Teaching dance in physical education using exergames

Béatrice Gibbs
School of Health Sciences, Örebro University, Sweden; The Swedish School of Sport and Health Sciences, GIH, Stockholm, Sweden

Mikael Quennerstedt
School of Health Sciences, Örebro University, Sweden

Håkan Larsson
The Swedish School of Sport and Health Sciences, GIH, Stockholm, Sweden

Abstract
This article explores the different ways in which a dance exergame can be used to teach dance in upper secondary school physical education. Particular attention is paid to the learning processes that students are involved in when the dance game is used as a teaching resource. A socio-cultural perspective on learning constitutes the analytical framework. The study demonstrates three different uses: instructor, facilitator and inspirer. In relation to these uses the students are involved in the following learning processes: learning by imitating, repeating, communicating, negotiating, instructing, modelling and using metaphors. It is argued that dance exergames can be used pedagogically to teach dance because they focus on the moves and steps and allow the teacher to focus on observing, supporting, assigning tasks and providing feedback.

Keywords
Dance exergames, teaching resource, learning process, physical education

Introduction
The focus of this article is the use of dance exergames as a teaching resource in dance education in school physical education (PE). Dancing and moving to music are used in PE for a number of reasons: for fitness purposes; to express feelings and moods; and to become familiar with different kinds of cultural heritage (Mattsson and Lundvall, 2015; see also McCarthy-Brown, 2009; Risner,
The benefits of dance in PE are further advocated by Bajek and colleagues (2015) and Mattsson and Lundvall (2015), who state that dance can be a way to not only develop students within a psychomotor domain, but also foster self-expression, aesthetics and feelings expressed in movement. However, research on the content of PE suggests that dancing is rare and sometimes entirely absent (Lundvall and Meckbach, 2008; Rovegno et al., 2001), even when it is clearly stated as core content in the national curricula (e.g. Pühse and Gerber, 2005). Research also suggests that dancing is frequently regarded as ‘boring’ and even ‘threatening’ by both boys and girls (Gard, 2003; Larsson and Redelius, 2008). In this article, we explore the use of dance exergames as a teaching resource in PE practice as one way of reinforcing the position of dance in the subject. The context of the study is PE in Sweden, a country that reflects how dance is dealt with in PE in many countries (e.g. Pühse and Gerber, 2005).

The ambiguous position of dance in PE can be explained in different ways. Several Swedish studies suggest that the most important goal for teachers and students is that the subject is interesting and that the students are physically active (Larsson and Redelius, 2008; Quennerstedt et al., 2008). Judging by what is seen as core content, physical activity as fun is expected to be achieved through the use of ball games and keep-fit activities – not dancing (Mattsson and Lundvall, 2015; Öhman and Quennerstedt, 2008). On the other hand, one in four teachers express that they would like to spend more time on dancing and less time on ball games (Lundvall and Meckbach, 2008). In the study undertaken by Lundvall and Meckbach (2008), many PE teachers say that their ability to teach dance is limited and that they are uncertain about their own competence in dance and consequently in their own ability to actually teach the subject. This resonates with Mainwaring and colleagues’ (2010), Connell’s (2009) and Russell-Bowie’s (2013) conclusions about teaching dance in schools in general. It also resonates with Kaufmann and Ellis’ (2007) and Andrade and colleagues’ (2015) results regarding generalist teachers versus dance specialists teaching dance in school. Put simply, we believe that many PE teachers devote little time to dancing because they cannot dance themselves and as a consequence are pedagogically limited in their teaching.

In many countries, the dancing that occurs in PE mainly revolves around learning a particular dance or learning specific steps to music (Quennerstedt, 2013). Gard (2006) holds that dancing is often ‘a largely mechanical exercise in either copying the movements of others or creating one’s own via a kind of “Lego block” piecing together of elements’ (237). However, Larsson and Karlefors (2015) suggest that using a task method, reducing the emphasis on ‘learning the correct moves’ and instead emphasising a collaborative approach to designing a movement choreography could reduce the ‘mechanical’ nature of the dancing lesson. On the whole, though, previous research suggests a need for new pedagogical approaches to teaching dance in PE so that dancing lessons can facilitate the kind of learning stipulated in the national curricula that requires dance to be taught in PE in all grades. In Sweden, dance is mainly taught in PE and not considered a separate subject (Mattsson and Lundvall, 2015).

In order to address pedagogical dilemmas like this, several scholars have put new technologies forward as one way to enhance students’ engagement, learning experiences and creativity (Casey and Jones, 2011; O’Loughlin et al., 2013; Sinelnikov, 2012). Technologies like video games (so-called exergames) have in this context been suggested as a way forward for PE teachers, mainly as a way to increase physical activity in PE practice (Ennis, 2013; Gibbs, 2014; Quennerstedt et al., 2013; Sun, 2015). Exergames are video games that include exercise (or to be more inclusive, body movements), and there are many different types of exergames on the market. Specific dance games like Dance Dance Revolution or Just Dance have proved to be very popular among children and
young people. Computer (or video) games are otherwise often said to counteract physical activity among children and young people (Hayes and Silberman, 2007). In contrast, exergames have been researched extensively in terms of the physical effects that playing has on fitness (e.g. Ennis, 2013; Quennerstedt et al., 2013). However, educational research on exergames is scarce, which largely means that the pedagogical implications of exergames, in general as well as in dance, are, as Ennis (2013) argues, shrouded in mystery even if exceptions exist (e.g. Maivorsdotter et al., 2015; Perlman et al., 2012).

The purpose of this article is twofold: to explore the different ways in which a dance exergame is used as a teaching resource in PE practice and to explore the learning processes that students are involved in when a dance exergame is used as a teaching resource. In the article we will also discuss how dance exergames can be used as resources in PE in order to promote students’ engagement with dance. In what follows we first outline the pedagogical use of a dance exergame as a teaching resource in a seven-lesson dance unit in an upper secondary school PE class in Sweden. We then present the analytical framework used to study the learning processes observed during the seven lessons. The findings are presented as three ways in which the games function as a teaching resource, and under each section students’ learning processes are described.

**Pedagogical approach**

In the study the first author created a lesson plan with seven lessons as a pedagogical intervention (Table 1). The purpose of the lesson sequence was to develop the students’ movement capabilities and in particular the abilities to create and refine moves to music. Thus, the goal was that groups of students would collaboratively assemble moves, discover rhythm, understand how a song is composed and how the energy and qualities of a dance can be choreographed. Finally, by means of an examination assignment, the students were expected to create their own dances and perform them. The lesson plan was created based on the purpose and the goal as follows. In four of the lessons, the dance exergames Nintendo® Wii Just Dance 3 and 4 were used as resources for teaching dance. During these lessons the students followed the avatars’ moves as they were dancing on the screen. In two separate lessons and for about 10–20 minutes at the end of the four earlier lessons the exergames were available to help the students create their own dances. In the seventh and final lesson the students performed their dances.

When playing Nintendo® Wii Just Dance 3 and 4, players are supposed to use one hand control per person, with up to four players. On the screen one or several animated dancers (or avatars) display the moves created for that particular song and the players are supposed to follow the dance moves as well as they can in order to score points. Through the hand controls, the games identify and give feedback in relation to the movements that are performed in terms of rhythm and precision. However, in this study we wanted the entire class to move at the same time and to move their entire bodies, which resulted in no hand controls at all being used. Instead, all the students stood in front of one large screen on which a dance video game was projected and mimicked the avatar’s movements to the best of their abilities. This can be seen as a way away from gaming since no individual feedback is given and no points are recorded. However, the context of the introduced game in terms of the exergame design, and students’ immediate engagement with the game, made us conclude that many aspects of the gaming in question were still present even though the individual feedback was deleted from the process.
|                     | Lesson 1          | Lesson 2          | Lesson 3          | Lesson 4          | Lesson 5          | Lesson 6          | Lesson 7          |
|---------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| **Time**            | 60 min            | 45 min            | 60 min            | 45 min            | 40 min            | 60 min            | 30 min            |
| **Aim of the lesson**| **Move to different kinds of music.**<br>**Talk about what an eight is in terms of eight counts.** | **Find rhythm. Practise coordination.** | **Construction of songs.** | **Practise own dances.** | **Formations in groups.** | **Practise own dances.** | **Perform own created dance.** |
| **Content**         | **Composing moves. Counting eights in the whole class. Assembling moves in groups.** | **Rhythm in the whole class. Practise difficult moves. Making moves in other ways. Composing moves.** | **Composing moves in the whole class. Music analysis. Composing moves freely in groups.** | **Practise moves. Find new moves.** | **Dance in pairs of 4 and 4. Try specifics of dancing in groups.** | **Practise moves.** | **Dance performance.** |
| **Materials**       | Just Dance        | Just Dance        | Just Dance        | Just Dance available. | Just Dance available. | Just Dance available. | Just Dance available. |
| **Teacher**         | Show an eight. Give them tasks as composing moves. | Help them find the beat. Give them tasks as practising moves. | Show them a music analysis. | Walk around to the different groups to help. | Ask them about effects appearing when dancing in groups. | Walk around to the different groups to help. |  

(continued)
|                | Lesson 1 | Lesson 2 | Lesson 3 | Lesson 4 | Lesson 5 | Lesson 6 | Lesson 7 |
|----------------|----------|----------|----------|----------|----------|----------|----------|
| **Time**       | 60 min   | 45 min   | 60 min   | 45 min   | 40 min   | 60 min   | 30 min   |
| **Students**   |          |          |          |          |          |          |          |
| Follow the avatar. | Follow the avatar. | Clap to beat. | Write down chorus, verse and moves compared to those. | Find moves. | Follow the avatars. Discuss effects when dancing in groups. | Find moves together. |
| Remember steps from songs and practise them with comrade/s. | Practise different moves with comrades. Change moves. |          |          |          |          |          |
| **Teamwork**   | Last 20 min: | Last 10 min: | Last 20 min: | Entire lesson: | Entire lesson: |          |          |
| Find a song. Work with moves to the song. | Listen to the song. Find the rhythm. Create moves. | Listen to how the song is structured. Find moves. | Create moves to song. | Create moves to song. |          |          |

*Table 1 (continued)*
A socio-cultural perspective on teaching and learning

In the study we use a socio-cultural perspective on teaching and learning in order to explore students’ learning processes when dance exergames are used as resources for teaching dance in PE (e.g. Rogoff, 1995; Vygotsky, 1986; Wertsch, 1998). In a socio-cultural perspective, the focus is on how students participate in different activities and the relation between the students’ actions and the context in which these actions occur. The approach then includes taking into account the cultural and institutional context, as well as different linguistic and material artefacts (Säljö, 2009). The ability to take part in a certain social practice, in this case dance in PE practice, is therefore important.

Learning is accordingly seen as a social production of meaning in the relation between individual experience and the institutional context and the path that students take to master new and complex tasks with the aid of learning resources (such as dance or dance exergames). The novice learner starts by (a) not knowing how to manage the resource in a particular practice, then (b) uses it under the supervision of a more competent person (an expert). After a while (c) the ability to deal with it on his or her own increases so that the support can be reduced. Finally, (d) the learner masters the resource independently and knows how to use it (Säljö, 2009). During this process the external support gradually diminishes and eventually disappears altogether. The support can either come from a teacher, classmates or appropriate resources (Säljö, 2009).

In PE, communication occurs both verbally and bodily (e.g. Quennerstedt et al., 2014) in order to adopt new ways of thinking, reasoning and acting (Säljö, 2009). Lave (1988), for example, emphasises that students think in groups, where thinking is seen as a collective process. When students communicate they re-present the problem for themselves and for others. Together they try to make sense of the situation by trying, ‘tasting’ and rejecting different options, and in the end, at best, manage to come up with what they are looking for (e.g. Säljö, 2009). In this endeavour the students co-talk, co-act and co-listen with each other as well as with the dance exergames.

In this article we explore learning as students interact with each other and with artefacts, in this case dance exergames used as learning resources. Using dance exergames allows students to do things they would otherwise not have been able to do by themselves. To exemplify, the students in this article create dances when they interact with the game and/or with their peers. Accordingly, learning is a result of the relation between the artefact (learning resource) and the students’ actions.

Method

The study was conducted in PE practice in a suburban Swedish upper secondary school to the south of Stockholm. The students who participated in the study were 16–17 years of age and the class consisted of 25 students: 13 boys and 12 girls. The first author works as a PE teacher at this school but the intervention took place in a class usually taught by a colleague. For the purpose of the study, the first author took part in the lessons and had the function of a teacher while the colleague supported during the lessons.

The lessons with exergames and also the final lesson were video recorded by two cameras on tripods, one shot from the front and one from the back. A handheld camera was also used to get closer to the students when they interacted in groups. In the two remaining lessons, the tripod cameras filmed two groups who created their dances. In the analysis, the resulting video films were used as data. Jordan and Henderson (1995) state that observation with video removes the gap between ‘what people say they do and what they, in fact, do’ (50). This is also in line with the
central ideas of a socio-cultural perspective on learning in terms of using studies in-situ. Conducting video observations of lessons in which dance exergames are used as a teaching resource allowed us to explore the movements that the students developed and used in interaction with their peers and in relation to the artefact. It also made it possible to focus ‘on a single individual’s movement response within the context of a changing environment that includes other movers and other stimuli (e.g. equipment, music)’ (Murray and Lathrop, 2005: 12). Using video is also a way of investigating what happens in the PE classroom and the data can be repeatedly viewed and reviewed (Heath et al., 2010).

Before the study began, we informed the students about the purpose and scope of the research project. Informed consent in line with the ethical guidance outlined in Swedish law was obtained from all students. They were also told that they could at any time choose not to be filmed or be part of the research. All the students consented to participate and be filmed. In the article, the use of ‘comic strips’, where students cannot be identified, is part of our ethical consideration and the students agreed that blurred pictures of them could be published for research purposes. The ‘comic strips’ were created in the program Comic Life 3. All the names in the article are fictitious.

In the analytical process, the first step was to be familiarised with the data material by repeatedly studying the films (Öhman and Quennerstedt, 2012) and transcribing what was said and done. The first author conducted this step. Next, we searched for learning situations in the lessons, or so-called didactical moments (Quennerstedt et al., 2014) – situations that we together considered to be relevant for student learning. In other words, we searched for situations in which different aspects of learning seemed to have an impact on the direction the learning was taking in the learning process occurring. These identified situations were, for example, when students developed different dance moves, when they interacted with the artefact and/or when they interacted with each other.

In the third step, the identified learning situations were divided into how the dance exergame was used. Three ways in which the exergame was used as a resource in the teaching of dance in PE were identified: (a) instructor; (b) facilitator and (c) inspirer. These different ways constitute the main structure for the results section.

In the fourth analytical step, the learning situations were explored in terms of on-going learning processes. By using the socio-cultural perspective on learning, questions about how the students co-talked, co-acted and co-listened with each other and with the dance exergame were analysed (Säljö, 2009). In the results section, seven different ways in which students were involved in learning processes are identified. These were learning by (1) imitating, (2) repeating, (3) communicating, (4) negotiating, (5) instructing, (6) modelling and (7) using metaphors. These categories are elaborated later in the article in order to describe how the exergames were used as resources in the teaching of dance in PE.

**Results**

In the first way of using the resource, as an instructor, we present the first three categories of learning processes: learning by *imitating, repeating* and *communicating*. In the second way, the resource as facilitator, we describe learning by *negotiating* and *instructing*. The third and final way, the resource as inspirer, consists of the two remaining categories: learning by *modelling* and *using metaphors*. 
The resource as instructor

The first way in which the artefact was used as a teaching resource is seen in lessons one, two, three and five (see Table 1), where all the students stand in front of the dance exergame and imitate the moves of the avatar. Thus, the avatar can be seen as an instructor that performs movements to music, i.e. movements that the students then follow to the best of their abilities. Here, we present three situations where the dance game is used as an instructor and where learning takes place by imitating, repeating and/or communicating.

Learning by imitating and repeating. In the first situation, the students stand in front of the screen, watch the game and imitate the dance moves demonstrated by the avatar to the song Good Feeling by Flo Rida. A move we call ‘crocodile gap’ appears four times during the dance.

When the students encounter the move for the first time (see Figure 1, image 1), they take a step to the side, lift one of their arms up in the air and then down again to the side of the body without stretching it out completely. The students perform the move quickly, weakly and with bound flow. When the move appears a second, third and even fourth time, the students have further opportunities to repeat the move. In the second image (see Figure 1, image 2) the move is performed for the fourth time. Here, the students take one step forward with the arm fully extended in front of them and then upwards into the air. The students now perform the move with more continuity, free flow and power.

On the first occasion the students imitate the moves of the avatar. In what we call bodily interaction between the artefact and the student, the students interpret the move based on their previous experiences. As there is no explicit feedback from the game, the students themselves have to re-interpret the moves in increasingly sophisticated ways by systematically repeating the moves of the avatar.

Hence, by imitating and repeating the same move several times the students learn how the move should be performed. By using the artefact as a learning resource, students learn to master this particular practice. In other words, learning occurs by students first imitating the moves of the avatar and then repeating these moves several times.

Figure 1. Learning by imitating and repeating.
Learning by communicating. In the second situation, the students dance in pairs or in groups of four. These formations are made because two or four avatars are engaged in the video game. The different avatars vary their moves so that they sometimes perform the same move and sometimes various moves. It means that different students follow different avatars and their moves. In the following section we present two examples.

The first example is when the students dance to the song *Everybody Needs Somebody to Love* by The Blues Brothers. As in the previous section, the students imitate and repeat the moves of the avatar. However, in the following example the students also communicate bodily with each other. This communication occurs when the students look directly at each other (see Figure 2, image 1). Communication also occurs when the students move in relation to each other’s bodily movements by jumping around, in front of or behind each other (see Figure 3, image 2). The students adapt their own movements to their peers while at the same time interacting with the dance game by imitating the moves of their specific avatar. Several things are going on here, namely that the students are expected to (a) imitate the moves of one of the avatars, (b) study what the other avatar is doing and (c) bodily communicate with their peers.

![Figure 2](image-url) Learning by communicating.

In the move shown in the first image in Figure 2, gestures and eye contact between the students are few and far between at the beginning of the dance. Rather, their heads are turned towards the screen in order to see and imitate the avatar. However, as their bodies are positioned towards each other in the dance, when the move is repeated a number of times the students begin to look at their dancing partners and smile at each other as their eyes meet. Hence, their movements become more relaxed and free.

A similar sequence occurs in the second image of Figure 2. Initially, several students collide when trying to jump past each other. They are unsure who is going to jump in which direction and the moves are therefore restrained and indistinct. After repeating the same move several times they manage to negotiate bodily and agree on the direction in which to jump. Here, their moves are more determined and distinct.
The second example is based on two different dances, one to the song *Time Warp* by Halloween Thrills and the other to the song *Istanbul* by They Might Be Giants. As in the previous examples, the students *imitate, repeat* and *communicate* the moves of the avatars. The difference here is that the students also hold onto each other and demonstrate some kind of bodily communication (see Figure 3).

In the first image in Figure 3, the two boys are holding hands and moving their arms up and down. The boys imitate the avatar and repeat the moves several times. After each repetition they find one another more rapidly and adapt their movements to those of the other. They thus interact with one another by holding onto each other in a form of shared bodily communication, where they together *co-create* the dance.

The second image in Figure 3 shows four girls touching the shoulder of the person in front of them and lifting the other arm. The movement is then repeated diagonally. The girls follow one another in a circle. At the beginning of the ‘walk’ they look constantly at the avatar in order to imitate the moves. After a while they turn their heads towards the back of the person in front and continue to walk behind each other in a circle. With the support of the artefact they collaboratively use bodily communication to manage the movement sequence.

In these two examples learning occurs by *imitating, repeating* and bodily *communicating* the movements. Here, the students not only focus on and interact with the avatar in the dance game, but also interact with the people next to or in front of them. It is evident in the way that they look at, circulate or hold on to each other and thereby adjust their own bodily movements. As earlier, learning occurs when the students *imitate* and *repeat* the moves, but also when they pay attention to someone else’s movements and *communicate* bodily. Learning then occurs through interaction with the artefact and in the bodily interaction with others. Consequently, when the members of the group help each other to interact with the artefact, they manage to *co-perform* the dance.

**The resource as facilitator**

The second way of using the artefact is also present in lessons one, two, three and five (see Table 1), when the students perform tasks connected to the video game. Here the dance game has the
function of a facilitator, in that the PE teacher gives the students tasks to solve with the help of the game. Such tasks may include practising or changing the moves in the demonstrated dances. Below, we present two situations in which a dance game is used as a resource to solve a set task and where learning takes place by negotiating and instructing.

**Learning by negotiating.** In lesson one, before the students dance to the song *Good Feeling* by Flo Rida, the students are asked by the teacher to remember one move from the dance. After the dance they gather in groups of four and show one another the moves they remember from the dance. All groups then select one of these moves and practise it within the group at the same time as they count to eight. Similar negotiations occur within all groups. The four girls in the following example (for the purpose of this article called Irma, Gabrielle, Elina, and Jasmine) show each other one move each that they remember from the dance. They ‘taste’ each other’s moves by imitating one another and continue in this way for a while before deciding which movement sequence to choose. The following happens when the group solves the task:

Irma remembers a movement sequence from the dance and shows it to the others. She moves her arms up and down and jabs both her index fingers in the air. Elina mimics these moves but also starts to move her legs, a little at first and then takes larger steps on the spot. Gabrielle performs similar moves but also sways her lower body and moves her hips in time with each step. Jasmine tries to jab her fingers in the air and lifts her legs a little. Suddenly the girls stop moving and look at each other. Jasmine says ‘this one’, and shows the others a move in which she swings her right arm back and forth along her side while at the same time moving her left knee in and out. Gabrielle moves both arms to the left and jabs forcefully with both hands at the same time as she hums ‘dun dun dun dun’. Jasmine says: ‘Yes, exactly’. Gabrielle then adds the previously performed move and Irma follows suit. Gabrielle and Irma continue doing the movement sequence in the opposite way and Jasmine and Elina follow. At first their movements are half-hearted but gradually become more powerful. Then, Irma begins to count from one to eight at the same time as they perform the movement sequence. (Transcript, lesson one)

What happens in the above excerpt is that Irma demonstrates a move and Elina mimics it and adds foot movements. Gabrielle then mimics the move with more swing in her legs and hips. When they stop moving and look at each other it can be interpreted as a need to reflect for a moment. Suddenly, Jasmine remembers the second move and shows it to the others at the same time as saying ‘this one’. Then Gabrielle suddenly remembers the move and shows it to the other girls. Gabrielle’s ‘dun, dun, dun, dun’ humming becomes a linguistic tool used by the group to make the move coherent. When Gabrielle assembles the two moves Irma follows, thereby indicating that she is developing a common understanding with Gabrielle. Elina and Jasmine also follow suit when the movement sequence is performed a second time. Here, Irma adds another tool by counting the beat. After a while the girls perform the moves in a more relaxed manner and with more power. Here it can be said that they jointly produce a sequence of movements by means of bodily negotiation.

What happens in the previous example is that the girls ‘think’ as a group, where thinking, from a socio-cultural perspective, can be seen as a collective process. The task, to co-create an eight count movement sequence based on the movements in the game, guides their way of making sense of the situation. They communicate by negotiating their movements, which according to a socio-cultural perspective means that they re-present the problem for themselves and for each other. In contrast to the previously described bodily communication, where they agreed which move to perform, this bodily negotiation signifies that the movements are still in the making and they do not know in
advance which moves will follow. What happens is that their bodies, in accordance with a socio-cultural perspective, co-act, co-talk and co-listen in order to solve the task. In other words, the girls develop a common understanding of what they are doing by bodily negotiating the moves. Here they can be said to jointly create and learn a movement sequence.

**Learning by instructing.** In lesson two the students dance to the song *Superstition* by Stevie Wonder. After the dance, all students are asked to practise a move they found difficult in the dance. As the game is playing in the background, the students are able to watch the moves of the avatar while solving the task. As an illustration of what is going on in the whole classroom the same four girls as in the previous example are used when they experiment by showing different moves to one another. The bodily negotiation follows the dance game in a way that makes the girls want to try one of the moves on the screen, and when another move emerges try that one out as well. Finally, after ‘tasting’ different moves, they choose a movement sequence we call ‘single-single-double’ (see Figure 4). The first and second time the arms are lifted up and down once corresponds to ‘single-single’ and the third time the arms are lifted up and down twice relates to ‘double’. At the same time, the legs move once to the side on ‘single-single’ and twice on ‘double’. The following occurs when the move is introduced, tested and practised:

![Figure 4. Learning by instructing, from the move (1) ‘single-’, (2) ‘single-’ and (3) ‘double’.](image)

Elina, standing diagonally in front of the others, half-heartedly demonstrates the move and jabs her arms a little as if to highlight the movements. Gabrielle says: ‘We’ll take this one’ and demonstrates the same move to the others. At the same time, Irma asks: ‘Which one?’ Elina answers: ‘This one’ and demonstrates the move once again, this time with much more power in her arm movements. Gabrielle follows while counting out loud from one to eight. (Transcript, lesson two)

As in the previous section, the students talk about how the move should be performed. In the above sequence only three of the girls practise the move while the fourth girl, Jasmine, stands at
the side watching. After a while Jasmine tells the others that she does not understand how to do the sequence, and Irma then instructs her in the move (see Figure 4).

Irma thus takes on the position of ‘expert’ and teaches the move to the ‘novice’ Jasmine. Initially, Jasmine’s movements are half-hearted and vague, but after Irma’s instructions Jasmine puts more power into the movements and performs them with greater precision. In this situation Jasmine develops her knowledge by interacting with Irma and can perform the entire movement sequence thanks to Irma’s instructions. What happens here is that a less skilled learner, in this case Jasmine, is guided by a more skilled student, in this case Irma. When a more competent peer guides Jasmine, she is able to add new ways of thinking and acting to successfully carry out the moves. In other words, Jasmine learns the moves through instruction. Accordingly, the two girls do together what Jasmine has found difficult to perform on her own.

**The learning resource as inspirer**

The third way of using the artefact is shown in lessons four and six and also at the end of lessons one, two and three (see Table 1), when the students work in their groups to create their own dances. On these occasions a dance game is available as inspiration. In addition to the dance games, the students use their past experience when creating their dances. Where they have developed these skills is impossible to tell, but on some occasions they utter verbally and/or show bodily certain moves that can relate to what has been done in previous lessons. Several groups also use the artefact as a source of inspiration, mostly at the beginning of the process when they have not yet decided which song or moves to use. Here we present two situations from one of the two groups we followed more closely.

In these situations the dance game is used for inspiration, where learning takes place by *modelling* and *using metaphors*. Both situations are from the same group of four girls used for earlier illustrations. However, similar (but of course not exactly the same) situations occur in both groups.

**Learning by modelling.** At the end of lesson two the same four girls as above consider which moves to use to their own selected song, *We Found Love* by Rihanna.

Irma tells Gabrielle, Jasmine and Elina that she has found some moves on her own at home. She thinks that these moves, two eights, should come at the beginning of the song, but after the intro. Irma performs the moves to music and afterwards the others smile and nod and tell her the moves are brilliant. Irma instructs the others in these moves by showing them the moves from each eight while counting the beat out loud. (Transcript, lesson two)

As in the previous section, Irma instructs the others in the moves and assumes the position of an expert, while the others imitate her moves and are to all intents and purposes novices. Thus, the three novices learn the moves by following Irma’s instructions. However, when Irma instructs them in the second eight, Jasmine says that she does not understand how to perform some of the moves. Gabrielle then instructs Jasmine, but in a different way than Irma (see Figure 5). Here, Gabrielle grabs Jasmine’s arms and shows her where they should be placed. In addition to Irma’s instructions, Jasmine also learns when Gabrielle models her arms. In this situation, Gabrielle’s earlier experiences help Jasmine perform the specific move. That is to say, Gabrielle grabs Jasmine’s arms and performs the move by controlling her arms in the right way at the same time as counting the beats. Gabrielle also receives confirmation that she is ‘modelling’ in the right way when Irma says: ‘Yes’. After this they perform the entire movement sequence from the beginning.
and all four girls do the moves in unison. Thus, the three other girls learn the moves by imitating and repeating Irma’s instructions, while Jasmine also learns from Gabrielle when Gabrielle models Jasmine’s arms.

**Learning by using metaphors.** In lesson six, which is the last lesson before the examination, the members of the same group rehearse their dance. When Gabrielle, Irma and Elina finally think that they can perform all the moves correctly they are excited. But then the following happens.

Jasmine points out that: ‘There was just one thing I didn’t manage to do and it was this’, and shows the move they called the ‘difficult step’, a step backwards. This time, without music, she manages to perform it and exclaims: ‘Look I can but . . .’ Gabrielle fills in: ‘You can, but not mixed with other moves’ and Jasmine nods in agreement. They suggest that Jasmine should practise the move before and after the move that follows. Gabrielle counts and Irma claps while Jasmine practises, first doing the ‘armpit move’ and then the ‘difficult step’. When Jasmine forgets what comes next, Gabrielle shows her the ‘v-step’, the ‘a-step’ and then the ‘squatting’ position. Jasmine tries it again by first doing the ‘armpit move’ and then the ‘difficult step’. After doing the ‘difficult step’ she jumps down into the ‘squatting’ position. However, when she is in the squatting position she realises that she forgot to do the v- and a-steps. She collapses on the floor and starts to laugh hysterically. (Transcript, lesson six)
Jasmine manages to do the ‘armpit step’ and the ‘difficult step’ while being guided by Irma, who is clapping, and Gabrielle, who is counting. Clapping and counting are tools that Irma and Gabrielle use at the beginning to help Jasmine assemble and perform the moves in the sequence. But when Jasmine is in the squatting position she realises that she forgot to do some of the moves. At this point Gabrielle becomes irritated and angry, because she has spent a lot of time with Jasmine in previous lessons practising the moves. The irritation can be heard in Gabrielle’s voice when she tries yet another method to help Jasmine to perform the movement sequence. Gabrielle demonstrates the moves and at the same time tells a story about each move (see Figure 6).

In the above situation we can at first note that Gabrielle, with irritation in her voice, tells Jasmine to ‘search on the map’ while doing the ‘v-step’. Then Gabrielle shouts ‘orientate yourself’ while doing the ‘a-step’. Finally, she jumps into the ‘squatting’ position and says: ‘then you will reach the coconuts and start digging’. Here, Gabrielle uses metaphors, or visual images, as tools in order to help Jasmine perform the movement sequence correctly. What happens is that Jasmine is given an additional tool, supported by her previous experience, as to how she should move to the counting and clapping. Jasmine stands up, stops laughing and does the entire movement sequence again from the beginning (see Figure 7).
In Figure 7, Jasmine uses Gabrielle’s metaphors to perform the movement sequence. In addition, she receives guidance from Irma who, just before the ‘v-step’, cries out ‘the map’. At the same time, Jasmine herself shouts ‘the map’ while doing the ‘v-step’. Guided by Irma she follows the metaphor, although it takes a while before she can use the tool on her own. When Jasmine approaches the final move, Gabrielle raises her voice while counting and when it is time for Jasmine to get into the ‘squatting’ position shouts ‘coconut’. Gabrielle’s tutorial method of counting and shouting ‘coconut’ helps Jasmine to perform the right moves. When Jasmine successfully performs the movement sequence she smiles and the others applaud and shout ‘Yeeaaah’. By practising and using metaphors, Jasmine learns how the moves should be performed and succeeds in doing the entire movement sequence with the support of Gabrielle and Irma.

Figure 8. Learning by using metaphors.
After this scenario Jasmine herself begins to use metaphors and suggests ways of thinking, which Gabrielle tags onto her story (see Figure 8).

In Figure 8, Jasmine uses her own metaphors when doing the ‘armpit step’ backwards. She utters: ‘First I’ll go to Africa, then I go too far’. Gabrielle tags onto this story, starts from the same step and says: ‘First you’ll notice that you’re sweaty... something is wrong’. Jasmine fills in and states: ‘I’ve walked too far so I get sweaty’. Gabrielle does the ‘difficult step’ backwards, and continues with the v- and a-steps at the same time as she tells a story. Finally, the story ends when Gabrielle gets into the squatting position and pretends to catch coconuts.

The story offers Jasmine additional tools for remembering the entire movement sequence. Gabrielle helps Jasmine create a story that enables her to make the various moves intelligible. As Gabrielle becomes an expert in the dance and its moves, she is able to guide and support the novice Jasmine. Gabrielle assists Jasmine with tools in the shape of metaphors or visual images that break down the moves and give them meaning. In this way, Jasmine becomes familiar with the moves and how they follow on from each other. On subsequent occasions Jasmine performs the entire movement sequence with confidence and power. Jasmine thus translates Gabrielle’s storytelling *metaphors* and creates her own in order to become familiar with the moves associated with them and thereby learns the movement sequence.

**Discussion**

In many countries dance is an important part of PE according to national curricula. Although dance offers emotional and aesthetic experiences and relates to a country’s cultural heritage (Mattsson and Lundvall, 2015; see also McCarthy-Brown, 2009; Risner, 2010), students’ experiences of dance in PE are often characterised by a teacher demonstrating moves that students then imitate (e.g. Gard, 2006; Quennerstedt, 2013). However, teachers do not always have the same cultural references as young people today and may find it difficult to match bodily expressions of contemporary youth culture. Digital technologies are also part of contemporary culture that young people can both recognise and relate to in PE (Casey and Jones, 2011; O’Loughlin et al., 2013; Sinelnikov, 2012). After playing a dance exergame in PE one student said: ‘This is more real than the teacher standing in front of the class’. This does not necessarily mean that traditional teaching of dance in PE or dance in terms of cultural heritage is sub-standard. Many teachers teach dance in amazing and creative ways. However, teaching dance often becomes connected to dance skills rather than pedagogy and creative teaching (Lundvall and Meckbach, 2008).

Teaching dance to students in PE further requires a lot of preparatory work and even more so if teachers are insecure about their own dancing abilities. Many teachers can probably acknowledge that rehearsing a dance and its moves and demonstrating them to students is time consuming. Being an instructor takes a lot of effort. The uncertainty that many teachers feel (Connell, 2009; Lundvall and Meckbach, 2008; Mainwaring et al., 2010; Russell-Bowie, 2013) can lead to them being more focused on doing the dance than on the actual teaching. As a consequence, teachers may deliberately limit their teaching of dance in PE (Lundvall and Meckbach, 2008). Nonetheless, teachers do not need to show all the aspects of dance included in the curriculum themselves. Instead, as this article shows, teachers can use a teaching resource such as a dance exergame to guide students in their learning. In addition, this study points to the versatile possibilities with regard to teaching and learning that using video games allows.

Even if this study is from one particular pedagogical intervention in one class and thus cannot offer any generalising ambitions, we have shown that dance exergames can be used as instructors,
facilitators and inspirers of dance in PE practice. When dance games are used in these different ways, the teacher does not need to know all the moves by heart and be focused on making them rhythmical. Instead, he or she can take a wider and more complex pedagogical role. The teacher can assign the demonstration of the moves to the avatar, and then take a step back and observe the students’ movements. Hence, it allows the teacher to focus on teaching in terms of planning and selecting the relevant dances from the exergame, giving students different tasks and walking around the room helping, advising and supporting them. In other words, the use of technology for pedagogical reasons (Casey and Jones, 2011; O’Loughlin et al., 2013; Sinelnikov, 2012), not merely being restricted to the purpose of increased physical activity, can help teachers to teach since they are free to focus on pedagogical issues and are not tied to demonstrating and instructing moves. But where do we go from here? As Ennis (2013) has argued, we need more studies on the educational and pedagogical aspects of new technologies like exergames in PE practice. In this scenario we would argue that both pedagogical interventions like this one and studies building on clear and explicit theories of learning are necessary in order to unpack the pedagogical questions of how, what and why related to the use of new technologies in PE.

It is important to emphasise that dance exergames will affect what and how students learn in dance in PE. However, the relevance of digital teaching resources does not lie in the technology itself. Rather, using technology puts extensive demands on the teacher as a constructor of how the game is used in teaching (e.g. Almqvist and Östman, 2006). The results of this study show that while dance games can be used as teaching resources, teachers need to reflect on why the game is used, for whom and in what context. ‘Throwing-in-a-ball’ in PE is often criticised as bad teaching. The same goes for ‘throwing-in-an-exergame’. In other words, teachers should not use dance exergames uncritically, but should instead develop teaching strategies and situations where students have an opportunity to interact with the avatar in the dance exergame and with each other. Thus, the teacher can focus on teaching and the students on learning to dance.

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**Author biographies**

**Béatrice Gibbs** is Research Assistant at the School of Health Sciences, Örebro University, Sweden. She is also a teacher in physical education at an upper secondary school in Stockholm, Sweden.

**Mikael Quennerstedt** is Professor in sport science at the School of Health Sciences, Örebro University, Sweden.

**Håkan Larsson** is Professor in physical education and sport pedagogy at The Swedish School of Sport and Health Sciences in Stockholm (GIH), Sweden.