‘Swim like a knife slipping on fresh cream’ The role of metaphors in struggling students’ engagement with learning activities in physical education

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Swim like a knife slipping on fresh cream

The role of metaphors in struggling students’ engagement with learning activities in physical education

Oriane Petiot and Jacques Saury

ABSTRACT

Introduction: Student engagement with learning activities is considered in educational research as a primary facilitator of academic achievement and student learning. Teachers play a major role in student engagement with learning activities. The use of metaphors is a way to promote this engagement, especially when students are struggling in school. This case study investigated a teacher’s activity when she interacted with struggling students. We were interested in the repeated use of metaphors by the teacher, associated with concerns of promoting student engagement with learning activities. More specifically, we characterized (a) the teacher’s concerns about student engagement with learning activities when the metaphors was used from the beginning of the school year; (b) these concerns’ dynamics when metaphors were used during the PE unit; (c) the effects of the use of metaphors, as perceived by the teacher, on student engagement with learning activities. This study was conducted following a situated approach from the theoretical framework of the ‘course of action.’

Methods: Sophie, an expert PE teacher, agreed to participate in this research. The class included twelve struggling students of the first grade of the Middle School. Two types of data were collected: (a) audio-video recordings of the lessons and (b) teacher’s verbalizations during self-confrontation interviews. The data were processed in five steps: (a) constructing a two-level protocol; (b) constructing the teacher’s course of experience when the teacher aimed to improve the student engagement by using the metaphor; (c) identifying and categorizing Sophie’s concerns; (d) describing these concerns dynamics; (e) highlighting the effects of the use of metaphors, as perceived by Sophie, on the students engagement in learning activities.

Results: The teacher promoted student engagement with learning activities using a singular metaphor throughout the PE-unit in this class, ‘the knife slipping on fresh cream,’ to name the learning content in swimming lessons. The results are presented in three stages: (a) the concerns to promote student engagement with learning activities by using the ‘knife on fresh cream’ metaphor; (b) the concerns dynamics presentation during the PE unit; (c) the effects perceived by the teacher of the ‘knife on fresh cream’ metaphor on student engagement with learning activities.

Discussion and conclusions: The results are discussed in three stages: (a) using metaphors to promote student engagement with learning activities; (b) promoting student engagement with learning activities over time from the first day of class; (c) measuring the effects of metaphors on student engagement from the teacher’s experience.

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PHYSICAL EDUCATION AND SPORT PEDAGOGY

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Introduction

Student engagement in physical education (PE): issues and definitions

A delimitation of student engagement
Engagement has long been considered in educational research as the primary facilitator of academic achievement and student learning (Bevans et al. 2010). School engagement is defined in terms of participation and intrinsic interest in school. Skinner and Pitzer (2012) proposed a multilevel model of school engagement: (a) engagement with social institutions, such as the school; (b) school engagement including studies, sports, or social activities; (c) school engagement in the classroom in relation to the teacher, peers, and the educational content; (d) engagement with learning activities influenced by the teacher-initiated climate. This level of engagement is the object of this research.

The components of student engagement with learning activities
Engagement with learning activities can relate to various dimensions (Taylor and Parsons 2011). Fredricks, Blumenfeld, and Paris (2004) argue that engagement with learning activities has three major components. First, behavioral engagement reflects students’ compliance with expectations in an identified school activity (e.g. responding to instructions, being assiduous). Second, cognitive engagement is associated with a student’s investment of effort, attention, and metacognitive strategies mobilized during an activity. Third, emotional engagement refers to students’ investment in the activity, showing positive emotions and even flow experiences.

Student engagement with learning activities in PE: the case of struggling students
Given the decline in physical activity among youth, it is imperative to understand the factors that can contribute to increased student engagement in physical activities (Chorney and Stecyk 2015). The student engagement with learning activities in PE is particularly crucial in Sections of General Education and Professional Adapted (SEGPA). In the French school system, the SEGPA classes provide an appropriate assistance to students with particular difficulties. For these students, PE seems to be one of the most popular subjects. However, they speak about their engagement in PE as something innate (Szajda-Boulanger 2015). The teacher has to change this representation with intervention modalities promoting their engagement and their positive relationship with physical activity (Doolittle 2016).

The influence of teacher intervention on student engagement with learning activities
Establish a quality relationship with students by creating a mastery climate
The teacher can promote student engagement with learning activities by establishing a positive relationship with students. This relationship is created when the teachers are available (Visioli, Petiot, and Ria 2015) and able to mask their awareness of misbehavior in the class (Vors and Gal-Petitfaux 2015). Create a mastery climate is a way to promote students engagement by offering activities that do not favor the most skilled students. In Morgan and Kingston’s (2008) study, the aim was to develop a mastery-based intervention program and then evaluate its effects on teachers’ behaviors and students’ perceptions. The study supported the hypothesis that PE interventions aimed at creating a mastery climate improved student engagement. Garcia-Gonzalez et al. (2019) confirmed these results revealing that an ego-oriented climate was positively related to basic psychological need frustration, eliciting a dark pathway to amotivation and boredom.

Engage students in collective and authentic life-long experiences
Models such as Sport Education emerged as alternatives to traditional modes of teaching. They were designed to create a real community of learners in the classroom, starting from relatively long teaching PE units based on extracurricular sports practices, persisting teams, and a finalization of the PE unit around a major event to engage students in learning (Hastie, Ojeda, and Luquin 2011). Some
studies revealed that these pedagogical models favor the engagement of struggling students in PE lessons through the conveyance of camaraderie (Ennis 1999). Nevertheless, Araújo, Mesquita, and Hastie (2014) questioned the status of learning using this model that has not been agreed upon by researchers. In particular, teachers have been identified as crucial enablers of the continuity of positive student engagement who can prevent the emergence of deviant competitive dimensions. For example, Vidoni and Ward (2009) showed that the teacher-targeted interventions promoted interactions between students’ cooperation and fair play attitudes during a season of Sport Education. The teacher role seems to be a major factor in ensuring student engagement.

The use of metaphors: a way to promote struggling student engagement with learning activities?

General benefits of metaphors in teaching

For Lakoff and Johnson (1980), a metaphor is an abstraction derived from human conceptual systems, not only a poetic figure of language. The metaphors structure our cognitive processes, giving us an access to the understanding of the world. Saban (2010) explored the functions of metaphors in teaching and learning research. He strongly argued for the inclusion of metaphors in teaching because of their functional benefits. Indeed, the use of metaphors in teaching seems important for language learning (Kamberi 2014) or in more general education (Badley and Hollabaugh 2012). For example, Mouraz, Pereira, and Monteiro (2013) carried out a case study revealing the importance of metaphors to promote learning and to develop fundamental knowledge. The use of metaphors allows also sensitize teachers to their own teaching, reflecting a teacher’s personal style.

Metaphors and engagement with learning activities with struggling students

Taylor et al. (2018) explicitly linked the use of metaphors to student engagement in a research based on higher education. Through a mixed methods approach, they argued that storytelling and metaphors can increase student engagement. By using metaphors, the teacher increases the power of the mind and puts the act of thinking at the center of activity (Bruner 1996). Metaphors can promote student engagement with learning activities by preserving the passion of discourse, at a time when rationality is valued in the society (Berut 2010). It seems interesting for the teacher to show a ‘metaphorical imagination’ in class (Lakoff and Johnson 1980). Moreover, few empirical studies have focused on the influence of metaphors on student engagement, especially with struggling students in PE. We suppose that the use of metaphors in SEGPA classes is an innovative pedagogy, as well as other proposals to use digital tools with these struggling (Marin 2013).

Theoretical framework

Our study was conducted within the ‘course of action’ framework (Theureau 2006). This theory has provided the basis for a considerable amount of French research conducted in various contexts related to sports and educational practices over the past 15 years. It has been used to analyze teachers’ activities (e.g. Vors and Gal-Petitfaux 2015) and students’ activities in PE (e.g. Evin, Sève, and Saury 2015).

We chose this framework because of its theoretical presuppositions. First, according to this approach, the activity of an actor (in this case, a teacher) is considered as inseparable from the situation. Student engagement with learning activities results from the dynamics of the interaction between the teacher and the classroom environment (Varela 1989). The actors construct the world they live (i.e. their own world). This construction reveals the capacities of the actors to actively build a meaningful environment for them, and to adapt to this environment during their ongoing activity.

Second, following the hypothesis of the ‘pre-reflexive consciousness’ (Theureau 2006), human activity is regarded as a ‘course of experience’ composed of subjective concerns, associated with perceptions, and knowledge permanently changing over time. The concerns of an actor in the situation
reflects the hypothesis of a ‘direction’ underlying human activity. According to Saury et al. (2013, 43), the concerns ‘include the opening (and closing) of possibilities for the activity, which prioritize the actor at this moment, which are delimited and which are updated according to what it takes into account in its situation.’

Third, this framework aims to produce scientific knowledge to better understand human activities, and to contribute to the design of work situations. The research carried out to establish an organic relationship between ‘theoretical’ and ‘transformative’ aims. An emblematic principle of this framework is to ‘understand the human work to transform it’ (Guérin et al. 1991). It’s important to learn more about the influence of teacher intervention modalities on student engagement in PE, to propose principles of intervention for teacher training.

**Aim of the study**

The aim of this study was to analyze a teacher’s activity when he interacted with struggling students. We were interested in the repeated use of metaphors by the teacher, associated with concerns of promoting student engagement with learning activities. More specifically, it involved (a) characterizing the teacher’s concerns about student engagement with learning activities when the metaphors were used from the beginning of the school year; (b) characterizing these concerns’ dynamic when metaphors were used during the PE unit; (c) characterizing the effects of the use of metaphors, as perceived by the teacher, on student engagement with learning activities.

**Methods**

**Participants and settings**

Sophie agreed to participate in this research. At age 44, she had been teaching PE for 20 years. Given her professional experience, her training, her active involvement in the profession, and her peer recognition, she could be considered an expert PE teacher (Tochon 1993).

She was observed during the first fourteen lessons of the year (first PE unit) in a class of twelve pupils (five boys and seven girls from eleven to twelve years old) of the first grade of the Middle School (‘Collège’ in France). These students were included in a special education class named SEGPA classes in the French educational system. This class included very struggling students. The teacher’s activity was analyzed during fourteen swimming lessons (two lessons per week). The students were all beginners. Five were non-swimmers (they used armbands or buoys during the first lessons). During the unit, the teacher proposed the same lesson frame:

- **TIME 1:** grouping (summary of the previous lesson, lesson presentation)
- **TIME 2:** swimming (six minutes with the desired equipment)
- **TIME 3:** grouping (instructions related to the following situation)
- **TIME 4:** swimming (with fins, board, and/or special instructions)
- **TIME 5:** grouping (exercise assessment and instructions for the game situation)
- **TIME 6:** game situation (toboggan, passages under water …)

During the thirteenth lesson, the students had to fill out a form with the skills they observed in a partner. The fourteenth lesson was mainly dedicated to games with another class student.

**Data collection**

**Audio-video recordings of the lessons**

The teacher and the students were recorded during all fourteen swimming lessons. The researcher manipulated a video camera first video camera. It was connected to a Bluetooth microphone worn by the teacher. Another camera was fixed. It was placed to film the entire classroom situation.
**Teacher’s retrospective verbalizations during self-confrontation interviews**

The teacher’s retrospective verbalizations were collected during self-confrontation interviews. During the self-confrontation interviews, the actor has to comment the significant elements on the basis of the lesson video. He has to relive the situation and not analyze it. These interviews were conducted each week. The teacher and the researcher watched the recording of the two lessons of the week together. The teacher had to explain, show, and comment on the elements that were meaningful to her during these lessons (Theureau 2006). She was asked to ‘relive’ each lesson without trying to analyze it or justify it *a posteriori*. The questions were about the teacher’s actions (e.g. what are you doing at this moment?), communications (e.g. what do you say to Romain there?), feelings (e.g. how do you feel when you write on the blackboard?), perceptions (e.g. what do you perceive in this situation?) etc. In total, about 14 hours of self-confrontation interviews were recorded.

**Ethical considerations**

Sophie volunteered to participate in this research. We explained to her the research’ purpose, and then met her before the start of the school year. We also met the head of the school, the administrative staff and the teaching team. This step allowed an ‘authentic integration’ (Saury et al. 2013) as a researcher within the school. At the beginning of the school year, we met the students and answered their questions. We indicated that the data collected were confidential. We gave them a document presenting the research, intended for their parents. We made sure that their parents had signed an authorization for the video-recordings of their children’s PE classes. During the research, we were constantly assured of the voluntary participation of both the students and the teacher. In addition, this study followed the ethical recommendations of the university ethics committee.

**Data processing**

**The construction of a two-level protocol**

The stage consisted of re-transcribing and synchronizing Sophie’s actions during the lessons and the verbalizations obtained by self-confrontation interviews. Table 1 provides an excerpt from the two-level protocol.

**The construction of the teacher’s course of experience within a selected corpus**

From the two-level protocol, we selected the moments when the teacher’s concerns were focused on the use of metaphors to encourage student engagement in learning activities. We have systematically documented the six components of the hexadic sign, accounting for the following phenomena (Theureau 2006). We explained the components with example of Sophie’s course of experience during the moment reported in Table 1:

<table>
<thead>
<tr>
<th>Lesson</th>
<th>Teacher actions</th>
<th>Retrospective teachers’ verbalizations during self-confrontation interviews</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Sophie: (moves along the pool where the students swim) Ok, Timeo, imagine the board is your knife blade, even on the back okay?</td>
<td>Researcher: So it’s Timeo I think you’re talking …? Sophie: That’s it. So I give Timeo and Clement indications so that they learn motor skills, because (…) they show signs of impatience … they do something else. They play, so they have fun, yes … I have not given everyone the instruction of lengthening the body with the knife tip. But they are ready to that. I must give them ‘candies,’ I must give them ‘to eat.’ They need to be faced with the difficulty to move forward.</td>
</tr>
</tbody>
</table>
Sophie’s engagement (E) in the situation, reflecting her concerns at time t (e.g. Introduce in a small way concepts that relate to the transformation of motor skills)

Potential news (A) reflecting Sophie’s expectations at time t (e.g. Give pictures to Timeo and Clément will allow to refocus them on learning)

The reference system (S) regrouping the knowledge mobilized by Sophie at time t (e.g. Timeo and Clément are ready for instructions on lengthening the body with the tip of the knife)

Sophie’s representamen (R) consisting of her perceptual, proprioceptive or mnemonic judgments at time t (e.g. Timeo and Clément show signs of impatience, do something else, play, have fun)

The course of experience’s unit (U), which reflects the fraction of Sophie’s activity that is meaningful to her at time t (e.g. give Timeo and Clement the instructions to imagine that their board is their knife blade)

The interpretant (I), which gathers the knowledge validated or invalidated by Sophie at time t (e.g. validation of knowledge: Timeo and Clement have difficulties to engage in learning activities).

**Concerns identification and categorization related to use of metaphors to promote student engagement with learning activities**

We identified and categorized the concerns (E) in which Sophie used metaphors to affect student engagement with learning activities.

- First, the concerns were identified based on the teacher’s course of experience. Each concern was named to reflect the teacher’s preoccupations at this moment. In the proposed example (Table 1), Sophie sought to engage students by speaking of ‘the board as the blade sharp knife’ (Concern 3).
- Second, concerns were categorized into macro-concerns. This step consisted of grouping the concerns inductively by comparing the hexadic signs components. The identified categories relate to the motor-skill learning objective in which the teacher wanted to engage the students. For example, ‘the board as the blade sharp knife’ belonged to the macro-concern ‘promote horizontality of students’ body in dorsal swim.’

**Description of the concerns’ dynamics**

We characterized the dynamic of these concerns according to three axes of analysis: their temporal arrangement during the PE unit, their redundancy, and their duration.

- The temporal arrangement of the concerns corresponds to their distribution during the lessons.
- The concern redundancy analysis consisted of determining the number of openings of each concern during the PE unit to identify the specific concerns and the recurring concerns.
- The duration of concerns was systematically measured from the video recordings of each lesson.

**Highlighting the intervention effects, as perceived by Sophie, on the students’ engagement with learning activities**

To identify the intervention effects, as perceived by Sophie, on student engagement in learning activities, we focused on the teacher’s representamen (R) (perceptual elements that were meaningful for her in the situation). We have inductively grouped and categorized these perceptual elements. For example, the perception titled ‘The knife on fresh cream metaphor makes Sophia laugh’ was grouped in the category ‘The knife on fresh cream promotes students pleasure.’

**Results**

Sophie used a singular metaphor throughout the PE-unit in this class, ‘the knife slipping on the fresh cream,’ to name the learning content in swimming lessons.
The concerns to promote student engagement with learning activities using the ‘knife on fresh cream’ metaphor

The 34 identified concerns were grouped into four macro-concerns.

Promote horizontality of students body in ventral swim

The macro-concern ‘promotes horizontality of students’ body in ventral swim’ included 25 concerns. During these concerns, the teacher urged the students in ventral swim using a metaphor ‘like a knife’ slipping on ‘fresh cream.’ The metaphor, ‘the knife on the fresh cream’ (Concern 1) was introduced during the second lesson. The students were in front of the blackboard after a warm-up. The teacher told them,

try to put your head in the water (…). Imagine you are a knife, imagine water is the cream, and with your knife, you will slide on the cream (mimicking the action of sliding with the hand). So try to put yourself in the knife position (the arms in sliding position), or as a board, or as a shark, and we will try to slip as much as possible on the fresh cream.’

Teacher’s course of experience: during this session, the teacher asked the students to swim as a ‘knife’ slipping on ‘fresh cream’ (U). The aim was to ‘search for pleasant sensations in the water’ to ‘change the student’s relationship with swimming’ (E). This intervention modality was based on the teacher’s experience with SEGPA students who can be frustrated (S) by competitive games. Sophie perceived the metaphor to be fun for students (R). Her perception validated the knowledge that giving metaphors to students generated ‘a little clown moment’ that they and the teacher enjoyed (I).

Promote horizontality of students body in dorsal swim

The macro-concern ‘Promote horizontality of students body in dorsal swim’ included 10 concerns. During these sessions, Sophie encouraged students to swim on their back like a ‘knife’ slipping on a ‘fresh cream.’ For example, in the sixth lesson, the students were instructed to swim for six minutes, one way face-down and the other way face-up. Sophie moved along the water line and distributed instructions and feedbacks to the students. The metaphor ‘The Jayson’s board as a chair backrest instead of a knife’ (Concern 17) was introduced when she saw Jayson swim while leaning against his board. She stopped him and said, ‘Jayson, Jayson, Jayson?! Are you still like that on your back? You always put your board here, like the backrest of a chair? Is it not possible to hold it like a knife with your arms extended? Is it not possible to do here?’

Teacher’s course of experience: during this session, the teacher acknowledged that Jayson had difficulty swimming like a ‘knife’ when on his back (I). Indeed, he placed his board under his back instead of holding it with his arms extended (R). She knew she had not given the students ‘other new images, other sensations’ about the dorsal swimming (S). She suggested Jayson to put her board further to ‘make the knife’ instead of a ‘chair backrest’ (U). Her concern was to have Jayson’s body stretch further when he swim on his back (E).

Promote the students aquatic breath

The macro-concern ‘Promote the student aquatic breath’ included 17 concerns. During these sessions, Sophie encouraged the students to put their head under water to resemble the ‘knife.’ For example, the metaphor ‘The knife with the head underwater and not the banana’ (Concern 31) opened the twelfth session. The students were grouped in front of the teacher after the warm-up. The teacher instructed the students to make sure they ‘breathe correctly’ during the six-minute task. She explained that:

if your head is like that, you are more likely to resemble a knife spreading the fresh cream than if your head is out of the water. With the head out of the water, we have a body called banana. So we try to make the knife body and not the banana body.’
The teacher wanted to engage students in the content not about the horizontality of their body but like the to particular circumstances. First, Sophie used a puppet named Max to question students. Metaphors cage or on a toboggan. Conversely, seven metaphors were introduced in the fourth lesson in relation (Concern 30). During this lesson, the students practiced only game: they jumped or played in a cream. Thus, the concern in each lesson. This result re

The temporal arrangement of 34 concerns during the lessons revealed the opening of at least one concern in each lesson. A regular opening of at least one concern in each lesson

The presentation of concerns' dynamics during the PE unit

A regular opening of at least one concern in each lesson

The temporal arrangement of 34 concerns during the lessons revealed the opening of at least one concern in each lesson. This result reflects a repeated search for the 'knife spreading the fresh cream' effects on student engagement. However, the number of concerns per lesson fluctuated. For example, in the eleventh lesson, one only metaphor was introduced, 'The rocket in the hoop' (Concern 30). During this lesson, the students practiced only game: they jumped or played in a cage or on a toboggan. Conversely, seven metaphors were introduced in the fourth lesson in relation to particular circumstances. First, Sophie used a puppet named Max to question students. Metaphors like the 'knife' but also like the 'rocket' appeared. Other metaphors were then introduced in connection with this new metaphor. Thus, the 'knife spreading the fresh cream' was a recurrent teacher's intervention modality. It appeared more or less frequently depending on the context.

A majority of punctual concerns during the PE unit

Most concerns appeared in a few cases, despite some recurring concerns. Of the 34 concerns identified, 27 were introduced only once, five were introduced twice, one four times, and one eight times. This result revealed a permanent renewal of Sophie's interventions by metaphors. More specifically, each lesson contained at least one new punctual concern except the last lesson. In this lesson, two concerns were included that were introduced in the previous lessons ('The lengthening on the water to make the knife,' Concern 21) and 'The head underwater to the knife tip does not prevent to advance' (Concern 26). Nevertheless, seven concerns were used at least two during the lessons. The most frequently used metaphor was 'The board as the blade sharp knife' (Concern 3). It was used eight times from the second to the sixth lesson, especially during Sophie's short interventions with students. Subsequently, it was not the 'board' but the 'head' that became the 'tip of the knife.' The teacher wanted to engage students in the content not about the horizontality of their body but

Promote the visualization of one’s body or another student’s body

The macro-concern 'Promote the visualization of one’s body or another student’s body' included 13 concerns. In these sessions, students were asked to watch a 'knife spreading the fresh cream' using different media (painting, video, direct observation, etc.). For example, a metaphor titled ‘The Max-knife with its head underwater like a rocket and not like a banana’ (Concern 6) was introduced in the fourth lesson. She used a puppet named Max and questioned the students about positions in which she had placed it,

Sophie: I just brought my Max here, come and see. Ok he is like that. That’s my beginner Max. Max is beginner … you’ll tell me what we talked about. What is the picture of? Students: the knife. Sophie: the knife, it’s my Max-knife. Now the beginner Max is going to have a body a bit like a banana. Yeah, he’s going to have, look, water is here, he’s going to have his feet in the water here but he’s going to be a bit like a banana. My Max, he’s going to get … Yes! As he said Jayson, he’s going to look like a rocket, very well'.

Teacher's course of experience: in this session, Sophie asked students about breathing (U). Expecting that they do not understand all of the concepts covered (A), she observed the students' reactions, especially those of Anais and Amandine (R). She knew these students had difficulty with the conceptualization. For them, however, 'the images work because, for example, when I talk to them about bananas, they smile' (S). The teacher wanted students to understand the concept of breathing notion, as something that improves swimming (E).
about the aquatic breathing. Thus, the concern ‘The head underwater to the knife tip does not prevent to advance’ (Concern 26) opened four times from the ninth to the fourteenth lessons.

A brief duration of most concerns
Most concerns were short (less than one minute and thirty seconds). For example, the eight introductions of ‘The board as the blade sharp knife’ (Concern 3) lasted less than a minute. Nevertheless, several concerns were longer. For example, the concern ‘The knife on fresh cream presentation’ (Concern 1), and ‘The census of student’s choices between frog, banana or knife’ (Concern 34) were the longest. They were punctual concerns occurring during a grouping. The longest was the last concern of the PE unit, ‘The census of student’s choices between frog, banana, or knife’ (Concern 34). It occurred during the fourteenth lesson and lasted four minutes and thirty minutes. It was introduced when Sophie collected student answers about the partner’s body position (frog, banana, or knife) in ventral and dorsal swim. Sophie took the time to question each student and bring out controversies: ‘is Romain swim like a knife or like a banana? Are you sure?’. Thus, the ‘knife spreading the fresh cream’ effects sought by Sophie seems to rest more on concerns’ opening reiteration than on their duration.

Effects of the ‘knife spreading the fresh cream’ metaphor, as perceived by the teacher, on student engagement with learning activities
The teacher’s use of the ‘knife spreading the fresh cream’ promoted the student pleasure
First, according to the representamen (R) of the teacher, the use of the ‘knife spreading the fresh cream’ metaphor promoted student pleasure in 11 concerns. This effect was systematically present in the first concerns, and it has faded into the teacher’s perceptions afterwards. For example, during the concern ‘Breathing underwater to work the knife and swim like a shark instead of a frog’ (Concern 5), Sophie observed that Timeo’s movements looked like a frog. She asked swimmers to shift from swimming ‘like frogs’ to swimming ‘like sharks’: ‘Timeo he bounces like a frog because of some metaphors (laught), it makes them react. It makes me laugh, it makes me feel good and it also makes them laugh … it marks them.’ Finally, during the concerns in which the teacher observed the students’ joy, she experienced feelings of pleasure herself. During the concern ‘The Romain’s request to know whether it’s necessary to make the knife spreading the fresh cream’ (Concern 24), the student asked insistently whether they had to ‘make the knife.’ Sophie explained in a self-confrontation interview:


many girls resembled the knife spreading the fresh cream, after that was Jayson … And now it’s Romain. And it’s great (…). I got him, Romain I got him! Yeah, you know, like fish, I got him Romain with the knife spreading the fresh cream.

The teacher’s use of the ‘knife spreading fresh cream’ motivated students to focus on learning and transformed their motor skills.
Second, the use of the ‘knife spreading the fresh cream’ had effects on students’ focus on learning and the transformation of their motor skills, according to the representamen (R) of the teacher. These effects appeared in 11 concerns. They intensified in the second half of the lessons. In the concern ‘The Max-knife with its head underwater like a rocket and not like a banana’ (Concern 6), Jayson compared Max to a ‘rocket.’ During exercise that followed, Sophie found that this metaphor of the ‘rocket’ was memorable for the student. It helped him have a horizontal body in dorsal swim. She said, ‘Jayson, if you can, you put the board behind okay? Because it’s your knife tip. You told me a rocket, it’s your rocket head in ventral and dorsal swim. Okay? Your board is your rocket head.’ During the interview, the teacher explained that she had deliberately used the term ‘rocket’:
Jayson, I am taking back his words, your board is your rocket head. It means to him, he used the rocket. I say to myself it is incredible because he spoke about the rocket, I tell him the rocket again, and he makes the rocket. In dorsal swim, it is more difficult but in ventral swim, he will try to make the rocket. (Concern 8)

Later, the teacher returned to Jayson. The changes in his motor skills were important. The teacher considered that the ‘rocket’ helped him become more horizontal: ‘Jayson, he worked with the hand like a rocket. Suddenly, he was one of those who do not lose horizontal equilibrium while good swimmers will lose it’ (Concern 11).

The teacher’s use of the ‘knife spreading the fresh cream’ helped create a common culture within the classroom

Third, according to the representamen (R) of Sophie, the use of the ‘knife on the fresh cream’ metaphor had contributed to creating a common culture within the class in 9 concerns. This effect has spread over the lessons. For example, in the ‘Nolwenn’s explanation about the knife slipping on a cake’ (Concern 19) concern, the student spoke to explain the ‘knife’ metaphor to four new pupils. Her explanation was different from the initial teacher presentation. The student included the idea of a ‘cake.’ For the teacher, it testified to students’ re-appropriation of the ‘knife spreading the fresh cream’ metaphor. Other metaphors that the teacher generated yielded similar perceptions. For example, in ‘The canoe paddle like a spoon and the Nolan’s butter knife’ (Concern 29), Nolan spoke about a ‘butter knife.’ The teacher considered the common culture created within the class around metaphors:

Nolan is going to talk about butter and it’s great (…) Actually it’s crazy! I assure you the paddle it really has the shape of the butter knife, you know, this little round knife? When he speaks about the ‘butter knife,’ I tell myself everyone share this metaphor as a common knowledge.

Discussion and conclusions

Using metaphors to promote student engagement with learning activities

The results allow us to see the gradual diversification of metaphors emerging in the classroom. A collection of metaphors was added to the ‘knife spreading the fresh cream,’ revealing the teacher’s ‘metaphorical imagination’ (Lakoff and Johnson 1980). It allowed her to promote student engagement in constantly renewed concerns that took the form of often brief interventions.

In addition to other researches on metaphors in teaching (Kamberi 2014; Badley and Hollabaugh 2012), our research shows that the use of metaphors for struggling students may be an innovative pedagogy (Marin 2013). It corresponds to a narrative approach that helps to promote student engagement with learning activities, especially when various metaphors are linked to create a global narrative (Taylor et al. 2018). Following on the case study conducted by Mouraz, Pereira, and Monteiro (2013), our research shows how metaphors develop in the classroom in the interaction between the teacher and the students.

Moreover, our research revealed that metaphors can evolve and adapt to each sensibility. It allows the teacher to support simultaneously a collective and individual class management (Petiot and Visioli 2017). Sophie is able to build and adapt to the classroom environment, by improvising from students’ ideas (Varela 1989). For example, Nolan spoke about the ‘butter knife,’ Nolwenn explained a ‘cake story’ and Jayson gave the ‘rocket’ word. Taing et al. (2015) examined the relationships between students’ use of metaphors and their engagement in mathematic learning activities. Teacher asked students to answer the following statement: ‘If mathematics was a food, it would be …. ’ They also had to provide a written explanation to justify their choice. Five students were then selected to participate in a collective discussion on the metaphors used. These were the subject of an inductive and deductive analysis. These were categorized a posteriori and then in relation to the three engagements’ type (behavioral, cognitive, and emotional) (Fredricks, Blumenfeld, and Paris 2004). It was found that the use of metaphors by students affected their emotional engagement. This effect was
followed by cognitive and behavioral aspects, such as self-confidence, perseverance, and valorization. In our case, emotional engagement resulting from the ‘knife spreading the fresh cream’ metaphor was reflected in the pleasure that the students felt, as perceived by their teacher.

**Promoting engagement with learning activities from the first day of class**

The benefits perceived by Sophie of the metaphors’ use depended on the duration of the PE unit. Indeed, the emergence of new terms (for example, the Jayson’s ‘rocket’) needed several lessons for students to appropriate metaphors. Sanchez, Byra, and Wallhead (2012) explored the perceptions of 77 students about the pros and cons of teaching styles. The results revealed that the amount of time spent in instruction was higher in the inclusion style of teaching. The use of metaphors can participate in an inclusion style.

This teacher’s perceptions were consistent with the dynamic dimensions of engagement described by Skinner and Pitzer (2012) who argued that positive interpersonal relationships involve self-perceptions that have a positive effect on learning, which in turn generates positive classroom relationships.

An ‘ordinary’ short PE unit of six to eight lessons would probably not have the same perceived effects on student engagement. These findings are in line with proposals for alternative teaching curricula, such as Sport Education (Hastie, Ojeda, and Luquin 2011). Perlman and Karp (2010) promoted long-term learning sequences in PE. In their study, structural aspects of the Sport Education Model assisted in facilitating movement along the self-determined continuum through support for relatedness, competence and autonomy. Teaching by metaphors is a way to encourage students to live a real history with a scenario, twists and an end. However, the teacher’s interventions make it possible to maintain educational values in the Sport Education (Vidoni and Ward 2009). In particular, teaching by metaphors could promote pleasure but must facilitate learning.

We see from Sophie’s activity that learning objectives are systematically reflected in her use of metaphors. Moreover, these objectives evolved with the metaphors. For example, Sophie told students their board was like their ‘knife tip’ when she wanted them to focus on their posture in water. When she wanted them to focus on breathing, ‘knife tip’ was not the ‘board’ but became the ‘students’ head.’ Such adaptation of metaphors allowed her to develop her teaching contents maintaining the importance of collectively constructed metaphors. This result suggests that metaphors could be used as Pedagogical Content Knowledge (PCK). They emerged in the situated action and they varied, integrated, and became structured and organized within experts teachers’ activity (Chen and Rovegno 2000). If PCK is constructed based on teachers’ professional experience, our study shows that they can also emerge and develop dynamically in interaction with students.

**Measuring effects of the metaphors on student engagement from the teacher’s point of view**

Student engagement with learning activities has long been measured using quantitative data, such as student attendance, outcomes, and students’ level of achievement (Taylor and Parsons 2011). More recently, qualitative methods have been used to understand the students’ and teachers’ perceptions of the students engagement during PE units.

In our research, student engagement has been measured by qualitative and perceived effects. Our study adds to many studies that analyzed student engagement from the students’ point of view, often by using questionnaires with pre-established categories (e.g. Bevans et al. 2010). The Sophie’s perceptions analysis highlighted the perceived effects of the use of metaphors on students’ pleasure of class activities, their focus on learning, transformation of their motor skills, as well as the construction of a common culture in the classroom.

On the one hand, according to Sophie, the metaphors have had a positive effect on student engagement by promoting student pleasure. This result contributes to studies that analyzed students’
emotional engagement (Fredricks, Blumenfeld, and Paris 2004). From Sophie’s perspective, metaphors enhance students’ enjoyment of their engagement in activities, along with teacher’s enjoyment, and created a common culture in the classroom.

On the other hand, according to Sophie, metaphors helped students focus on learning and transform their motor skills, as in the case when Jayson ‘made the rocket.’ According to the teacher, the metaphors’ use has helped make the classroom situation sustainable, despite a context bringing together struggling students, which is consistent with other studies conducted in ‘difficult context’ (Vors and Gal-Petitfaux 2015).

Finally, according to Sophie, the ‘knife spreading the fresh cream’ contributed to the creation of a common culture within the classroom. This type of engagement, more social, is rarely analyzed in the literature. It echoes the findings of research conducted by Crance, Trohel, and Saury (2014). This study focused on the experience of students engaged in building a year-long choreographic show entitled ‘The garden.’ The authors revealed a singular micro-culture created around the garden. Our study shew advances in collective processes to build a common culture within the class based on habits initiated by the teacher.

**Disclosure statement**

No potential conflict of interest was reported by the authors.

**References**


