

Overcoming acculturation: Physical education recruits' experiences of an alternative pedagogical approach to games teaching

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Background: Physical education teacher education (PETE) programmes have been identified as a critical platform to encourage the exploration of alternative teaching approaches by pre-service teachers. However, the socio-cultural constraint of acculturation or past physical education and sporting experiences results in the maintenance of the *status quo* of a teacher-driven, reproductive paradigm. Previous studies have reported successfully overcoming the powerful influence of acculturation, resulting in a change in PETE students' custodial teaching beliefs and receptiveness to alternative teaching approaches. However, to date, limited information has been reported about how PETE students' acculturation shaped their receptiveness to an alternative teaching approach. This is particularly the case for PETE recruits identified in the literature as most resistant to change.

Purpose: To explore the features and experiences of an alternative games teaching approach that appealed to PETE recruits' identified as most resistant to change, requiring a specific sample of PETE recruits with strong, custodial, traditional physical education teaching beliefs, and whom are high achieving sporting products of this traditional culture. The alternative teaching approach explored in this study is the constraints-led approach (CLA), which is similar operationally to TGfU, but distinguished by a neurobiological theoretical framework (nonlinear pedagogy) that informs learning design.

Participants and Setting: A purposive sample of 10 Australian PETE students was recruited for the study. All participants initially had strong, custodial, traditional physical education teaching beliefs, and were successful sporting products of this teaching approach. After experiencing the CLA as learners during a games unit, participants demonstrated receptiveness to the alternative pedagogy.

Data collection and analysis: Semi-structured interviews and written reflections were sources of data collection. Each participant was interviewed separately, once prior to participation in the games unit to explore their positive physical education experiences, and then again after participation to explore the specific games unit learning experiences that influenced their receptiveness to the alternative pedagogy. Participants completed written reflections about their personal experiences after selected practical sessions. Data were qualitatively analysed using grounded theory.

Findings: Thorough examination of the data resulted in establishment of two prominent themes related to the appeal of the CLA for the participants: (i) psychomotor (effective in developing skill), and (ii), inclusivity

(included students of varying skill level). The efficacy of the CLA in skill development was clearly an important mediator of receptiveness for highly successful products of a traditional culture. This significant finding could be explained by three key factors: the acculturation of the participants, the motor learning theory underpinning the alternative pedagogy and the unit learning design and delivery. The inclusive nature of the CLA provided a solution to the problem of exclusion, which also made the approach attractive to participants.

Conclusion: PETE educators could consider these findings when introducing an alternative pedagogy aimed at challenging PETE recruits' custodial, traditional teaching beliefs. To mediate receptiveness, it is important that the learning theory underpinning the alternative approach is operationalised in a research-informed pedagogical learning design that facilitates students' perceptions of the effectiveness of the approach through experiencing and or observing it working.

Keywords: acculturation; physical education; physical education teacher education; nonlinear pedagogy; constraints-led approach.

Introduction

In recent years there has been considerable interest in the evolution of physical education teaching practice away from the dominant traditional approach. This traditional approach is characterised by a conventional practice sequence which starts with the introduction of technical skill(s), followed by students' repetitive attempts to reproduce teacher-prescribed movement 'templates' in isolated drills, finishing with a game (Hopper et al. 2009). This de-contextualised approach to practice is not compatible with the aim of developing intelligent, thinking performers, a central theme in physical education curriculum documents worldwide (e.g., Department for Education 2013; NASPE 2009; QSA 2010). For example, successfully playing team games in physical education involves the intelligent performer being challenged beyond mere template imitation to critically interpret play and make their own decisions to solve game-related problems (Renshaw et al. 2010).

The traditional 'one-way-fits-all' pedagogical approach, which erroneously assumes that one movement pattern acts as an optimal template suitable for all individual learners (Chow et al. 2009; Schöllhorn et al. 2012), is also failing physical education students on a psychological level. Emphasising the mastery of specific techniques in drills and competitive games can sometimes humiliate, marginalise and exclude less gifted and confident individuals (Ennis 1999; Light and Georgakis 2005). In contrast, student-centred, inquiry-based approaches to teaching physical education games such as Teaching Games for Understanding (TGfU) (Bunker and Thorpe 1982), offer viable teaching alternatives more compatible with the development of the cognitive and affective dimensions of the games performer.

Physical Education Teacher Education (PETE) programmes have been identified as a critical point in time in the professional development of teachers to encourage the exploration of alternative teaching approaches (Light 2002). However, there are many socio-cultural constraints that present a challenge to this desired evolution of physical education teaching

approaches. Occupational socialisation is a theoretical framework that has guided researchers in understanding the socialisation process that explains why teachers teach physical education as they do (Lawson 1983a, 1983b). Lawson (1986, 107) defined occupational socialisation as 'all kinds of socialisation that initially influence persons to enter the field of physical education and later are responsible for their perceptions and actions as teacher educators and teachers'. He proposed a number of hypotheses, which attempted to explain how and why three distinct types of socialization, (i) acculturation or past physical education and sporting experience, (ii) professional socialisation or formal physical education teacher education (PETE), and (iii) organisational socialisation or the teacher's workplace, were likely to shape American physical education teachers' perspectives and pedagogical practices they employed (Lawson 1983a, 1983b). The socialisation process of acculturation is particularly relevant to PETE as observations and interactions with physical education teachers and coaches appears to have a powerful influence on prospective physical education teachers' beliefs about how the subject should be taught (Lave and Wenger 1991; Moy, Renshaw and Davids 2013). Lortie (1975) proposed that, through internalisation of many years of observing physical education teachers and coaches, PETE recruits strongly identify with the pedagogical approaches to which they have been exposed. Consequently, these recruits have a strong interest in adopting a *custodial approach* to teaching and anticipate teaching in a manner similar to how they were taught (Lawson 1983a; Lortie 1975). According to Lortie (1975) and Lawson (1983a) these recruits' custodial beliefs are resistant to change and PETE programmes have little effect on them, particularly if recruits are not challenged to critically examine these pre-entry beliefs during their professional training (Butler 2005; Curtner-Smith 2007). Although not all recruits may possess this custodial orientation, this socialisation process clearly has the capacity to inhibit pre-service teachers from adopting new teaching approaches in the profession.

Previous studies have reported successfully overcoming the powerful influence of acculturation resulting in a change in PETE students' preconceived custodial teaching beliefs and receptiveness to an alternative physical education teaching approach (Gurvitch et al. 2008; Li and Cruz 2008; Moy, Renshaw, and Davids 2013; Wang and Ha 2012; Wright, McNeill, and Fry 2009). Exploring the features and student experiences of alternative pedagogy programmes during PETE that overcome acculturation and make this receptiveness possible is an important next step (Light and Tan 2006; McMahon and MacPhail 2007; Philpot and Smith 2011; Sofo and Curtner-Smith 2005). To date, some research studies have explored PETE students' experiences of TGfU and reported various reasons for its appeal (Gubacs-Collins 2007; Li and Cruz 2008; Light and Butler 2005; Wang and Ha 2009, 2013). Most notably was the capacity of TGfU to physically and cognitively engage students of varying skill levels in games, and the associated affective benefits such as the feeling of achievement when making correct tactical decisions as well as the social and emotional benefits from working in a team environment.

To build on these findings the next step is to explore how PETE students' acculturation shaped their reasons for receptiveness to an alternative teaching approach. However, very limited information has been reported in these previous PETE studies about students' past personal physical education and sporting experiences to allow any link to be explored. A series of studies by Light (2002) and Light and Georgakis (2005, 2007) has explored how Australian generalist primary teacher education students' acculturation shaped their reasons for receptiveness to Game Sense, an Australian variation of TGfU (den Duyn 1997). The majority of participants in these studies were females who reported memories of experiences of marginalization, exclusion, humiliation and failure due to their low skill level and an emphasis on skill mastery and competition in their traditional physical education classes. The reduced technical skill demands of modified games, associated with Game Sense,

strongly appealed to the study participants since they were perceived to successfully address these negative physical education experiences, encouraging more competent and equitable participation by engaging students of varying skill levels in games. These studies have provided strong evidence to suggest how pre-service teachers' (PSTs) receptiveness to an alternative teaching approach might be shaped by past negative personal physical education experiences.

However, a key limitation of these studies from a physical education perspective is that their focus was on female *generalist* primary teacher education students who had largely negative personal traditional physical education experiences. Future *specialist* physical education students have reportedly had contrasting positive and successful backgrounds in physical education and sport (Doolittle, Dodds, and Placek 1993; Sofu and Curtner-Smith 2005; Wright, McNeill, and Butler 2004). Further research is, therefore, needed to explore how specialist PETE recruits' acculturation can shape their receptiveness or otherwise to an alternative teaching approach. In particular, work is needed on perception of samples of PETE recruits' identified in the literature as very resistant to change, that is those with a strong custodial orientation who are high achieving sporting products of this custodial culture (Lawson 1983a).

Aim of study

A recent study by Moy, Renshaw, and Davids (2013) investigated how acculturation mediated Australian PETE students' receptiveness to an alternative pedagogical approach to teaching games. Contrary to prior expectations based on Lawson's (1983a, 1983b) physical education teacher socialisation theory and previous research (Sofu and Curtner-Smith 2005, 2010; Stran and Curtner-Smith 2009), PETE recruits who were highly successful products of the traditional approach (i.e. state or national representative in sporting games), and who were

expected to stay strongly committed to a process that had worked effectively for them, significantly changed their strongly held, custodial, traditional physical education teaching beliefs and demonstrated receptiveness to the alternative approach to teaching games. However, that study did not seek to identify the reasons that made this significant change in teaching beliefs possible. The aim of this present study is to build on this work, and that of other investigators who have gained similar success using related games-based pedagogies, by exploring features and experiences of an alternative games teaching approach that appealed to PETE recruits with strong, custodial, traditional physical education teaching beliefs, and whom are high achieving sporting products of this traditional culture. These findings could have important implications for PETE design, helping teacher educators to recognise and understand potential differences in the receptiveness of PSTs to new pedagogical approaches shaped by past physical education and sporting experiences. The alternative teaching approach adopted in the study by Moy, Renshaw, and Davids (2013) was the constraints-led approach (CLA). Like TGfU, it is specifically suited to the development of intelligent, thinking, autonomous performers capable of exploring different movement patterns to find functional performance solutions (Davids, Chow, and Shuttleworth 2005). The study provides an opportunity to gain an insight into the CLA, which has previously been more broadly aligned with applications by sport and human movement scientists rather than physical education teachers. Although the CLA has a strong empirical research base, the study described in this paper was its first documented application in a pedagogical setting.

The CLA and TGfU approaches to games teaching have similar operational principles in practice. Both are student-centred approaches that challenge students to solve common tactical problems through performance exploration in representative games modified to regulate skill level and to emphasise particular tactical aspects of the game (Bunker and Thorpe 1982; Thorpe, Bunker, and Almond 1984). For TGfU, guided questioning by a

teacher, based upon set learning objectives, and the cognitive reflective activity of the student, are core features of the learning process (Richard and Godbout 2000). However, for CLA this is just one possibility to achieve learning objectives among many others including little reflection (for a detailed description see Davids, Button, and Bennett 2008).

Although the two approaches have some commonalities at an operational level, the theoretical framework that informs TGfU and the CLA learning design is substantially different. The TGfU model uses 4 pedagogical principles, sampling, modification-representation, modification-exaggeration, and tactical complexity, to provide a framework to guide teachers in TGfU game design (Thorpe and Bunker 1989). This model contains embedded assumptions about learning, but it does not seek to provide a theoretical framework to empirically support the learning process (Chow et al. 2007; Kirk and Mac Phail 2002). The principle distinguishing feature of the CLA is that its practice design and delivery is informed by a nonlinear pedagogy (NLP), which provides a sound theoretical model of the learner and of the processes of learning, based on key ideas and concepts of ecological dynamics (an integration of ecological psychology and dynamical systems theory) (expounded in substantial detail by Chow et al. 2009, 2011). In contrast to TGfU, the CLA is focused at the student-environment scale of analysis, providing a pedagogy that is based on a model of the learner as a complex adaptive system (Davids, Button, and Bennett 2008). The CLA proposes that human behaviours are an emergent property of self-organising, nonlinear dynamical movement systems, which are regulated by the continuous interaction of personal, task and environmental constraints (Newell 1986; Davids, Handford, and Williams 1994). The CLA framework for learning design empowers learners to actively discover and explore individualised, functional movement solutions to satisfy this unique combination of interacting task (e.g. rules), environment (e.g. playing surface), and individual (fitness level) constraints (or boundaries) imposed on them (for more detailed overview see Chow et al.

2006, 2013; Davids, Chow, and Shuttleworth 2005). The motor learning principles of NLP that underpin the CLA have been shown to provide a theoretical framework to support the principles of learning designs like TGfU (see Chow et al. 2007; Tan, Chow, and Davids 2013).

Based on the powerful theoretical framework of ecological dynamics, NLP has identified principled pedagogical features such as representative learning design, affordances (invitations for action), perception-action coupling (rejecting traditional reductionist pedagogical practices such as task decomposition), constraints manipulation, implicit learning (exploiting intrinsic self-organisation tendencies) and harnessing functional adaptive variability in practice, to guide the practice of coaches, performance analysts and sport scientists, movement practitioners and physical education teachers (see Renshaw et al. 2009; Davids, Button, and Bennett 2008).

An important distinguishing feature of the CLA is that it is an interdisciplinary approach that has been directly applied beyond the tactical focus of games. TGfU and the CLA both acknowledge that technical skills are generally developed in tandem with tactical awareness within a game context (Kirk and MacPhail 2002; Light 2012). However, the TGfU model advocates 'technical instruction' to address poor technical skill execution within the game (Bunker and Thorpe 1986; Werner, Thorpe and Bunker 1996). The motor learning principles of NLP offers a viable solution to address common technical skill problems by using a modified representative practice design that enhances transfer of cognitions, perceptions and actions during learning (see Renshaw 2012; Renshaw et al 2010, for specific examples). The key features of a NLP have also been successfully investigated and applied beyond games to performance activities such as gymnastics, swimming and springboard diving where constraints manipulation has been used to encourage exploratory behaviours of

athletes in overcoming common technical errors (see Barris et al. 2014; Renshaw et al. 2009; Seifert et al. in press, for examples).

The contemporary motor learning theory that informs the CLA was expected to be the main facilitator of attraction for PETE students. Providing opportunities for students to personally experience the efficacy of the CLA in the development of skill as learners in practical workshops that adopt the underpinning motor learning theory, was expected to strongly appeal to PETE students. This learning design, integrating motor learning theory and practice, was expected to allow participants the opportunity to develop a clear understanding and appreciation of the principles of the motor learning theory underpinning the CLA, providing them with a deep theoretical framework for informing their physical education practice. In line with previous TGfU research findings (Gubacs-Collins 2007; Light and Butler 2005; Wang and Ha 2009, 2013) it was expected that the CLA would have some affective appeal for PETE students, such as the equitable engagement of students of varying skill level given the very similar operational principles of this approach and TGfU.

Method

Participants and setting

A purposive sample of ten pre-service PETE students was recruited for the study from a cohort of 100 first year students undertaking a compulsory unit on games teaching at an Australian university. Although students of varying ages and course progressions took the unit, only first year students who had finished school the previous year were chosen for the study, ensuring that this unit was the student's first practical higher education unit aimed at the professional development of teaching skills. The purposive study sample was not homogenous, i.e. mixed gender (6 females; 4 males), varied school background (co-educational, n=7, same sex, n=3; private, n=3, public, n=7), and mean

age (18.88 ± 1.57 years). To increase the trustworthiness of the research findings, participants were selected from two different year cohorts (4 from 2010, 6 from 2012). To help ensure consistency of experience for all students across the two cohorts, lecture content was identical, the same teaching personnel was used, and a detailed ‘tutor guide’ was provided that prescribed the exact content and delivery method for each practical workshop. Study participants were not identified to tutors, thus ensuring parity of experience to enhance external validity. All names used in this paper are pseudonyms to ensure participant anonymity.

Purposive sampling involves the selection of participants based on pre-specified criteria (Denzin and Lincoln 2005). For this study, potential participants who met the selection criteria were identified through analysis of their responses to the questionnaire used in the study by Moy, Renshaw, and Davids (2013). The first part of the two-part questionnaire was used to gather data about PETE students’ physical education and sporting background. Respondents who were successful products of the traditional approach, as defined by their achievement of an A or B standard for school physical education and state or national representation in school sport, were identified as potential study participants. The second part of the questionnaire was used to measure respondents’ traditional games teaching beliefs. It consisted of six short descriptive statements that were based on each of the sub-components of the traditional approach to games teaching, i.e. about the value of repetitive isolated skill drills. The statements required participants to respond with their opinion of the importance of the sub-components for an effective games teaching session via a five-point Likert Scale. The six response scores added together resulted in a traditional games teaching belief score for each respondent out of a possible score of 30. Respondents who were successful products of the traditional approach, recorded a high pre-intervention traditional games

teaching belief score, participated in the games unit, then recorded a significantly lower traditional games teaching belief score, as revealed by a two-tailed, paired samples *t*-test, were selected as study participants.

Data collection

To address the study aims a qualitative case study methodology was employed since the research methods allowed the researchers to explore and gather rich, detailed and in-depth information of an interpretative nature (Creswell 2002). Face-to-face, semi-structured interviews and written reflections were the sources of data collection. Each participant was interviewed separately, once prior to participation in the alternative games unit to explore and gain an in-depth understanding of their positive physical education experiences and then again after participation in the games unit to explore the specific games unit learning experiences that influenced their receptiveness to the alternative pedagogy.

Interviews were conducted by the first author who was also the games unit coordinator and lecturer. There are key advantages of using an interviewer who is involved in the research, the delivery of the unit and who is also familiar to the participants. According to Bonner and Tolhurst (2002) these individuals typically possess a wealth of knowledge and expertise in the field, a superior understanding of the research context, and an ability to naturally interact with students, which promotes a more insightful understanding of the students' opinions. Previously established trustful relations between participants and the interviewer also allows the possibility for interviewees to feel comfortable and free to talk openly, potentially increasing validity due to the added richness, honesty, fidelity and authenticity of the information acquired (Hammersley and Atkinson 1983; Tierney 1994).

However, this 'insider research' where the researcher has a direct connection with the research setting, also has the potential to compromise the validity of the research as the power relationship between the interviewer/lecturer and participant/student may result in socially desirable responses (Unluer 2012). To enhance validity and allow participants the opportunity to provide authentic, reliable accounts of their games unit experiences the research was conducted in a rigorous manner and steps were taken to minimize the impact of bias associated with the researcher's involvement within the research context. The first step was for all interview questions to be developed by the first author in collaboration with three colleagues, all of whom used their extensive experience of qualitative research methods and of teaching physical education to formulate a set of questions designed to test the study aims (see Table 1 for example questions). The next step was for interviews to be conducted in an informal, neutral setting where participants were likely to feel comfortable and 'in control' (Unluer 2012). The interviewer attempted to minimise the power differential by acting as a co-learner and maintaining a professional, honest and transparent manner throughout each interview (Harklau and Norwood 2005). The final step incorporated a technique called *respondent validation* (Cohen, Manion, and Morrison 2000). All interviews were audio taped and transcribed verbatim, with transcripts being returned to participants to review the reported information to check that it corresponded to their own 'subjective reality'. Participants were provided an opportunity to modify or clarify any aspect of the interview transcripts before the researcher embarked on data analysis. In summary, it is acknowledged that bias associated with this power relationship between the interviewer/lecturer and participant/student cannot be totally eliminated and complete objectivity is thus impossible (Cohen, Manion, and Morrison 2000). However,

it is important to ensure that a concerted effort is made to minimise the impact of biases and enhance validity.

Participants also completed qualitative documents in the form of personal student written reflections after four selected practical tutorial sessions and at the conclusion of the games unit (see Table 1 for example reflection questions). They were required to reflect on their personal experiences and observations during the session and also attempt to make a connection between these experiences and their previous physical education experiences. This triangulation between different information sources provided the opportunity to crosscheck the data and ensure that findings were accurate as well as providing a richness and depth of data (Carpenter and Suto 2008; Denzin and Lincoln 2005).

Intervention: Games unit

The delivery of the games unit was via practical workshops (8 x 4-hour practical sessions on invasion, net/court, striking and fielding games) and supporting theory lectures. Lectures were delivered in the first four weeks of the unit and presented the motor learning principles of NLP that inform the CLA, as well as practical examples of how teachers might implement a NLP into their practice. Also, a deliberate attempt was made in lectures and practical workshops to critically challenge PETE recruits' custodial, traditional teaching beliefs, through highlighting the contemporary skill acquisition and psychological failings of traditional physical education practice environments. For example, traditional practice drills isolate technical skills from relevant perceptual and decision-making skills, in contrast to an authentic games context where all three skills are performed simultaneously (Renshaw et al. 2009). The traditional approach also allows confident and aggressive males and females to dominate games and excludes girls and less skilled and less confident boys (Ennis 1999).

The motor learning theory underpinning the CLA was adopted in the practical workshops allowing students the opportunity to experience the approach as learners. During the practical workshop sessions, PETE students were exposed to a variety of representative game environments with key constraints manipulated such as game rules and field size to facilitate active exploration and the emergence of individual functional movement patterns and decision-making behaviours to solve technical and tactical related problems (Chow et al. 2013; Renshaw et al. 2010). For example, students were challenged to explore technical and tactical solutions to the problem of attacking and defending an opponent in 1 v 1 soccer/football dribbling game. The playing area was manipulated with a 1 m wide goal set up at each point of a triangle with 10 m long sides. Players could score by dribbling between any goal in control of the ball, from any direction. In line with NLP, tutors adopted a more ‘hands-off’ teaching approach, acting as a learning facilitator and guiding learners using questioning and more natural implicit learning strategies (see Jackson and Farrow 2005; Renshaw et al. 2010). For example, in the 1 v 1 dribbling game, students were allowed to individually explore multiple solutions to beat their opponent without explicit instruction.

As previously mentioned, students completed written reflections on their personal experiences and observations during the practical activities. For example, students were asked to reflect on their experiences during the 1 v 1 dribbling game and give a specific example of the implicit learning of one trick or dribbling skill (perceptual, decision making or technical) that they personally experienced or observed in any game. At the conclusion of each session, students were also required to give short written responses to (typically) 3–5 questions to demonstrate an understanding of the motor learning theory and how it been applied in the workshop. After the 1 v 1 dribbling game students were asked to demonstrate their understanding of ‘repetition without repetition’ (Bernstein 1967) or functionality variability, a key principle of NLP used to create instabilities in the learner essential in producing an

adaptable performer. Students were, therefore, asked to respond to the following questions: 'In the 1 v 1 dribbling game what was the skill learning advantage of changing opponents after each game as opposed to keeping the same opponent? How would constantly changing opponents during practice help a player perform in an actual game of soccer/football?'

Data analysis

Data from interviews and student reflections were qualitatively analysed using the grounded theory operational steps (Glaser and Strauss 1967). The objective of this analysis was to organise and interpret the qualitative data through an ongoing process of generating, examining and comparing data to establish prominent themes (Denzin and Lincoln 2005). Data analysis consisted of three main operations: (1) breaking down the data into meaningful units through a detailed line-by-line examination, (2) grouping units with similar meanings into broader categories, and (3) organizing categories into larger and more inclusive themes (Table 1). The adoption of a case study methodology and data analysis using the grounded theory operational steps is well established and has been successfully utilized in previous comparable qualitative investigations (Harvey, Cushion, and Massa-Gonzalez 2010; Light and Evans 2010; Light and Tan 2006; Roberts 2011; Smith and Cushion 2006).

Trustworthiness is established when research findings authentically represent meanings as described by the participants as closely as possible (Lincoln and Guba 1985). In this study trustworthiness was established and consequently findings strengthened through the use of triangulation between different information sources (Patton 2002; see Table 1), ongoing peer debriefing with two colleagues to check and share interpretations of data and arrive at consensus (Creswell 2007), and the conducting of member checking and verification of interview transcripts and researcher interpretations by participants (Merriam 1998). These same strategies were successfully utilized to establish trustworthiness and strengthen findings

in previous comparable qualitative investigations (Deglau and O'Sullivan 2006; Tsangaridou 2008; Wang and Ha 2009, 2013; Wright, McNeill, and Fry 2009).

Insert Table 1 here

Results and discussion

The principal aim of the study was to explore the features and experiences of the CLA games unit that appealed to Australian PETE recruits with a positive and highly successful background in traditional physical education and sport. The following section identifies two prominent themes, in order of significance, that were established from the data analysis related to this aim, (i) psychomotor appeal, and (ii) inclusivity appeal.

1. Psychomotor appeal: The CLA was effective in skill development.

The efficacy of the CLA in the development of perceptual, technical and decision-making skills was the most important factor in its appeal to the PETE recruits in this study. This is a significant finding as, to date, previous research in the area has identified only the inclusive (e.g. engaging students with varying skill levels), affective (e.g. fun) and cognitive (e.g. tactical problem solving) appeal of similar alternative games-based pedagogies for pre service teachers (Li and Cruz 2008; Light 2002; Light and Butler 2005; Light and Georgakis 2005, 2007; Wang and Ha 2009, 2013). Although skill acquisition is an expected learning outcome from participation in game-situated learning (Turner and Martinek 1999; MacPhail, Kirk, and Griffin 2008), the psychomotor dimension has not been previously reported as a reason for pre service teachers' receptiveness to an alternative games-based pedagogy. It is an important dimension for PETE students to recognise and appreciate within an alternative physical education pedagogical practice, since psychomotor, cognitive and affective learning outcomes are common features of physical education curriculum documents in Australia (QSA 2010), USA (NASPE 2009), UK (Department for Education 2013) and China (Chinese Ministry of Education 2002). This significant finding in this study could be explained by three key

factors, the acculturation of the participants, the motor learning theory underpinning the alternative pedagogy and the unit learning design and delivery.

Participants' acculturation or previous level of success as games players helped shape their initial strong custodial belief in the traditional physical education teaching approach. Prior to experiencing the CLA, study participants unanimously justified their future intention to teach physical education using the traditional approach because of its effectiveness in personal skill development and their resultant high level of success as a games player:

My teachers and coaches always used drills, and that's how I learnt and I've been successful like being good at a sport, I was always MVP (most valuable player) of my team. The traditional approach worked fine for me and I believe that it can work for the students that I'm teaching as well. (Interview, Harry, state representative in rugby union)

The CLA offered these highly successful products of a traditional physical education culture an alternative teaching approach that was also effective in skill development. When applied in tutorials, participants unanimously reported a strong attraction to the CLA, facilitated by their personal experience of the successful acquisition of movement skills. The following quote is an example of a participant's personal experience and observations of the efficacy of the CLA in the learning of perceptual, technical and decision-making skills associated with dribbling when playing a previously described 1 v 1 soccer/football dribbling game.

With constraints we see that they actually worked on us and like if I see how it works I'll believe in it more. Other subjects they just tell us that it works and then they expect you to understand; we don't see that it works. I saw it work. I've probably played soccer once in my life. And just learning dribbling in the unit – the first time I did it was just completely slow, and I think by the end of it I was trying new things, and I was starting to dribble faster. I could read the game better as well. I learnt something, yeah. That I was able to see other people learning and also myself

learning something has led me to think that I'm going to teach that way. (Interview, Sandy, state representative in netball)

Many participants were surprised that they observed learning without novice learners practising the prescribed optimal model in a traditional environment of teacher-led isolated drills. This personal experience of observing skill development through representative practice environments seemed to challenge participants' custodial beliefs about teaching practice and enabled them to recognise and appreciate the effectiveness of the CLA.

In the following quote, the participant reports on the experience of observing technical skills such as passing emerge from novice touch football players through participation in representative touch football games without a demonstration and explicit teacher instruction. This game required the attacking team to advance the ball up field against a retreating defence. Players self organised under the constraints of a narrow field and a time limit of 20 seconds facilitating the emergent skill of quick, lateral passing and direct running to solve the problem of gaining maximum distance in the time limit.

The approach is based on learning theory that I think works for the students. Like for example, we had the group of Norwegian girls who'd never played touch footy before, and with no explanation really of how to play the game, or how to throw a pass, or what to look for, or where to stand, you know it was just amazing the progress that they made from a relatively small amount of time under this more games based approach. I saw learning. I just saw them learn pretty much every part of it, like learning how to pass a football and the positioning aspect especially through games with constraints and that's sort of when it really hit home. Just seeing it from a beginner's perspective, it was pretty eye opening to tell you the truth. (Interview, Max, state representative in volleyball)

The motor learning theory underpinning the CLA facilitated participants' psychomotor attraction to the alternative pedagogy. Many participants reported that the

understanding of the motor learning theory underpinning the CLA was a very important factor in the appeal of the alternative pedagogy as it provided them with a convincing theoretical framework that explained how and why the approach worked:

Yeah, I think it all makes sense. It's not just random stuff, it actually fits. Having a reason for using the constraints led approach like how the learner learns is important. Knowing how the different constraints worked and how they affected learning, and applying the theory in tutorials and seeing and experiencing it work really helped my understanding and acceptance of the approach. Before the unit, I didn't really even think about how individuals learn how to play games. (Interview, Bridget, state representative in hockey)

Metzler (2000) and Rink (1999) have argued that to achieve intended skill learning outcomes, pedagogical strategies should be based on learning theory. The distinguishing feature of the CLA among alternative pedagogies is that it is underpinned by the principles of NLP based on motor learning theory, which provides a detailed theoretical framework to empirically augment its perceived effectiveness (see Chow et al. 2007). The appeal of the learning theory for participants supports the suggestion by Light (2008) that this understanding of 'how the learner learns' is a particularly important catalyst for change when an alternative pedagogy challenges the beliefs about learning that PSTs hold.

Participants reported personal experiences of the successful acquisition of movement skills and also a clear understanding and appreciation of the motor learning theory underpinning the CLA, findings that support the efficacy of the learning design and delivery of the unit within a research-informed pedagogical framework (Dewey 1938; Lawson 1986; Light 2008; Rink 2001). The integration of motor learning theory and practice, the engagement of the body in learning through students experiencing the CLA as learners in practical workshops, ongoing immediate student reflections on these personal experiences and observations, and written revision questions requiring an application of the motor learning

theory enhanced students' experience, appreciation and understanding of how the learner learns using this approach. Previous authors have also credited similar learning design and delivery with an enhanced appreciation and understanding of an instructional model introduced during PETE (Light and Georgakis 2005).

As predicted, adopting the motor learning theory underpinning the CLA in practical tutorials gave participants the opportunity to experience for themselves as learners the effectiveness of this individualised student-centred approach. Even though they were high achieving performers in at least one sport, the range of sports played by students in the unit meant that, on many occasions, they were exposed to sports where they had little experience or at times were complete novices, as evidenced in some participants' comments included in this paper. This personal experience of the acquisition of movement skills facilitated a change in participants' beliefs about physical education teaching practice and resulted in a psychomotor attraction to the CLA.

This finding is consistent with Guskey's (1986, 2002) research and model of professional development for teacher change which states that changes in teachers' beliefs are more likely to occur only after they witness improved student learning resulting from the proposed change in teaching practice. According to Tom (1997) PETE students typically do not change strongly held beliefs unless they are challenged through powerful and meaningful experiences that cause them to recognize and value the consequence of the change process for themselves and their learners. An example of a powerful and meaningful learning experience from the unit that mediated receptiveness is illustrated in a reflection from a female participant after playing the 1 v 1 soccer/football dribbling game:

I have never really had the chance to play soccer until today. Today my skills improved in a way that I didn't think possible in such a short amount of time and this was because I was given a chance to play and make mistakes. 10 minutes in – I had a busted lip and had been knocked over

twice because I was too focused on the ball-so I learned to LOOK UP! As I watched other players I found myself using my body more to “block” my opponent and would look for an opportunity to play the ball backwards or turn it away from them on their weaker side. I wasn’t criticised by focusing on HOW to perform; in the end I just did. My body was starting to make decisions for me because I was learning implicitly from my mistakes. (Reflection, Bella, state representative in softball)

A belief in the efficacy of an alternative pedagogy is a major determinant prior to changing pedagogical practice (Butler 2005; Pjares 1992; Tsangaridou and O’Sullivan 2003; Bechtel and O’Sullivan 2007). Supporting evidence for this was provided by three of the study participants who were already coaching junior sporting teams before taking the unit. After exposure to the initial lectures and practical workshops, independently, they chose to change from their traditional coaching practice and experimented with the CLA. These participants all reported observations of improved skill performance by their young learners and the successful transfer of skills learned in practice to the competitive performance environment. This coaching experience seemed to further convince participants of the effectiveness of the CLA in skill development over isolated drills and strengthened their attraction to it. The following quote from a participant who implemented the approach in her basketball coaching illustrates this psychomotor appeal as well as an affective appeal:

The unit coincided directly with the beginning of my basketball coaching of 14-year-old boys, and initially I wasn’t much of a believer of the constraint based learning just because of how I’d been taught. I’ve always done drills so I just figured I’ve learnt that way, I’ve been successful, it must work, and I wasn’t very open to the idea of constraint based learning. But after the first two drill based training sessions that I held with the boys and noticed that in their first game they hadn’t really taken many of the skills that I’d tried to teach them in isolated drills, they hadn’t really carried them over into a game, I thought why not, let’s try this game based learning, it seems to be working in our tutorial. And immediately they were showing some of the skills and actually

implementing them into a game, and by the end of the season I was just so impressed with how much they'd learnt and how much they'd actually learnt to take into a game that I wouldn't go back to drills based learning. When I saw them develop their skills it made me feel proud and successful as a coach. I would definitely implement the constraints based theory into my teaching and coaching because kids learn more without being told exactly what to do and have fun while doing it, which is amazing. You not only get results but you get smiles! And kids who want to learn more and train harder. It's brilliant!! (Interview, Melinda, state representative in basketball)

2. *Inclusivity appeal: The CLA facilitated the inclusion of students of all skill levels*

Prior to participation in the games unit, study participants unanimously reported the game as the most enjoyable aspect of their traditional physical education lesson, particularly when the game involved students of similar high skill and motivation level. This enjoyment was derived from participants' dominant involvement in the game and the subsequent success they experienced as illustrated in this quote:

Most enjoyable aspect was the game at end of the PE lesson. I was quite good at sports and it fuelled my confidence and brought out my competitive side. Loved the high intensity games with people of similar skill level and motivation to participate as always challenging and we won. Winning is fun. PE was fun because I was always involved and I kind of did well at it. (Interview, Amelia, state representative in hockey and volleyball)

However, several participants reported that it was frustrating and boring playing games in physical education with students who lacked motivation and preferred not to get involved in the game. These feelings toward these excluded students were derived from the subsequent lack of competition and challenge provided within the game. Bridget's reflection typifies this common personal perspective of student exclusion prior to participation in the games unit:

Core PE, they mainly separated us into girls and boys, but I played games with the boys not the girls just because it was boring to play with girls in my PE class because they didn't participate as much so, it wasn't really competitive so yeah, it frustrated me. I thought that it was pathetic that they played tennis and volleyball but they would just stand there and not hit the ball. (Interview, Bridget, state representative in hockey)

Experiences gained from participation in the games unit prompted a change in participants' perspective of student exclusion within their traditional school physical education classes. Upon reflection, participants personal feelings of frustration and boredom were replaced by empathy for these excluded students and the realisation of the importance of their inclusion in games. The inclusive nature of the CLA provided a solution to the problem of exclusion, which made the approach attractive to participants. The following post games unit reflection by Bridget illustrates her pronounced change in perspective:

The games unit appeals to me because I used to see a lot of students not included and who wanted to sit out in PE. PE should be about including everyone and having fun, not be about getting embarrassed because you're not skilful enough. I believe that the constraint led approach allows for these things to occur. (Reflection, Bridget, state representative in hockey)

Specifically chosen PETE students with a positive and highly successful background in traditional physical education were not expected to be as strongly attracted to an alternative approach because it engaged students of low skill level. This expectation was based on previous research which provides compelling evidence to suggest that the inclusive appeal of an alternative pedagogy is profoundly shaped by past negative personal physical education experiences of failure, exclusion and marginalisation (Light 2002; Light and Georgakis 2005, 2007). It was, therefore, assumed that contrasting past positive personal physical education experiences of dominant involvement and successful performance in team games would not

facilitate a similar strength of attraction for participants in this study. However, this finding is consistent with previous similar research involving one American PETE student with a positive and moderately successful background in traditional physical education who was attracted by the inclusive nature of TGfU (Light and Butler 2005).

Two aspects of the research informed unit design and delivery can offer a credible explanation for the pronounced change in participants' perspective of exclusion in physical education (Lawson 1986; Rink 2001). First, a deliberate attempt was made in lectures and practical workshops to challenge participants' custodial, traditional beliefs through the presentation of personal reflections of PSTs who had not enjoyed traditional physical education. Many of these personal reflections recounted experiences of humiliation, failure and exclusion caused by a traditional teaching approach that focused on the performance of technique that was beyond their personal capabilities and allowed skillful males to dominate games (see Light 2002; Light and Georgakis 2007; Morgan and Hansen 2008). These reflections enabled participants to gain an insight into the perspectives of less skilled and less motivated students who viewed traditional physical education differently to them. This understanding of the reasons for exclusion resulted in a more empathetic, teacher-centred perspective facilitating participants' strong attraction to the inclusivity of the CLA:

Why the games unit appealed to me and shaped my perspectives about teaching was the way it incorporated inclusion, which would make lessons more enjoyable for students. I guess, when I first started the games unit I wasn't really looking at the other kids in my class. I was looking at me and the people I was friends with in that class who were the real sporty kind, and I probably wasn't thinking about the other kids and how they felt in the classes. But in the lectures, it said sort of ...mostly...primary school teachers - they look back and say they hated PE, and I didn't really think about those kids until it was put to me that they are embarrassed and bored. I could see it, but to me it was...they didn't want to be there full stop. (Interview, Sandy, state representative in netball)

Second, participants experiencing the individualised practice design and delivery of the CLA as learners in practical workshops allowed them to personally experience inclusive game environments. All learning tasks afforded students the opportunity to be included in all activities and to have opportunities to experience and demonstrate success. This was because learning design incorporated small-sided games and individualized practice tasks with constraints manipulated to match students' ability level. These experiences appealed to participants as they highlighted the potential of the CLA in providing a solution for the exclusion of less skilled students in physical education classes:

You don't realise how much some students are excluded and embarrassed in classes until-well, I realised that in this unit, how everyone always wanted to do play and was involved in the game regardless of skill level and everyone loved it, which is very different to what I have previously experienced in schools. This was done in the unit by allowing the pairing of students of similar abilities, so that they have a chance to win and feel good and have fun. (Interview, Maddie, state representative in soccer/football)

Practical Implications of the Findings

Most often, recruits' existing beliefs tend to shape the professional knowledge they acquire through teacher education programmes, rather than vice versa (Tsangaridou 2006). These findings emphasise the importance of challenging initial, custodial teaching beliefs through the introduction of alternative pedagogies at the commencement of PETE programmes. The findings of this study can be useful for informing and improving the design of alternative PETE games units aimed at challenging resistant custodial teaching beliefs of recruits who are highly successful products of a traditional physical education culture. The efficacy of a physical education teaching approach in skill development is clearly an important mediator of receptiveness for highly successful products of a traditional culture. Thus to facilitate

receptiveness to an alternative pedagogy, PETE students should be given the opportunity to personally experience and observe it ‘work’ through the successful acquisition of movement skills as learners, just as they have previously experienced as successful products of the traditional approach. This aim can be achieved in practical workshops that adopt the principles of practice design and delivery of the alternative pedagogy. To provide the opportunity to personally experience skill development it is important to cover a range of sports to allow students the opportunity to experience a sport as a novice. It is also important that these experiences are offered in conjunction with a clear understanding and appreciation of the learning theory that empirically supports the learning process within the design and delivery of the alternative pedagogy. The operationalised theoretical framework within a research-informed pedagogical unit design will provide students with a theoretical rationale for the perceived effectiveness of an alternative approach, and a framework for application of key principles and a justification for its future use. This receptiveness can be further enhanced if PETE recruits’ custodial, traditional teaching beliefs are critically challenged through highlighting the contemporary skill acquisition and psychological failings of traditional physical education practice environments.

Future Research

The impact that the CLA games unit had on the teaching beliefs of PETE recruits is encouraging. An attempt was made to maintain this attraction to an alternative pedagogy beyond the initial experience. This was undertaken through an increased intensity of exposure within the PETE programme as a result of the integration of the CLA across other units. However, the challenge is to maintain this attraction for PETE students through school practicums. Many participants in this study showed an encouraging desire to implement the CLA in schools but highlighted potential problems:

I'd definitely try and use the constraints led approach. It will be hard to think about all the games and stuff and try and make them up, but yeah, it just means that you've got to think about it and prepare yourself a lot more. (Interview, Josh, state representative in touch football and cricket)

Future research is planned to investigate these PETE students' experiences implementing the CLA in a school setting on practicum and the subsequent impact these experiences have on their physical education teaching practice when they become in-service teachers. These findings would enable the constraints-based model to continue to evolve by exploring the issues that impact upon its successful teaching and learning. Knowledge gained from such studies would subsequently inform and improve the design of PETE games units and programmes aimed at changing traditional physical education teaching practice. As previous research indicates the school practicum is not a good place for PSTs to experiment with innovative practice approaches due to resistant conservative cultures of schools and many other contextual factors (Howarth 2005; Lawson 1983a, 1983b; McNeill et al. 2004; Zeichner and Tabachnik 1981). To overcome these barriers, and facilitate PETE student's successful implementation of CLA, this planned research programme will adhere to recommendations that the practicum placement site should have a culture that encourages innovative practice, with PETE students being provided with guidance and support from a university mentor and the co-operating teacher during the experience (Gurvitch et al. 2008; Howarth 2005).

Conclusion

This study has presented the features and experiences of an alternative pedagogy games unit that appealed to highly successful Australian PETE recruits with a positive background in traditional physical education. PETE educators should consider these findings when introducing an alternative pedagogy aimed at challenging PETE students' resistant, custodial,

traditional teaching beliefs. This is an important first step in the evolution of physical education teaching practice towards an approach that is more compatible with the development of the psychomotor, cognitive and affective dimensions of the physical education performer.

References

- Barris, S., D. Farrow, and K. Davids. 2014. Increasing functional variability in the preparatory phase of the takeoff improves elite springboard diving performance. *Research Quarterly for Exercise and Sport* 85: 97-106.
- Bernstein, N.A. 1967. *The control and regulation of movements*. London: Pergamon Press.
- Bechtel, P.A, and M. O'Sullivan. 2007. Enhancers and inhibitors of teacher change among secondary physical educators. *Journal of Teaching in Physical Education* 26, no. 3: 221-235.
- Bonner, A., and G. Tolhurst. 2002. Insider-outsider perspectives of participant observation. *Nurse Researcher* 9, no. 4: 7-19.
- Bunker, D., and R. Thorpe. 1982. A model for the teaching of games in secondary schools. *The Bulletin of Physical Education* 18, no. 1: 5-8.
- Bunker, D., and R. Thorpe. 1986. The curriculum model. In *Rethinking games teaching*, ed. R. Thorpe, D. Bunker, and L. Almond, 7-10. Loughborough: Loughborough University.
- Butler, J. 2005. TGfU and pet-agogy: Old dogs, new tricks and puppy school. *Physical Education and Sport Pedagogy* 10, no. 3: 225-40.
- Carpenter, C., and M. Suto. 2008. *Qualitative research for occupational and physical therapists: A practical guide*. Oxford: Blackwell.

- Chinese Ministry of Education. 2002. *Primary and secondary physical education curriculum standard*. Ministry of Education of the People's Republic of China.
- Chow, J.-Y., K. Davids, C. Button, I. Renshaw, R. Shuttleworth, and L. Uehara. 2009. Nonlinear pedagogy: Implications for teaching games for understanding (TGfU). In *TGfU...simply good pedagogy: Understanding a complex challenge*, ed. T. Hopper, J. Butler, and B. Storey. Canada: Ottawa Physical Health Education Association.
- Chow, J.-Y., K. Davids, C. Button, R. Shuttleworth, I. Renshaw, and D. Araujo. 2006. Non-linear pedagogy: A constraints-led framework for understanding emergence of game play and movement skills. *Nonlinear Dynamics, Psychology, and Life Sciences* 10, no. 1: 71-103.
- Chow, J.-Y., K. Davids, C. Button, R. Shuttleworth, I. Renshaw, and D. Araujo. 2007. The role of nonlinear pedagogy in physical education. *Review of Educational Research* 77, no. 3: 251-78.
- Chow, J.-Y., K. Davids, R. Hristovski, D. Araújo, and P. Passos. 2011. Nonlinear pedagogy: Learning design for self-organizing neurobiological systems. *New Ideas in Psychology* 29: 189-200.
- Chow, J.-Y., I. Renshaw, C. Button, K. Davids, and C.W.K. Tan. 2013. Effective learning design for the individual: A nonlinear pedagogical approach in physical education. In *Complexity thinking in physical education: reframing curriculum, pedagogy and research*, ed. O. Ovens, T. Hopper, and J. Butler, 121-134. London: Routledge.
- Cohen, L., L. Manion, and K. Morrison. 2000. *Research methods in education*. 5th ed. London: Routledge.
- Creswell, J. 2002. *Educational research: Planning, conducting and evaluating quantitative and qualitative research*. Upper Saddle River NJ: Pearson.
- Creswell, J. 2007. *Qualitative inquiry and research method: Choosing among five*

- approaches*. 2nd ed. Thousand Oaks, CA: Sage.
- Curtner-Smith, M. D. 2007. The impact of critically oriented physical education teacher education on pre-service classroom teachers. *Journal of Teaching in Physical Education* 26, no. 1: 35-56.
- Davids, K., C. Button, and S.J. Bennett. 2008. *Dynamics of skill acquisition: A constraints-led approach*. Champaign, Illinois: Human Kinetics.
- Davids, K., J.-Y. Chow, and R. Shuttleworth. 2005. A constraints-based framework for nonlinear pedagogy in physical education. *Journal of Physical Education New Zealand* 38, no. 1: 17-29
- Davids, K., C. Handford, and A.M. Williams. 1994. The natural physical alternative to cognitive theories of motor behaviour: An invitation for interdisciplinary research in sports science? *Journal of Sports Sciences* 12: 492-528.
- Deglau, D., and M. O'Sullivan. 2006. The effects of a long-term professional development program on the beliefs and practices of experienced teachers. *Journal of Teaching in Physical Education* 25, no. 4: 379-396.
- den Duyn, N. 1997. Game sense, it's time to play. *Sports Coach* 19, no. 4: 9-11.
- Denzin, N.K., and Y.S. Lincoln. 2005. *The sage handbook of qualitative research*. 3rd ed. Thousand Oaks CA: Sage.
- Department for Education. 2013. *National curriculum in England: Physical education programmes of study*.
- Dewey, J. 1938. *Experience and Education*. New York: Touchstone.
- Doolittle, S.A., P. Dodds, and J.H. Placek. 1993. Persistence of beliefs about teaching during formal training of pre-service teachers. *Journal of Teaching in Physical Education* 12, no. 4: 355-65.
- Ennis, C.D. 1999. Creating a culturally relevant curriculum for disengaged girls. *Sport*

- Education & Society* 4, no. 1: 31-50.
- Glaser, B.G., and A.L. Strauss. 1967. *The discovery of grounded theory: Strategies for qualitative research*. New York: Aldine.
- Gubacs-Collins, K. 2007. Implementing a tactical approach through action research. *Physical Education and Sport Pedagogy* 12, no. 2: 105-126.
- Gurvitch, R., B.T. Blankenship, M.W. Metzler, and J.L. Lund. 2008. Student teachers' implementation of model-based instruction: Facilitators and inhibitors. *Journal of Teaching in Physical Education* 27, no. 4: 466-486.
- Guskey, T. 1986. Staff development and the process of teacher change. *Educational Researcher* 15, no. 5: 5-12.
- Guskey, T.R. 2002. Professional development and teacher change. *Teacher and Teaching: Theory and practice* 8, no. 3: 381-391.
- Hammersley, M., and P. Atkinson. 1983. *Ethnography: Principles in practice*. London: Tavistock.
- Harklau, L., and R. Norwood. 2005. Negotiating researcher roles in ethnographic program evaluation: A postmodern lens. *Anthropology and Education Quarterly* 36: 278-288.
- Harvey, S., C.J. Cushion, and A.N. Massa-Gonzalez. 2010. Learning a new method: Teaching games for understanding in the coaches' eyes. *Physical Education and Sport Pedagogy* 15, no. 4: 361-382.
- Hopper, T., J. Butler, and B. Storey (eds.). 2009. *TGfU... simply good pedagogy: Understanding a complex challenge*. Ottawa, ONTARIO: PHE-Canada.
- Howarth, C. 2005. Introducing the teaching games for understanding model in teacher education programs. In *Teaching games for understanding: Theory, research and practice*, ed. L. Griffin and J. Butler, 91-106. Champaign, IL: Human Kinetics.

- Jackson, R.C., and D. Farrow. 2005. Implicit perceptual training: How, when, and why? *Human Movement Science* 24, no. 3: 308–325.
- Kirk, D., and A. MacPhail. 2002. Teaching games for understanding and situated learning: Rethinking the Bunker-Thorpe model. *Journal of Teaching in Physical Education* 21, no. 2: 177-192.
- Lave, J., and E. Wenger. 1991. *Situated learning: legitimate peripheral participation*. Cambridge, UK: Cambridge University Press.
- Lawson, H.A. 1983a. Toward a model of teacher socialisation in physical education: The subjective warrant, recruitment & teacher education (part 1). *Journal of Teaching in Physical Education* 2, no. 3: 3-16.
- Lawson, H.A. 1983b. Toward a model of teacher socialisation in physical education: Entry into schools, teacher's role orientations, and longevity in teaching (part 2). *Journal of Teaching in Physical Education* 3, no. 1: 3-15.
- Lawson, H.A. 1986. Occupational socialisation and the design of teacher education programs. *Journal of Teaching in Physical Education* 5, no. 2: 107-16.
- Li, C., and A. Cruz. 2008. Pre-service PE teachers' occupational socialisation experiences of teaching games for understanding. *New Horizons in Education* 56, no. 3: 20-30.
- Light, R. 2002. The social nature of games: Australian pre-service primary teachers' first experiences of Teaching Games for Understanding. *European Physical Education Review* 8, no. 3: 286-304.
- Light, R. 2008. 'Complex' learning theory in physical education: An examination of its epistemology and assumptions about how we learn. *Journal of Teaching in Physical Education* 27, no. 1: 21-37.
- Light, R., and J. Butler. 2005. A personal journey: TGFU teacher development in Australia and the USA. *Physical Education and Sport Pedagogy* 10, no. 3: 241-54.

- Light, R.L., and J.R. Evans. 2010. The impact of Game Sense pedagogy on Australian rugby coaches' practice: A question of pedagogy. *Physical Education and Sport Pedagogy* 15, no. 2: 103-115.
- Light, R., and S. Georgakis. 2005. Integrating theory and practice in teacher education: The impact of a game sense unit on female pre-service primary teachers attitudes towards teaching physical education. *Journal of Physical Education New Zealand* 38, no. 1: 67-82.
- Light, R., and S. Georgakis. 2007. The effect of game sense pedagogy on primary school pre-service teachers' attitudes to teaching physical education. *ACHPER Healthy Lifestyles Journal* 54, no. 1: 24–28.
- Light, R., and S. Tan. 2006. Culture, embodied experience and teachers' development of TGfU in Australia and Singapore. *European Physical Education Review* 12, no. 1: 99–117.
- Light, R. 2012. *Game Sense: Pedagogy for performance, participation and enjoyment*. London: Routledge.
- Lincoln, Y., and E. Guba. 1985. *Naturalist inquiry*. New York: Sage.
- Lortie, D. 1975. *Schoolteacher: A sociological study*. Chicago: University of Chicago Press.
- MacPhail, A., D. Kirk, and L. Griffin. 2008. Throwing and catching as relational skills in game play: Situated learning in a modified game unit. *Journal of Teaching in Physical Education* 27, no. 1: 100-115.
- McMahon, E., and A. MacPhail. 2007. Learning to teach sport education: The experiences of a pre-service teacher. *European Physical Education Review* 13, no. 2: 229-246.
- McNeill, M., J. Fry, S. Wright, W. Tan, K. Tan, and P. Schempp. 2004. In the local context: Singaporean challenges to teaching games on practicum. *Sport, Education and Society* 9, no. 1: 3-32.

- Merriam, S. 1998. *Case study research in education: A qualitative approach*. San Francisco, CA: Jossey-Bass.
- Metzler, M.W. 2000. *Instructional models for physical education*. Boston: Allyn & Bacon.
- Morgan, P.J., and V. Hansen. 2008. The relationship between PE biographies and PE teaching practices of classroom teachers. *Sport, Education and Society* 13, no. 4: 373-91.
- Moy, B., I. Renshaw, and K. Davids. 2013. Variations in acculturation and Australian physical education teacher education students' receptiveness to an alternative pedagogical approach to games teaching. *Physical Education and Sport Pedagogy*, DOI: 10.1080/17408989.2013.780591.
- National Association for Sport and Physical Education USA. 2009. *Opportunity to learn: Guidelines for high school physical education*. 3rd ed. Reston, VA: NASPE.
- Newell, K.M. 1986. Constraints on the development of coordination. In *Motor development in children: Aspects of coordination and control*, ed. M.G. Wade and H.T.A. Whiting, 341–60. Dordrecht, Netherlands: Martinus Nijhoff.
- Pajares, M.F. 1992. Teachers' beliefs and educational research: Cleaning up a messy construct. *Review of Educational Research* 62, no. 3: 307-32.
- Patton, M. Q. 2002. *Qualitative research and evaluation methods*. 3rd ed. Thousand Oaks, CA: Sage.
- Philpot, R., and W. Smith. 2011. Beginning and graduating student-teachers' beliefs about physical education: A case study. *Asia-Pacific Journal of Health, Sport and Physical Education* 2, no. 1: 33-47.
- Queensland Studies Authority. 2010. *Physical education senior syllabus*. Brisbane: QSA.
- Renshaw, I. 2012. We're all going on a constraint-led cricketing holiday. Paper presented at The Fifth International Teaching Games for Understanding Conference, Loughborough University, UK, July 14-16.

- Renshaw, I., J.-Y. Chow, K. Davids, and J. Hammond. 2010. A constraints-led perspective to understanding skill acquisition and game play: A basis for integration of motor learning theory & physical education praxis? *Physical Education & Sport Pedagogy* 15, no. 2: 117-37.
- Renshaw, I., K. Davids, R. Shuttleworth, and J.-Y. Chow. 2009. Insights from ecological psychology and dynamical systems theory can underpin a philosophy of coaching. *International Journal of Sport Psychology* 40, no. 4: 540-602.
- Renshaw, I., K. Davids, and G. Savelsbergh. 2010. *Motor learning in practice: A constraints-led approach*. London: Routledge.
- Richard, J.F., and P. Godbout. 2000. Formative assessment as an integral part of the teaching-learning process. *Physical and Health Education Journal* 66, no. 3: 4-10.
- Rink, J.E. 1999. *What do students learn in physical activity and how do they learn?* Keynote presentation at the AIESEP conference, April, in Besancon, France.
- Rink, J.E. 2001. Investigating the assumptions of pedagogy. *Journal of Teaching in Physical Education* 20, no. 2: 112-28.
- Roberts, S.J. 2011. Teaching games for understanding: The difficulties and challenges experienced by participation cricket coaches. *Physical Education and Sport Pedagogy* 16, no. 1: 33-48.
- Seifert, L., J. Komar, T. Barbosa, H. Toussaint, G. Millet, and K. Davids. (in press). Coordination pattern variability provides functional adaptations to constraints in swimming performance. *Sports Medicine*.
- Siedentop, D. 1994. *Sport education: Quality physical education through positive sport experiences*. Champaign, IL: Human Kinetics.
- Schöllhorn, W.I., P. Hegen, and K. Davids. 2012. The nonlinear nature of learning - A differential learning approach. *The Open Sports Sciences Journal* 5: 100-112.

- Smith, M., and C.J. Cushion. 2006. An investigation of the in-game behaviours of professional, top-level youth soccer coaches. *Journal of Sports Sciences* 24, no. 4: 355-366.
- Sofa, S., and M.D. Curtner-Smith. 2005. Development of pre-service teachers' value orientations and beliefs during a secondary methods course and early field experience. *Research Quarterly for Exercise and Sport* 76, no. 1: A90-91.
- Sofa, S. and M.D. Curtner-Smith. 2010. Development of pre service teachers' value orientations during a secondary methods course and early field experience. *Sport, Education and Society* 15, no. 3: 347-65.
- Stran, M., and M.D. Curtner-Smith. 2009. Influence of occupational socialisation on two pre-service teachers' interpretation and delivery of the sport education model. *Journal of Teaching in Physical Education* 28, no. 1: 38-53.
- Tan, C.W.K., J.Y. Chow, and K. Davids. 2012. How does TGfU work? Examining the relationship between learning design in TGfU and a nonlinear pedagogy. *Physical Education and Sport Pedagogy* 17, no. 4: 331-348.
- Thorpe, R., and D. Bunker. 1989. A changing focus in games teaching. In *The place of physical education in schools*. ed. L. Almond, 42–71. London: Kogan Page.
- Thorpe, R.D., D.J. Bunker, and L. Almond. 1984. A change in focus for the teaching of games. In *Sport pedagogy: Olympic scientific congress proceedings*, ed. M. Pieron and G. Graham, 163–69. Champaign, IL: Human Kinetics.
- Tierney, M. 1994. On method and hope. In *Power and Method*, ed. A. Gitlin. London: Routledge.
- Tom, A.R. 1997. *Redesigning teacher education*. Albany, NY: SUNYP.
- Tsangaridou, N. 2006. Teachers' beliefs. In *The handbook of physical education*, ed. D. Kirk, D. Macdonald, and M. O'Sullivan, 486-501. London: Sage.

- Tsangaridou, N. 2008. Trainee primary teachers' beliefs and practices about physical education during student teaching. *Physical Education and Sport Pedagogy* 13, no. 2: 131-152.
- Tsangaridou, N., and M. O'Sullivan. 2003. Physical education teachers' theories of action and theories-in-use. *Journal of Teaching in Physical Education* 22, no. 2: 132-152.
- Turner, A.P., and T.J. Martinek. 1999. An investigation into teaching games for understanding: Effects on skill, knowledge and game play. *Research Quarterly for Exercise and Sport* 70: 286-96.
- Unluer, S. 2012. Being an insider researcher while conducting case study research. *The Qualitative Report*, 17, no. 58: 1-14.
- Wang, L.J., and A. Ha. 2009. Pre-service teachers' perception of teaching games for understanding: A Hong Kong perspective. *European Physical Education Review* 15, no. 3: 51-72.
- Wang, L.J., and A. Ha. 2012. Factors influencing pre-service teachers' perception of teaching games for understanding: A constructivist perspective. *Sport, Education and Society* 17, no. 2: 261-280.
- Wang, L.J., and A. Ha. 2013. Three groups of teachers' views, learning experiences, and understandings of teaching games for understanding. *Physical Education and Sport Pedagogy* 18, no. 3: 336-350.
- Werner, P., R. Thorpe, and D. Bunker. 1996. Teaching games for understanding: Evolution of a model. *Journal of Physical Education, Recreation and Dance* 67: 28-33.
- Wright, S., J.M. McNeil, and J. Butler. 2004. The role socialization can play in promoting teaching games for understanding. *Journal of Physical Education, Recreation and Dance* 75, no. 3: 46-52.

Wright, S., J.M. McNeill, and J.M. Fry. 2009. The tactical approach to teaching games from teaching, learning and mentoring perspectives. *Sport, Education and Society* 14, no. 2: 223-244.

Zeichner, K.M., and B.R. Tabachnik. 1981. Are the effects of university teacher education “washed out” by school experience? *Journal of Teacher Education* 32, no. 2: 7-11.