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"How seeing helps doing, and doing allows to see more": the process of imitation in the dance class

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Our field research in five contemporary dance technique classes, observing and describing the complexity and diversity involved in the traditional "demonstration-reproduction" pedagogical relationship, has led us to reconsider the role of modeling behaviour in the dance teaching context. We have also outlined recent neuroscientific findings concerning imitation processes, which tend to point to a biological basis for interactions based on movement observation. A theoretical framework drawing on concepts from the fields of Activity Analysis and Communication allowed us to develop an original methodology in order to observe, describe and analyse human interaction in the dance class. We have identified some of the constructive aspects, as well as the weaknesses, inherent to the conventional pedagogical configuration. The present research develops a number of analytical tools which may be applied to research in dance pedagogy and stimulates further reflection on teaching-learning activities in the dance context.

Keywords: contemporary dance; teaching; activity analysis; communication; imitation; resonance

1. Introduction

The typical demonstration-reproduction model for teaching dance technique is usually treated as a given and generally continues to be accepted without question. It would seem to be valued as a "traditional" tried and true teaching method, without having benefited from thorough and well-reasoned reflection. Our purpose in this article is to bring to light some of the strengths and the disadvantages of the demonstration-reproduction model, in particular in regards to its influence on student commitment to class, while outlining and reformulating some of the constituent elements of the process.

A number of writers in the field of dance research have in fact questioned the process of learning through imitation, considering it to be superficial and alienating. Our field research in five contemporary dance technique classes, as well as recent neuroscientific findings regarding the "mirror" system, have led us to observe that this type of interaction is in fact complex, diverse and has a strong biological basis. We will begin by outlining some of the conflicting perspectives regarding contemporary dance education. We will then discuss relevant research findings on mirror neurons that offer an understanding of the biological basis of imitation. Finally, we will present

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our field research, the results of which suggest a new way of formulating the process of imitation and a better understanding of the teacher-learner interaction.

In order to carry out our field research we designed an original methodology based on "Activity Analysis", an emergent field of research in the domain of adult education as well as in professional contexts. The results of the research, limited to five dance classes in 2005–2006, cannot be generalized, but do open new perspectives for research and for teacher training in dance.

2. Intercorporeal relationship: a fundamental component of teacher-learner interaction in the dance class

In the literature pertaining to education and training in contemporary dance we have noted a number of issues – not all of them explicit – relative to the question of the pedagogical model prevalent in the dance class. Some authors question the fundamental congruity of teaching technique at all in contemporary dance, others take exception to what they see as a dominant teaching model imported from the academic (ballet) heritage, still others warn us about the dangers of a conventional mode of teaching based on the representation of a model (the dance teacher) to be emulated. The various questions and arguments raised by these authors have formed a background of discussion and critique, particularly in France, relative to training the contemporary dancer. We will outline below some of the arguments put forward by several authors in the general context of this critique. We are interested in the extent to which the questions that are raised concern, explicitly or implicitly, the pedagogical "demonstration-reproduction" model.

2.1. Dance technique class for a disciplined and efficient body?

The authors cited below have taken issue with the system of learning through reproduction, pointing out that the quest for modernity in dance has historically been oriented to the search for individual expression in movement (Ganne 1998, 95). For these authors, imitating a model (a teacher's demonstration) presupposes more or less passive learning that can contribute to the standardisation and normalisation of the body (Ganne 1998; Ginot and Launay 2002; Lefebvre 1998; Pujade-Renaud 1976), a state of dependence, even alienation and subjugation, of the learner and a seeming lack of integration and personal appropriation (van Dyke 1992, 114–15; Vellet 2003, 134, 215).

Ginot and Launay (2002) vigorously oppose the "academic, disciplinary, and efficiency-oriented model"[1] (107) that prevails in the training of professional contemporary dancers and challenge the legitimacy of the preponderant presence of ballet technique in contemporary dance education. Both authors decry that:

> … ballet technique is considered to be a universal truth – the indispensable and fundamental basis of all professional dance training – even for contemporary dance. (108)

In the collective work *L'enseignement de la danse, et après?*[2] (Bruni 1998), two of the authors underscore their perception of ballet technique as an infiltrator in contemporary dance teaching, as decried by Ginot and Launay (2002), Lefebvre (1998) challenges the hegemony of technique learning, a state diploma requirement for dance teachers in France (87); she considers that the technical perspective has

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become a trap from which contemporary dance cannot escape. Ganne (1998) challenges the imperialism of ballet, which tends to occupy, and continue to gain, ground (90, 91). Both authors find it disturbing to see a general standardisation of the body and students to be perceived as "body machines" (Lefebvre 1998, 87). According to Lefebvre, this training orientation generates "controlled, skilled, trained, docile bodies at the expense of poetic bodies" (89).

Moreover, a number of authors (Faure 1998; Foster 1997; Ginot and Launay 2002; Launay 2001; Lefebvre 1998) denounce the disciplinary model of the dance class, which, for the most part, is based on what they call the work ethic of the ballet technique class. All attribute the persistence of this model in dance education to "productivist values" (Lefebvre 1998, 88) or to the "desire for efficiency" (Ginot and Launay 2002, 107). In turn, Launay uses the testimonials of dancers to underscore the "relations of influence" (Launay 2001, 92) that exist between teachers and students. She describes dance training as a "ritual that glorifies the absolute body"[3] (93). According to her, the notion of "absolute body" pervades the imagination and dreams of the dancer and is precisely what "contributes to strengthening the figures of power" (93).

The traditional pedagogical set-up, the specific and recurring configuration for teacher-student interaction based on modelling behaviour, could and, may we suggest, should, be examined in the light of important issues such as the "disciplinary model", "relations of influence" and "figures of power" raised by these authors. Bearing in mind the ongoing critique of conventional dance teaching methods, the purpose of our field research is to put this discussion into perspective while gaining a greater understanding of the teacher-learner relationship through a careful observation of what is actually going on during the dance class. While the present study is centred on, and limited to, gaining a better understanding of "imitation" processes, as well teacher-student interaction, we believe that our observations can be brought to bear on questions concerning the wider the scope of dance education.

2.2. The intercorporeal relationship: constructive openness to alterity and to the poetry of movement

The phenomenologist Merleau-Ponty (1945) used the word "intercorporeality" in order to describe the sensing body's ability (vision, hearing, kinaesthesia etc.) to perceive someone else's behaviour. It is a kind of body knowledge that might occur at a subconscious level and constitutes the base of the imitation process (Deschamps 1995, 76). Godard, a dance researcher and movement specialist, refers to this phenomenon of intercorporeality as a kind of kinaesthetic empathy (Dobbels, Rabant, and Godard 1994; Godard 1990, 2001), an expression that accounts for the tight interweaving of senses and affects, specifically in the context of body movement.

The authors cited below have stressed the irreplaceable value of the intercorporeal relationship that exists between teachers and students in the dance teaching context. It seems to us that the lack of verbal codification of movement (specific dance vocabulary, for instance: pirouette, arabesque …) in contemporary dance contributes to the undeniable necessity for the dance teacher's showing-by-doing, which functions as an immediate and ephemeral "score".

Pujade-Renaud (1976) suggests that the rhythmic modulations conveyed by the teacher's movement demonstration resonate in the student's body, thereby motivating the dancer: "the teacher's movements may have an immediate impact,

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comparable to that of music, on the student's body" (105). Louppe (1994), meanwhile, describes the imparting of movement as an "initiatory moment" and refers to an "imprint" and a "mysterious contagion" transferred from one body to another, concluding that this body-to-body transmission is essential in order to embody the "poetic act" (16–17). Godard (1992), like Louppe, confirms the essential nature of intercorporeal communication in dance transmission, conditioned by the limits of spoken language, stating that dancers' knowledge (know-how or "savoir-faire") is imparted through a deep-level nonverbal communication (141–42). Likewise, Godard and Louppe (1993) associate this intercorporeal communication with an empathetic phenomenon which, they suggest, has not yet received sufficient consideration by researchers in dance education.

In her essay "Danses de l'écriture, courses dansantes et anthropologie de la kinesthésie", Foster (1998) echoes Godard and suggests that the empathetic connection is inherent to the dance experience. She posits that in striving to "embody another body's movement", students learn "to experience what another body is feeling …" and "… cultivate their sensitivity to the relationship between visual appearance and proprioceptive sensation" (110).

In this regard, it would seem reasonable to compare the student's experience of learning by following or copying the dance teacher to the professional dancer's experience when learning choreography by following the movements shown to him (not all choreography is created this way of course, particularly when we are dealing with contemporary dance and dancers). For the purposes of this article we will consider the observational activity as similar in both cases.

The American choreographer Merce Cunningham, when speaking about professional dancers learning a choreographic work, expresses his appreciation of certain dancers' ability to learn dance sequences by simply observing movement, a phenomenon that can be described as kinaesthetic absorption:

> For example, I watch dancers learning steps, and with some of them, they must be told very clearly from the start. … But other dancers "see" it; they will start to move and they don't ask questions. They just absorb it through the skin. It is marvellous to watch. … It is visceral, it is very kinaesthetic – the ability to absorb the way the animals can. (Roseman 2001, 45)

Dancer and choreographer Edward Villella also uses the metaphor of absorption when he talks about imitation in learning choreography without verbal cues:

> We should find a word that suggests one body observing and absorbing. … Your eyes are absorbing from the person who is demonstrating. It's body to body and mind to mind. (Roseman 2001, 15–16)

Using numerous testimonials collected among dancers, Launay (2001) highlights the constructive aspects involved when confronted with the task of emulating another's movement: "Taking on the movement of another means working on oneself – altering, articulating, reconfiguring, imagining, or playing at being *other*" (94). She also likens the phenomenon of intercorporeal contagion to inductive processes; her analysis goes as far as to include the notion of trance. Finally, she also notes that, while "intercorporeal contagion" implies a certain "suspension of judgment", on the other hand it may provide an opportunity for the dancer to "identify and analyse his or her own preferred coordination strategies" (94).

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3. The intercorporeal relationship – an innate biological function

The concepts of immediate impact, contagion, empathy, absorption and induction put forward by the above authors have received confirmation, indeed scientific validation, over the last 15 years by the research on mirror neurons (Rizzolatti, Fogassi, and Gallese 2001). Research points to the existence of a neural system that is active during interactions between the observer and the observed, a system that provides a biological basis for the imitation process. These phenomena are described by Decety (2004) in terms of "motor resonance" (72) or by Berthoz and Petit (2006) as "motor contagion" (237) and may be explained, according to Gallese (2005; Gallese, Eagle, and Migone 2007), by the process of "embodied simulation" (24).

Movement observation and the "mirror system" are very complex processes, which we will not develop in detail in this article, but we will put forward some findings and hypotheses from mirror neuron studies that will help us to understand the interaction's biological dimension. We will address the question of how we embody another person's movement and access understanding the intentions underlying that movement, by considering three major concepts: "response facilitation" (667) (Rizzolatti, Fogassi, and Gallese 2001,), "resonance" (Decety and Jackson 2004, 76) and "embodied simulation" (Gallese 2005, 23).

Rizzolatti, Fogassi and Gallese (2001) distinguish several levels of the cognitive aspect of imitation, depending on the brain centres involved. The authors describe the basic level, "response facilitation", as follows:

> In our view, a fundamental phenomenon that forms the basis of imitation is that which has been referred to as "response facilitation" – the automatic tendency to reproduce an observed movement. Response facilitation can occur with or without an understanding of the meaning of what has been observed. (667)

Let us keep in mind that, although this mechanism operates at a pre-reflexive level,[4] it generates a true neural simulation activity in the observer and it allows access to a kind of implicit understanding of the observed action. We suggest that, at a basic level, this direct observation of another's movement facilitates a certain experience of otherness and may be a way to access movement knowledge. It is possible that the pedagogical demonstration-reproduction set-up of the dance class does have potentially harmful or pernicious effects, as is suggested by the critique we outlined above, nonetheless, we postulate that the imitative process does not inevitably reduce learning to "conforming and trying to fit the mould".

The concept of embodied simulation proposed by Gallese (2005) and defined as an "automatic, unconscious, and pre-reflexive functional mechanism, whose function is the modelling of objects, agents, and events" (41), postulates a modelling mechanism for action that is capable of predicting the consequences of the actions of others. This mechanism would allow observers not only to use their own resources to experience the world of others through a process of direct, automatic and unconscious simulation, but also to understand the intention of the actions of others. Thus, this mechanism goes beyond the purely visual-spatial dimension of movement to incorporate some kind of cognitive process. Furthermore, as this mechanism is automatic, it is not subject to voluntary control. It is admitted to be a biologically innate mechanism; however, it operates, as we shall see, given certain conditions.

To account for a direct access to someone else's movement, implying an automatic matching and sharing system between the observer and the actor, Decety and Jackson (2004) propose the term "motor resonance", which they define as a "neural activity that is spontaneously generated during the perception of movements, gestures, and actions made by another person" or "a general arousal reaction" (76), that is to say a process very similar to the one described in the research on mirror neurons. We posit that the term "resonance" could better express what is happening during the "demonstration-reproduction" interaction in dance and could replace the term "imitation". It is one of the points we will consider in our field research.

However, it should be noted that several neuroscientific studies have clearly demonstrated that the observation of an action is largely dependent on the repertory of actions previously learned by the observer (Blakemore and Decety 2001; Calvo-Merino et al. 2005; Decety 2002; Gallese 2005; Hagendoorn 2003; Rizzolatti et al. 1999; Rizzolatti, Fogassi, and Gallese 2001). We may infer from this that there are degrees of simulation according to the familiarity we have with the observed movements. The results of Grammont's (2003) studies relative to motor learning and the neuronal mirror mechanism would seem to suggest that, when learning new movements, it is the student's previous motor practice that develops his/her motor representations, thereby enabling him/her to better understand the demonstration and explanation (15). It is by building new representations through their own practice that individuals increase their capacity for perceiving, representing and understanding the observed actions of others (16). In other words, we must "see" to "do more", but we must also "do" to "see well".

Although we have outlined above the neuroscientific view of imitation processes whose basis is largely unconscious, we mustn't lose sight of the fact that a dancer-learner engages in goal-oriented and voluntary observation activity. The term "reproduction" as we use it in this article can be likened to the imitation process as defined by Dias (2005): "an intentional act presupposing a conscious effort from the actor … in order to reproduce gestures, speech, appearances and actions of other individuals taken as models"[5] (23).

4. Field research: teacher-student interactions observed through the filter of Activity Analysis

4.1. *Activity Analysis perspective*

To our knowledge, the "demonstration-reproduction" pedagogical configuration in dance teaching has not been closely studied in terms of the interactions among the participants. It also seems important to note that what is seen (when we observe a dance class) does not allow us to identify the actual activity of the protagonists in the interaction. We are inevitably limited to an outsiders' point of view: we do not know how the actors of the situation (teachers and students) experience this learning situation. In our view, it would be instructive to consult them on the subject.

Firstly, the Activity Analysis perspective allowed us to adopt a point of view external to the usual framework for dance studies (Barbier and Galatanu 2000, 16–17), setting aside the reference systems of the actors in the situation and establishing a kind of neutral lexicon. As Barthélémy (1990) has noted, the use of a

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new vocabulary to give a detailed description of the constituent elements of a situation creates a framework that is conducive to reflection and analysis – the situation is no longer taken for granted as a "given" (195). Secondly, the neutral lexicon developed in this methodology allowed us to refer to several relevant fields of study in order to take into account the complexity of the interactive situation: the mirror system studied in neuroscience, the notions of intercorporeality and intersubjectivity as used in the phenomenological approach, and concepts from the field of pragmatics in communication.

This research was conducted with the hopes of distinguishing between supposed activity and real activity, while taking into consideration the experiences of the protagonists in the situation. We propose to identify what is actually observable in the typical "demonstration-reproduction" configuration in terms of "activities". We will cross these observations with interviews allowing the actors to express what makes sense for them in the interaction.

The following concepts have provided the basis for our methodology and research design: the concept of "activity" (singular) with its various forms in terms of "Preferred activities", "Associated of activities" and "Paired activities".[6] These three terms will be defined and developed in the next sections.

According to Barbier (2004), the concept of "activity" refers to "all of the processes in which a living being engages" (80); also, etymologically speaking, activity refers to the "potential for self-transformation and for the transformation of one's environment" (Barbier 2004; Barbier and Galatanu 2000, 17). The notions of "transformation" and of "engagement" – as in involvement or commitment – seem to adequately describe the interactional situation in the teaching-learning configuration we've chosen to study.

"Preferred activities": the observation and noting of the frequency and the relative duration accorded by the subject to specific activities allows us to identify his/her "preferred activities" within the given framework. According to Barbier (2003), "preferred activities" are related to "what a person considers worthwhile doing or achieving", whether the values are conscious or not. As he has noted, "often people do not consciously represent their choices" (127–8). In this regard, as a tool for gaining awareness about our unconscious choices, this research mode could be helpful in training dance teachers-to-be.

"Associated activities": teaching and learning situations involve complex activities "requiring diverse functions and the coordination of several actions" (Brossard and Vygotskii 2004, 100). Barbier (2004) renders the simultaneity of thinking, communicating, and operational activities carried out by the same agent by defining them as "associated activities" (88–91); it is understood that these activities are carried out in relation to each other without conscious knowledge of their interactions.

"Paired activities": in order to carry out a closer examination of the interactions between teacher and students, we relied on the notion of "paired activities" based on the concept of "structural coupling" [7] introduced by Maturana (1977) and Varela (1989, 64) and developed by Theureau (2004) in his Course of Action Theory (29). In our study, paired activities are those that are carried out by the teacher and students at the same time. These observations allow us to highlight certain dynamics in the student-teacher interactions, inferring the mutual impact of their respective activities. Overall, our observations enabled us to shed light on the relations of influence between the two groups of subjects and the typicality of these relations in the "demonstration-reproduction" configuration that we studied.

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In order to better understand the dynamics of these relations, which significantly involve the communication activities of the teacher, we turned to the pragmatic theory of communication proposed by Sperber and Wilson (1989), notably their concept of "ostensive-inferential"[8] communication. This concept helped us to describe the particular type of communication at work in this teaching situation. For example, the teacher's dance demonstration is considered as a communication activity, consequently involving (for the students) questions of selection and personal interpretation of the information, and other reception-type activities.

The purpose of this study being to outline, reformulate and understand what is going on during what would appear to be a "simple" "demonstration-reproduction" type of pedagogy, our inquiry was oriented along three lines of questioning:

(1) What are the various activities of the teacher and students and how are these activities carried out during the interaction between the two subject groups?
(2) How does the identification of these activities and interactivities help to address the role of the teacher's dance demonstration in the traditional type of pedagogy?
(3) How does the teaching configuration affect, positively or negatively, students' involvement in dance class?

4.2. Methodology

We used an inductive approach that allowed us to describe the situations observed in terms of categories and relations that emerged directly from the data collected in the field research (Glaser and Strauss 1967).

Our field research, carried out in 2005–2006, focused on contemporary dance technique classes at two pre-vocational, dance-training institutions in Montreal. Both are academic institutions offering a three-year program of study. One, at the post-secondary/pre-university level, fulfils requirements for the technical college diploma in dance and the other, at the university level, fulfils requirements for a bachelor's degree in dance. Both institutions aim to train professional dancers. Our research is presented in the form of a descriptive and comparative study of five selected sequences based on the observation of five contemporary dance classes given by five teachers (three women and two men), all of whom have solid teaching experience. The teachers' ages range from 42 to 52. This study received human subject approval from the University of Quebec, Montreal, Dance Department's ethical committee. All participants were informed of the aim of the research and signed an agreement form. Each teacher in this study is identified by a pseudonym and the students are distinguished by a number.

The choice of teachers was solely based on their common objective, namely to train professional dancers, and on their agreement to participate. Three teachers work at the college-level institution, two of them (Sabine and Thérèse) are responsible for the first-year class and one of them (Octave) teaches the third-year class. The two other teachers work at the university-level institution (Dora and Quentin), both teaching the third-year class. All of the teachers also have ballet training,[9] but this was coincidental and not a selection criterion. Quentin is also a Feldenkrais practitioner, Sabine is also a massage therapist and all of them have some kind of somatic experience (Ideokinesis, Feldenkrais Method®, Mathias Alexander Technique etc.). All five teachers use the "demonstration-reproduction" style of

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pedagogy (I show you what to do, you follow and then do the same thing). During the interviews, when discussing their teaching goals, they each expressed concern with enhancing the internal authority of the students. The dance sequences were new only for Dora's students. For the four other classes, the students were learning and practising the sequences that they had seen in a previous class.

Three-to-five student volunteers per class participated in the study, for a total of 18 students, 14 women and 4 men, ranging in age from 17 to 26 years. There was a heterogeneous mix of technical level in dance – this was not a selection criterion. Seven dancers had less experience than the others (four men and three women at intermediate level) and they were equally distributed among the five classes. The others were at an advanced level. Five of the same students participated in the two third-year university contemporary technique classes given by Dora and Quentin. The students' average ages were about the same in the two institutions – 22.2 years for the college institution and 23.4 years for the university. Because the contemporary dance technique classes were a required course of their academic program, none of the students could choose their dance teacher. They all had known their teacher for at least one month when the observations were carried out. All of the students enrolled in the two programs aspire to become professional dancers. The admissions audition at the college-level institution is very selective and requires a high level in technique class; only 20 students are accepted the first year. The university institution is less selective, accepting around 50 students, after audition, for first-year studies.

Three modes of data collection were used:

(1) Biographical interviews (Demazière and Dubar 2004) with each teacher. This kind of interview outlines the main events that contribute to the dynamic of a person's identity within the socialization process. In this study, the aim of the interviews was to evoke the subject's most vivid memories of their own dance training and to highlight what is important in their current teaching approach. The comments were used as clues to the axiology underlying the teaching activities of each teacher.
(2) Video recordings of the five dance classes. The videos were used as support both for the observation of the subjects' activities, as the basis for analysis and for the self-confrontation interviews of the participants (teacher and students) in the study.
(3) Self-confrontation interviews (Theureau 2002)[10] with each teacher and the student volunteers. The aim of these interviews was to encourage participants (teacher and students) to discuss the activities in which they had participated, and how they had experienced them, as concretely as possible, using the video support. The comments gave insight into certain structures of meaning held by the actors in relation to different aspects of the situation. This kind of interview process allows the participant to stop the video whenever he/she wants to explain something worthwhile to him/her; they were informed of the questions that interested us. The questions that guided the students' interview were: What is important for you for your learning process? What are you doing at this precise moment? What are you paying attention to? What are you aware of? The questions that guided the teachers' interviews were: What motivates your dance proposals? What are you doing at this precise moment? What is drawing your attention? What causes you to react?

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4.3. The analysis

Based on our examination of the five sequences, we conducted a two-stage analysis. The first, descriptive, was divided into two parts. Part one identified the "typical" activities (Schutz, Noschis, and Caprona 1987) of the teaching situation under study. This allowed us to describe, in terms of activities, the "demonstration-reproduction" configuration observed. Part two of this step focused on describing the peculiarities of each case in terms of preferred, associated and paired activities.

The second stage of analysis linked the meaning attributed by the subjects in situ (Suchman 1987, 50)[11] to their interactions. At this step, we crossed the identified activities with the participants' sense of meaning, which had been collected during the self-confrontation interviews; subjects attributed meaning to their activities at the moment they were engaged in them. The purpose of this step was to point out how the traditional pedagogical situation affects the student's involvement and commitment to class, it also gives insight into strengths and weaknesses of the situation.

The identification of activities in the first stage led us to develop an analytical model in the form of a detailed classification of the observed activities of both teachers and students during sequences lasting between 13 and 20 minutes (depending on the case) that were selected from the video recordings of the dance classes. The sequences corresponded to the learning of a relatively complex dance phrase presented by the teacher toward the end of the class. In each case, it begins with the teacher "demonstrating" the sequence and ends with the students "performing" it alone.

We developed the classification by first identifying the major groups of activities for each group of actors. As such, teachers' activities consisted essentially of two types: "communicating an action" and "observing student performance". For the students, two groups of activities were identified as "assimilating" and "performing". We named "assimilating" the student's observable behaviour while his posture and focus is turned toward the teacher, the teacher being himself involved in his communication activity. We named "performing" the student's observable behavior while he performs the dance phrase apart from the teacher's communication activity.

Each group of activities was then divided into various levels of sub-activities, using the notion of "minimal praxeological units" (Filliettaz 2002, 146–7).[12] We identified between 8 and 10 minimal activities, depending on the group of actors (teacher or students). Each minimal activity was precisely defined in order to distinguish them. Providing all of these definitions would lengthen this article considerably, going too far beyond our scope. Among the teachers' activities, we termed what is traditionally called "demonstration", as "Doing what to do". We identified three other activities concerning the teachers' communication: "Saying what to do", "Doing how to do it" and "Saying how to do it". It may be worth distinguishing these four activities, especially between "what" and "how". What we identified as "Doing what to do" refers to the demonstration of the exact body movements as they should be done in time and space. What we identified as "Saying what to do" refers to the descriptive information given for the movement. We grouped these two activities "Doing and saying what to do" in the category "dance proposal presentation". For example, in Dora's sequence, Proposal 10, action unit 2, Dora demonstrates the dance sequence while saying (the numbers are music counts):

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> … so walk one high lift two two three in "tendu", three arabesque by plié four five two three, we touch at five and at two three we stretch again with arabesque, five two three six promenade seven développé eight développé nine …

What we identified as "Doing how to do it" refers to pedagogical strategies that emphasize the way to do the movement, for example effective versus ineffective ways to execute the movement – exaggeration, slowing down, breaking it down. What we identified as "Saying how to do it" refers to the procedural information of the movement, especially the relationships made by the teacher between different kinds of information. We grouped these two activities in the category "dance proposal explanation". For example, in Sabine's sequence, Proposal 6, action unit 15, Sabine shows the movement by doing what the students should not do (for example lifting the heel while moving the arm in a circle) and in her verbal cues, she points out relationships between the students' center of gravity, the floor, the upward direction and the heel:

> We just want to connect to the idea of your center going toward the center of the earth and toward the ceiling. There is as much of you going downwards as upwards, otherwise it's finished and we don't have roots anymore.

Concerning the students' reproduction activities, we distinguished three different assimilating activities identified as "Echoing-resonating": "Doing with", "Doing after" and "Watching without doing". During each, the students established a clear relationship with the teacher's activity. Whereas in the performative activities, the students practised by themselves, either in their own space and choosing the movements they wanted to practice ("Doing alone-exercise"), or in the shared space, dancing with the music but not necessarily trying to perform it for the teacher's observation ("Doing alone-practice"), or in the shared space with the music and with a full display of the exact (as close as possible) dance phrase for the teacher's observation ("Performing-displaying").

Once the classification of activities was established, a detailed observation of the sequences was carried out at the action unit level. At this level, the sequence was divided into "time-meaning" units, which we recognized by a start and stop cue. For example, a unit start cue is identified when the teacher begins to demonstrate the dance phrase; when he stops demonstrating and asks "Do you have it?" the question constitutes the end cue of the first action unit. Each action unit was identified, timed and placed in the chronology of the sequence.

These three operations – (1) identifying typical activities present in the five sequences, (2) describing the particular activities configuration of each sequence and (3) crossing the activities with the meaning the participants attributed to them – were reported in double-entry Tables incorporating all the teachers' and students' activities, where columns represent the chronology of each action unit and rows represent the classification of activities. Not only do these Tables provide a visual representation of the sequences divided into identified action units, they moreover contribute to highlighting the associations of the teachers' activities, the simultaneity of activities among all students and the paired activities between teachers and students.

In Table 1, which represents a sequence from Dora's class, we note, for example, that in Action Units 1–6, the teacher systematically associates the activities

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"Doing what to do" with "Saying what to do" and that in Action Units 2, 3 and 4 these activities are coupled with "Doing with", "Doing after" and "Watching without doing".

From the chronology of action units, we were able to calculate the total duration for each category of activity. Comparing the total duration of the various activities enables us to identify preferred activities – expressed in percentages (Figure 1) – associated activities and paired activities types for each sequence (Table 2). In Dora's sequence, her two favoured activities were "Presenting the sequence" and "Observing", while the "Echoing-resonating" activities ("Doing with", Doing after" and "Watching without doing") were favoured by the students. In Octave's sequence, "Accompanying with saying" was the teacher's preferred activity, while the two "Performing" activities (alone and displaying) were favoured by the students. In Quentin's sequence, "reacting" and "observing" were his preferred activities, while "reacting" and "performing alone" were favoured by the students. In Sabine's sequence, "reacting-explaining" and "managing the shared space" were her preferred activities, while "performing alone" was favoured by the students. In Thérèse's sequence, "observing" and "managing the shared space" were her preferred activities, while "performing-displaying" was favoured by the students.

In terms of paired activities (teacher/students), six major pairing types were identified. They are summarised in Table 2.

Examining the chronology of pairing occurrences for the various sequences revealed a certain invariance that allowed us to map out, or represent, a typification (Schutz, Noschis, and Caprona 1987) of the teaching tradition in dance. Each sequence invariably starts with the presentation of the dance phrase by the

Table 1. Classification and duration of associated and paired activities.

Dora's Class, Sequence 11, Total Duration 13'										
Action unit					1	2	3	4	5	6
Chronology					0'	2'8"	1'28"	1'53"	2'35"	2'57"
Duration in seconds					28	60	25	42	22	18
Teacher activities	Communicating an action	Managing the shared space								
		Doing alone								
		Presenting an action	Presenting the sequence	Doing what to do						
				Saying what to do						
			Explaining the sequence	Doing how to do it						
				Saying how to do it						
		Reacting	Reacting to students' questions	Questions-Answers						
			Reacting to students' performance	Combining doing with saying						
				Evaluating doing						
	Observing student performance									
Student activities	Assimilating	Echoing-resonatingc		Doing with *	10	9	9	7		2
				Doing after *	3	3	1	3	3	3
				Watching without doing *		1	3	3	9	7
		Reacting		Asking questions *						1
				Answering questions						
	Performing	Performing alone		Doing alone-exercise *					1	
				Doing alone-practice						
		Performing-displaying								

* the figures correspond to the number of students involved in the activity

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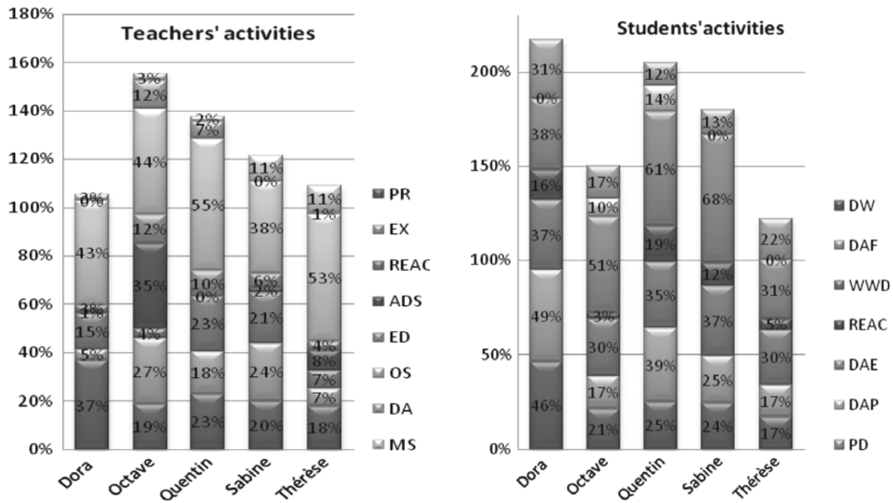

Teacher's activities		Student's Activities	
PR	Presenting the sequence	DW	Doing with
EX	Explaining the sequence	DAF	Doing after
REAC	Questions, answers	WWD	Watching without doing
ADS	accompanying doing with saying	REAC	Questions, answers
ED	Evaluating doing	DAE	Doing alone-exercise
OS	Observing students	DAP	Doing alone-practice
DA	Doing alone	PD	Performing-displaying
MS	Managing the space		

Figure 1. Preferred activities for the five dance sequences.

Table 2. Typical pairing in the dance technique class.

	Teacher	Students
Type 1	Presenting (doing and saying what to do)	Echoing-resonating
Type 2	Explaining (doing and saying how to do it)	Echoing-resonating + performing alone
Type 3	Presenting an action + reacting + observing	Echoing-resonating + reacting + performing alone
Type 4	Managing the space	Preparing the performance + performing alo ne
Type 5	Observing	Performing-displaying
Type 6	Evaluating	Watching without doing

teacher's "doing" and "saying", systematically coupled with the students' "Echoing-resonating" activities (Type 1). It ends systematically with the students' "Performing-displaying", coupled with the teacher's "observing". Between the beginning and end of the sequence, the teacher provides explanations (Type 2), the student asks questions that the teacher answers (Type 3) and the teacher manages the shared space (Type 4).

Let us apply this chronological examination to Dora's and Sabine's sequence in Figure 2. We notice for example that the pairing type 2 (Explaining + Doing and

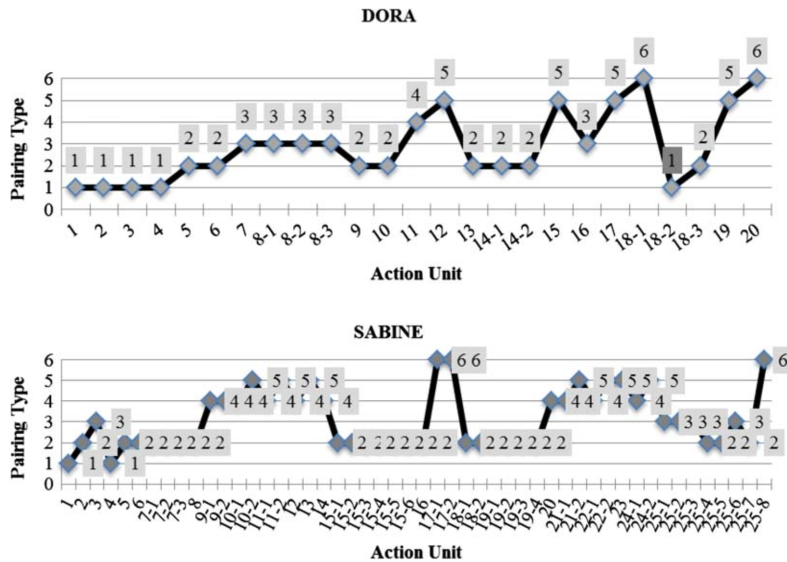

Figure 2. Chronology of the paired activities in Dora's and Sabine's sequences.

Table 3. Teaching-learning rationales of the five dance classes.

Teacher	Dora	Octave	Quentin	Sabine	Thérèse
Preferred activity-teacher	Presenting	Accompanying doing with saying + explaining	Reacting + observing	Reacting-explaining + managing the shared space	Observing + managing the shared space
Preferred activity-students	Echoing resonating + performing-displaying -	Performing (alone + displaying)	Reacting + performing alone	Performing alone	Performing-displaying
Teaching-learning rationale	Teacher gives clear presentations facilitating student memorisation of the sequence	Teacher supports student performance	Teacher observes students and is open to student self-practice and questions	Teacher provides reactive and preventive explanations to support student self-practice	Teacher has an observant attitude toward student performance-displaying
Pairing types	Type 1	Types 5	Type 3	Type 2	Type 4, 5
Lexical register	Musical time signatures	Action verbs	Onomatopoeia	References to gravity, metaphors	Vocabulary of dance steps, musical time signatures

Saying how to do it) / (Echoing-resonating + Performing alone) occurs at the fifth action unit (2'35" after the beginning of the sequence) in Dora's sequence while the same pairing type 2 occurs at the second action unit (13" after the beginning of the sequence) in Sabine's sequence. Whereas both sequences lasted 13 minutes, we can see that Sabine's sequence contains twice as many action units (50) as Dora's (25).

At this first stage of analysis, we conducted a thorough identification of the different lexicons used by each teacher. The main lexicons included musical time signatures, words for the body, words for space, action verbs, the vocabulary of

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dance steps where applicable (arabesque, pirouette etc.), lateral references (right, left), references to gravity (push the ground, land on the ground, reach for the sky), metaphors and onomatopoeia. The second step, which involved identifying the meaning of the activities for the subjects, consisted of linking the teachers' and students' narratives collected during the self-confrontation interviews with each moment of the sequence, in order to put the intentions of the teacher and the meanings constructed by the students into perspective. The next step in analysis consisted of identifying the similarities and differences in the narratives of the various actors by category of activity.

5. Research results: between autonomy and dependence

The invariants identified in the activities, associated activities and paired activities in the five sequences reveal at least two central elements in the "demonstration-reproduction" pedagogical set up. First, it is clear that a dance sequence created and communicated by the teacher occupies the foreground, in central position structuring all of the activities of the subjects. Second, the particular "relations of place"[13] (Barbier 2006, 186) between the teacher and the students generated by this typical teaching situation displays a certain hegemony of discourse and decision-making with regards to the function of the dance teacher in terms of "knowledge" content, the structuring of activities and the controlling of students' activities. Moreover, it became clear that the teacher's observation of students occupies a considerable amount of time during the activity. We note that the teacher's comments emphasize the "kinaesthetic-empathetic"[14], particularity of the interpretive processes at work during this period of activity. That is to say that the teacher understands what is happening in the students' movement through a physical experience (real or simulated).

In regards to the students, their accurate descriptions indicated a large variety of students' activities during the assimilation activities ("Doing with", "Doing after", "Watching without doing"). This reflects the possibility for personal choice in learning strategies; a significant amount of time was devoted to "Performing alone", that is, to self-activity. The collect of data from activities observation as well as from the student narratives showed a clear difference among the students, according to their level of dance training. Nevertheless, we observed a clear difference among student's of different levels indicated by the "activities" observations as well as expressed in the student narratives. The less advanced students preferred "Doing with", while the more advanced students more easily appreciated "Watching without doing". Furthermore, we were surprised to find that the more active the teachers were in "doing" and "saying", the more significant was the amount of time the students devoted to the self-activity of "Performing alone". These findings shed a different light on the view that some authors have expressed, decrying as docile and mechanical the type of learning that currently takes place in the dance technique class, attributed in particular to the processes of reproduction and repetition (Lefebvre 1998, 87–8).

5.1. Different teaching rationales for the same teaching mode

Our analysis allowed us to identify specific characteristics for each sequence; we were able to infer a particular teaching-learning rationale. For example, let us examine the three third-year classes (Dora, Octave and Quentin). Dora's preferred activity was to present the sequence through a lexicon involving musical time

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signatures and the students' preferred activity was Echoing-resonating ("Doing with", "Doing after" and "Watching without doing"). The teaching-learning rationale that becomes apparent from this particular configuration corresponds to the teacher's search for clarity of presentation, facilitating, among other things, the students' memorisation of the sequence. This is consistent with the fact that the dance material was new for the students the day Dora's class was observed. In the case of Octave's sequence, the teacher's preferred activity was "Accompany doing with saying" through a lexicon emphasizing action verbs, while the students' preferred activity was "Performing" (alone and displaying). Octave's teaching-learning rationale favoured vocal support of the students' performances. In Quentin's sequence, with a lexicon that included a great amount of onomatopoeia, his preference for observing the students provided them with the opportunity for performing alone and asking questions.

Concerning the two first-year classes, the teaching-learning rationale of Sabine's sequence demonstrated an abundance of reactive and preventive explanations in support of student self-practice (Performing alone), while the rationale of Thérèse's sequence showed an observant attitude toward students' performance-displaying.

The aim of this comparison is not to evaluate the teaching style of each teacher but to underline the diversity of rationales that can be found within the traditional mode. We suggest that the notion "preferred activities" be a clue to identifying a personal style of teaching and to account for personal teaching values which are expressed through action (see Table 3).

We can infer that the nature of interactions can be quite diverse despite some invariance in the nature of the subjects' activities. We also emphasize that while the activities of the "typical" configuration do not change radically, differences in their development are noticeable. We observed two indicators in particular: (1) the amount of time students spent on "Performing alone" and "Reacting" and (2) activities that are somewhat peripheral relative to of the strict "demonstration-reproduction" schema. In other words, we found, quite surprisingly, that in the sequences in which the teacher was particularly active, especially regarding explanation activities ("Doing how to do it", "Saying how to do it") the proportion of self-activity of the students was significant. Our second indicator, verbal communication, which is traditionally almost exclusively one-way (from teacher to student), progressed in fact toward a more interactive communication in which students had a greater opportunity to speak. Because the majority of the time the teacher is speaking, we would have presumed that the students would be simply listening during movement explanations. This suggests that the quality of the teacher's verbal support, regarding procedural explanations ("How to do it"), promotes self-activity in the student and encourages student initiative.

5.2. "Ostensive-resonant" communication of the teacher

The narratives collected in the self-confrontation interviews gave us some indication of the effects, conditions and limitations of this traditional teaching situation on the students' construction of meaning. The students often cited the "Doing what to do" phase as having a great impact on their motivation. Students see this activity of presentation as providing a valuable source of information that goes beyond the descriptive level and gives them access to the actual process of the movement. This would seem to be indicative of the phenomenon of "resonance" as described in the

research related to mirror neurons. When we take into consideration all of the students' comments related to observing the movement's procedural elements, and there are many,[15] we note a close relationship with what we call "access to" or an intuitive analysis of movement. One student (S8) told us that the clarity of the teacher's presentation allows her to see things in terms of "weight transfer, energy, opposing directions"; another student mentioned that simply watching allows her to "understand the pathways" taken by the teacher in performing the movement; another (S9) said that "just by looking, he knew which sensations the movement required"; two other students (S6, S11) insisted that the dance teacher's demonstration was crucial to their overall understanding of the movement; others (S2, S8, S9) mentioned how the clarity of the teacher's movement is helpful ("it's very clear in her body"; "I only have to watch … and I understand"). Other students (S13, S14) emphasized the perceived quality of movement in the teacher's dance demonstration, the way it encourages and stimulates them in their own understanding and performance of the movement ("it is more the quality she wants, I capture first. The second time she demonstrates, I will learn the phrase, but the first time, it's more the quality and the rhythm of the phrase"). Some (S10, S12) go as far as specifically describing a phenomenon of transference between the teacher's body and their own ("Seeing into someone else's body allows me to do it";[16] "The second time she demonstrates, I try to see with my head, then to see myself doing it in my head at the same time she is doing it … in order that it goes really inside my body"). Understanding the pathways of movement, having the impression of gaining direct access to the teacher's body, to the sensations, to the quality or to the rhythm of movements just by observing, correspond to what is pointed out in the mirror neuron studies and expressed in the above as "response facilitation" (Rizzolatti, Fogassi, and Gallese 2001) and "motor resonance" (Decety 2004). Such testimonials also incite us to adapt the concept of "ostensive-inferential" communication, developed by Sperber and Wilson (1989, 80–81), to characterise verbal communication as well as the dance teacher's physical communication, which is described by Harbonnier-Topin (2009) as "ostensive-resonant" (349).

Students frequently cited the importance of the teacher's presentation ("Doing what to do") of the dance proposal and its effect on their own sense of involvement. They see this presentation-type as providing a valuable source of information that goes beyond the descriptive level and gives them access to the actual process of the movement. Consequently, we can recognise through simple observation the phenomenon of "resonance" as described in the research related to mirror neurons. Considering all the students' comments related to capturing the movement's procedural elements, and there are many,[17] we note a close relationship with the actual understanding of the movement. One student (S8) told us that the clarity of the teacher's presentation allows her to see things in terms of "weight transfer, energy, opposing directions"; another student mentioned that simply watching allows her to "understand the pathways" taken by the teacher in performing the movement; another (S9) said that "just by looking, he knew which sensations the movement required"; two other students (S6, S11) insisted that the dance teacher's demonstration was crucial to their overall understanding of the movement; others (S2, S8, S9) mentioned how the clarity of the teacher's movement is helpful ("it's very clear in her body"; "I only have to watch … and I understand"). Other students (S13, S14) emphasized the perceived quality of movement in the teacher's dance demonstration, the way it encourages and stimulates them in their own understanding and performance of the

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movement ("it is more the quality she wants, I capture first. The second time she demonstrates, I will learn the phrase, but the first time, it's more the quality and the rhythm of the phrase"). Some (S10, S12) go as far as specifically describing a phenomenon of transference between the teacher's body and their own ("Seeing into someone else's body allows me to do it";[18] "the second time she demonstrates, I try to see with my head, then to see myself doing it in my head at the same time she is doing it, … in order that it goes really inside my body"). Understanding the pathways of movement, having the impression of gaining direct access to the teacher's body, to the sensations, to the quality or to the rhythm of movements just by observing, correspond to what is pointed out in the mirror neuron studies and expressed above as "response facilitation" (Rizzolatti, Fogassi, and Gallese 2001) and "motor resonance" (Decety 2004). Such testimonials also incite us to adapt the concept of "ostensive-inferential" communication, developed by Sperber and Wilson (1989, 80–81), to characterise verbal communication as well as the dance teacher's physical communication, which is appropriately described by Harbonnier-Topin (2009) as "ostensive-resonant" (349).

5.3. Students' imitation and teachers' verbal cues

Furthermore, the nature of the content of students' narratives relative to integrating and appropriating movement suggests that the richness of the teacher's procedural verbal cues in support of the students' movement ("Saying how to do it") provides real opportunities for co-construction. This would seem to contradict the idea that learning by imitation tends to be superficial. We note that the combination of movement and speech in the teacher's communication seems to have a strong impact on the students' feeling of integration:

> She has great verbal skills, and she manages to produce the movement in her body, so I have two ways of knowing: verbally and just by watching … I have two paths to understanding that are extremely effective. (S2)

The importance of the quality of verbal support from the teacher, which is another salient point of this study, is congruent with the results obtained by Barr (2009) in her study about procedural feedback in the contemporary dance technique class and with the concept of the "transmission matrix"[19] proposed by Vellet (2003) in a study of how a choreographer communicates with her dancers. With the help of this concept, Vellet refers to a type of verbal communication used by a choreographer which focuses on the underlying source of the movement:

> The transmission matrix contains elements of the source of the movement that determine how to engage and produce it (and which we previously called "deeper elements"). (215)

On the other hand, the comments collected in our study tend to contradict the opposition that Vellet makes between matrix transmission and imitation transmission. In imitation, says Vellet, capturing can only consist of an external image, and the action of reproducing is part of a "reductive and alienating process"[20] (Vellet 2003, 243). According to this author, the transmission matrix would be the only way to provide access to the deeper elements of movement.

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Firstly, we have seen that the teacher's communication constantly associates "doing" with "saying", therefore transmission is never simply imitative. Moreover, several testimonials of the students in our study contradict the "surface" or superficial aspect of imitation mentioned above. Secondly, an identical repetition by imitation as referred to by Vellet, in our view, cannot in fact exist. Watching movement, we see not merely a body that executes the movement but rather an individual with his or her personal history. Each individual's background is quite unique, making identical reproduction absolutely impossible. One student's testimonial reflects the individual nature of the process of assimilation wherein the teacher is reference but it is also made clear that the experience is personal: S11: "… watching him do it once, it was like … well that's his path; now I have to find my own."

We suggest a complementary, rather than oppositional, relationship between the two modes of transmission named above: "imitation" and "matrix" communication. Whereas movement imitation provides general, rapid and immediate access – what Vigarello and Vives (1986) would call a "global syncretic" (239) vision – the matrix communication, through an analogous operation, allows associations between the new and the already known and orients attention to certain elements that are effective in helping to produce the movement.

5.4. Resonance: a skilled dancers' ability?

The phenomenon of "resonance", as described in the existing research on mirror neurons, offers the perspective of a new way of formulating the question of imitation or mimicry in dance learning. We might say that the student "resonates", more or less quickly and easily, with the dance sequence presented by the teacher, depending on his or her experience with the movement. The more experienced the students are, the easier it is for them to learn through observation. This would seem to indicate one of the main drawbacks of the "demonstration-reproduction" pedagogical configuration. Nevertheless, it is also true that less experienced students do learn from the teacher's demonstration, but will struggle to memorise the movement and will experience greater difficulty reaching, if at all, the "performance-display" stage.

The testimonials of the following two students emphasize the gap that exists between their own and the teacher's motor repertory. The first student (S2) speaks about the length of time it takes for her to assimilate and integrate the teacher's movement and states that it is difficult to understand its "logic":

> … sometimes it takes me a while to feel it because, well, she has her own logic; I've noticed that with her arm and hand movements, it takes me a while …

The other student (S7) worries about not being able to "see" the dynamics of the teacher's movement.

> … I think it would help if I could see the dynamics of the movement, but that's not how I see it; I see it more as a shape …

5.5. Student imitation and mastery of movement

Students' comments pointed out other weaknesses inherent to the traditional teaching situation. The feeling of powerlessness regarding their capacity to master the movement performance was expressed by several students. For example, the following student (S4) expresses her feeling of inadequacy when she compares her capacities to those of her teacher:

> … when I see him [her teacher] dancing, it is so fluid … but I do not think about fluidity when I should. I just think about stretching my legs, pushing into the floor and keeping my balance …

Other students admitted they were not able to do the movement the way the teacher showed it and expressed their dissatisfaction or frustration. They express a strong sense of failure and a self-disparaging attitude about their ability to learn. This would seem to confirm the fear expressed by Pujade-Reynaud (1976) about the "freeze effect" on the students when faced with what they perceive as perfect performance (118): "… the student may imagine the movement know-how to be withheld, contained within the teacher's body" (104) by virtue of the "distancing perfection" of the teacher's execution. The same apprehension was reflected in the words of one teacher, who felt that if she was too involved in the demonstration, if she demonstrated "full out", the students would feel that the gap was too wide to cross and they would become discouraged.

It is also interesting to note the reluctance of the two male teachers to be overly engaged in the "Doing what to do" part of the sequence. Octave is dubious about whether to demonstrate the sequence too clearly or to leave things open for interpretation. He believes that demonstrating with just enough clarity will encourage constructive imitation; conversely, if he is too clear, it may be intimidating and impose a finished quality on the movement that, from his point of view, should be the responsibility of the students. Motivated by his wish to encourage the students to learn on their own, Quentin says he just "outlines" the sequence, wanting the students to take responsibility for their own personal interpretation of the sequence.

These comments seem to attest to a desire on the part of the teachers to devolve some of the responsibility of performing the dance sequence to the students. By reducing their involvement in the presentation of the sequence, these teachers believe that they are leaving more room for the students' expressivity and encouraging them to claim the sequence as their own. It is interesting to note that this devolution is not explicitly communicated in situ through verbal cues but through more indicative, corporeal ones, with a potentially greater impact on the students.

Yet, is this not precisely acknowledging the very power of the dance demonstration – holding back rather than imposing one's own interpretation at the expense of that of the students? And, conversely, this attitude would seem to ignore the beneficial effect of the dance demonstration's "resonating" impact, both inevitable and necessary for student learning.

6. Conclusion

First of all, this study has allowed us to name and to classify the various activities and interactivities being carried out during the "demonstration-reproduction" pedagogical situation observed in five contemporary dance technique classes. The methodology design based on Activity Analysis allowed us to develop a new lexicon providing a framework for comparison. We were able to highlight the complexity of the interactions and the diversity of personal teaching styles despite an apparently similar pedagogical mode.

The study points out the value of the teacher's demonstration for its "resonant" impact on the student. In this regard we must emphasize the importance of the verbal cues given by the dance teacher as well as the significance of the time engaged in "performing alone" activities. These factors favour the students' constructive

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involvement in the dance class. Certain points should be kept in mind: the traditional demonstration-reproduction model is more successful with more advanced students and is dependent on the observer's previous experience; the students inevitably compare their execution to the model (the teacher's demonstration), often perceived as perfect, thus generating a self-disparaging attitude. The "demonstration-reproduction" pedagogical set up has been called into question, but we have seen that the situation is more complex than it is usually presumed to be and cannot be treated without fine-grained analysis. Taken as a given, we do not usually identify the numerous activities taking place and are probably unaware of the implications of the situation for the actors (teacher and students).

We put forward that, although the traditional "demonstration-reproduction" pedagogical mode in the dance technique class is not the only approach nor always the best choice for successful learning, the main thrust of our findings points to the necessity for rethinking how and when the different teaching activities, particularly the demonstration, are implemented.

Finally, we emphasize that the results obtained are limited to our data and cannot be generalized. We suggest that the methodology created from Activity Analysis for this research may offer a new way to look at teacher-student interactions; it may be a useful tool for further research as well as for teacher-training situations.

Acknowledgements

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Notes

1. All French quotations are translated by us.
2. A possible translation of the title: "Teaching dance, and then what?"
3. The author refers to a predominating ideological conception of the dancer's body as "anatomic-organic", an object to be trained, and considers the dance technique class organisation to be conducive to the imposition of this conception.
4. Gallese (2005) defines this pre-reflexive level as "a basic functional mechanism of our brain" which is "not necessarily the result of a willed and conscious cognitive effort" (41) and Theureau (2005) specifies that the "pre-reflexive level is meaningful for the actor, that is to say, "presentable, repeatable and commentable by him at every moment of the course of the action to an observer under favourable conditions" (282).
5. Translated by us: "Le terme 'imitation' comporte de nombreuses acceptions; il convient donc de préciser que, dans ce numéro, l'accent a été mis sur les comportements et les pratiques (politiques, culturelles et sociales) qui délibérément cherchent à reproduire des gestes, des paroles, des apparences et des actions d'autres individus pris comme modèles. Autrement dit, l'imitation est, dans ces comportements et pratiques, un acte intentionnel, présupposant un effort conscient de la part des individus en tant qu'agents."
6. Centre de Recherche sur la Formation du Conservatoire National des Arts et Métiers.
7. Theureau's definition of "structural coupling": "Dynamic relationships of a living system with its environment".
8. The term "ostensive" refers to "a behaviour whose intention is to render something manifest to someone" (Sperber and Wilson 1989, 80–81). The term "inferential" refers to "the best the receiver can do is to form a hypothesis based on information provided by the ostensive behavior of the communicator" (103).

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9. Dora's initial training is ballet, but she has trained in contemporary dance since she was 18 years old. The other four teachers initially trained in contemporary dance but have had complementary training in ballet.
10. The self-confrontation interview is defined by Theureau (2002) as "an indirect way to know about the introspective activity or the immediate understanding of one actor's actual experience at each moment of his activity".
11. This expression refers to "situated action theory" developed by Suchman (1987): "This term underscores the view that every course of action depends in essential ways upon materials and social circumstances. Rather than attempting to abstract action away from its circumstances and represent it at a rational plan, the approach is to study how people use their circumstances to achieve intelligent actions. Rather than build a theory of action out of a theory of plans, the aim is to investigate how people produce and find evidence for plans in the course of situated actions" (50).
12. Filliettaz (2002) defines the "minimal praxeological unit" as "the smallest identifiable unit at a strategic level, that is cognitive aim or intention guided, such as it can be potentially spotted by a co-agent" (147).
13. Translated by us: "rapports de place".
14. References Barbier 2006, 3.
15. We collected 20 testimonies from nine students about a "resonance" type observing, learning and understanding movement.
16. An interesting connection can be made between this testimonial and an article by Jacob and Jeannerod (1999): Quand voir, c'est faire; unpublished working paper, Institut des Sciences Cognitives de Lyon.
17. We collected 20 testimonies from nine students about a "resonance" type learning of movement.
18. An interesting connection can be made between this testimonial and an article by Jacob and Jeannerod (1999): Quand voir, c'est faire; unpublished working paper, Institut des Sciences Cognitives de Lyon.
19. Translated by us "transmission matricielle".
20. Translated by us: "enjeu réducteur et aliénant".

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