The value of movement content knowledge in the training of Australian PE teachers: perceptions of teacher educators

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Abstract
The purpose of this paper is to describe, analyse and discuss the statements made by Australian physical education teacher educators (PETE) in terms of how they perceive and value movement content knowledge (CK) in their assessment of movement courses. Drawing on Shulman's perspective of CK, this paper builds on qualitative analysis of in-depth interviews with nine teacher educators from a total of seven PETE universities in New South Wales as well as written unit outlines including assignments from these PETE universities. The main results from the study show that among the participants, movement CK is conceptualised as physical movement performance. This conceptualisation limits the value placed on movement CK in the assessment of PETE students. Further, movement courses are often assessed using written assignments rather than practice-oriented assignments. The findings have been analysed and discussed in relation to Shulman-inspired concepts of CK and pedagogical content knowledge (PCK), as well as in relation to epistemological perspectives in PETE.

Keywords
content, movement, knowledge, value, training, educators, australian, pe, teachers:, perceptions, teacher

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The value of movement content knowledge in the training of Australian PE teachers: perceptions of teacher educators

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\section*{ABSTRACT}

The purpose of this paper is to describe, analyse and discuss the statements made by Australian physical education teacher educators (PETE) in terms of how they perceive and value movement content knowledge (CK) in their assessment of movement courses. Drawing on Shulman’s perspective of CK, this paper builds on qualitative analysis of in-depth interviews with nine teacher educators from a total of seven PETE universities in New South Wales as well as written unit outlines including assignments from these PETE universities. The main results from the study show that among the participants, movement CK is conceptualised as physical movement performance. This conceptualisation limits the value placed on movement CK in the assessment of PETE students. Further, movement courses are often assessed using written assignments rather than practice-oriented assignments. The findings have been analysed and discussed in relation to Shulman-inspired concepts of CK and pedagogical content knowledge (PCK), as well as in relation to epistemological perspectives in PETE.

\section*{KEYWORDS}

Physical education teacher education; movement; content knowledge; pedagogical content knowledge; Australia

\section*{Introduction}

The discussion about what content to prioritise in physical education teacher education (PETE) is ongoing, particularly in the US and Australia, and has been for some decades (see, for example, Kirk, 2010; Macdonald, Hunter, Carlson, & Penney, 2002; O’Sullivan & Parker, 2018; Rink, 2007; Siedentop, 2009; Tinning, 2010). Siedentop (2009) argues that the most fundamental as well as the most marginalised part of content knowledge (CK) for pre-service teachers in physical education (PE) is movement CK.\textsuperscript{1} While scholars agree as to the value of movement experience by PETE students, there are different ideas with regards to whether movement CK should be assessed or not. This is particularly the case for one part of movement CK, namely physical performances of movement.

the discussion, on which several Australian researchers position themselves, argues for less emphasis on the assessment of movement CK, and in particular less emphasis on the assessment of personal demonstrations of technique, for the benefit of socially critical reflection in terms of the purpose of PE (Capel, Hayes, Katene, & Velija, 2011; Fyall, 2017; Macdonald, 2005; Philpot & Smith, 2018; Tinning, 1992, 2004, 2010; Tinning, Macdonald, Wright, & Hickey, 2001). In this paper, we will respond to Herold and Waring’s (2009, 2017) call for a further investigation of the role of movement CK in PETE in our ambition to contribute with more balance and nuance to the somewhat dichotomised discussion.

Through an analysis of statements about the assessment of movement courses, we will investigate how Australian PETE educators perceive and value movement CK. The collected material that we refer to in this paper consists of interviews with nine PETE educators in New South Wales (NSW), and the analysis of written assignments for assessment. Illuminating these issues can assist PETE educators to be vigilant with regards to what types of teacher knowledge they want their students to develop through movement courses.

**Movement CK in Australian PETE**

PETE programmes, as with all initial teacher education programmes in Australia, have nationally agreed professional standards describing what teachers should know and be able to do (AITSL, 2013; BOSTES, 2014). CK for Australian PETE students is, at many universities, constituted by the field of Human Movement Studies (HMS) in which movement is embedded into one or more sub-disciplines. Movement CK in Australian PETE programmes generally has five components: Games, Aquatics, Gymnastics, Dance and Athletics. These are taught in Australian schools. Within these five components, there are ‘certain institutional practices and forms of pedagogy’ that have been developed ‘to (re)produce valued knowledge’ (Tinning, 2010, p. xi).

The research on movement CK in Australian PETE has focused heavily on constructivist game pedagogies such as Teaching Games for Understanding (TGfU) and Game Sense (GS) rather than on individual sports and movement activities. The value emphasised in research on game pedagogies in Australia does not specifically address the students’ ability to ‘play the game’ but rather their understanding of the game (which can implicitly include playing the game) as well as their ability to think critically about how the game is played and about who benefits from the way the game is played (Forrest, 2015; Forrest, Wright, & Pearson, 2012; Light & Butler, 2005; Light & Georgakis, 2007; Pill, Penney, & Swabey, 2012). The literature on movement CK in Australian PETE emphasises learning potentials and less of assessment (see Forrest, 2015 for an exception). Tinning (2010) claims that ‘personal demonstrations by the teacher might be a useful pedagogical device but are not absolutely necessary for teaching PE’ (pp. 128–129). Further, he argues that if PETE students need to develop movement CK, then they must be encouraged to do so themselves, outside teacher education (Tinning, 2010).

Based on the literature about Australian PETE, the position of movement CK in PETE programmes, as well as the meaning of movement CK for future PE teachers, appears to be an underdeveloped issue, particularly with regards to individual movement activities. In this paper, we will investigate if this observation in the literature is reflected in PETE educators’ statements about how they assess their PETE students in movement courses.
Theoretical perspective

Our way of thinking about movement knowledge for PE teachers has been informed by Shulman’s (1987) division of different forms of teacher knowledge, and in particular CK and pedagogical content knowledge (PCK). Shulman (1987) has defined CK as ‘the accumulation of literature and studies in content areas, and the historical and philosophical scholarship on the nature of knowledge in those fields of study’ (pp. 8–9) and PCK as ‘the blending of content and pedagogy into an understanding of how particular topics, problems or issues are organized, represented, and adapted to the diverse interests and abilities of learners, and presented for instruction’ (p. 8).

It has been claimed that both CK and PCK are underspecified concepts that lack precision (Ball, Thames, & Phelps, 2008; Ward, 2009; Ward, Kim, Ko, & Li, 2015). Drawing on a further development of these concepts by Ball et al. (2008), Ward and colleagues (Ward, 2009; Ward et al., 2015) have shown that there are different forms of movement CK and different forms of PCK for a PE teacher. One form of CK that will be central to the results in this paper is common content knowledge (CCK). For example, Ward (2009) suggests that CCK can be expressed through the performance of the crawl stroke as well as through cognitive knowledge about technique, tactics, rules, etiquette and safety in swimming.

Although we do not agree with the behaviour analytic perspective underlying the work of Ward (Ward & Ayvazo, 2016; Ward, Ayvazo, & Lehwald, 2014), and instead position ourselves within a constructivist research tradition, we find his contextual explanations of different forms of movement CK and of PCK useful in our work. However, the use of CCK as an analytical tool implies being strict to Ward’s (2009) definition, and because research has shown that movement CK can include other perspectives of movement, we will further use movement CK and PCK as our analytical concepts. International PETE literature demonstrates that there are different views on the role that movement CK has in the development of PCK in PE. Some years ago, Macdonald (2005) acknowledged that ‘many Australian PETE programs emphasize theoretical learning rather than physical performance skills’ (p. 27–28). In light of this, we find the Australian PETE context to be particularly interesting in our aim to describe, analyse and discuss PETE educators’ statements about how they perceive and value movement CK in their assessment of movement courses.

Methodology

The sample

By the end of 2014, the year in which this study was conducted, there were 24 universities across Australia offering PETE: eight were in New South Wales (NSW), which is one of six states in Australia. These eight universities in NSW are the sample that we based our study on. Seven PETE universities of the total sample of eight took part in the study. For the interviews, we approached the head of each PETE department and asked him/her to recommend two staff members who taught movement and sport courses whom we could contact for this study. Our request was for one male and one female participant from each university since there is research that claims PETE to be a male hegemony and a producer of gender stereotypes (Dowling, 2006; Tinning, 2006). After we contacted 14
recommended participants, nine (five female, four male) PETE educators agreed to take part in one in-depth, semi-structured individual interview (Fontana & Frey, 2003). Their ages spanned from 34 to 56 years, and their experience from teaching PETE spanned from one to 15 years. A few of the participants were from countries other than Australia and had international experience of teaching PETE students. The participants in the interviews were asked to contribute with a minimum of two unit outlines for courses in sport and movement practices for PETE students training to be secondary-school teachers. A unit outline is a written document in which the curriculum for a course is identified, including content, assignments and criteria for assessment of movement and sport practices. The unit outlines we studied had titles such as ‘Gymnastics and Dance’, ‘Teaching and Learning Invasion Games’, ‘Physical Education’ and ‘Foundations of Movement Skill Acquisition’. The unit outlines we collected did not state whether the courses addressed movement as CK, as PCK or as both. The sample of both unit outlines and interviewees can be described as strategic and purposeful (Patton, 2002), in line with the sample in Dowling’s (2006) study of PETE educators in Norway. The names of the participants in this paper are pseudonyms.

**Data collection**

We collected the data from the participating universities in November and December 2014. After we had sent information about the study by e-mail (telephone calls were also made), 14 unit outlines in total were sent to one of the authors by e-mail, predominately from the PETE staff who had been interviewed. This initial part of the contact also included information about the ethical approval that the university of one of the authors had granted and about the participants’ consent to take part in the study. All the interviews were conducted by one of the authors at the participants’ respective home university except for one, which was conducted over the Internet, face-to-face in real time. The interviews ranged from 45 to 75 min. The interviews were semi-structured and consisted of a series of questions that focussed on assessment of movement CK in PETE programmes and the value that PETE educators placed on movement CK in their courses. More specifically, the interviews were based on the following main questions:

1. How do you conceptualise movement CK?
2. What are your experiences of teaching and assessment of movement CK for PETE students?
3. What is the difference between movement as CK and movement as PCK?
4. What is the significance of movement CK in order to succeed as a PE teacher?
5. How do you document assessment of movement CK?
6. Can you describe the process of constructing assignments and criteria for assessment in movement CK?
7. Can you describe a PETE student who has a high level of movement CK and one who has a low level of movement CK?

The interview guide also contained more specific follow-up questions. Inspired by Herold and Waring (2009), we tried to adopt a questioning strategy that allowed the participants to ‘talk freely about their experiences, enabling them to use whatever terminology
they felt comfortable with’ (p. 345). As our study only involved PETE universities in NSW, we do not claim the results of this study to be general for all PETE institutions in Australia, especially since Whittle (2014) found differences between Australian PETE universities with regards to how practice and theory are valued in assessment.

**Transcription and analysis**

The nine interviews were transcribed verbatim by one of the authors in January and February 2015. Drawing on Herold and Waring (2009), we recognise that participants ‘might explore a range of aspects related to the knowledge base of teaching, without using consistent terminology that distinguishes between different aspects of subject knowledge’ (p. 346). The analysis was divided into two phases. In the first phase, when reading through the collected and transcribed material, we asked ourselves questions such as ‘How do Australian PETE educators perceive movement CK?’ and ‘How is movement CK valued in the assessment of movement courses in Australian PETE?’ Asking these questions involved a process of clustering as described by Patton (2002) as convergence, which was followed up by a process of divergence, that is, an exclusion of formulations and quotes that did not fit into the identified pattern. This process resulted in the first seven themes presented in the results section. In the second phase of the analysis, presented at the end of the results section, we use a model by Shulman (1987) to analyse the themes found in the results.

**Trustworthiness and authenticity**

The trustworthiness of the study reported in this paper is strengthened by way of measures at different levels. There is a certain degree of trustworthiness built into the fact that the aim of this paper is a product of the state of knowledge about movement CK in PETE. Carlson (2010) suggests that ‘if researchers can substantiate these various data sets with each other, the interpretations and conclusions drawn from them are likely to be trustworthy’ (p. 1104). Following this, our ambition to gather and analyse data in more than one way could also be seen as a way to strengthen the trustworthiness of this study. Interview responses were compared to what was provided in relation to the assessment of movement CK in the unit outlines. We also argue that the ethical approval granted a certain degree of authenticity (Lincoln & Guba, 2003). Further, we mean that there is authenticity built into the interviewer’s and the interviewee’s intersubjectivity, i.e. the degree to which they perceive their conversation in the same way (Ödman, 2004). The intersubjectivity might have been facilitated by the fact that the interviewer was not only a researcher but also a PETE educator in various movement courses.

**Results and analysis**

**Movement CK interpreted as physical performance of movement**

When asked about the significance of movement CK for teaching PE, several of the interviewed PETE educators interpreted movement CK to be the physical performance of
movement. In the quote below, Mable uses movement demonstration as a tool to relate to when explaining how she would teach an unfamiliar activity.

Researcher (R): What is the significance of movement CK when teaching movement courses?
Interviewee (I): Sometimes I think like … I can’t throw a javelin. But I have an understanding of how I can teach it without having to demonstrate it, you know …
R: How do you do that?
I: Mm … let’s say I am teaching freestyle swimming, maybe I would demonstrate the kicking action, I would be able to practice the breathing, you would have to break the skill down. Mable, uni 4.

In a situation where Mable cannot demonstrate the movement herself, it still seems that demonstration of the skill, broken down into parts, is the teaching strategy that first comes to her mind. The interpretation of movement CK as physical performance was characteristic for many of the conversations with the interviewed PETE educators. While movement demonstration was often referred to in the interviews, few expressed the need to formally assess PETE students’ physical performance.

The ability to teach – a predominant theme

The overall impression from the interviews is that there is an emphasis on assessment of PETE students’ abilities to teach movement. Below are two illustrations of this: one is an example of a teaching assignment from a unit outline and one is a quote from Heidi in which PETE students’ teaching ability is given focus.

Assignment, uni 5: Each pair will be required to present a 30-minute assessment session relating to an invasion game to the rest of the tutorial group in a team-teaching fashion (students will work in pairs). Students will select aspects of their nominated game and prepare a structured assessment session for their peers aimed at Stage 4.

… yes, it’s more about their pedagogy, how they teach and how they use the concepts to inform their teaching, as opposed to their own performance. Heidi, uni 2.

In addition to this domination of teaching ability, some PETE educators also mentioned how it was difficult to draw boundaries between movement CK as a knowledge base in itself and the use of movement CK in the teaching of PE.

A culture that places high value on written work

Several of the PETE educators we interviewed had experiences from studies or teaching PETE in other countries and claimed the rare occurrence of assessment of practice-oriented abilities to be specific to Australia. The written and reflective work was emphasised as being highly valued in Australian PETE.

I: Written work is highly valued in Australia, and I think they [the students] are used to that. When we first put it in the aquatics, students were like, ‘what do you mean, do we actually have to show how to swim?’ The lecturer who had them then went, ‘you are not going to write your way out of this one. It’s time for you to actually demonstrate something.’ They like the written work out here, they really do.
R: Why is that do you think?
I: I think it is because of the prescriptive nature of the ways things are done here. And I think that marking written assignments is easier compared to observing someone’s movements. Chris, uni 3.

Some of the participants, as was the case with Chris in the above quote, specifically mentioned that there was more focus on assessments of PETE students’ movement performance when they worked at PETE universities in the US and in the UK. Some also stated that the high value placed on written work was something that had increasingly developed at Australian PETE universities over recent decades. The quotes below from Heidi and Paul display a variation in attitude towards this development.

For me, coming to Australia was fairly strange, because […] you spend lots of time in the classroom where they weren’t physically active and minimum time in the physical activity environment. Heidi, uni 2.

When I was in Canada last year, I was speaking to a colleague in a PETE programme in Canada, he said that about 20 years ago, Canada phased out the testing of students’ abilities to do things like kick a ball 10 metres […]. Earlier this year, I was at a conference and there was a guy from Finland saying that they still do that there! Paul, uni 1.

While Heidi stated that the high value placed on the written work appeared strange to her when she arrived in Australia after having worked abroad in PETE for many years, Paul was clear in his opinion that assessment of PETE students’ movement performance had to do with ideas from the past.

Assignments: often written reflections, sometimes teaching and rarely movement CK

The analysis of the unit outlines shows that the courses generally ran for 13 weeks and that they included three or four assignments. From these assignments, one was often (in 10 of 14 units) a written exam, placed at the end of the unit and weighted from 40% to 50% of the total unit mark. Another assignment was generally (in 14 of 14 units) a reflective paper weighted from 20% to 30% of the total unit mark. One of the assignments in a movement unit sometimes (in 9 of 14 units) included some kind of teaching presentation, often complemented by a written assignment, which was weighted from 20% to 30% of the total unit mark. There were some deviations from the described structure, especially in those units including an assignment with some kind of physical performance or skills test. When this occurred, which was rare, this assignment was generally weighted to 10% to 20% of the total unit mark. Here follows one example of a teaching assignment.

Assignment, uni 7: You will be expected to research and teach a sports specific skill for both Athletics and Gymnastics in pairs. You will be allocated a specific skill for each sport. You will be allocated 30–40 min for each presentation, which must include the following: 1. All key teaching points, 2. A demonstration of your skill, 3. Lead-ups/progressions to support your teaching (please consider modified equipment), 4. All safety considerations, 5. Any rules/regulations that apply for competition.

As reflected above, there were a few examples in the study where demonstration of movement was specifically mentioned in the assignment as being a prerequisite for teaching.
However, more common were the cases where nothing was mentioned about which teaching methods to apply.

**PETE students’ ability to assess movement**

We also found some assignments orientated towards teaching in which students were to assess movements, either of schoolchildren or of their peers. Below is an example of such an assignment, followed by comments made by Chris.

Assignment, uni 3: As observer, each student will measure and evaluate a variety of psycho-motor movement skills.

The students (...) will observe fundamental abilities: for example, running, dribbling, or supporting. And the observer has to measure them. We use Graham Generic Level of Skill Proficiency, so the levels are pre-control, control, utilisation, proficiency. I have to watch you [the students] during the game and make a judgement on your [the students’] abilities. That is the intention of that assignment. We want our PETE students to know that it’s not about whether you have an able body or not, it’s about observing a movement. Chris, uni 3.

It should be mentioned that PETE students’ ability to assess movement was only one of several abilities included in the assignments addressing teaching. However, it appeared more common to specifically address PETE students’ assessment ability in the assignments than to specifically address demonstration as one of several ways to teach movement. We will discuss this identification later in the paper.

**Movement CK and PCK in game pedagogies**

A general impression from the interviews is that PETE educators are familiar with educational models such as TGfU and GS. Several of the participants gave in-depth descriptions of what these models had meant to them in their professional development and how they used them in their teaching. Below, Melba elaborates on the reason behind the popularity of game pedagogies.

… I think it’s more discovery-guided learning for students. Getting them to play a game and making them familiar with the idea that the teacher is a facilitator more than an instructor of skills. I guess the Game Sense in that way helps the student to question: ‘How can we modify this game?’, ‘What rules would you change?’, ‘What happens if you change the space?’ But I think in reality it is very much a blended approach between traditional instructional teaching and more student-centred teaching. Melba, uni 6.

The traditional teaching approach, which was roughly described as teacher-centred whole-class drilling of a technique, ending in a full-team game, was often polarised against the game pedagogies building on small groups, problem-based pedagogy, student-centred decision-making, peer teaching and in-depth understanding of the game. However, as in the quote above, several also mentioned how they in fact used a mixture of these pedagogies in their daily work. Below, Steven elaborates on his teaching and assessment in GS.

I: The teaching model has been that you practice that individual skill and then you finish with a game. Whereas we’re trying to change that culture, getting kids to play the game and then breaking those skills down afterwards.
R: If you look at one of the learning outcomes in your course here: ‘demonstrate an ability to perform various motor skills’. Do you do that in the Game Sense approach as well?
I: No… you would expect the students to have a certain … level of ability to demonstrate. We look at it, but we don’t really assess it as specifically as we would in the direct instruction approach. Steven, uni 5.

As expressed at the end of Steven’s quote, several participants acknowledged that physical performance was not really the main target for assessment in GS. The question about what it means to assess physical performances as ‘specific’ was described by Paul.

You might stand 10 metres apart and kick the ball to one another. And the teacher walks around and instructs and tells you what you are doing right and what you could improve on. Paul, uni 1.

In contrast to this model, Paul clarified that in his assessment of GS, he used ‘small-sided games that work on skill development, but also there’s a bit more about the rules, tactics and strategies of the game’. It appears that physical performance of movement has a more contextual and situational role to play in the participants’ implementation of various game pedagogies compared to what is referred to as a ‘traditional and instructional’ approach to movement.

**Reasons for not assessing movement CK: time, academic legitimacy, ethics and inclusion**

The reasons not to include movement CK in the assessment ranged from institutional and organisational factors (such as time and resources) to ethics-related factors. Reasons could also be found in the value orientations at universities and among faculty staff.

Because when you assess something, you give it a mark, and when you give physical ability a mark, they don’t like it at the university. It’s a problem. Students complain. Your colleagues look down on you. Marking physical ability in PE would mean that the subject would not have a very high status in university. Brian, uni 7.

The above quote from Brian indicates that movement CK (which Brian interpreted to be physical performance of movement) is not considered as academically legitimate. The subordinate position of practical knowledge will be discussed later. As shown in the quote below, an academic ambiguity to physical performances of movement is made apparent in discussions about issues of inclusion.

R: A student in a wheelchair, could he or she graduate as a PE teacher at your uni?
I: Yes, because obviously anti-discrimination laws mean that we have to provide learning opportunities that meet the diversity of the students that might come into the course. So yes, we have to care for that in our teaching and in our assessments. Heidi, uni 2.

Several of the participants had experiences teaching and assessing students with physical disabilities in courses in which movement was a component. They stated how such students were given alternative assignments for assessment purposes; the participants further stated that such students can be just as good in the role of PE teacher as their peers who do not have a physical disability.
**Assessment of movement CK: only in certain (individual) sports**

The first impression from the interviews was that assessments of movement CK were few and far between at the PETE universities we studied. However, when we started to talk about individual sports, assessment of movement CK (in the form of physical performance) showed itself to be quite common. In gymnastics and swimming, several participants stressed the fact that PETE students were assessed on their physical performance, often in situations that had little to do with teaching. Further, how students performed in different dances was also assessed, and the participants claimed that the distinction between content and teaching in dance was unclear. In swimming, most participants stated that their PETE students had to be certified with the Bronze Medallion, sometimes upon examination by external providers. Although skills tests were most common in the three individual movement practices described above, one of the participants also described the use of a skills test in ball games.

Assignment, uni 5: (30%) Practical skill-based assessments in each of the six court and striking games.

We actually give them a skills test. We use a scoring system, so for example in volleyball they [the PETE students] have to serve and if it [the ball] lands in certain areas, they get a certain number of points. We show them three different styles of assessment that they could use when they are teaching. Obviously, watching someone play and giving him or her a grade is very subjective. But if you have a criterion that says: ‘To get this mark, you have to do this during the game’, it minimises the subjective nature of the test and brings it more towards an objective test. Tanya, uni 5.

It should be mentioned that the above skills test in volleyball was an exception among how the games pedagogies in this study were assessed. The results of this study show that the initial impression of a strong focus on teaching abilities and written work was later mixed with elements of de-contextualised assessment of students’ physical performances.

**Analysis through concepts of movement CK and PCK**

The questions we have asked in this paper concern how movement CK in Australian PETE is assessed, with focus on how PETE educators perceive and value movement CK in their assessment of movement courses. Although the intention was to focus on movement CK, a substantial part of the interviews and of the unit outlines have been about PCK as well. This observation must be seen in light of the fact that the movement courses in this study were not specified in terms of whether their focus was on CK or PCK. In Figure 1 below, we use Shulman’s (1987) model to illustrate how our results can be analysed in relation to the concepts CK and PCK.

Assessment of movement CK and PCK takes its contextual form and shape when examined in Australian PETE. Some of the themes in the result (see Figure 1) are about movement CK (themes 1, 7 and 8), some are about PCK (themes 2 and 5), and some are about both movement CK and PCK (themes 3, 4 and 6). The interviewed PETE educators’ conceptualisation of movement CK was mainly interpreted as physical performance of movement, and several of the themes relate to that part of CCK (Ward, 2009; Ward et al., 2015).
We have divided the discussion into three parts. First, we will discuss the consequences of the limited interpretation of movement CK (theme 1). Second, we will discuss what can be learned from various models-based game pedagogies (theme 6), in order to develop models for teaching and assessing movement CK in individual movement practices (theme 8). Third, we will discuss what can be learned from contextual expressions of PCK in this study (themes 2, 3, 4 and 5) in order to develop the investigated PETE courses. Finally, in the conclusion, we will search for potential explanations for the results in epistemological assumptions underlying PETE research.

**Discussion**

*Movement CK as physical performance: the result of a lack of alternative conceptualisations?*

The intention was to investigate movement CK as a broad concept. However, we mainly met expressions of movement CK as physical performance, both in the interviews and, occasionally, in the written unit outlines (theme 1). Contextual knowledge in the form of tactics, rules, etiquette, safety, student errors, instructional tasks and progressions in these tasks (Ward, 2009; Ward et al., 2015) did not become apparent in our search for expressions of movement CK, and nor did movement CK in terms of discerning ways of moving or discerning ways of using space (Author, in press; Nyberg, 2014) become apparent in this study.

The concern with academic legitimacy that became apparent in this study (theme 7) could be an expression of a lack of alternative conceptions of knowledge, partly in terms of movement CK as a knowledge base for PE teachers, partly in terms of the conception of movement originating from normative standards of excellence in sports.
We believe that knowledge aspects of movement CK that have not become apparent in the study are a potential area of development among the PETE universities that we have studied. In the conclusion we further discuss this narrow conception of movement CK.

**Assessment of individual movement practices: in search of a model**

One of the critical questions arising from this study is the extent to which PETE students need to be able to demonstrate movements as part of their assessment. Some Shulman-inspired literature, mainly US-based, suggests that PETE students need to have a certain ability to physically perform movements if they are going to develop PCK (Ayvazo & Ward, 2011; Heidorn, 2014; Iserbyt et al., 2017; Kim et al., 2015; Siedentop, 2009; Ward, 2009; Ward et al., 2015). The results from this study show that the PETE educators we interviewed find it difficult to assess movement ability per se, isolated from its context and/or isolated from a teaching situation, if they – the PETE educators – are to be inclusive and contribute to maintaining the academic legitimacy of PE (theme 7).

A common assumption in game pedagogies such as TGfU, GS and GCA, which is also made apparent in this study (theme 6), is that contextual movement CK (including physical performance) is a part of PETE students’ understanding of the game along with a range of other abilities such as positioning, tactical awareness and social interaction (Forrest, 2015; Forrest et al., 2012; Light & Butler, 2005; Light & Georgakis, 2007; Pill et al., 2012). However, there are also examples of instrumental and normative assessment (in terms of appropriate and inappropriate actions) in other TGfU-inspired studies (see Mcneill, Fry, Wright, Tan, & Rossi, 2008 for an example). Based on this identification in the literature, combined with some identifications of de-contextualised skill-assessment in ball games (see theme 6 in this study and Cho, Richards, Blankenship, Smith, & Templin, 2012), it appears that there is more than one way of assessing movement in game pedagogies.

It is seemingly challenging, particularly in individual movement activities such as gymnastics, dance and swimming (theme 8), to find alternatives to skills-based, technical and instrumental assessment of movement (Sloan, 2007; Webster et al., 2014). We argue that assignments in PETE should involve movement, but not in terms of de-contextualised movement skills, isolated from context and/or from a teaching situation, and not in terms of all students being measured in relation to the same standard of excellence (Larsson & Nyberg, 2017). Instead, PETE students should have options with regards to choice of movement, and these should be followed by critical reflection on what it means to move or what movement ability can mean in a teaching situation (Author, in press). As some of the described aspects are characteristic of game pedagogies, the need would appear to be pressing in terms of developing alternative models of assessing movement in PETE in individual sports. We fear that a total exclusion of movement from assignments in PETE, a tendency we have seen in this study (themes 3, 4 and 7), will risk marginalising its educational value.

**Assessment of contextual PCK abilities: what can be improved?**

From the findings, and in line with the work of Tinning and colleagues (Tinning, 1992, 2010; Tinning et al., 2001), our initial impression was that PCK dominates the assessment of the investigated Australian PETE movement courses (theme 2). This position, which we
support, also aligns with research from outside Australia that calls for a balance between content and pedagogy (Backman & Larsson, 2016; Backman & Pearson, 2016; Capel et al., 2011; Herold & Waring, 2017; Stran & Curtner-Smith, 2010). However, there are some issues with regards to the contextual expressions of PCK in this study that we believe require further attention.

One observation is that great value is placed on the assessment of ‘written work’ (themes 3 and 4). This result must be understood in relation to the general academisation of teacher education over the last few decades, which for PETE has meant a reduction in physical movement and practical components (Kirk, 2010; Siedentop, 2009). Former research (Kirk, Macdonald, & Tinning, 1997; Kirk & Macdonald, 2001; Macdonald, 2005), as well as the results of this study, indicates that the tendency of theoretical discourses to dominate practical discourses might be particularly strong in Australian PETE. Against this background, we want to emphasise how important it is that PETE students’ understanding of teaching assignments should not be transformed into purely cognitive abilities but rather also into practice-oriented abilities (Johnson, 2013).

Another observation relates to several examples in the Australian PE curriculum in which PE teachers are to assess movements of schoolchildren (ACARA, 2018). This study shows some examples that PETE students are ‘assessed on their assessing-ability’ (theme 5). We believe that movement CK, interpreted as a broad conception, is an important knowledge base for PETE students if they are to learn how to make assessments of movement in a school setting. This study has shown that this aspect of PCK – PETE students’ ability to assess movement – needs to be further investigated.

**Conclusion**

Assessment of movement CK and PCK reflects a certain purpose with PETE as well as a certain view of the PE teacher profession. Therefore, we find it relevant to search for answers to our results in the epistemological beliefs underpinning Australian PETE (Tinning, 2006).

One explanation as to the displayed contextual expressions of movement CK and its marginal role among the investigated PETE universities could be that the value placed on movement CK tends to be associated with behaviouristic views of knowledge (see, for example, Ward & Ayvazo, 2016). Behaviouristic epistemology has had a relatively limited influence on the literature of Australian PE and PETE over recent decades, where instead constructivist epistemology has dominated, both in the form of socially critical pedagogy (Kirk et al., 1997; Kirk & Macdonald, 2001; Macdonald, 2005; Tinning, 2006) and in the form of learning principles in game pedagogies (Forrest, 2015; Forrest et al., 2012; Light & Butler, 2005; Light & Georgakis, 2007; Pill et al., 2012). The problem with a behaviour analytic approach to movement CK in PETE is that it takes little account of the meaning of context and culture. On the other hand, one problem with some of the socially critical constructivist research of PETE is that the marginalisation of movement from assignments also marginalises its educational value. In this paper, we have tried to argue that movement CK, both as a knowledge base in itself and as a part of PCK, from a constructivist perspective, should be valued.
With regards to movement CK as a tool for teaching, we find that Shulman (1987) promotes CK as he suggests that ‘teaching requires a special kind of expertise or artistry, for which explaining and showing are central features’ (p. 12) and that ‘teachers cannot be adequately assessed by observing their teaching without reference to the content being taught’ (p. 20). We agree with Tinning (2004) when he states that it is ‘the way of thinking about education, health, physical education, and the work of contemporary schooling, that is the most important graduate attribute our students may acquire’ (p. 250). However, the narrow conceptualisation of movement CK as physical performance seems to marginalise the position of movement CK among several of the universities that we investigated in this study. Instead of avoiding movement CK in assignments (in terms of individual movement practices as well as a tool for teaching), we suggest that PETE educators should elaborate on different conceptualisations of movement (see, for example, Author, in press). This study shows that interviewing PETE educators about movement CK and PCK makes epistemological assumptions visible. Giving movement more attention in constructivist and socially critical PETE programmes could perhaps also be a way to increase the practical impact of this epistemology (Fyall, 2017; Philpot & Smith, 2018).

### Note

1. We take a broad conception of movement CK including a wide range of activities and practices. We include forms of knowledge such as physical performance, technique, tactics, rules, etiquette, safety, student errors, instructional tasks and progressions in these tasks (Ward, 2009).

### Disclosure statement

No potential conflict of interest was reported by the authors.

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