Amsterdamse Hogeschool voor de Kunsten

EMBODIMENT IN ARTS EDUCATION

TEACHING AND LEARNING WITH THE BODY IN THE ARTS

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PREFACE

Martha Graham once stated that dance is a song of the body. Likewise, music can be seen as a rhythmical and melodious dance of the body. Music making and dance share an underlying musicality: a desire for cultural expression, a sense-making on the spot (beyond and before language), a playfulness that is ever present and a place where cultural narratives are shared.[1] Both music and dance are celebrations of the lived body and the lived experience.

Music making and dance are thus deeply connected. Not surprisingly, teaching and learning practices within these arts also share essential commonalities. Both take experiential learning as a starting point: through attending, sensing and experiencing the pupil acquires insights into the what and how of music and dance.

In this booklet we take embodied learning/teaching through and in the arts as our central theme. The body is not considered as an instrument but as a primary signifier in the cultural transmission of musical and dancing skills - both from the perspective of the pupil and that of the teacher. We specifically focus on the teaching of rhythm skills in preschoolers and on the power of dance improvisation as an educational tool.

Three ideas are central to this booklet. First, the teaching/learning process is seen as a *multi-modal form of teaching/learning*. A form of learning that is distributed over the entire body: a living process that requires a bodily attentiveness and dynamical attunement of both teacher and pupil. Second, teaching and learning in dance and music is considered a *participatory sense-making activity* (in terms of De Jaegher & Di Paolo, 2007). An activity that can be described as an embodied engagement process in which music and dance experiences are exchanged, coordinated and shaped between pupil and teacher. Rhythm, pulse and timing are co-constituted and co-regulated in the interaction. The third and final idea is that art itself is *aesthetic* and *expressive-affective*. In learning and teaching music and dance meaning is created together: the aesthetic and expressive-affective meet, and from this meeting meaning arises.

In other words, that which is being learned settles itself in the body. Learning and teaching in music and dance is a relational, emergent practice in which the social, the physical and the cultural coincide.

[1] In reference to Malloch & Trevarthen (2010).

OF MOVEMENTS AND AFFECTS: DANCE IMPROVISATION AS A PARTICIPATORY SENSE-MAKING ACTIVITY

> 'Dance improvisation fuses creation with execution. The dancer simultaneously originates and performs without preplanning. It is thus creative movement of the moment' (Blom & Chaplin, 1988, p.61).

> 'We were not interested in having ideas about how movements should relate but in looking at how things did relate' (Simone Forti, Handbook in Motion, 1974, p.32).

> 'Improvisation presses us to extend into, expand beyond, extricate ourselves from that which was known. It encourages us or even forces us to be 'taken by surprise'. Yet we could never accomplish this encounter with the unknown without engaging the known' (Foster, 2003, p.4).

Thought #1: It is now more than 10 years ago that I stopped having a professional career in dance and choreography. Nowadays, I divide my (professional) time mainly between doing research, teaching students and writing. This means that I spend quite some time behind a computer, sitting still for hours on end while looking at a screen. When I work at home I leave my desk now and then to make coffee or tea, to go to the toilet or to have a longer break in which I do all kinds of practical things (such as the laundry, making a phone call or checking my agenda). But there is something else I do too: when I get stuck in a thought, I get up and dance for a while. Just for myself. In the living room. I let the thought resonate in my entire body, looking for unknown places, putting the thought in my knee or in my elbow. The thought turns into a sensation: instead of a strict linguistic articulation, I try to find the edges and the curves of the thought, bringing it back to the potential and excitement that I first felt when the thought popped up in my mind. Not unimportantly, the body returns the pleasure of the thought, the niceness and smoothness about it. The thought moves through my entire body and by doing that, it becomes a spatial dynamic form.

Thought #2: A thought came into my mind a few days ago. It was one of these days that I was sitting behind my desk, drinking some tea, working on a new essay, when something caught my eye. It was a paper written by Hanne de Jaegher and Ezequiel Di Paolo with the following title: Participatory sense-making, an enactive approach to social cognition (2007). For those who are unfamiliar with the enactive approach: it is a new framework for understanding social interaction within cognitive science. This approach claims that we create meaning and make sense of the world through a dynamic interaction. Enaction stands for the manner in which a subject of perception creatively matches its actions to the requirements of the situation and it was introduced by Varela, Thompson and Rosch (1991). The term 'enactive approach' refers to a pathway[1] in which several related ideas come together and are unified: autonomy, sense-making, embodiment, emergence and experience (De Jaegher & Di Paolo, 2007).

1 Varela got inspired by the words of the poet Antonio Macheda: 'Wanderer, the road is your footsteps: you lay down a path in walking' (Varela, as cited in Thompson, 2007, p.13).

In this essay I will try to do nothing more and nothing less than to relate these two different thoughts to each other, since I believe they deeply resonate with each other. For the sake of my argument I will focus foremost on group dance improvisation.

FIVE IDEAS THAT RELATE THE ENACTIVE APPROACH TO DANCE IMPROVISATON

Idea #1: Embodiment (enactive approach) and the lived body
In the enactive approach cognition is seen as a form of embodied action: 'Cognitive structures and processes emerge from recurrent sensorimotor patterns of perception and action' (Thompson, 2005, 407). Saying that a cognitive system is embodied is almost a 'tautology' (De Jaegher & Di Paolo, 2007, p.487), albeit a necessary one, since in cognitive science the body has long been ignored.

The enactive approach stands in a longer phenomenological tradition that takes the lived body as the starting point of understanding the world and the self. Phenomenology is a philosophical 'method' that focuses on the immediate experience – on the appearance of the things themselves and the way they appear to us. Originating from Edmund Husserl, the original founder of phenomenology, consciousness is considered as a process of making sense of life, from which meaning arises. Phenomenology means 'a specialized study of experience or consciousness' (Gallagher & Sørensen, 2006, p.119). Consciousness is always consciousness about something. Consciousness therefore has an intentional content that is inseparable from its phenomenal character.

Within the phenomenological tradition it is Merleau-Ponty who put special attention to the nature of corporeity by making the physical (somatic) being the site of the psyche (Warburton, 2011). Sheets-Johnstone (1966 [2015]) draws further on these phenomenological insights and relates them explicitly to dance. She places consciousness back in the body and speaks of a kinetic, corporeal consciousness in which perceptions, movements and emotions are intertwined. She furthermore argues that we know ourselves, not in linguistic terms but in a bodily felt, kinaesthetic sense.

Sheets-Johnstone (2012) criticises the theoretical denial of the body, specifically the idea that the body in dance is seen as an instrument of the mind. Fraleigh, too, objects against a Cartesian dualist approach, because it reduces the body to a mechanical entity, 'a *thing* to be whipped, honed and molded into shape' (p. 11). Instead, Fraleigh proposes the terms *lived body* and *lived experience*. 'The body is not something I possess to dance with. I do not order my body to bend here and whirl there. I do not think 'move', then do a move. No! I am the dance; its thinking is its doing and its doing is its thinking. I am the bending and I am the whirling. My dance is my body as my body is myself' (Fraleigh, 1987, p. 32).

Sheets-Johnstone (1966 [2015]) describes dance improvisation as the spontaneous articulation of sheer movement. Dance improvisation requires a bodily mind and a mindful body. Each improvised phrase can be seen as an instance of thought: as a sentence, a remark, a question, an exclamation or whatever utterance suits that specific movement. Improvisation is not the letting go of thinking. On the contrary, improvisation requires a (pre-)reflective and decisive body. 'We read of improvisation as the process of letting go of the mind's thinking so that the body can do its moving in its own unpredictable way. But this description is obfuscating, as unhelpful as it is inaccurate; surely all bodily articulation is mindful' (Foster, 2003, p.6).
The body is not an instrument of the mind, just as movement is not just a motoric process. Dance improvisation focuses on the moment-to-moment adjustment of the various qualitative dynamic aspects of movement, for instance the amount of force and energy given to the movement. Sheets-

Johnstone (1999; 2010) speaks of the qualitative movement dynamic, which unfolds continuously and is experienced kinaesthetically. The intentional aesthetic structure of dance is captured in the experienced qualitative movement dynamics, which is determined by, among other things, the speed, force, direction and reach of the movement (Sheets-Johnstone, 2012). Dance improvisation is the celebration of the *lived body* and *the lived experience*. A thought is not a pre-established category, a linguistic term, nor a defined mental representation. It is a dynamically felt form. It is potential that is realised in movement. Dance improvisation is thinking and moving at once.

Idea #2: Autonomous agent (enactive approach) and sense of self
In the enactive approach living beings are seen as 'autonomous agents that actively generate and maintain their identities, and thereby enact or bring forth their own cognitive domains' (Thompson, 2005, p. 407-408). An autonomous agent is a living being that generates its own activity: the living being is organised in such a way that the activity is both cause and effect of its own autonomous organisation (Thompson & Stapleton, 2009). A key attribute of the living body is its individuation, the process by which it makes itself distinct from its immediate surroundings and that enables an observer to distinguish it as an identifiable entity. More precisely, 'a key attribute of the body is that it is *self- individuating* – it generates and maintains itself through constant structural and functional change' (Di Paolo & Thompson, 2014, p.68).

Autonomous agents are self-constructive: they actively monitor and coordinate their interactions with the environment (Froese & Di Paolo, 2011). An agent is not passive but actively constructing its identity in relationship to the world. In dance improvisation the dancers are also seen as autonomous agents who actively construct meaning. Identities do not merge nor do participants in the dance improvisation lose their own sense of self.

The first requirement in order for the dance to become relational is to develop a sense of self in dance (Blom & Chaplin, 1988). Dance improvisation is an encounter of embodied, autonomous agents. In meeting the other, one needs to have established a primary sense of self. So the first thing to do is to explore your own physicality through movement. To know oneself in movement is to become familiar with your own body and your own movement potential.

Through a growing kinaesthetic awareness the student develops a sense of self in dance. The student becomes aware of the range and subtlety of a particular movement and internalises the specific qualitative movement dynamic. The student acquires technical skills and increases flexibility, strength, kinaesthetic awareness, coordination skills, balance etc. These technical skills may help in broadening the movement vocabulary and in gaining control over the body. Technique helps to 'prepare the body for dance'. 'The student however, must pass beyond mere technical mastery, 'for it is only by forming and performing dance that a dancer's technique *develops*: the technique of dance is ultimately *the ability to move according to the demands of the form being created or presented'* (Sheets-Johnstone, 1966 [2015], p. 123).

Through training the student gets familiar with his own bodily self. The student becomes aware of weak and strong points of his own bodily constellation (for example in terms of flexibility); he becomes aware of movement preferences, habits, values and aesthetic style. Personality of the student blends in with technical skills.

According to Froese and Di Paolo (2011) autonomy means organisational closure: a recognisable unity in which processes are related as in a network. This does not mean that autonomous agents are completely enclosed: they are open to the environment. In the very same movement they change and are changed by the environment.

In dance improvisation the agents are considered autonomous agents who instantly create and perform. In order to be 'taken by surprise' dancers have to give room to the context. The context (other dancers, space, the rhythm and pace of that particular moment) shapes the dance. 'If a dancer would be self-contained, he would not be able to move beyond the known. Living forms are never totally contained. They embody combinations of predictability and chance that make them open to change' (Tufnell & Crickmay, 1990, p. 198).

In improvisation this is important, since the dancer is not performing a fixed dance piece but is creating the piece on the spot. Chance and choice make up a great deal of the improvisation. These decisions and choices are mainly made on a pre-reflective level: through being in the moment, dancers sense and feel what is needed. Improvisation is a shared-decision making process in which dancers keep their own autonomy. They are open to be changed by each other: however, they are not absorbed by the other.

> Group improvisation demands an opening of the attention, both to the work space and to the corpus of people in the space, as an ever-changing pattern of sound, activity, colour and energy. […] Each person is at once responsive to others and independent of them, ready to be changed by, but not absorbed into, another person's activity. The skill lies in being able to include what another person is doing while not losing one's own momentum of thought. This is a fine line and a difficult balance to strike. It is all too easy to make interventions which cut off another's person ability to respond in their own way, or to give up one's own line of thought in preference to another's (Tufnell & Crickmay, 1990, p. 72).

The dancers are 'adaptive agents', that is, they are autonomous agents that adaptively regulate their interactions with each other and with the space. In group dance improvisation the movements of one agent can affect the movements of the other agent, and vice versa. Through moving together 'a multi-agent recursive interaction' starts to develop (Froese & Di Paolo, 2011).

Idea #3: Emergence (enactive approach), form (Merleau-Ponty) and structure
Emergence is a term that refers to collective self-organisation in complex systems theory. An emergent process 'belongs to an ensemble or network of elements, arises spontaneously or self-organises from the locally defined and globally constrained or controlled interactions of those elements, and does not belong to any single element' (Thompson, 2005, p. 60). In neuroscience the concept of emergence offers a new perspective on how numerous interacting brain regions and areas work together in linking movement, cognition and action. Emergence offers an alternative to 'boxology' thinking (De Jaegher & Di Paolo, 2007), that is, 'the localisation of function at one level in specific components at a lower level' (p. 487).

Instead of the term emergence, I prefer to use Merleau Ponty's notion of form and structure. According to Thompson, emergence is closely connected to Merleau Ponty's notion of form and structure. Form is a 'whole that cannot be dislocated from its components but cannot be reduced to it either' (Merleau-Ponty, as cited in Thompson, 2007, p. 66). For Merleau-Ponty (1962) form and structure are essentially the same. He argues against a decompositional thinking. Instead Merleau-Ponty considers form as a constitutive practice in which change in a single unit affects and modifies the whole system while on the other hand the relationships between different single units are maintained despite changes in singular units.

Group dance improvisation can be seen as a dynamic system in which single units (singular body parts, singular sensations, singular kinaesthetic melodies, singular agent) shape and modify the whole (the Gestalt of a dance improvisation): just as the whole (the multi-agent/the Gestalt) changes and modifies the singular (the singular agent).

In group dance improvisation form and structure emerge from the interaction between the dancers. 'The structuring task is one of recognising an emergent form rather than imposing one. The material will seem, as it were, to form itself: form arriving via a process of evolution rather than from any preconceived shape. This requires a continual interplay between making and watching' (Tufnell & Crickmay, 1990, p. 196). The dancers instantly compose the dance. In order to do so the dancer need:

1. to be attentive (towards space, towards the others, towards himself, towards the specific qualitative movement dynamic, towards what was in space and what was not, what is in space and what is not, what will be in space and what will not);

2. to allow (for dance impulses, for attending to edges of awareness, for the seemingly unimportant, for mistakes);
3. to explore (for potential);
4. to compose (be specific, be sensitive to the whole).

Dance improvisation is a continuous play between sensing, attending, perceiving on the one hand and making, moving, doing on the other hand. Dance is created on the spot, and therefore contains elements of surprise and spontaneity. The dance unfolds and creates its own past and its own future. Form and structure constantly emerge and dissolve.

Blom and Chaplin (1988) refer to this process in dance improvisation as 'forming':

> Movement builds on its own necessity, its own impetuousness, its own desire to seek form. Form is produced in the ongoing immediate, yet seeks a final overall structure as well. This large or complete form satisfies and justifies each individual moment and in turn leads unerringly and inevitably (though possibly with much elaboration and complexity) to the end. Forming is an unfolding, evolving process which supports yet also responds to the ongoing movement. Form is being spun into existence as phrases of movement pour out and directions are taken. […] We sense the direction of the phrases: we find ourselves making choices that seem consistent with the forming pattern (p. 9).

Patterns provide an internal framework: a skeleton around which an overall form is placed. Form is emerging: however when a form is realised it also becomes a driving force that 'dictates' and shapes future forms. Form unites intent and content: 'it generates a forward motion towards unity and wholeness' (Blom & Chaplin, 1988, p. 9).

Idea #4: Experience (enactive approach) and kinaesthetic experience
In the enactive approach experience is interweaved with being alive and acting upon the world (De Jaegher & Di Paolo, 2007). We give meaning to the world not by an isolated mental act but by experiencing and interacting with that very same world. 'The experiencing agent is intentionally engaged with the world through actions and projects that are not reducible to simple mental states, but involve an intentionality that is motoric and bodily' (Gallagher & Miyahara, 2012, p. 119).

Sheets-Johnstone (1966 [2015]) speaks of the lived body and the lived experience. To give meaning to the world is to move into the world, to act upon it. 'A dynamically attuned body that knows the world and makes its way within it kinetically is thoughtfully attuned to the variable qualia of both its own movement and the movement of things in its surrounding world—to forceful, swift, slow, straight, swerving, flaccid, tense, sudden, up, down, and much more' (Sheets-Johnstone, 1999, pp. 516–517).

In dance improvisation we engage with ourselves and with others through *the kinaesthetic*. We experience movements of self and others in a kinaesthetic way, through the felt qualitative dynamics of movement. This experience is a first-person experience, that is, we live the movement and as we live it we understand it and give meaning to it. Kinaesthetic experiences are thus always connected with a sense of self.

Beginners in dance first have to explore their own movement potential, in order to enhance kinaesthetic awareness of their own body. Kinaesthetic attentiveness to the specific qualitative movement dynamics is crucial in the process of widening and deepening the movement potential.

> How does it feel to jump with the arms high in the air? How does it feel to jump and land on one foot? How does it feel to roll on the ground? How does it feel to hop, to run, to skip, to glide, to slide, to slip, to tumble, to fall, to rebound? What is the difference between reaching and punching? How long can you stand on one foot? How fast can you accelerate? What is your slowest move? Can you move your pinky and middle finger simultaneously? How far can you turn your head to the side?

In group improvisation the dancer constantly has to relate movements of the self to movements of the other. When a group of dancers start to run through space, what do you? Do you join? Do you start a solo action? Do you withdraw? Dancers in a dance improvisation have to be sensitively attuned to one another: being in the midst of the dance while at the same time being attentive and attuned to anything that happens in the space. 'In improvising dancers are [...] attuned to the qualitative dynamics of movements, their *own kinesthetically felt movement*, and the *kinetically perceived movement* of other' (Sheets-Johnstone, 1966 [2015], p. xxviii).

Experiencing self and others – in and through movement – also includes the intentions and affects that flow back and forth between the agents. The lived body manifests itself in perceptual experience – not as an object among objects but as a bodily subject (Thompson, 2005). The intentional structure of bodily subjectivity is deeply connected to a 'bodily-self-that-can-move-itself-in-a-certain-way'. Gallagher and Miyahara (2012) refer to this as operative intentionality: the experiencing agent is intentionally engaged with the world through bodily movements. In a group dance improvisation dancers are not in an 'observer' position: they are inside the dance, fully engaged and responding in an embodied way to the other.

Intentions are not made up, preconceived or set but intentions unfold, shift and evolve during the dance improvisation. Intentions are moulded into a recognisable and perceivable form as a response to the ongoing movement. 'While I was improvising I sensed some intention evolving. I didn't see it all in a second: I only recognized it as I was moving. If I'd been stopped in the middle, I wouldn't have the whole shape because it was still in the process of becoming' (Blom & Chaplin, 1988, p. 9).

A sense of order arises out of the choices and intentions that dancers make during the process. It is important to note that intentions in a dance improvisation are always in a process of becoming: not yet defined, crystallised or definite. But changing, transforming and becoming. Some intentions lead to a dead end: others are taken up and transformed into something new.

The underlying intentional structure forms a framework, an internal structure, which determines new movement. In the unfolding of intentions patterns of movement arise and form solidifies. Additionally in dance improvisation intentions are shared and co-modulated by the interaction itself.

Idea #5: Sense-making (enactive approach) and the relational

By moving in the world we do not only process information but we create meaning. We inhabit the world: we bring our own identity into play. As an autonomous agent we sustain our identity, and by doing that, we do not only witness the world, but we modify it, we adapt it, we shape it. To create meaning is to give the world a temporal spatial shape. Moving in the world also means being moved by the world.

Sense-making is not something passive but it presupposes a living being that actively engages in the world. By bringing his own identity into play, the living being throws a perspective into the world, through which meaning arises (De Jaegher & Di Paolo, 2007). Sense-making is thus interactional and relational (Thompson & Stapleton, 2008).

Dance improvisation is relational since the dancers participate in each other's movements. Following or leading, accepting or denying, starting something new or continuing and finishing someone else's actions: the dancers attune to each other in a kinaesthetic, empathic way. A dance is jointly created – a dance that would not be possible with one body (Blom & Chaplin, 1988). All agents contribute to joint relational sense-making: self-in-interaction is confronted with the other-in-interaction. A shared coordination and articulation of rhythm, momentum, speed and phrasing takes place. My own movements are altered contextually in order to meet the other.

Through group improvisation the dancer will learn to develop a sense of the moving self in relationship to the moving selves of others. The other in dance improvisation is not entirely obscure nor inaccessible, nor fully transparent, but is seen as something else. The body of the other has knowable and unknowable surfaces, familiar and unfamiliar angles and curves.

We take a movement impulse from someone (such as a change in direction, a drop in weight, a sudden acceleration), we borrow it, steal it, transform it and return it to the other in a spatial-temporal kinetic form. A conversation starts to develop: affects and intentions flow back and forth. In a group improvisation a constant negotiation takes place between the self-in-interaction and the other-in-interaction. Affective values are formed through timing and sharing of kinematic forms: out of that meaning arises (Stern, 1985, 2010). One could therefore speak of a collective agency: a joint decision-making on the spot. This joint decision-making is highly spontaneous and full of surprises. It is not so much a process of leading and following as a reciprocal process in which movements are shared. 'Many of us have enjoyed the experience of neither leading nor following, but instead moving with, and being moved by another body. One body's weight and momentum flow into and with another body's shaping and trajectory making a double bodied co-motion' (Foster, 2013, p. 8).

In other words, movements are realised through co-agency. The dancer in improvisation is constantly shifting from self to other, from detail to whole, from connecting the present to past and future. Improvisation celebrates the here and the now: being in the present while moving away from what was and moving towards what will be.

Dance is created in real time. That which happens and that which does not happen is not (only) a matter of personal choice: the dance shapes itself through the constant dialogue between moving agents. In improvisation it is often unclear how choices are being made: they are just there. In front of you. With an inner logic that most of the time cannot be explained. Through a shared sensibility, the movement unfolds in an unpredictable manner.
Blom and Chaplin (1988) state that dance improvisation is a special form of social interaction since it challenges the cultural defined codes about body boundaries and personal space (specifically in Western countries). The 'normal' social space in daily life is contested: the cultural code of distance between the self and the other is broken and instead dancers play with merging own bodily boundaries with boundaries of others. Touching each other, lifting each other, giving weight, pushing, pulling: these are all normal (accepted) things to do in improvisation. In normal life, however, these things would not be so normal or accepted (except perhaps when it comes to the playful interaction with young children).

Dance improvisation (like jazz improvisation) shares quite some commonalities with the mother-infant interaction: in a sense that communication precedes and exceeds language, in the musical narratives that are created, in the expressive movements that are being shared (Malloch & Trevarthen, 2009). Group dance improvisation is a rhythmic and melodic co-creativity between the agents involved. It is a wordless conversation: an interpersonal sharing of movements, affects and intentions. The dancers dynamically anticipate each other's movements resulting in a joint engagement. Synchrony is not only a dynamic sharing between the dancers but highly contextual as well. 'The information carried by interpersonal rhythms does not move directly from one person to another. Thus information cannot easily be conceptualized as messages since the information is always simultaneously shared and always about the state of the relationship' (Byers, as cited in Malloch & Trevarthen, 2009, p. 3).

GROUP DANCE IMPROVISATION AS PARTICIPATORY SENSE-MAKING

De Jaegher and Di Paolo (2007) draw further on the five basic ideas of the enactive approach. They introduce the concept of 'participatory sense-making'. They ask themselves the question how the physical interactional coordination of movements relates to the capability to share meanings and to understand each other. Sense-making, according to De Jaegher is an intentional and expressive activity. An activity affected by coordinating movements in interaction. Meaning arises out of the physical engagement process.

Each agent involved in this interaction process contributes in his own way to the coordination and co-regulation of intentions/perceptions and movements. Even more, the interaction process itself can move into directions that are unexpected to the agents and even not-willed. This means that when we engage in interaction, not only the participants but the interaction process itself can influence the sense-making. Intentions are generated and transformed into social interactions. In the enactive approach sense-making and meaning in interaction cannot be a solely individual activity: they are co-authored, inter-bodily, situated and situational (Jensen, 2014). 'Sense making re-enacts multiple voices, defined as silent others that affect what we think, say, do and not do in situated dialogue. Sense-making, thus, unfolds as double dialogicality that links socio-cultural history (norms, knowledge, rules etc.) with real-time dynamics as we orient toward each other and use cultural artefacts (including verbal patterns)' (Pedersen and Linell, as cited in Jensen, 2014, p. 285).

De Jaegher (2013) refers to this as participatory sense-making, a thoroughly embodied activity in which individual sense-making is affected by inter-individual coordination of movements, perceptions and emotions. In the participatory sense-making process the participants coordinate their behaviour. This coordination can take on different shapes (such as imitating, mirroring, rhythmic synchronisation) and different modalities are at play (such as movements, gestures, language, thoughts etc.). Each participant engages dynamically in the interaction process: previous (mentally decided) intentions can change during the interaction process, other intentions can take over while yet others remain invisible. Social situations are thus complex, dynamic and hard to predict. Like Gallagher (2004), De Jaegher (2013) claims that sense-making is not so much about making theoretical inferences as a thoroughly embodied process in which we share intentions by interacting with each other.

Now let us return to dance improvisation. According to Blom and Chaplin (1988), dance improvisation is made up of three things. First of all, dance improvisation is a kinetic-kinaesthetic event. The dance movements are kinaesthetically sensed, experienced and perceived. Second, in dance improvisation the dancers are agents who decide on the spot how they will move next. The third is movement form itself: the specific form that emerges during the improvisation. The dancers make (pre-) reflective choices that crystallise in a particular movement form. Intent becomes a movement: the dancers are oriented toward a form. In dance improvisation the focus lies on the 'moving point of contact between two (or more) bodies and the concomitant and unpredictable unfolding of movement produced by that focus' (Foster, 2011, p. 3).

Group dance improvisation can be seen as participatory sense-making, as a physical creative conversation between me and the other. The dancers join each other in the movement: they make sense of each other's movements on the spot.

THE EDUCATIONAL VALUE OF GROUP DANCE IMPROVISATION

Group dance improvisation is in essence an embodied engagement process in which movement experiences are exchanged between autonomous agents. Not only the qualitative movements dynamics (effort, shape, space and rhythm) but also underlying (aesthetic) intentions are shared and coordinated. Meaning is generated and transformed through this embodied interaction. Dance improvisation is a special form of dance, since it is created on the spot. It is explorative, creative and performative at once

I hope to have shown in this paper that dance improvisation is a unique participatory sense-making activity. Group dance improvisation offers tremendous opportunities not only for professional dancers but also for amateurs in enhancing kinaesthetic awareness, in attuning and listening to the bodies of others, in coordinating movements together, in connecting inner felt intentions with a specific dynamic form.

Group dance improvisation is not restricted to dancers with a professional background but accessible to a wide range of people who dare to explore movement potential in an aesthetic way. Dance improvisation suits anyone who wants to think in sheer movement. In dance improvisation the body is not an object or instrument but a lived experience that creates movements as dynamic forms-in-the making (Sheets-Johnstone, 1966 [2015]). Dance improvisation offers so much potential since it zooms in on the lived experience, not as an isolated phenomenon, but as a contextualised conversation that takes place between bodies. Dance improvisation is essentially about making-sense-with-each-other-on-the-spot-in-the-moment.

If we assume that education is primarily concerned with individual growth, the development of a stable sense-of-self, productive living, self-realisation, critical thinking, creative problem-solving and the ability to relate to others, then dance improvisation is educational in itself. For dance improvisation is nothing more than:

[…] a total engagement of the individual in which he perforce encounters himself in depth, in which he utilizes the fullness of his resources, in which he draws upon his past experiences and knowledge, in which his discrimination and sensitivity to form are, in fact, tested as creative intelligence. Furthermore the creation of a dance is necessarily connected with individual growth, self-realization, and the ability to work well with others, since it puts so much stress on something of recognized and paramount importance in the world, yet something which education does not often specifically state as its goal: communication' (Sheets-Johnstone 1966 [2015], p.118-119).

Dance improvisation, as the instant creation of sheer movements on the spot, is a special form of participatory sense-making. It is pure in its essence, as well as complex in the intertwining of affects, intentions and qualitative movement dynamics. It is the coming together of different embodied agents who spend time together in a pleasant and meaningful way.

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WHAT THE BODY KNOWS ABOUT TEACHING MUSIC

A summary of the research study into the specialist preschool music teacher's pedagogical content knowledge regarding teaching and learning rhythm skills viewed from an embodied cognition perspective

1. INTRODUCTION

It could be argued that rhythm is one of the most fundamental pillars of music – one can hardly find music without temporal organisation (Cross & Morley, 2009; Thaut, 2008). Rhythm divides and organises music "into coherent and comprehensible patterns and forms" (Thaut, 2008, p. 6) that can vary throughout different music cultures (Campbell, 2004). By dividing and organising music in patterns and forms, rhythm on the one hand guides listeners and performers in making sense of important moments in the unfolding of music through time and on the other hand it creates anticipation and predictability for listeners and performers (Thaut, 2008). As rhythm is such a fundamental feature of music rhythm skills are viewed as a key element in music education, including early childhood music education (Flohr, 2005; Gordon, 2003; Young, 2009). Preschoolers start developing rhythm skills from birth (Trehub, 2006) or possibly prenatally (Parncutt, 2006) and the task of specialist preschool music teachers is to extend, deepen and broaden the development of rhythm skills of young children (Hargreaves, 1996), giving them a foundational basis for learning music.

Although rhythm skills are seen as a key element in early childhood music education, it still remains a question how these skills can be taught. Over the past decades models have been created that describe the musical development, including rhythmical development, from infancy to adulthood (see e.g. Gordon, 2003; Swanwick & Tillman in Tillman-Boyce, 1996) and these models have been developed with the purpose "to advance thinking about educating and teaching the child in settings of formal schooling" (Taetle & Cutietta, 2002, p. 279). Educational models are often general enough to be applicable to different (music) educational settings (Leinhardt, Young, & Merriman, 1995), however, teachers can feel that these models do not match their own classroom practice or personal ideas of what "works" for them and their pupils (De Baets & Nijs, 2013; Heller & O'Connor, 2006). As a result, teachers tend not to use them for their classroom practice.

At the other side of theory, practice has brought forth a plethora of music books with hands-on practical rhythm and movement activities that can be applied directly in early childhood education but which lack theoretical underpinnings as to why such activities are of importance to the rhythmic development of children. Yet in-between theory and generic practice-based principles concerning teaching and learning rhythm skills is the knowledge of the music teacher. Teachers can implicitly and explicitly develop ideas, theories and intuitions through practice (Loughran, 2010; Meijer, 1999) about how rhythm skills can be taught to preschoolers, and in doing so, they not only think about the "what" of teaching – often given in national curricula – but also about the "how" of teaching those skills. The knowledge these teachers develop of teaching and learning rhythm skills can give insight into the complexities of teaching those skills in the social, cultural and physical constraints and possibilities of the preschool. In that sense, this knowledge might complement

the generative models of musical development that have been developed and can form a bridge between theories on how children learn music and the educational practice (Kwakman & Van den Berg, 2004).

The North American educational psychologist Lee S. Shulman (1986) recognised that teachers think about both "what" to teach – the content – and "how" to teach that content. He suggested that teachers develop a unique kind of knowledge in and through practice that intertwines their content knowledge and pedagogical knowledge, and he called this knowledge "pedagogical content knowledge" (Shulman, 1986, p. 9). Pedagogical content knowledge (PCK) is about teachers' knowledge of how to adapt specific subject matter for the teaching and learning of certain pupils and Shulman (1986, p. 9) therefore defined PCK as: "[…] the most useful ways of representing and formulating the subject that makes it comprehensible to others... Pedagogical content knowledge includes an understanding of what makes the learning of specific topics easy or difficult […]". Since its introduction, an underlying assumption has been that exploring PCK could give entry points for improving teaching and learning in certain subject areas. Researching PCK therefore soon caught on and has unleashed a great amount of research - mainly in the field of science, maths and language education (Ball, Thames & Phelps, 2008). In contrast, the music education researcher Millican (2013, p. 47) notes that "only a few music scholars have begun to investigate and describe just what pedagogical content knowledge looks like in music education".

In this summary of my PhD, I will discuss how the specialist preschool music teachers' PCK regarding teaching and learning rhythm skills can be conceptualised and explored. I will first of all make insightful how current constructivist and information-processing perspectives on PCK that have been developed in the field of maths, science and language education and subsequently have been adopted in other fields of education tend to neglect the role of the body in teaching. Yet in music education, the body of the music teacher seems to play a central role in teaching and learning music (Bresler, 2004). Therefore, an embodied cognition perspective on PCK will be discussed that emphasises the intimate relationship between *body*, mind and the environment, which might be more suited to describe a music teacher's PCK. Further, this summary will report the research design, methods and the participants of the study, and the analysis of the data. A summary of the findings about the nature and content of the specialist music teacher's PCK regarding rhythm skills of preschoolers from an embodied cognition perspective will also be given and discussed. Lastly, the way the music teachers' bodies take on different roles to mediate the preschoolers' learning process of rhythm skills will be presented.

2. DIFFERENT PERSPECTIVES ON THE CONTENT AND NATURE OF PCK

2.1 Constructivist and information-processing perspective on PCK

After Shulman's initial introduction, the concept of PCK has provoked a great amount of research over the last decades. At a closer look, however, researching PCK has shown to be problematic (Ball et al., 2008). The concept has been interpreted and defined differently and this has engendered a "variety of meanings" (Park & Oliver, 2008, p. 262) and has not led to a universally accepted conceptualisation of PCK (Van Driel & Berry, 2010). For example, several researchers have built on Shulman's description of the *content* of PCK, slightly altering it: from the field of maths and science education, Magnusson, Krajcik and Borko (1999) have added "knowledge and beliefs of assessment in a subject area" to its content, and from the field of educational technology, Mishra and Koehler (2006) changed the original term into "technical pedagogical content knowledge" to indicate that they integrated knowledge of technology into the concept of PCK.

Regarding the nature of PCK, different perspectives on teacher learning and development have influenced its conceptualisation. For example, Cochran and colleagues (1993) proposed a modification of Shulman's concept of PCK by explicitly taking a constructivist perspective on it. They renamed "pedagogical content *knowledge* (PCK)" to "pedagogical content *knowing* (PCKg)" (1993, p. 265) to reflect their view of the dynamic nature of the development of the teacher's personal knowledge. According to Cochran and colleagues (1993) the teachers' PCKg is situated and context bound, continuously shaped through interaction and reflection on the social, political, cultural and physical classroom environment. Alternatively, from the field of language education, Meijer (1999) has explicitly taken an information-processing perspective on the PCK of teachers. From this perspective, the way long-term and short-term memory hold information and the way memory is used in action is stressed: through the activation of the long-term memory, knowledge about teaching is "called up" and used in the working memory to deal with a (classroom) situation (Meijer, 1999). The teacher's PCK that is located in the working memory consists of knowledge from long-term memory, called up to deal with incoming information of the classroom (Meijer, 1999). These different views on the content and nature of PCK have resulted in a diversity of research questions and in researching and exploring PCK in diverse ways which has complicated comparing research throughout different fields of education (Baxter & Lederman, 1999). Furthermore, a question is whether the aforementioned perspectives on the nature of PCK are suited to describe the nature of the classroom music teachers' PCK, as will be discussed below.

2.2 PCK and music education

Shulman - but also Cochran and colleagues (1993) and Meijer (1999) who respectively take a constructivist perspective and an information-processing perspective on PCK - seems to "conceive of knowing in terms of thoughts and structures in the head" and teaching "then is equivalent to making available the content and structures of the mind to others" through language or visual and written symbols (Pozzer-Ardenghi & Roth, 2010, p.31). Musical skills, however, are often laid down in the physical actions and gestures of the classroom music teacher (Bremmer, 2015) suggesting that teaching music involves more than "making available the content and structures of the mind to others" through language (Pozzer-Ardenghi et al., 2010, p.31). In that context, Burnard (2013, p. 113) observes that "not all musical practices are representable through language nor can they necessarily be taught through linguistic means" but teaching music seems to involve the bodies of music teachers and their pupils. Ultimately, this could mean that the music teacher's PCK might be distributed over mind and body. A more recent perspective on learning and developing that stresses the complex relationship between body and mind is that of embodied cognition (Wilson, 2002).

3. THE MUSIC TEACHER'S PCK FROM AN EMBODIED COGNITION PERSPECTIVE

3. The perspective of embodied cognition

The research field of embodied cognition refers to a range of philosophies, theories and research that wish to redress a perceived neglect of the role of the body in cognitive science (Chrisley & Ziemke, 2002). Although there does not exist one comprehensive view of embodied cognition, researchers working from an embodied cognition perspective will emphasise the intimate and mutual relationship between body, mind and the environment (Gallagher, 2009; Wilson, 2002). Or, as the music education philosopher Bowman (2004, p. 30) summarises: "Mind is inextricably biological and embodied; and what it can

know is always grounded in the material and experiential world". From this perspective, the social, cultural and physical environment in which the teacher teaches and the teacher's body all interact and shape cognition and define how PCK develops and can be communicated (Bremmer, 2015). This aforementioned description, only gives a general idea of how PCK can be viewed from an embodied cognition perspective. However, the North American psychologist Wilson (2002, p. 625) distinguishes between "online" and "offline" embodied cognition and this distinction might be more applicable to describe where and how music teachers develop and communicate their PCK.

The term "online" embodied cognition refers to the idea that most cognitive activity is performed in real-life situations and that consequently cognition is intimately linked to the sensory-motor processes needed to interact with those situations (Niedenthal, Barsalou, Winkielman, Krauth-Gruber & Ric, 2005). For example, when a teacher is teaching rhythm skills through movement to preschoolers who are excited, these teachers could lower their head to have a better view of them (sensory perception), they could feel their excitement (somatic perception) and could tune in with their own movements to the excited movements of the preschoolers (motor perception). From an online embodied cognition perspective, all these sensory, somatic and motor perceptions are essential for encoding and understanding the preschoolers' musical behaviours (Niedenthal et al., 2005; Wilson, 2002). From this perspective, goal-directed physical action is not considered to be an *expression* of internal cognitive processes but rather part of cognitive activity (Gallagher, 2005; Lindblom, 2007) and knowledge itself is embodied for instance through gestures (Pozzer-Ardenghi & Roth, 2010). For example, teachers can chant a rhythm pattern and at the same time they can make the underlying pulse of the rhythm pattern clear by using conducting gestures. Thus, information is communicated through gestures (the pulse) which is not communicated through the voice (rhythm pattern).

The term "offline" embodied cognition refers to the idea that when the individual's cognitive processes are decoupled from the real-life situation where they originally took place, their sensorimotor systems can run a simulation of aspects of the social, cultural and physical environment, as a means of representing information of that environment (Niedenthal et al., 2005; Wilson, 2002). For example, when teachers think about their pupils, a lesson or a specific teaching activity beyond the classroom their sensorimotor systems can run a simulation of (some aspects of) the classroom environment, pupils or the teaching activity as a means of representing information of that classroom environment, the pupils or teaching activity (Niedenthal et al., 2005; Wilson, 2002). Through visual imagery but also through auditory and kinaesthetic imagery a teacher can (partially) mentally simulate classroom events (Wilson, 2002).

By taking an embodied cognition perspective on PCK, one has to acknowledge that the body might communicate aspects of the classroom music teacher's PCK through gestures and physical actions, and this therefore has consequences for the way in which PCK can be explored (Bremmer, 2015). Not only exploring the classroom music teacher's PCK through written and spoken language is important but also exploring the music teacher's PCK through methods that could capture embodied aspects of the music teacher's PCK. Section four will report how the nature and content of the classroom music teacher's PCK regarding rhythm skills was explored from an embodied cognition perspective.

4. RESEARCH METHODOLOGY

4.1. Research design

An interpretive approach was taken to researching the specialist preschool music teachers' PCK regarding the teaching and learning of rhythm skills. Within the interpretive approach, knowledge is not viewed as the objective truth, but is (co)constructed by individuals in a social context (Cain, 2010; Koopman, 2010). In this study, a multiple-case studies approach within an interpretive paradigm was taken to researching the teacher's PCK. A case study is viewed as a form of inquiry that "investigates a contemporary phenomenon in depth and within its real-life context" (Yin, 2009, p. 18). This approach offered the opportunity to explore the teachers' PCK within their teaching context through multiple methods (Sandberg, 2005) and to draw "cross-case" commonalities and differences between the cases.

The research study involved six teachers who all hold a Bachelor Degree in Music Education and who teach preschoolers (four- to six-year olds) in the Dutch educational system (group 1 and 2). These teachers developed their own curriculum regarding the teaching and learning of rhythm skills, although they could draw on existing teaching materials, and taught in open spaces, e.g. a gym or playroom. To increase the comparability of the participants, teachers with a minimum of four years of experience were involved, as literature suggests that the influence of experience on the development of teaching (including PCK) seems to stabilise after several years (De Vries, 2004). All the participants who were involved directly (specialist preschool music teachers and the preschoolers) and indirectly (headmasters and parents) in this study were told about the research and informed consent was obtained from all of these participants for the research study.

4.2 The choice and order of the research methods

One assumption in the research study was that during the act of teaching the teachers' PCK could be manifested in their *online* embodied cognition and this was explored through a stimulated recall interview and two video analysis tasks. The stimulated recall interview (SRI) is an introspective research procedure through which the teachers' online embodied cognition could be explored by asking them "to recall when prompted by a video sequence, their concurrent thinking during that event" (Lyle, 2003, p. 861). The teachers taught a lesson which focused on rhythm skills and then used the SRI to recall their online embodied cognition. Furthermore, the teachers executed two video analysis tasks: in the first video analysis task they indicated, described and interpreted their physical actions within two rhythm activities that could reflect the instructional sequence of those rhythm activities and in the second video analysis task they indicated, described and interpreted their gestures within those rhythm activities. The two video analysis tasks were first executed by the teacher and by the researcher individually and then executed together. During the co-analysis phase the teacher and researcher could compare which instructional sequence and gestures had been indicated and described, and how they could be interpreted.

An assumption beyond the classroom was that the teachers' PCK could be manifested in their offline embodied cognition and this was explored through a digital notebook and a semi-structured interview. With regard to a digital notebook, the teachers were asked to write down as much as possible about what they believed to be their PCK regarding the rhythm skills of preschoolers over a time period of two to three weeks. For the semi-structured interview six interview questions were predefined and derived from the literature on PCK. These questions could be asked in a random order allowing the interview to have a freer character. Lastly, concerning the order of the methods, I chose to gradually sensitise the teachers to the concept of PCK and started with

the most open methods and ended with the relatively least open method: I started with the SRI, then applied the video analysis tasks, after that the digital notebook was used and lastly the semi-structured interview was undertaken.

4.3. Data analysis

In the research study, a thematic analysis approach was applied. Thematic analysis focuses on identifying, analysing and reporting themes within data (Braun & Clarke, 2006). The analytical procedures included transcribing the data and coupling the time frames of the video analysis tasks to the verbatim transcriptions. Secondly, I started with the inductive coding of the five different methods that were employed per case and started developing a coding scheme from the data and an accompanying coding manual. In this process, sensitising concepts were used that were derived from the literature on PCK. Thirdly, to establish the quality of the research, the process of intercoder-agreement was applied after the analysis of the third case. The goal of the intercoder-agreement was to shed light on my blind spots, to allow for the possibility of adapting the codes and to tighten the definitions of codes in the coding manual before moving on to deductive coding. In the fourth phase, I moved from inductive coding to deductive coding and determined whether the codes developed thus far covered the new data and whether codes should be split or merged with codes with a similar meaning. Further, I began developing subthemes and in this process the codes of the different methods were clustered together in a subtheme on the basis of shared characteristics. Below in the figure an example is given of how codes were clustered in a subtheme:

Subtheme: general teaching strategies for rhythm skills
• Learning pulse metre phrasing through movement • Learning rhythm skills through fantasy figures or themes • Learning through touch • Music that induces rhythmic movement • Learning rhythm skills through repetition, variation or contrast • Learning rhythm skills through language • Learning rhythm skills through visual aids

Figure 1: An example of a subtheme

During the last phase, the analysis focused on the development of main themes with the use of sensitising concepts. In the figure below an overview is given of the themes that were described in the literature and the themes that were identified in the data of this study:

Themes in literature	**Themes identified in the data**
Orientations towards teaching and learning a topic (e.g. Cochran et al., 1993; Grossman, 1990; Magnusson et al., 1999; Meijer, 1999)	Pedagogical orientations regarding the teaching and learning of rhythm skills of preschoolers
A topic and teaching (e.g. Ball et al., 2008; Grossman, 1990; Magnusson et al., 1999; Meijer, 1999; Shulman, 1987)	Teaching strategies for rhythm skills of preschoolers
-	Musical communication and musical interaction that facilitates the learning of rhythm skills of preschoolers
A topic and learners (e.g. Ball et al., 2008; Cochran et al., 1993; Grossman, 1990; Magnusson et al., 1999; Meijer, 1999; Shulman, 1987)	Preschoolers' dispositions and learning difficulties with regard to learning rhythm skills

A topic and the curriculum (e.g. Ball et al., 2008; Cochran et al., 1993; Grossman, 1990; Magnusson et al., 1999; Meijer, 1999)	The curriculum in relation to rhythm skills of preschoolers
A topic and assessment (e.g. Magnusson et al., 1999)	Assessment of preschoolers' rhythmic behaviour in relation to learning rhythm skills
A topic and the educational context (e.g. Cochran et al., 1993)	The interaction between an educational context and the learning of rhythm skills of preschoolers

Figure 2: Themes described in the literature and themes identified in the data

In total, seven themes were developed that reflected different knowledge components of PCK with specific relevance to the teaching and learning of rhythm skills in preschool education. One of the themes was new and had not been identified in the literature reviewed in this current research, namely *"Musical communication and musical interaction that facilitates the learning of rhythm skills of preschoolers"*. In the following section these seven themes will be presented.

5. FINDINGS

5.1. Theme 1: Pedagogical orientations regarding the teaching and learning of rhythm skills of preschoolers

One theme that was identified in the data was *"the pedagogical orientations regarding the teaching and learning of rhythm skills of preschoolers"*. A teacher's orientation regarding teaching, learning and the topic or skill plays a role in how teachers facilitate the learning of a certain topic or skill (Magnusson et al., 1999). For example, all the teachers explained that they developed ***a child-centred approach*** to teaching and learning rhythm skills. Central to this *child-centred* orientation is that teachers try to work out "where the children are" rhythmically and try to help them move forward in their rhythmic development. Furthermore, the teachers noted that preschoolers benefit from learning rhythm skills from *peers* who can set the right rhythmic example, and that they encourage preschoolers to contribute their own rhythmic ideas within a rhythmic activity. The second pedagogical orientation was teaching and learning rhythm skills through *imitational learning*. All the teachers mentioned that preschoolers learn rhythm skills through observing the rhythmic skills of the teachers or peers and (unconsciously) imitating them without verbal instruction. Teaching and learning rhythm skills through *experiential learning* was the third pedagogical orientation found in the data. The teachers described that preschoolers develop a sense of rhythm *because* the rhythm is experienced and felt through the whole of the body.

5.2. Theme two: Teaching strategies for rhythm skills of preschoolers

The second theme *"Teaching strategies for the rhythm skills of preschoolers"* covered the actual teaching strategies of these teachers. For example, using movement was an important teaching strategy: all the teachers employed different *whole-body movements* to develop rhythm skills and frequently let preschoolers move with their whole body to rhythm aspects of music. They also mentioned that they could employ a thematic approach to rhythm activities. The teachers would verbally introduce a theme, e.g. fairy-tale figures, and ask the preschoolers to take on a role that elicits certain rhythmic movements within that theme. Furthermore, the teachers described that preschoolers learn rhythm skills through *repetition*: preschoolers need to be repeatedly exposed to the same rhythm activity over time and need enough repetition within an activity to be able to develop a rhythm skill. "Physical modelling" too was mentioned as a teaching strategy: the teachers will mainly present themselves

as a rhythmic model but they will also use peers as a rhythmic model. Lastly, the teachers remarked that music induces a physical rhythmic response in the preschoolers. In other words, the music *presents* rhythm aspects and simultaneously becomes a "pedagogical tool" to elicit rhythmic movement without the teachers having to explain verbally what the preschoolers have to do.

5.3 Theme three: musical communication and musical interaction that facilitates the learning of rhythm skills of preschoolers

"Musical communication and musical interaction that facilitates the learning of rhythm skills of preschoolers" was the new theme identified in the data which had not been described in the literature reviewed for this current study. This theme covered the musical communication and musical interaction *within* the chosen teaching strategies. The teachers developed knowledge of how to employ their gestures, body and sounds to communicate and interact predominantly non-verbally about rhythm aspects in the music and rhythm skills. The teachers' repertoire of gestures seemed to consist of three different types of gestures. First of all, they employed "instructional gestures": in advance of the rhythmic activity, the teachers would often verbally explain and *simultaneously* act out the intention of a rhythmic activity with the use of gestures. Secondly, the teachers seemed to employ "guiding gestures": they would cue preschoolers with gestures when and how to respond rhythmically or how to synchronise their moving or playing to the (recorded) music, e.g. cueing the start and end of a rhythmic activity and the beginning of a new rhythmic movement or rhythm pattern within music though gestures. Lastly, the teachers employed (re)presentational gestures: through their body and gestures, the teachers (re)presented rhythm aspects as the beat, rhythm patterns and rhythmic phrasing.

5.4 Theme four: Teachers' understanding of preschoolers' learning behaviour with regard to learning rhythm skills

The theme: *"Teachers' understanding of preschoolers' learning difficulties with regard to learning rhythm skills"* covered what teachers understand to be what preschoolers might find difficult about the process of learning rhythm skills and what "typical" preschooler behaviour could be with regard to learning rhythm skills. With regard to learning difficulties, these teachers explained that some preschoolers have trouble staying motivated and engaged during a rhythm activity, or some preschoolers have trouble with their motor coordination and therefore find it hard to synchronise their rhythmic movements to an external music source and other preschoolers can have difficulty translating their inner hearing to "rhythmic output", be it on an instrument or with rhythmic movements. Four teachers explained that in general preschoolers exhibit a different kind of behaviour whilst learning rhythm skills than older pupils, e.g. preschoolers are highly explorative and will start exploring rhythm instruments immediately, and preschoolers copy each other's rhythmic behaviour even though they are allowed to improvise their *own* rhythm pattern.

5.5 Theme five: The curriculum in relation to the development of rhythm skills of preschoolers

The fifth theme *"The curriculum in relation to the development of rhythm skills of preschoolers"* covered the teachers' long-term approach to teaching rhythm skills. Although their curriculum was not written down explicitly, the teachers all had global ideas about their curriculum. Concerning their curriculum orientations, four teachers explained that they have a global idea about how the development of rhythmic skills of preschoolers unfolds and they will offer a range of activities and adapt activities in such a manner that the activities can facilitate that development. This approach resulted in a developmental

curriculum. Less common in this current study, was a more content-orientated approach to the curriculum. Two teachers mentioned that the starting point for their curriculum was laying a broad musical foundation (including rhythm skills) for the later years. With regard to curriculum goals, all of the teachers noted that preschoolers should be able to *move* to rhythm aspects of music, e.g. to the pulse of duple or triple metre, to rhythm patterns, to different tempi and to different styles. Furthermore, they agreed that the preschoolers should be able to *perform* (e.g. clap or play) a steady beat and three teachers noted that preschoolers should be able to sing a song with a steady beat. Another three teachers noted that preschoolers should be able to hear the differences between the beat and rhythm patterns, between different tempi and different metres.

5.6 Theme six: Assessment of preschoolers' rhythmic behaviour in relation to learning rhythm skills

The sixth theme *"Assessment of the preschoolers' rhythmic behaviour in relation to learning rhythm skills"* covered how teachers assess the rhythmic learning process of the preschoolers and what their views on assessing are. All of the teachers preferred using formative assessment (assessment for learning) opposed to summative assessment (assessment of learning): they actively *observed* the preschoolers as a group during a rhythm activity to assess whether the group was picking up on a rhythm skill during the lesson or over time. During an observation the teachers could also relate the physical feeling the rhythm activity evokes in their own body to what the preschoolers were doing during that rhythm activity; this provided teachers with additional information about the preschoolers' performance of rhythm skills. Furthermore, through tactile modelling (Metz, 1989, p.52) some teachers also received haptic information about the rhythmic development of a preschooler because they would be able to feel the way the preschoolers were able to join in with the swaying of the beat.

5.7 Theme seven: The interaction between an educational context and the learning of rhythm skills of preschoolers

The seventh theme *"The interaction between an educational context and the learning of rhythm skills of preschoolers"* covered the teachers' understanding of how contextual factors influence the teaching of rhythm skills of preschoolers. All the teachers noted that they might use instruments in the development of rhythm skills of the preschoolers but that preschoolers do have to be able to handle an instrument motorically. Five teachers noted that because they believed preschoolers learn rhythm skills through movement, there needs to be enough space to move. Four teachers explained that thirty minutes is enough time to spend on the development of rhythm skills although it should not be shorter as some rhythm skills need enough "time-on-task" to seep in.

The seven themes described above illustrated the content and nature of the specialist preschool music teachers' PCK with regard to teaching and learning rhythm skills. In the following section interpretations will be given of these findings.

6. DISCUSSION

6.1 The nature of the specialist preschool music teachers' PCK regarding rhythm skills viewed from an embodied cognition perspective

Interpreting the findings together, similar to the constructivist view on PCK by Cochran and colleagues (1993) and the information-processing view of Meijer (1999) as described in section 2, in this research study PCK is viewed as in part personally, socially and culturally defined and in part dependent on the school context. However, an embodied cognition perspective on PCK does differ from the aforementioned views in several ways. I first of all propose that from an embodied cognition perspective PCK is not only viewed as a verbal form of knowing but as a multimodal form of knowing that is distributed over the entire body: these teachers can draw on language, sonic *and* non-verbal resources to blend content and pedagogy into what Pozzer-Ardenghi and Roth (2010, p. 2) call a "communicative unit" that forms a meaningful whole for the preschoolers. For example, when teachers are performing music they are able to keep the temporal unfolding of music going *because* they can employ their body to instruct and guide the preschoolers through the rhythm activity instead of using language. Beyond the classroom, the teachers not only talked about their lessons but also *demonstrated* what they did during teaching. The way teachers "act out" what they had done during teaching might help them to elicit and shape their PCK: they can re-enact parts of their lesson at a slower pace and have time to figure out what they did during teaching. Thus, reflecting on teaching might be facilitated through re-enacting the lesson with the *entire* body.

Secondly, an interpretation arising from this study is that the teacher's PCK emerges from the interaction between the social, cultural and physical classroom environment, the task that is performed and the teacher's body (Johnson, 1989). In this summary, to exemplify how PCK can *emerge* from a classroom environment, I will not focus on the cultural and physical dimensions of a classroom environment but on the social dimension of the classroom. The teachers in this study were active participants in most of the rhythm activities and together with the preschoolers they could form a close-knit social system that directly reacted and interacted with each other. The ethnomusicologist Brinner (1995, p. 183) developed the term "interactive system" to describe the way in which music performers – or in the case of this study the teacher and preschoolers – communicate and coordinate themselves during the performance of music. According to Brinner (1995, p. 5) an interactive system includes "[...] cues, responses, prompts, signals and markers [...]" through which performers musically interact with each other. So, although preschoolers often imitate the rhythm skills of teachers, they will also actively react to the teacher, and evoke a physical reaction in the teacher that can alter the way the teacher models a rhythm skill. Possibly, the use of their bodies allows preschoolers a stronger role in the interaction with the teachers: preschoolers do not need to search for language explaining what they understand but they can continuously *show* their learning process of rhythm skills through their gestures and movements and thus affect the way the teacher models during the rhythm activity itself. This then results in an interactive teaching and learning process and thus leads to the possibility for the teacher's PCK to emerge from the social context.

6.2 The content of the specialist preschool music teachers' PCK regarding rhythm skills viewed from an embodied cognition perspective

In conceptualising the content of the specialist preschool music teacher's PCK from an embodied cognition perspective, one of the findings of this study is that the centrality of the teachers' bodies cannot be ignored. An embodied view of the content of PCK broadens earlier conceptualisations of its content to include physical and non-verbal ways of teaching next to linguistic, aural and visual ways of teaching. An embodied approach therefore has more possibilities to

describe the content of PCK that specialist preschool music teachers develop and communicate, e.g. during the teaching and learning process of rhythm skills, the teachers' bodies can take on different roles – that of a model, guide, assessor and adaptive curriculum.

First of all, the teacher's body can take on the role of a model by modelling the rhythm skills for preschoolers. Although modelling might seem an easy teaching strategy, these teachers did not simply model a rhythm skill with their body. They emphasised their rhythmic movements more strongly when they wanted the preschoolers to imitate new rhythmic movements or rhythm patterns, and they signalled the preschoolers when they started modelling a new movement. The anthropologist Downey (2008, p. 205) notes that the teacher who models a skill does not simply enact "a practice but also provides other sorts of stimulation and direction tailored to the novice's needs". Imitational modelling (Metz, 1989, p.52) then can be viewed as far more interactive than unidirectional (Downey, 2008). Secondly, the teacher's body can take on the role of guide during a rhythm activity. These teachers used *instructional* gestures that coexisted with speech to communicate their instructions of a rhythm activity. By linking their words to gestures that reflected real-world actions, these teachers clarified the intention and sequence of a rhythm activity (Alibali & Nathan, 2007) and as a consequence, preschoolers do not need to fully rely on language to be able to understand the intention of a rhythm activity. Furthermore, teachers' *guiding* gestures that coexisted with music were able to enhance the synchronisation of the preschoolers' rhythmic movements (including playing rhythm patterns on an instrument) to the teacher and their peers with whom they were interacting musically. The teachers' bodies seem to become an entry point for preschoolers to co-experience the rhythmic movements or rhythm patterns that coincide with the rhythmic structure of the music. By enhancing synchronisation through their guiding gestures teachers can help preschoolers to "latch on" to their body and to become immersed in rhythm aspects of a given music culture. Through *(re)presentational* gestures these teachers were able to give visual signposts of important rhythm aspects in the music. These signposts can help preschoolers to "ground their understanding of abstract ideas in the physical world" (Hostetter, Bieda, Alibali, Nathan, & Knuth, 2006, p. 1523). In other words, abstract rhythmic notions such as the pulse become embodied and concrete when preschoolers can hear, see and feel the pulse.

Thirdly, the teachers' bodies can take on the role of assessor and teachers can develop what I would like to call a multisensoric way of assessing preschoolers. Teachers "read" the preschoolers' bodies by listening and looking at how the preschoolers are performing rhythm skills, and through tactile modelling (Metz, 1989, p.52) they can physically feel the rhythmic development of preschoolers. In addition, because teachers can participate with the preschoolers in rhythm activities, they can relate the physical feeling the rhythm activity evokes in their own body (e.g. a sense of weight or tempo) to what the preschoolers are actually doing during the activity. In that way, teachers can draw on *different* senses to gain information about the rhythmic development of preschoolers. Lastly, I suggest that these teachers' bodies can take on the role of an adaptive curriculum. In contrast to written or visual curriculum materials that are less easy to change on the spot, during the moments that these teachers performed a rhythm activity, they became "living curriculum material". Remarkably, during a rhythm activity, these teachers could sense and adapt to the musical level of preschoolers *and* simultaneously to the emotional state of preschoolers. Through performing rhythm activities faster or slower these teachers adapted the level of *difficulty* of the activity but at the same time they could regulate excited *behaviour* of preschoolers through that same activity. From the field of music psychology, Swaine (2014) suggests that through co-regulation, e.g. between teacher and preschooler, emotional responses of preschoolers can be regulated in ways that enhance rather than diminish the attentional capacity of preschoolers. It is conceivable that by keeping attuned to the emotional state of preschoolers, teachers keep the preschoolers regulated in such a manner that they stay concentrated on the rhythm skills.

7. CONCLUSION OF THE STUDY

This study has contributed to developing a novel perspective on PCK that departs from earlier perspectives on PCK as described by Shulman (1986) and other researchers following his line of thought that PCK is viewed as more static knowledge brought to the classroom and applied to teaching. An embodied perspective on PCK builds on the constructivist perspective on PCKg of Cochran and her colleagues (1993) in the sense that from an embodied cognition perspective PCK is viewed as a dynamic way of knowing emerging from the social, physical and cultural classroom practice. This is why the term "pedagogical content *knowing"* would fit an embodied cognition perspective better opposed to the term "pedagogical content knowledge" which suggests a far more static view of knowledge. An important difference with a constructivist perspective is that an embodied cognition view on PCK includes the teachers' and pupils' bodies as crucial factors for developing and communicating PCK in and beyond the classroom. Furthermore, from this embodied perspective PCK should not be viewed as merely verbal in nature but multimodal because teachers can flexibly draw on verbal, sonic and non-verbal resources to develop and communicate their PCK. As teachers often perform music during the act of teaching, their use of language can diminish, and their bodies can (interchangeably and simultaneously) take on sophisticated roles in the teaching process of rhythm skills: their bodies model rhythm skills, guide rhythm skills through gestures, assess rhythm skills and co-regulate emotions elicited by a rhythm activity. Thus, teachers' bodies become a strong mediating factor for preschoolers to experience and learn rhythmical structures of a given music as their bodies transform the invisible and intangible world of rhythms to a visible and tangible one – bridging an abstract and sonic realm to a concrete and physical world for the preschoolers. The teachers' bodies can create a multimodal learning environment that gives preschoolers access to a shared meaning of music.

For the full research report see:
https://ore.exeter.ac.uk/repository/handle/10871/18010

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