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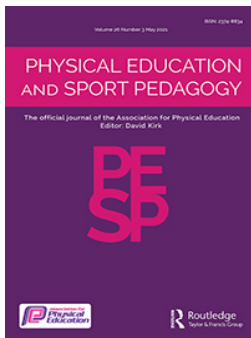
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# Learning in the educational landscapes of juggling, unicycling, and dancing

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## ABSTRACT

**Background:** Movement learning has been thoroughly investigated in the area of motor learning research. Although existing studies have contributed to a substantial understanding of motor learning, many have been criticized for their reliance on experimental designs where learning is decontextualized, simplified, and investigated in laboratory settings. Researchers have claimed that motor learning theories emanating from such studies are grounded on a dualistic approach to learning and that the theories are often difficult to apply in educational settings. More pedagogically-inspired studies of movement education have investigated movement learning, but the majority of this research has focused on teaching. This focus has left the process of learning somewhat unexplored. There is thus a need for empirical studies that investigate students' learning processes in educational contexts.

**Purpose:** The aim of this study is to explore, analyze, and understand how learners develop their movement capability when they are provided opportunities to choose different ways of learning activities.

**Theory and method:** We combine Ryle's and Polanyi's ideas concerning practical knowledge with Hirst's and Carlgren's idea of knowing as familiarity with a landscape. Ryle's notion of 'intelligent practice' is used in thinking of the kinds of actions individuals might engage in. Characterizing features of intelligent practice includes being sensitive to one's own actions, changing one's behavior as the result of mistakes, and profiting from the examples of others. We understand the development of movement capability as continuously expanding one's ability to discern nuances and their relationships. This perspective fits well with Polanyi's notion of focal and subsidiary awareness. Taken together Ryle's, Polanyi's, Hirst's, and Carlgren's notions related to knowing and learning inform our perspective on learning in movement education. Based on this perspective on knowing and learning, an action-oriented study was conducted. The researchers created pedagogical modules and collaborated with teachers and university educators to develop learning sequences in line with the needs of their respective groups. With each group, we produced data based on video and field notes. Three successful learners were chosen and followed in-depth with regard to their learning actions.

**Findings:** The findings show the learners' varying ways of exploring a movement landscape as playing around in the terrain; checking the map; investigating one chosen path; occupying the vantage point;

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## KEYWORDS

Movement learning; practical knowledge; movement landscapes; oscillating

imitating and actively observing. The findings suggest that oscillating between varying kinds of learning actions is an additional characterizing feature of 'intelligent practice.'

**Discussion:** The findings demonstrate how the learning of movement capability could occur when providing opportunities to engage in 'intelligent practice' while at the same time directing their focal awareness toward what is most beneficial to them. Opposed to a 'step-by-step' approach to learning, the learners come to know a movement landscape as extending one's capability to discern and differentiate details, nuances, and their relationships. The findings suggest that it may be beneficial for learners to get opportunities to oscillate between different kinds of learning actions.

## Introduction

Physical education researchers have become increasingly interested in movement capability in the last decade. This increased interest could be the result of at least a couple of influential commentaries. Almost two decades ago, Evans (2004) claimed that discussions of what it meant to be physically educated were scarce and that physical education had justified its place on school curricula with claims to just about anything other than movement learning. Almost a decade later, Kirk (2010) roundly criticized physical education's preoccupation with decontextualized techniques, which he claimed are unlikely to help pupils participated in movement cultures outside school settings (Kirk 2010). Researchers appear to have responded and have launched a number of research initiatives in the area of movement capability (e.g. Renshaw and Chow 2019; Roberts, Newcombe, and Davids 2019). Our own research has contributed to this growing understanding of movement capability.

We have been concerned to challenge narrow views of ability and explore what knowing can mean when it comes to movement education (see e.g. Nyberg 2015; Nyberg and Carlgren 2015; Nyberg, Barker, and Larsson 2020). In this paper, we want to broaden our focus, complementing our earlier focus on the meaning of movement capability with an additional focus on what it can mean to learn movement capability. To do this, we develop the idea that learning movement capability can be likened to extending one's familiarity with a landscape (Nyberg, Barker, and Larsson 2020). From this perspective, learning concerns what one does in a movement landscape that eventually leads to further familiarity with that landscape. In this paper, we draw on observational and interview data to illustrate the processes by which three individuals familiarize themselves with movement landscapes. The specific landscapes investigated are juggling in grade nine physical education, dancing in a sports coaching program, and unicycling in physical education teacher education.

## Movement education research

Movement learning has been thoroughly investigated in the area of motor learning research (see e.g. Abernethy and Zawi 2007; Magill 2011; Laguna 2008; Iserbyt et al. 2010). Although these studies have contributed to a substantial understanding of motor learning, they have been criticized for their reliance on experimental designs where learning is often decontextualized, simplified, and investigated in laboratory settings (Barhama 2019). Unsurprisingly, pedagogy researchers have claimed that motor learning theories emanating from such studies are often difficult to apply in educational settings (Tinning 2010; Steel et al. 2013; Tidén, Redelius, and Lundvall 2017). Critique has also been directed toward the dualistic approach to learning on which these studies have been based (Tinning 2010; Barhama 2019; Moe 2004).

More pedagogically-inspired studies of movement education exist. Such studies have attempted to outline different theoretical perspectives, models, and principles that may prove useful in movement learning situations. These studies include guidelines for promoting physical literacy (Durden-Myers, Green, and Whitehead 2018; Roberts, Newcombe, and Davids 2019); principles for designing teaching by using the nonlinear pedagogy or constraints-led approach (Chow 2013; Renshaw and Chow 2019); principles for enhancing embodied learning based on phenomenology and existentialism (Thorburn and Stolz 2017); guidelines for using phenomenography and the variation theory of learning (Nyberg and Carlgren 2015); and principles for implementing a philosophically-informed kind of ‘practising’ (Barker et al. 2018). Researchers have also investigated the effects of using different theories and models on movement learning (Gray and Sproule 2011; Bergentoft 2018; Nyberg 2018), whereas some scholars have compared different models (see e.g. Bozkurt 2018; Hooyman, Wulf, and Lewthwaite 2014).

The majority of this research has focused on teaching. This focus has left the process of learning somewhat unexplored. Chow (2013), for example, asserted that ‘the over emphasis on comparing one teaching approach against another has blinded researchers from examining more meaningful information about the processes present in these different approaches’ (479). Studies that have taken learners’ experiences into account (Bergentoft 2018; Nyberg and Carlgren 2015; Nyberg 2015; Rönqvist et al. 2019) have tended to overlook what learners actually ‘do,’ or the actions that they take, to develop movement capability (see e.g. Lindgren and Barker (2019) and Barker, Nyberg, and Larsson (2020) for exceptions). There is thus a need for empirical studies that investigate students’ learning processes in educational contexts.

### Theoretical framework: knowing and learning moving differently

Our conception of movement capability as a type of practical knowledge accords with Ryle’s (2009) notion of ‘knowing how’ and Polanyi’s (1969) conception of ‘knowing.’ From this perspective, movement capability comprises both ‘practical’ and ‘theoretical’ knowledge as an indivisible whole.

Other scholars in the field of sport, physical education, and philosophy of sport have been inspired by Ryle and Polanyi when discussing and investigating epistemological issues regarding practical bodily knowledge. Stolz (2013), for example, has highlighted Ryle’s notion of practical knowledge and intelligent performance as significant for physical educators, whereas Breivik (2014) emphasizes Ryle’s critique of intellectualism, which holds that practical ‘know how’ is preceded by mental acts. Additionally, Hawkins (2008) and Kretchmar (2000), when arguing for the significance of meaning in moving and how to strengthen pedagogy in the field of sport and physical education, base their arguments on Polanyi’s ideas of tacit knowing and his notion of meaning. In essence, these scholars have all asserted a need for viewing bodily knowledge as embracing practical as well as theoretical knowledge.

We have previously investigated possible meanings of movement capability with this holistic approach to knowing (see e.g. Nyberg 2015; Nyberg and Carlgren 2015; Nyberg, Barker, and Larsson 2020) and asserted the benefits of investigating *what* there is to know (and learn) in movement education. Our findings from these studies suggest that some ‘what-aspects’ with regard to movement capability are, for example, *knowing one’s own way of moving*, *knowing a rhythm*, and *knowing a pattern* (Nyberg 2014; Nyberg 2015; Nyberg, Barker, and Larsson 2020). Thus, learning movement capability can involve developing one’s capability to know rhythms or patterns. Following Polanyi’s (1969) contentions that knowing, regardless of whether one considers it in a ‘practical’ or ‘theoretical’ sense, is personal and embodied, and that knowing is dependent on a transactional relationship between focal and subsidiary awareness, we regard learning as extending one’s awareness.

In this paper, we combine Ryle’s and Polanyi’s ideas concerning practical knowledge with the idea of knowing as familiarity with a landscape (Carlgren et al. 2015; Hirst 2010). Familiarity has to do with a sense of feel for a place (or in our case, a way of moving). It is centrally concerned

with what one notices or discerns when one is exploring the place. Carlgren et al. (2015) provide a useful example from the field of biology:

... people who know a lot of biology relate to nature in special ways – an expert biologist discerns (and therefore can see) a more differentiated fauna and flora as well as traces of biological processes as compared to a non-biologist. The ability to discern has several layers. On one level there is the recognizing and knowing the names of different species. On another level the ability to determine the species includes elements such as an acquaintance with the different parts of plants such as e.g. leaves or stalks. The biologist must also discern different groups or families of plants, which in turn, are ordered in relation to each other into a huge system of classification. (Carlgren et al. 2015, 147)

The biologist has, during her learning process, integrated ‘subsidiaries,’ thus building a comprehensive subsidiary knowing. A person’s focal awareness depends on what constitutes the subsidiary knowing (Polanyi 2002, 55), which means that what is an expert’s focal awareness differs from the focal awareness of a novice.

Conceiving of knowing in this way can help us to think about how individuals might learn. If knowing comes about through participating, or dwelling in a landscape, with an aim at becoming familiar with it, then examining what individuals do while they dwell can provide us with insights into learning. Ryle’s (2009) notion of ‘intelligent practice’ is useful in thinking through the kinds of actions individuals might engage in. Characterizing features of intelligent practice includes being sensitive to one’s own actions, changing one’s behavior as the result of mistakes, and profiting from the examples of others (Ryle 2009, 17). These actions are not necessarily steered by a preceding mental intellectual process, nor are they easily verbalized. Nonetheless, actions involved in intelligent practice can be seen as ‘learning actions.’

Seeing learning as an intelligent process through which learners build their subsidiary knowing connects with the ideas of educational philosopher Hirst (2010). Hirst rejects traditional step-by-step conceptions of learning. He proposes that: ‘no one means to the end is logically necessary, and which is the best means depends on numerous facts about me and my circumstances’ (Hirst 2010, 10). Swedish educationalist Ingrid Carlgren builds on Hirst’s description of learning as a non-hierarchical way of coming to know something. She suggests that: ‘gradually you learn to discern more and more nuances, understand how the different parts are interconnected as well as [develop] an ability to orient yourself in the landscape’ (Carlgren 2012, 124). She adds that such landscape thinking can be contrasted with traditional conceptions of learning, where the acquisition of knowledge is seen as climbing consecutive rungs on a ladder ‘one step at a time’ (124).

Taken together Ryle’s, Polanyi’s, Hirst’s, and Carlgren’s propositions related to knowing and learning inform our perspective on learning in movement education. That is, we understand learning, or more specifically developing movement capability, as continuously expanding one’s ability to discern nuances and their relationships. People may do this through intelligent practice, involving reflection, flexibility, and willingness to change, and an awareness of others around them. On a more abstract level, discerning nuances and engaging in intelligent practices can be seen to take place as a process of dwelling in a movement landscape. Dwelling may provide possibilities for integrating subsidiaries to expand one’s tacit as well as explicit capability to move in different ways. Furthermore, since learners often differ from one another in what they discern, there are possibilities to learn by observing or communicating with others.

## Methodology

The results reported in this paper come from a larger project in which movement learning was investigated in different movement educational contexts in Sweden (three grade nine PE classes, one physical education teacher education group, and one coach education group, approximately 110 learners in total). The investigation was action-oriented (Kemmis and McTaggart 2005) in that the researchers created pedagogical modules, collaborated with teachers and university educators to develop the modules in line with the needs of their respective groups, and assisted with the

implementation of the modules. The specific aspects of producing empirical material are described below.

### *The learning modules*

The learning modules were designed to encourage students to engage in ‘intelligent practice’ (Ryle 2009) and provide students time to ‘dwell’ in (Polanyi 1962), and reflect on, their own as well as others’ ways of moving. Specific learning experiences were created in a way that reconfigured hierarchically organized, goal-directed skills, and our intention was to help students approach learning as exploring a landscape (Nyberg, Barker, and Larsson 2020; see also Barker, Bergentoft, and Nyberg (2017) and Barker, Nyberg, and Larsson (2020) for discussions of embodied exploration). The general assignment for the learners was to develop a sophisticated appreciation of the movement activity rather than an ability to perform a movement in a specific way.

With regard to the movement activities, we selected unicycling, dancing, and juggling, which we deemed to be activities that fall outside a ‘mainstream sport’ category. The intention was to provide learning experiences that, as far as possible, did not disadvantage students without sporting backgrounds (Tidén, Redelius, and Lundvall 2017). Approximately ten hours of learning activities were planned in each module. The juggling module activities involved a combination of station cards and teacher-directed group activities. The station cards provided inspiration for different kinds of exercises presented as films, pictures, and questions to reflect upon, both individually and in collaboration with peers. Instructions for the group activities were provided by the teacher and contained an element of challenge (e.g. can your group come up with different ways to juggle?). The unicycling involved brief inputs from the teacher educator, relatively long periods of practising in which the students could attempt to unicycle with the aid of different apparatus, and whole-group discussions in which students reported their experiences and shared what they were learning about unicycling. Dancing activities were presented by the course lecturer and through instructional video clips. The students spent a significant part of the ten hours – approximately four hours – practising dance moves and putting them together in a routine. The module culminated in performances given by each of the groups.

### *Sample selection*

For the purpose of this study, we selected one student from each movement activity who appeared to be a novice initially and who developed considerable movement capability over the course of their learning module. We evaluated improvement differently in the different contexts. In juggling, it meant going from not being able to keep two objects moving through the air to managing to throw and catch different objects in a pattern that made continuous juggling possible. In unicycling, it meant going from not being able to pedal on the unicycle to riding without support and managing to regain balance after disruption. In dance, it meant going from jerky, halting ways of dancing to moving in ways that were similar to the presented dance moves and being able to put at least four dance moves together to form a dance sequence. Additionally, pragmatic criteria were that (1) the students were present for the majority of the lessons and (2) they were caught by the cameras during the ten-hour modules.

### *Data production*

With each group, we produced both experiential (interview and reflective-writing) and spatial (video and field notes) data. Due to the theoretical framing of this paper, and specifically the attempt to understand students’ approaches to learning in terms of their actions, only video data are referred to here. Video data were produced by two researchers circulating in the learning environments with chest-mounted GoPro video cameras. The researchers filmed individuals and



groups of individuals, remaining with individuals/groups for approximately five minutes at a time. The researchers entered the sessions as ‘interested physical educators,’ a role that involved entering into ethnographic-type conversations (Spradley 1979) with the students and asking the students questions about their learning experiences.

## Analysis

The first step in the analysis was to watch all the video footage of each of the three students, while they were exploring the landscapes of juggling, unicycling, and dancing. While watching this video material, each student’s actions and verbal expressions were transcribed. Transcription was theoretically driven, and transcriptions covered aspects related to the ways that the students’ actions and expressions could be seen as (tentative) attempts at coming to know the landscapes of unicycling, dancing, or juggling, in more complex and differentiated ways. Questions guiding analysis were: what do the students ‘do’ when they explore the landscape? What seems to be beneficial for them coming to know the landscape? In what way do they explore? Do they ask for help and if so, what kind of help?

After transcribing all of the students’ actions and verbal expressions, the next step was to return to the actions/expressions and provide them with codes. This step was initially done by the first author, who relied on what Miles, Huberman, and Saldaña (2013) refer to as *in vivo* coding. The third step of the analysis was collaborative in nature. The first author sent the marked transcriptions to the other authors. Together, the authors came to an agreement on the possible meanings of the marked expressions, as they related to different ways of coming to know a landscape. Our goal in this analytic activity was to gather all observed ways of exploring and identify differences in the students’ ways of acting (as opposed to trying to see what was overall characteristic for each student).

## Ethical considerations

Ethical approval was granted by the Regional Research Ethical Review Committee. The research was conducted in accordance with the Swedish Research Council’s ethical guidelines (SRC 2017). Participants, and where relevant their guardians, were informed about the project, its purpose, and how collected material would be used. Informed, active consent, which included the possibility to cease participation at any time, was obtained from the participants. The use of video cameras raises issues of confidentiality, possibilities for anonymity, and privacy for all participants. The video-filmed material was only used for research purposes and was stored in a manner that prevents unauthorized use. Anonymity was not possible or desirable in the analysis of the data. Instead, we aimed for anonymity in the presentation/publication of the research results. Therefore, the students’ names are fictitious in this paper.

## Findings

### *Ella explores the landscape of juggling*

#### *Ella’s learning environment*

Three girls are practising juggling, one of whom is Ella. Ella seems to be comfortable with her group and they appear to be good friends. When the teacher asks Ella to work in another group, she quietly returns to her friends anyway. Mostly, the girls just laugh when the objects (beanbags, scarves, or balls) fall to the ground. Ella seems to be comfortable in this learning environment, and this allows her to explore the movement landscape in a joyful, carefree manner. Ella’s group stays with their selected tasks provided in each lesson, and in this way, the girls encourage each other to persist with their exploration of juggling. In the last two lessons, however, when the class’s task is to create a short juggling show, Ella’s approach changes. She is placed in another group,



which combined with the change of task, and seems to inhibit her experimenting and playfulness. She appears to become reluctant to search for new possible paths in the landscape. Furthermore, she laughs less than she did when working with her two friends. Ella's exploration is less joyful than before.

### *Playing around in the terrain*

From the very beginning, Ella seems to be comfortable in exploring and experimenting when throwing and catching different objects. She plays, smiles, and laughs.

Ella has grabbed two beanbags and throws them in one big circle quite successfully. In other words, she throws them from left hand to right hand, from the right hand up and landing in the left. She smiles all the time. One of the researchers asks 'ok, what are you doing now, tell me.' Ella laughs and says 'ha, ha, I don't know really.' She goes on throwing the bean bags in one circle. 'Isn't this the way to do it ... and then you should clap also.' She tries to clap her hand on the chest while juggling but drops the bean bags. (L1, Camera 1G, GP020005)

Ella is playing and experimenting not only with bean bags, skittles, and balls but also with her own way of moving. She tries out what happens when jumping while throwing objects higher and higher, and she also tries to perform gymnastic moves before catching the thrown objects:

[...] she throws the ball up in the air while at the same time performing a 'split jump' before she catches the ball again. After a couple of minutes she stops, seemingly thinking about something. Then she throws the ball up again and performs a cartwheel. (L 3, camera 1, GP03004)

On the whole, Ella seems to be relaxed and playful. She explores the landscape of juggling as if there is nothing to fear 'in there.' She tries out different possible paths in different directions in a carefree mood.

### *Checking the map*

Although Ella is playfully running around in the terrain in terms of playing and experimenting, she also wants, to a certain extent, to keep control. She often gathers the balls and bean bags to her chest before initiating her next attempt (and dropping them):

Ella seems to stop the juggling when she feels a skittle will fall and manage to gather both at her chest before that happens. When she occasionally drops one skittle she throws herself to the floor trying to catch it. (L 3, Camera 1, GP020008)

She grabs them again and this time she adds a third bean bag, throws them all up in the air and catches them like she is holding a baby at her chest. (L1, Camera 1G, GP020005)

It seems as if Ella sometimes gathers the objects to her chest, even when it is not necessary. This could be likened to 'checking the map,' or coming back to a 'familiar' position before setting off to explore the unfamiliar again.

### *Investigating one chosen path*

Quite often, Ella leaves her spontaneous and rather unsystematic exploration of the terrain and chooses one path to pursue. When she does this, her engagement appears more 'rational' and thought-through:

[...] she grabs two bags in her right hand, one in her left and seems to think. She throws one bag from the right hand up in the air and catches it with her left hand. She seems very concentrated. Then she tries again also throwing the second bag from her right hand. (L1, Camera 1G, GP020005)

When Ella tries to find out in what order the objects are to be thrown, she takes one bean bag and moves it upward through the air to the other hand. Then she repeats this with the second bean bag following the pattern in which it should be thrown if she would juggle with the 'cascade pattern' instead of in one big circle (L1, Camera 1G, GP020005). In this sequence, she slows down, following one path as if she is looking for clues that will help her find a way.

Occasionally, Ella retreats into her 'own world,' but much of the time, she is exploring and interacting with others:

Ella turns to her friend. They try to figure out the pattern in which the bean bags should be thrown. They practise together and suddenly Ella succeeds with one 'lap.' She stops, looking surprised and then she smiles widely. (L1, Camera 1G, GP020005)

Ella's success seems to be a lucky accident, but she shows awareness of her success. When learning one path thoroughly, Ella sometimes travels alone and sometimes she travels with someone else.

Ella's approach to exploring and learning the landscape of juggling can be described as oscillating between different ways of exploring. Sometimes she experiments in a playful way while at the same time aiming at controlling the objects. At other times, she leaves her playful experimenting, staying at one path to learn it in a more 'rational' manner. Both ways can be conducted individually or with someone else.

### *Robert explores the landscape of dancing*

#### *Robert's learning environment*

Robert is a coach education student participating in the dance class. He seems to be quite relaxed with the group in which he starts to work. It is apparent that he considers himself a novice and he places himself in the background, often observing his classmates without moving. In many respects, he acts out his lack of experience in dancing. The members of his group are also, more or less, novices, but they are keen to start moving, trying out different paths. Robert does not explicitly ask for help although his group members are willing to help. Only when one of the researchers suggests that Robert needs assistance, does he ask for directions.

When Robert joins another group in the last two lessons, his learning environment changes. After having learned quite a lot regarding the different dance moves through trying out different possible paths as well as investigating some paths thoroughly, he now just follows two classmates who have assumed leader roles within the group.

#### *Occupying the vantage point*

When each new dance move is introduced, either by the teacher or through a video, Robert takes a position as an observer. As observer, he does not move except for lightly stroking or pulling his beard. He just watches:

The instructor on the video starts with showing the step in a fast mode and then in a slow mode. Robert's classmates start imitating, following the instructor. Robert does not. He still stands with his arm crossed occasionally pulling his beard, watching. After five minutes, Robert does not yet move. (L 1, Camera 1, GP050096)

Although Robert does not follow the instructor as his classmates do, he seems to be actively observing and after a while, he also begins to imitate the instructor on the video. It is like he initially prefers to get a view of the landscape from above before he explores different possible pathways.

#### *Following*

Robert follows others' ways of moving in different ways. At times, he seems to merely imitate without reflecting on his own way of moving:

They practise many times. Robert manages quite well sometimes although he struggles to catch up. He is like marching in the end of a line of soldiers rather than dancing on his own. (L 5, camera 1, GP010678)

At other times, he imitates with another kind of awareness. In the excerpt below, Robert and two classmates practise a dance move called 'the shuffle.' Elisa tries to instruct Robert:

Elisa raises her left knee. Robert follows. 'And then' (to Robert). She slides backwards with the other foot. Robert follows and manages to do this. The researcher says 'yeah' pointing at Robert. Robert smiles. Elisa and Robert continue doing the shuffle slowly. Robert has difficulties with balancing. He seems to thoroughly concentrate and sense how he is moving. (L 1, Camera 1, GP050096)

Robert imitates and follows either actively with the sharp awareness of his way of moving, or passively in terms of following on a leash, through a landscape without knowing where he is heading. In this latter kind of action, he is merely trying to catch up and become more aware of the leaders' ways of moving than his own.

### *Investigating one chosen path*

At times, Robert seems to analyze his way of moving by dividing the movement up into parts. He is deeply concentrated, for example, when trying to figure out how to do 'the shuffle':

Robert shakes his body a bit and takes a position in order to try again. He takes a deep breath and makes a move with his arms up-down as he blows out the air. Then he tries again. The other students in his group perform 'the shuffle' in a fast way but Robert ignores them, moves slowly, one part of the move, stops and then next. He manages but loses balance before ending the movement. He starts again, this time in a different position holding his arms spread out to the sides, he slides, stops and laughs. 'What's the name of the guy in the Magill-book ... the one who says you should break down the movement', he says. (L 1, Camera 1, GP050096)

In this situation, Robert is referring to a course textbook. The 'textbook approach' is to break the movement down into parts, practise each part separately, and then put them together. This would be similar to investigating one path in a landscape before moving on to a second and third, and eventually attempting to connect the paths together to get a sense of the whole area. Robert does, however, also attempt to see the 'whole area' by trying the dance move without breaking it into parts:

Robert imitates the instructor on the video and he manages this step (kick ball change) immediately. However, when trying further he leaves out the end of 'the change.' But he continues to imitate. He gets it again and soon he also moves his arms. It seems that he is confident in doing the kick ball change! (L 2, Camera 1, GP010100)

In other words, Robert explores and learns one path in the landscape of dancing in two distinct ways: as if the path consists of separate sequences, and as if it is a nondivisible whole.

### *Playing around in the terrain*

Sometimes, Robert is playing around in the terrain in terms of experimenting and creating different ways of moving. This is especially obvious when he and his group are dealing with the task of 'interpreting' a movement that is only textually described:

The group walk to the next station where a written description of 'the wave' is. Albert and Robert read quietly side by side. Robert starts to wave his arms. Then he raises up and tries a 'bigger wave' but still only with his arms, bending his knees a little bit. He varies this for a while and stops. Then he bends forward, starts with his hands on the floor and does a wave-like movement ending up standing with raised arms. While Albert is still reading, Robert moves all the time, trying out different ways of 'doing waves.' It looks smooth. (L 2, Camera 1, GP030100)

Earlier in this lesson, Robert described himself as 'stiff,' which is not the case when he explores 'the wave.' He also tries to help Albert and John (who try to understand through reading and moving one body part at the time) by using metaphors: 'you could instead imagine sea weed, waving under the water' (L 2, Camera 1, GP040100).

Robert explores the landscape of dancing by trying out different paths, playing around quite freely in the terrain. He frequently shows his difficulties and laughs. Robert's overall approach to coming to know the landscape of dancing can be described as oscillating between different ways of learning of which two significant ways are exploring one path in a concentrated and determined manner, either as learning the parts or the whole, and moving around in the terrain, experimenting,

and playing. Sometimes he explores the landscape together with others, but for the most part, Robert seems to prefer doing this alone. He seemingly also prefers to observe, occupying the vantage point, before he starts his embodied exploration.

### *Sanne explores the landscape of unicycling*

#### *Sanne's learning environment*

Sanne is very active in her learning environment. She approaches classmates, asks questions, asks for help, and discusses with them how to learn unicycling. She chooses to work with different peers. She actively observes others' different ways of exploring how to unicycle and then determines and practises her own ways of exploring pathways.

Sanne is persistent and sometimes angry but most of the time she laughs when she fails to ride the unicycle as many of her classmates do. She practises a lot together with one student who is also engaged and persistent while at the same time helpful and encouraging. Her body posture often signals 'angry determination.' On the other hand, failing seems for Sanne and many of her classmates to be something that is required and part of the learning process.

#### *Actively observing*

Sanne seems to be very engaged in learning unicycling. She observes her classmates' trials and discusses and comments on ways to improve her own (and others') unicycling:

Sanne is working with Ylva at a box. Ylva mounts the unicycle and Sanne is watching, holding out her hand for support. After a couple of meters Ylva falls. Sanne asks: 'shouldn't we try to raise the saddle?' One of the researchers asks why she suggests this. Sanne says 'well I think ... coming up more' ... she shows by stretching herself. 'Instead of like ...' she bends forward. Ylva wants to try again and Sanne offers her hand as support. While doing this she observes Ylva's pedalling, quite concentrated. Ylva falls. The researcher says to Sanne 'I think you have a point there' and Sanne encourages Ylva to raise the saddle. (L 1, Camera 1, GP040028)

Sanne actively directs her attention to different aspects of unicycling, specifically one's position on the bike and in the above case, the height of the saddle and how this can affect one's upper body position. She is active in terms of interacting with other students in order to notice details and their relations in the landscape.

#### *Investigating one chosen path*

Sanne persistently practises, either with support from a classmate or alone. A considerable part of her practising involves struggling with finding a balanced start position on the unicycle. She experiments with different strategies that may help her and one solution seems to be finding a proper height of the saddle:

Sanne mounts the bike, Ylva supports with her hand. Sanne seems to be aware of whether the height of the saddle is good for her or not. 'I don't think I would like it higher' she says. (L 2, Camera 1, GOPR0619)

Apart from finding a proper height of the saddle, she tries to be aware of where to look and what muscles ought to be tightened:

Sanne cycles on her own at least ten meters. She stops and raises both arms in a victory gesture. 'GOOD', Karen shouts, 'shit what happened?' 'I don't know', Sanne says, 'I just balanced.' Sanne tries again and manages to ride even further. It looks balanced and stable at least 20 meters. She stops, raises her arms again and makes some happy dance moves. When she is back, Sanne and Karen discuss how to best control the bike through 'tightening one's butt.' Karen says that this is a way to make the bike a 'part of the body' and Sanne agrees. (L 3, Karen's camera, GP020645)

Sanne explores and develops an understanding of one path in the landscape of unicycling. She continues to explore the landscape, whereas some others in the group decide to sit down and have a break. There is one part of the landscape that she thinks is especially important to understand so she

stays there, trying to work out what it is and how it works in a quite rational and systematic way. She uses her senses, observes, and discusses with classmates and is persistent in her practising. She both receives and offers support in terms of advice and concrete support through holding hands. She oscillates between practising on her own and actively observing others.

## Discussion

Our aim of this study was to complement our earlier focus on the meaning of movement capability with an additional focus on what it can mean to learn movement. In achieving this purpose, we have investigated students' learning processes in terms of how they explore and familiarize themselves with the movement landscapes of juggling, dancing, and unicycling. The findings show the students' varying ways of exploring a movement landscape as playing around in the terrain; checking the map; investigating one chosen path; occupying the vantage point; following; playing around in the terrain; and actively observing.

When comparing the different ways of exploring, similarities as well as differences regarding ways of exploring can be noted. Ella's, Robert's, and Sanne's ways of exploring differ regarding what they 'do most.' Ella is to a great extent involved in pleasurable, carefree exploration, with elements of systematic exploration; Robert is involved in systematic exploration ('getting it right'), with some elements of pleasurable exploration but specifically with a lot of contemplation (when he pulls his beard, observing); and Sanne is also involved in systematic exploration ('getting it right'), with a lot of determination and active observing (rather than contemplation).

The most apparent similarity is a feature within the research participants' ways of exploring that we call oscillating between different kinds of 'doings.' Oscillation designates a move back and forth between two (or several) points, and Ella's exploration oscillates between (a) lively experimenting (playing around) and systematic practising (investigating one chosen path), and (b) group and individual exploration. Robert's exploration oscillates between (a) actively doing and withdrawn observation, (b) imitating and experimenting (playing around), and, like Ella, (c) group and individual exploration. Sanne's exploration oscillates between (a) actively doing and active observation, and, like Ella and Robert, (b) group and individual exploration. Thus, group and individual exploration are noticeable among all three of them.

The learners in this study chose different ways of exploring the landscapes, and they are to a great extent engaged in what Ryle (2009) would call 'intelligent practice.' They seem to (i) be sensitive to their own actions (when investigating one path as well as when playing around and experimenting); (ii) change their actions as the result of mistakes (e.g. when varying their experimenting and when Sanne decides to change the height of the saddle), and (iii) profit from examples of others (when observing and imitating). According to these findings, we suggest that oscillating between varying kinds of learning actions is an additional characterizing feature of 'intelligent practice.'

Engaging and dwelling in 'intelligent practice' allow, we argue, individuals to direct their focal awareness to what is most beneficial for them. As mentioned earlier, one can assume that learners' earlier embodied movement experiences vary. The result is that in a group of learners, individual subsidiary knowing differs widely. Consequently, a learner whose subsidiary knowing is extensive needs to attend focally to other aspects than a learner whose subsidiary knowing is less extensive (see Polanyi 1969).

The findings demonstrate how the learning of movement capability could occur when providing opportunities to engage in 'intelligent practice' (Ryle 2009) while at the same time directing their focal awareness (Polanyi 1969) toward what is most beneficial to them. The findings suggest that oscillating between varying kinds of learning actions is a characterizing feature of 'intelligent practice.' This study also provides examples of how learners can explore and familiarize themselves with a movement landscape in a nonhierarchical way (Hirst 2010). Opposed to a 'step-by-step' approach to learning, they come to know a movement landscape as discerning and differentiating details, nuances, and their relationships (Hirst 1974, 124; Carlgren et al. 2015).

This study differs from traditional motor learning research in that it is conducted in authentic educational settings as opposed to laboratory contexts. This may enhance the use of the findings in movement education settings (Barhama 2019; Steel et al. 2013; Tidén, Redelius, and Lundvall 2017). A dualistic approach to learning (critiqued by e.g. Tinning 2010; Barhama 2019; Moe 2004) has been replaced by a perspective on learning as becoming familiar with a landscape, thus replacing a traditional hierarchical step-by-step approach to learning. Finally, in contrast to earlier work that has considered the place of knowing in movement education (Nyberg 2015; Nyberg, Barker, and Larsson 2020), we have focused on what is involved in learning. Our perspective on knowing and learning in this paper does not separate practical knowing from theoretical knowing but instead approaches them as one in the same. To learn or to familiarize oneself with a movement landscape involves the development of both aspects of knowing.

Although we based the learning sequences on an approach to knowing and learning as becoming familiar with a landscape, we did not specify guidelines or principles for teaching (see e.g. Durden-Myers, Green, and Whitehead 2018; Roberts, Newcombe, and Davids 2019; Renshaw and Chow 2019; Thorburn and Stolz 2017). Nor did we investigate the effects of any model or principles as was done by Gray and Sproule (2011) and Bergentoft (2018). Rather, we have suggested a way of approaching learning, designed learning sequences, and then chose three learners whose progress was apparent in order to analyze their learning processes.

## Conclusion

The aim of this study was to understand students' learning processes and how they come to familiarize themselves with the movement landscapes of juggling, dancing, and unicycling. The study shows how the learning of movement capability could occur when learners are 'dwelling' (Polanyi 1969) in, and engaged in 'intelligent practice' (Ryle 2009).

The findings suggest that oscillating between varying kinds of learning actions is a characterizing feature of 'intelligent practice.' These different kinds of learning actions, and opportunities to oscillate between them, could be acknowledged by teachers when arranging learning environments with the aim of helping learners to develop movement capability. We want to emphasize also that the way the teacher acts, listens, and interacts with the students during their practising is important. The teacher can help learners by providing them with opportunities to vary their movement learning actions. It may be useful to set aside time for reflective action or observation, for example, or simply ask pupils to dedicate some time to these actions while practising. It may even be useful simply to identify different learning actions explicitly so that learners are aware of different options for action while coming to develop movement capability. The teacher can also enable learning by suggesting and showing variations of the different tasks with the aim of helping learners to develop their movement capability.

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