case shows that the rule taught in the VETP ("Give students instructions in a situation," meaning "give the objective, one (or more) criteria for achieving that objective, and organize those criteria in an understandable way and explain them as quickly as possible" in order to obtain the outcome that "the students follow the instructions") was followed by PT 6 in his teaching. This case uses data extracted from his teaching a lesson (Sequence 4). (All interviews were conducted in French and have been translated by the translator. To increase legibility of the excerpts, we have adopted the following convention throughout this section. In each SCI excerpt, the verbatim indicated in the text were the elements analyzed to obtain the results. Specifically, the bold text refers the PT's indicating the rule followed. The underlined words refer to the knowledge considered meaningful by the PT and to the complementary and illustrative elements provided by the PT in following the rule.) At the moment of the video discussed, PT6 presented a warm-up situation in handball to his middle-school students.

Researcher (R): What are you doing?

PT: I'm **giving the instructions of the first situation**. The context is the first lesson in handball. I'm trying to make it a fun introduction because we've just finished an individual activity of long-distance running.

R: "To give the instructions of the situation" means what?

PT: <u>As we have seen in training</u> (VETP), I give the goal, and after, **the organization, the criteria.**

R: How do you think you did?

PT: Good, in terms of the students; they were pretty happy.

R: "Good"?

PT: What I was trying to do, **is that all the students, especially the girls, get involved.**

R: Is that what you wanted to achieve?

PT: Yes. **Student engagement, affective and energetic.**

R: Only that?

PT: And of course, **that they do what I ask in the exercise**. What I asked them to do is win the game, which they did rather well. What I was also looking for in the background was that **they fully participate in the activity**.

R: Did you get what you wanted?

PT: Yes.

R: Are there are other elements that enable you to judge that it was "good"?

PT: Last week's training (VETP).

R: What exactly do you mean?

PT: I followed the methodology, the objective, the organization, etc., with my students.

R: Where did [all that information] come from?

PT: From the handout where all the elements were written in order.

R: Was that all?

PT: No, the practice [role playing], watching others and viewing myself. The training (VETP) reassured me in my teaching.

R: Only "reassured"?

PT: It also gave me reference points, new ideas on how to do this with my students. For example, there, I am careful not to have students behind me because the US gave me that feedback during my teaching, I was turned the wrong way in relation to the basketball basket and other comrades [peers] also made the same remark.

R: Is there anything else?

PT: With this class, I usually first explain orally and then do a demonstration with students. Also, we talked about timing, we were told that we had to be as fast as possible and **so I was fast but taking the time needed for them to understand.**

R: Where does this "as fast as possible" come from?

PT: Our training (VETP).

R: Can you be more precise?

PT: <u>The video of the teacher</u> who was doing the wrestling lesson with her students. We saw that she took a long time to explain the instructions but that she ended up saving time because the students then did what she asked. That made me <u>realize</u> that we could take some time explaining instructions, that it was not necessarily a problem for them to understand.

In his SCI, PT 6 followed the rule ("Give instructions in a situation" meaning "give the objective, the organization, the criteria, and this as quickly as possible but taking the time needed for students to understand") to achieve the outcome ("they do what I asked" and "they are fully engaged"). When teaching his lesson, PT 6 did, in fact, follow the rule that was taught to him. Teaching a lesson is the last training activity of learning to follow the rule and, therefore, in theory, the completion of learning the rule taught in the university.

PT 6 first identified the three "training" experiences (VETP) that influenced his following of the rule. First, he mentioned that he "followed the methodology" provided during ostensive teaching (Sequence 1) with the help of the "handout." Second, he mentioned that a "video" viewed during video analysis (Sequence 2) allowed him to "realize" the significance of some elements supporting the rule. Third, he mentioned that "practicing," getting "feedback from the US," and "seeing others" during role playing (Sequence 3) reassured him about his teaching practice and offered him "reference points" and "new ideas."

The ostensive teaching as well as various kinds of support in following the rule through video viewing, therefore, apparently increased PT 6's ability to teach a lesson. In other words, his capacity seemed to be influenced by numerous experiences, and the multiplicity of those experiences helping him follow the rule seemed particularly useful. However, he indicated that his teaching practice was also enhanced by what he was used to doing in the classroom. A fourth experience, outside the VETP, thus also supported his following the rule in class. However, we noted that PT 6 had a unique and situated way of following of the rule, in that he added an element to the expected results compared to the rule initially taught: "that all the students fully participate...especially the girls."

Case 2. The second case explained here in detail shows that the rule taught in the VETP was not followed by PT 8 in her lesson. This case is based on data extracted from her teaching practice (Sequence 4). At the moment analyzed in the video, she taught a lesson in long distance-running to her high school students.

R: What are you doing?

PT: <u>I think I wasted a lot of time</u>. I **explained the instructions** to them, but I wasn't organized enough. I had only one goal. It was to make them run, that my **giving instructions of the situation** be done **as quickly as possible**, and in the end, I lost [the students]. That's why at one point, <u>I recapitulated everything</u> and the students came up to me after to ask questions.

R: How do you judge your "giving instructions of the situation"?

PT: <u>Not at all effective. I should've been much clearer, more comprehensible to my students.</u>

R: For all students?

PT: <u>There were some that still understood the situation</u> of the rectangle with the doors, but three-quarters<u> stopped because they didn't understand</u> that they shouldn't stop at the pylon. <u>I had to remind them every time.</u>

R: What did you want to achieve?

PT: **That they understand the situation and do it right.**

R: Did you get what you wanted?

PT: No, not really.

R: "Not really" meaning?

PT: I had to remind them that they had to keep going after the pylon, not to stop. But after that, <u>there were two boys who did what I asked the first time.</u> I think <u>I didn't know enough about the situation,</u> it was new, complicated, and I also made a mistake on the time you pass in front of the pylon.

R: Is there anything else that allows you to make that judgment?

PT: <u>The US had told me, when I was filmed</u>, that we had to have the students do one round as a demonstration so that they could really understand the situation. In class, I wanted to do it but <u>the field was big, I was afraid to waste a lot of time showing them, and besides, I had difficulty keeping their attention.</u> In training (VETP), <u>I found that I had done well there</u> but <u>in front of high school students that are difficult, especially the girls, and with the stress, I decided how I would go about it. That is the difference between my fellow teachers in training and my students.</u>

R: Is there anything else?

PT: Compared to the <u>rule</u> we saw in training (VETP), <u>I really had in mind</u> to present to them **the goal, the objective, the criteria of achievement, success, organization**. I had already been taught the criteria in another course. And the last time, we also saw [the importance of] being **clear, understandable while being fast enough.**

R: Where does that come from specifically?

PT: The <u>handout</u> and <u>seeing the videos of the novice teachers</u>, especially the one in swimming, but <u>with the stress, I didn't manage to do everything that had been said</u>.

During her SCI, PT 8 was able to mention the rule taught ("Give students instructions in a situation," meaning "give the objective, one or more criteria for achieving that objective, and organize those criteria in an understandable way and explain them as quickly as possible" in order to obtain the outcome that "the students follow the instructions"). She stated that she "really had that rule in mind during the lesson." However, she admitted that she was "not at all effective" in following this rule. In fact, she specified that she did not achieve the expected results because "three-quarters of the students did not understand." She, thus, engaged in other activities such as "reminding students" and "recapitulated."

More precisely, she mentioned three experiences during training that provided the reasonings for her negative judgment, in particular, the "waste of time" and the "lack of clarity." She mentioned the advice of the US while "viewing her [simulated] lesson" (Sequence 3), the "handout" (Sequence 1), and analyzing the "videos of novice teachers" (Sequence 2).

Moreover, PT 8 indicated four reasons for her "failure" to follow the rule. First, she "didn't know enough about the subject" in terms of knowledge. Second, the "group of students" was "difficult." Third, she felt overwhelmed by "stress" and "fear" of not being able to succeed. Fourth, she mentioned having "done well" in role playing, contrary to the classroom, because she felt there was a "difference" between following the rule with her peers and with her students. We can thus observe a gap in PT 8's ability to follow the rule in two situations of trying to follow the rule (Sequences 3 and 4).

In sum, the results show that this VETP fostered the ability of the majority of PTs to teach a lesson. This capacity was influenced by some of the multiple experiences that the VETP offered but also by others (e.g., past teaching experiences). The rule taught in this VETP was followed in an individual and situated way by the PTs in their lessons. Even though one PT failed to follow the rule in her teaching, her experiences in the VETP, nevertheless, enabled her to give a reasoned judgment about the lack of success. Four reasons were mentioned for this failure: a lack of knowledge, the difficult students, stress, and the difference between simulating an activity and teaching it in the classroom.

Research Question 2

The results for the second research question were primarily based on the elements mentioned by the PTs during their SCI of the video of their lesson (Sequence 4). When PTs followed a rule, and when they identified and named their activities during the SCI with the researcher, they often stated several experiences that allowed them to follow this rule. Influence was thus determined according to the PTs' point of view. Concretely, analysis of the SCIs brought to light the type of experiences that influenced their following the rule in their teaching practice. They pointed to six *Ostensive Teaching Experiences*, *Video Analysis Experiences*, *Role Playing Experiences*, *Other Training Programs Experiences*, *Past Teaching Experiences*, *and Mentoring Experiences*. These experiences were organized following the VETPE-OE Explanatory Model (Figure 2).
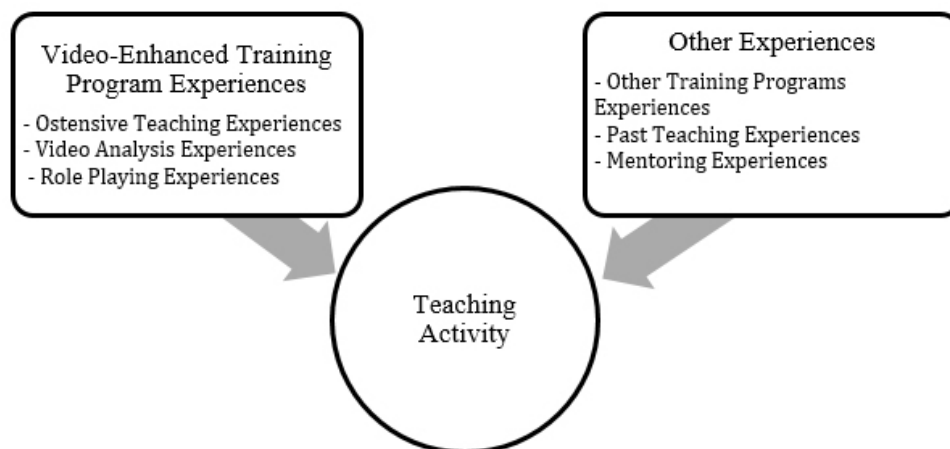
Figure 2. The VETPE-OE explanatory model.

Ostensive Teaching Experiences

In PT 6's SCI (Excerpt 3), he mentioned that the methodology supported by the handout (Sequence 1) influenced his following of the rule when teaching his students, as did six of the other PTs.

> R: Are there other elements that allow you to judge it as "good"?
>
> PT: Last week's training (VETP).
>
> R: What exactly?
>
> PT: <u>I followed the methodology</u>, the purpose, the organization, etc. <u>with my students.</u>
>
> R: Where does that come from?
>
> PT: From the handout where all the elements were written in order.

Video Analysis Experiences

In her SCI (Excerpt 4), PT 1 stated that "the debate on the three videos" (Sequence 2) influenced her following the rule in his classroom lesson. She said that this debate, that is, giving her opinion and getting feedback from the US, was necessary for her to be able to use the viewing of videos.

> R: Where does that come from?
>
> PT: From <u>the debates on the videos</u>. After the 3 videos, it was interesting, we <u>gave our opinion, and the US gave feedback</u>. We were told that it was good in terms of the students' perception to give instructions according to the roles assigned to the students, and after in the simulation in the gymnasium and <u>in the classroom, I tried to put this into practice.</u>
>
> R: Was it more the debate than the video?
>
> PT: No, the debate was triggered by the video, so both. <u>I need the debate to [be able to] use the video.</u>

Role Playing Experiences

In his SCI, PT 2 referred to some elements of role playing (Sequence 3) as influencing his following of the "instructions" rule when teaching his lesson. Specifically, he clarified the influence of the explanations of the US from the "video of his performance and also that of one of his classmates. Regarding the viewing of his own practice, he mentioned that it felt "bizarre" and allowed him to become aware of certain aspects of his teaching practice, such as his attitude or way of speaking.

> R: Where does that come from?

PT: [When viewing] <u>my video of the role play</u>, the <u>US told me</u> to use playful vocabulary. It<u>'s bizarre to watch yourself, you're not really aware of how you are, even in your attitude, your way of speaking.</u> <u>And also PT 6.</u> We saw that he used a figurative expression with his students. <u>I try to be careful when I explain the instructions for the situation.</u>

Other Training Program Experiences

In his SCI, PT 5 stated that "another course" had influenced his following of the rule on giving instructions in his teaching activity. He specified that this course influenced his classroom management (e.g., the "modulation of the volume of his voice").

R: Is there anything else?

PT: <u>I used some things that we saw in another course on classroom management.</u>

R: That is to say?

PT: <u>I tried to give instructions by modulating the sound of my voice, placing all the students in front of me to keep visual control of them, and other things.</u>

Past Teaching Experiences

In her SCI, PT 7 stated that past experience with this class influenced her following of the rule on giving instructions when teaching the lesson. She said that every time she uses a diagram because she has found it to be effective with her students in previous lessons.

R: Is that all?

PT: <u>The system with a diagram, I do it every time</u>. I draw the diagram of the situation on the board at the same time <u>I give instructions</u>.

R: Where does this [idea] come from?

PT: <u>From past experience with this class</u>, using visuals works with these students. <u>I have seen</u> in the previous lessons that my students better understand what they need do with a diagram.

Mentoring Experiences

In his SCI, PT 3 referred to the fact that his SM influenced his following the rule about instructions in his teaching. He therefore focused on his SMs favorite subject to optimize his following of the rule.

R: Is that all?

PT: <u>My SM is obsessed with the content to give the students,</u> and I focused on that to make explanations less general, more precise. I differentiated between the overall <u>instructions</u> about the organization, like pairing off, which I put at the end. Before that, I gave the content on the gymnast and the spotter.

In short, PTs reported that the VETPEs as well as OEs influenced their following the rule when teaching. In other words, influence was not limited to experiences in the VETP in which the rule was taught. In addition, analysis of the SCIs revealed the number of experiences that each PT mentioned as influencing their following the rule (Table 2): from two to five experiences (average = 4).

Table 2
Number of Experiences Mentioned by Each Preservice Teacher

Preservice Teachers	Experiences
#1	5
#2	4
#3	4
#4	3
#5	5
#6	4
#7	2
#8	5
Average	4

Specifically, the ratios show that not all experiences mentioned by the PTs had the same importance (Table 3). Contrary to what we expected, the OEs were most frequently mentioned by the PTs as influencing their following of the rule in the classroom. Nevertheless, the VETPE experiences had higher ratios.

The results showed that the PTs' following of the rule was influenced by a combination of experiences unique to each person. No PT mentioned the same group of experiences; individuals each appropriated the rule by forging their own combination of experiences. On the other hand, the proportion between the VETPEs and the OEs was not statistically significant: 4 PTs = *VETPE > OE*; 3 PTs *VETPE = OE*; 1 PT *VETPE < OE.*

Finally, the ratios showed that the video viewing experiences were not mentioned by the PTs with the same frequency (Table 4). Viewing one's own teaching practice was most often identified by PTs as influencing their following the rule in the classroom. Surprisingly, no PT mentioned the video viewed during ostensive teaching. One explanatory hypothesis may be that this video was the only one that was not subject to discussion between the US and the PTs. This hypothesis is supported by the comments of the PTs, a majority of whom indicated that video viewing was useful only if accompanied by a discussion (e.g., Excerpt 4).

Table 3
Ratios of the Experiences Mentioned by Preservice Teachers

Preservice Teachers	Video-Enhanced Training Program Experiences			Other Experiences		
	Ostensive Teaching Experiences	Video Analysis Experiences	Role Playing Experiences	Other Training Program Experiences	Past Teaching Experiences (student-teaching)	Mentoring Experiences (Advice from their School Mentor)
#1	x	x	x		x	x
#2		x	x	x	x	
#3			x	x	x	x
#4		x	x		x	
#5	x	x	x	x	x	x
#6	x	x	x		x	
#7	x				x	
#8	x	x	x	x	x	
Ratios	5/8	6/8	7/8	4/8	8/8	3/8

Table 4
Ratios for Each Type of Video Mentioned by Preservice Teachers

Preservice Teachers	Types of Video				
	Ostensive Teaching Experiences	Video Analysis Experiences		Role Playing Experiences	
	Experienced Teacher	Experienced Teacher	Novice Teacher	Oneself	Peer
#1		x	x	x	
#2		x	x	x	x
#3				x	x
#4		x	x	x	
#5		x		x	
#6		x		x	x
#7					
#8			x	x	
Ratio	0/8	5/8	4/8	7/8	3/8

Discussion and Conclusion

Teaching Practice: Both a Training Object and a Situation of the Video-Enhanced Training Program

The results of the study found that the VETP based on our theoretical premises fostered the PTs' ability to conduct a classroom activity. In other words, the rule taught in the VETP was followed by the majority of PTs (7/8) when teaching a lesson. These results confirm those of other studies (Gaudin, et al., 2014; Leblanc, 2014; Santagata & Yeh, 2013; Tripp & Rich, 2012a), which showed the influence of VETPs on PTs' teaching. Nevertheless, additional studies are needed to confirm this result with a greater number of PTs and in other sociocultural contexts.

The results showed that the experience of classroom teaching was an important training moment for PTs. Only when PTs could compare what they had learned with classroom events were they able to give professional credibility to the rule taught by teacher-educators, because only then could they judge the rule's effectiveness. In other words, rules are considered credible when the PTs see that following the rule in classroom situations as taught by teacher-educators brings the expected result. VETPs should, therefore, not only be understood as an educational exercise, because a situation of learning at the university cannot "in theory" generate learning (Chauviré, 2004).

In fact, teaching practice is both "an object and an educational situation" in these programs (Chaliès et al., 2015). However, the results demonstrated that one PT did not succeed in following the rule in his classroom lesson, whereas he had succeeded in following it during role playing. The question that follows is then how to modify the situation of training in the classroom to make it a facilitating training situation, that is to say, one that enables all the PTs to experience for themselves the expected result when they follow the rule.

SMs are well-placed to think about how to make these changes (e.g., restrict the number of students) because they know the PTs' teaching circumstances precisely and are ultimately the teacher-educators best suited to make these modifications (Chaliès et al. 2008; Escalié & Chaliès, 2011; Gaudin & Chaliès, 2011). Concerning the VETP we studied, supporting the PTs' first attempts at following the rule should ultimately be done by a collective of teacher-educators including USs and SMs. A truly collaborative activity within this group would both meet the various expectations of the PTs and ensure effective continuity in guiding the PTs from their initial education to their work in classrooms (Cartaut & Bertone, 2009; Chaliès, Escalié, Bertone, & Clarke, 2012).

As Flandin and Ria (2014a,) noted, "from the subjective point of view of a PT, training does not take place through alternating training and classroom practice, but in continuity with it, in that the activity done in both contexts is engendered by the same concern: increasing the viability of work situations" (p. 70). In a complementary way, Escobar Urmeneta (2010) stressed the importance of USs and SMs together examining issues of teaching-learning during video viewing in the presence of the PTs. In the same vein, another study has shown the benefits of a group of experienced teachers from the same school guiding the teaching practice of novice teachers in the same institution in a "collaborative video learning lab" (Lussi Borer, Ria, Durand, & Muller, 2014). These groups of teacher-educators would be a privileged means for supporting PTs as they begin to follow the rules they have learned.

Other research suggests investigating the effects of a VETP not only on PTs' actions in the classroom but also, in a complementary way, its effect on their students (Allen, Pianta, Gregory, Mikami, & Lun, 2011; Kersting, Givvin, Thompson, Santagata, & Stigler 2012; Kiemer, Gröschner, Pehmer, & Seidel, 2014). In the same vein, it would be beneficial to enrich our VETP, in particular the Sequence 2 video analysis, by complementing the classroom video viewing with videos of the SCIs of teachers and students filmed (Gaudin & Chaliès, 2016; Santagata & Guarino, 2011). In this way, PTs would be able to better understand the meaning that each filmed actor attributes to his/her action (Gaudin & Chaliès, 2016; Santagata & Guarino, 2011).

Integrating the VETP Into a Broad Teacher-Training Path

The findings of this study showed that the PTs' teaching practice (following the rule taught) was influenced by between two and five experiences from the VETP. In other words, PTs gave meaning to the events of a classroom situation by reacting to some of the experiential aspects (as in Chauviré, 2010) of the exemplar they learned previously, which served as a meaningful link. They appropriated the rule by transforming it in the classroom to understanding what was happening and to adapt to circumstances.

In addition to the number of experiences invoked, the findings also revealed the kinds of experiences that influenced them: Ostensive Teaching Experiences, Video Analysis Experiences, Role Playing Experiences, Other Training Program Experiences, Past Teaching Experiences, and Mentoring Experiences. This result enabled us to further refine the VETPE-OE Explanatory Model (Figure 2). Further studies are needed to test the reliability of this model and, ultimately, to validate it as a generic model.

These results complement those of Gaudin and Chaliès (2015), which show that PTs' professional activity (analysis, planning, teaching) as only rarely supported solely by viewing teaching videos; in most cases, their teaching practice was also influenced by other experiences in initial education (e.g., US activities around video viewing) or student teaching (e.g., analogous or similar professional experiences).

PTs' teaching practice was, therefore, informed by their own amalgam of experience, which could be described as "complex" since they forged it from multiple experiences during the US' teaching of the rule, their first attempts to follow the rule, and their teaching in the classroom. In other words, PTs have a variety of experiences that interconnect, enhance each other, and sometimes overlap and which progressively are forged into one, unique personal experience, by nature complex. Moreover, the findings of this study suggested that this complex of experiences was forged over time. As such, in some ways, this complex may be assimilated to a personal, experiential trajectory that is shaped and becomes richer through the multitude of experiences the PTs has in both educational and teaching situations. Furthermore, this result indicated that this experience should be viewed as dynamic in nature. Thus, it is important to rethink how we organize broad teacher-training paths (VETP and OE) in order to support the construction of this personal body of experiences. Such a program would need to be consciously designed in such a way as to allow this individual complex of experience to be forged progressively and not merely left to chance.

Designing such a training path, however, raises two questions. The first involves the difficulty of designing a teacher-training path adapted to the diversity of PTs' needs in terms of learning-development and work contexts. Should we thus move toward an early individualization of teacher-training? Is it possible to envisage a sufficiently broad program that would take into account all of this individual diversity in experiences and in

constructing each teacher's own teaching practice? Once again, the idea of PTs being accompanied by a group of US-SMs appears heuristic for individualizing their training paths and ultimately guiding more precisely their multitude of experiences (Theureau, 2015).

The second question refers to how to design this training path. Should we start from the experience that they are expected to have acquired by the end of the training and then work backwards in time to reveal the potential experiential trajectory leading there, thus to reverse engineer it? In the same vein, studies have stressed the value of integrating video viewing as early as possible in PTs' training to promote their professionalization and help them begin to forge their own path of experiences (Fadde & Sullivan, 2013; Rekik & Bali, 2017; Scott, Kucan, Correnti, & Miller 2013; West, 2012). Further studies are needed to further refine how to design and individualize the training programs that would enable each PT's experiential trajectory to be forged through multiple training and teaching situations.

Moreover, the results show that the PTs' following the rule in their teaching was influenced by an individual mix of experiences. No PT had the same combination, and the influence of these experiences was unique to each person. Nevertheless, the proportion between the influence of the VETPE and the OE could not be analyzed in this study and requires additional research. The results highlighted the importance of multiplying and diversifying the experiences of learning to follow a rule so that PTs can each shape their own experiential trajectory. Indeed, the results of the study supported the premise that multiplying the situations of following a rule was necessary in order to facilitate PTs' learning of that rule.

In a broader research program that this study draws on, other research showed that a rapid and ill-adapted "jump" from initial learning of the rules to their use in the classroom was often unproductive and resulted in little learning of new rules (e.g., Escalié, 2012). The findings of the present study, as in others cited, argue for a connection between initial education and classroom situations in order for PTs to establish a continuum of experiences. In a complementary way, the various situations of the first attempts to follow the rule must be chosen and organized so that the PTs can weave an experiential similarity among them (Williams, 2002; Wittgenstein, 1996). The PTs' ability to make connections between a variety of training and work experiences is, in fact, related to how similar the experiences are (e.g., the viewing situation is similar or close to the one experienced in the classroom).

In the same vein, organizing situations in which to apply the rule must be progressive to facilitate PTs' learning. This progressiveness may involve the various experiential aspects of the exemplar. For example, teacher-educators could initially give PTs videos of unknown teachers to soften the emotional aspect and then help them deal with it gradually by using peer testimonials and viewing of their own teaching practice. In the same way, the various goals of the first attempts to follow the rule can also be set out gradually, for example, cumulatively: analyze, plan, then teach. Generally speaking, the way in which this progressiveness is designed seems to be crucial. Once again, it could be designed in reverse, that is to say, from the experience to be acquired by the end of the training course and then unpacking it in order to reveal the potential experiential trajectory.

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