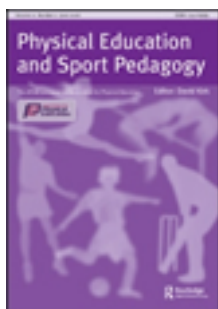


This article was downloaded by: [University of Bedfordshire]

On: 21 January 2013, At: 07:52

Publisher: Routledge

Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



Physical Education and Sport Pedagogy

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/cpes20>

A review of the game-centred approaches to teaching and coaching literature since 2006

Stephen Harvey^a & Kendall Jarrett^b

^a Institute of Physical Activity Research, University of Bedfordshire, Polhill Avenue, Bedford, MK41 9EA, UK

^b Department of Childhood Studies, Canterbury Christ Church University, Old Sessions House, North Holmes Road, Canterbury, CT1 1QU, UK

Version of record first published: 21 Jan 2013.

To cite this article: Stephen Harvey & Kendall Jarrett (2013): A review of the game-centred approaches to teaching and coaching literature since 2006, *Physical Education and Sport Pedagogy*, DOI:10.1080/17408989.2012.754005

To link to this article: <http://dx.doi.org/10.1080/17408989.2012.754005>

PLEASE SCROLL DOWN FOR ARTICLE

Full terms and conditions of use: <http://www.tandfonline.com/page/terms-and-conditions>

This article may be used for research, teaching, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing, systematic supply, or distribution in any form to anyone is expressly forbidden.

The publisher does not give any warranty express or implied or make any representation that the contents will be complete or accurate or up to date. The accuracy of any instructions, formulae, and drug doses should be independently verified with primary sources. The publisher shall not be liable for any loss, actions, claims, proceedings, demand, or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of this material.

A review of the game-centred approaches to teaching and coaching literature since 2006

Stephen Harvey^{a*} and Kendall Jarrett^b

^a*Institute of Physical Activity Research, University of Bedfordshire, Polhill Avenue, Bedford, MK41 9EA, UK;* ^b*Department of Childhood Studies, Canterbury Christ Church University, Old Sessions House, North Holmes Road, Canterbury, CT1 1QU, UK*

(Received 10 March 2012; final version received 25 August 2012)

Background: In 2006, Oslin and Mitchell published a review of the game-centred approaches (GCAs) to teaching and coaching literature highlighting a number of core concepts thought to provide justification for the use of GCAs including (a) its potential to enhance participant motivation, (b) potential for tactical transfer, and (c) development of decision-making skills and effective decision-makers. Oslin and Mitchell also suggested recommendations for future GCA research.

Purpose: The purpose of this paper was threefold: (a) to present a review of Anglophone research into GCAs building on the previous review of Oslin and Mitchell published in 2006; (b) to identify new trends in research since 2006; and (c) to investigate the extent to which the initial suggestions and future research directions suggested by Oslin and Mitchell have been addressed.

Data collection: GCA literature since 2006 was searched systematically using a three-phase approach. Phase 1 included initial searches of the EBSCO database using terms associated with GCAs and their acronyms (e.g. TGfU (teaching games for understanding), GS (Game Sense), etc.). Phase 2 expanded the search adopting more generic terms from keywords located in the recent literature (e.g. teaching games, tactical development, game performance, etc.). Multiple searches through the EBSCO database were conducted, whereby key terms were cross-referenced until a saturation point was reached. Phase 3 involved removing those publications that were not empirical, peer reviewed, intervention studies or published in English.

Findings: Forty-four studies on GCA implementation were identified and the methodological and substantive nature of these studies was examined. The review noted two positive trends: (a) the expansion of research which included the growth of research on GCAs in Europe and Southeast Asia and (b) an increased amount of research in the affective domain. The review found, however, that a number of key challenges remain within GCA research, which include (a) the need for improved articulation of GCA verification procedures; (b) further assessment of tactical awareness development; (c) extended inquiry about GCAs in coaching contexts; (d) more research into 'newer' GCAs (i.e. PP (play practice), IGCM (invasion game competence model) and TDLM (tactical decision learning model)); (e) use of longitudinal research designs; (f) inadequate length of GCA induction and training for teachers and coaches, and (g) examination of GCAs in terms of fitness and special populations.

Conclusions: GCA pedagogies are of significant importance as they have the potential to promote change within current adult-centric cultures of youth sport and encourage engagement in physical activity over the life course. To meet these needs, it is recommended that GCA research undergo continued expansion with the use of research designs and data collection techniques that aid the examination of different

*Corresponding author. Email: stephen.harvey@beds.ac.uk

philosophical understandings of GCAs (e.g. ethnographic, phenomenological and psycho-phenomenological). These are paramount to the exploration of ‘who the individual is’ and ‘how the learner is motivated to continue to participate’ and further permit the in-depth, contextual and ecological analysis of GCA interventions that Oslin and Mitchell recommended in their previous review.

Keywords: game-centred approaches; teaching; coaching; review

Introduction

The purpose of this paper is to present a review of research into game-centred approaches (GCAs) to teaching and coaching building on the previous review of Oslin and Mitchell published in 2006. Oslin and Mitchell’s review highlighted a number of core concepts thought to provide justification for the use of GCAs including (a) its potential to enhance participant motivation, (b) potential for tactical transfer, and (c) development of decision-making skills and effective decision-makers, as well as discussion highlighting the alignment of GCAs with constructivist perspectives of learning. Oslin and Mitchell identified four prominent GCAs: teaching games for understanding (TGfU; Bunker and Thorpe 1982), play practice (PP; Launder 2001), the tactical games model (TGM; Mitchell, Oslin, and Griffin 2006) and Game Sense (GS) (Light 2004). The major findings section of their review provided an in-depth discussion of the studies comparing technical and tactical approaches, the use of game performance assessment tools, the development of tactical knowledge, as well as providing an overview of in-service and pre-service teachers’ and students’ responses to GCAs. A summary of their major findings is given in Table 1.

Of further significance to the current review were Oslin and Mitchell’s recommendations for future GCA research (see Table 2) that emphasised, among other factors, a need to focus on research in coaching contexts. Their suggestions also reflect the requirement for research focused on expanding the contextual analysis of GCAs with an emphasis on using ecologically robust research designs such as teaching experiments (see Rovegno et al. 2001), what Kirk (2005) has since described as a practice-referenced approach.

Similar to the recent review of the sport education (SE) literature by Hastie, de Ojeda, and Lucquin (2011), the current review of the GCA literature had three aims: (a) to provide an updated analysis on the literature surrounding GCAs to teaching and coaching since 2006, in doing so expanding the scope of Oslin and Mitchell’s review to incorporate additional GCAs¹; (b) to identify new trends in research since 2006; and (c) to investigate the extent to which the initial suggestions and future research directions suggested by Oslin and Mitchell have been addressed.

In contrast to Oslin and Mitchell’s previous review, the current review was organised into the ‘5 big aims of PE’ (Alexander and Luckman 2001, 255): (a) motor skill development, (b) tactical knowledge and game performance, (c) fitness, (d) personal and social development, and (e) students’ attitudes and values. This aligns this review to the two SE literature reviews by Wallhead and O’Sullivan (2005) and Hastie, de Ojeda, and Lucquin (2011). However, the authors of the current review additionally include a section on teachers’ and coaches’ perceptions of GCA utilisation, consistent with the review of Oslin and Mitchell. Justification for this framework follows comments made by Wallhead and O’Sullivan (2005, 186) suggesting that the ‘5 big aims of PE’ are ‘legitimate student learning outcomes of physical education programmes’ worldwide. These aims also reflect fundamental outcomes associated with coaching programmes: those of health/fitness, psycho-social and motor skill development (Fraser-Thomas and Côté

Table 1. Summary of major findings from Oslin and Mitchell (2006).

Focus of analysis	Summary
Comparative analysis of technical and tactical approaches	Taking into account the variability in research design, contexts, content delivery and validation procedures between reviewed studies, results suggested • Improved skill outcomes within game play linked to response execution • Improved cognitive outcomes relating to decision-making and response selection • Improved game performance outcomes relating to off-the-ball movement and support movements
Game performance assessment	Discussion linked the relative infancy of GCA research to the limited breadth of the development of game performance measures
Understanding the development of tactical knowledge in students	Perceived sources of tactical knowledge were identified and prior experience was deemed important in the development of tactical knowledge. The influence of students' social system on tactical knowledge development was reported as well as the differing rates of students' knowledge development. Student exposure to an 8–12-lesson unit of instruction typically provided sufficient opportunities to develop tactical and decision-making knowledge
Responses to GCAs	Pre-service teachers' responses • Enjoyment of being taught using a GCA • Initial inconsistency when teaching using a GCA • Difficulties adjusting to a new teaching practice from a more traditional approach In-service teachers' responses • Initial scepticism raised by challenges associated with limited pedagogical content knowledge • Improved confidence in using approach over time as well as improved appreciation of student-centred philosophy Students' responses • Limited research presented on students' responses, mostly reported through teachers' perceptions • Higher levels of enjoyment, effort, engagement and ability to think reported • Some resistance to a change in pedagogical approach reported

2006), and tactical development (MacPherson and Kernodle 2003) as well as personal and social development (Light 2010; MacPhail, Gorley, and Kirk 2003) and values and attitudes (Light 2006; Strachan, Cote, and Deakin 2009).

Identification of studies

GCA literature since 2006 was searched systematically using a three-phase approach. Phase 1 included initial searches of the EBSCO database, which contains journals from North America, the UK, Europe and Australia, using terms associated with GCAs and their acronyms (TGfU, GS, TGM, games concept approach (GConA), PP, Ball School, IGCM and tactical decision learning model (TDLM)). Phase 2 expanded the search

Table 2. Breakdown of the type of GCA and country where research was undertaken since 2006.

Country	Type of GCA	Number
Australia	TGfU	5 ^a
	GS	3
UK	TGfU	5
	TGM	2
	GS	1
Singapore	GConA	5 ^a
	TGfU	1
Germany	Ball School	4
	TGfU	1
USA	TGfU	3
	PP	1
	GS	1
	Tactic-focused instruction	1
Hong Kong	TGfU	5
Belgium	IGCM	1
	TGfU	1
Malaysia	TGfU	1 ^a
Portugal	IGCM	1
Brazil	Deliberate play (Ball School)	1
Canada	TGfU	1
Spain	TGfU	1
	Modified invasion game (deliberate play)	1

^aResearch design incorporates data from two separate countries.

adopting more generic terms associated with GCAs from keywords located in the recent literature, for example, model-based instruction, teaching games, tactical development, tactical creativity, game performance, game understanding, games for understanding and game performance assessment. Similar to the literature review completed by Cale and Harris (2009), multiple searches through the EBSCO database were conducted, whereby key terms were cross-referenced until a saturation point was reached and no new studies were identified. Phase 3 involved removing those publications that did not meet an agreed inclusion criterion: that it was an empirical, peer-reviewed study including an intervention² that was published in English, consistent with other reviews of this type (e.g. Hastie, de Ojeda, and Lucquin 2011). For example, MacPhail, Kirk, and Griffin's (2008) 'Throwing and catching as relational skills in game play: Situated learning in a modified game unit' paper was included as it was an intervention study. In contrast, the study by Evans (2006) on 'Elite rugby coaches' interpretation and use of Game Sense' was observational and therefore excluded. Descriptive studies of a theoretical nature (e.g. Randall 2008) and papers focused on practical strategies for implementing GCAs (e.g. Harvey 2007) were also excluded. Records from dissertation abstracts were not included.

Summary of studies since 2006

Forty-four studies on GCA implementation were identified in the current review. Before moving on to discuss the substantive nature of these studies under the '5 big aims of PE' (Alexander and Luckman 2001, 255), the methodological aspects of these studies are reviewed (i.e. participants used, type of sport/activity, etc.). The authors also felt that it was pertinent to provide within this section details on the verification procedures articulated

in the included papers. The authors believed that an examination of such information reflected the need to adhere to recent recommendations by Hastie, de Ojeda, and Lucquin (2011) regarding the provision of information regarding the context of the research study so that readers are better placed to assess the claims made by authors of the various studies.

Participants

The majority of research identified utilised participants from school-related physical education programmes (e.g. school students and pre-service and in-service physical education teachers). Only eight studies reviewed were conducted within a sport club setting or a sport enrichment programme and three explored coaches' perceptions of GCAs. Of further significance is the identification of only five studies involving early elementary school-aged students (aged 5–8), four of which related to research conducted by Memmert (Memmert 2006, 2007; Memmert and Harvey 2010; Memmert and Roth 2007). The number of participants in each of the studies also ranged from two coaches (e.g. Harvey, Cushion, and Massa-Gonzalez 2010) to over 1000 pupils and 100 teachers in one study (e.g. [Wright, McNeill, and Fry 2009](#)).

Type of sport/activity

With respect to the type of sport/activity studied, the predominance of invasion games was still noticeable with 27 of the 44 studies articulating the use of invasion games. A further 13 studies were nondescript as to the type of sport/activity used. For example, although Wang and Ha (2012a) provided a description of the various school sites the pre-service teachers were engaged in, they did not state what activity was being taught. Of note was the lack of studies involving target games and individual sports, similar to trends found in Oslin and Mitchell's review.

Research design and data collection techniques utilised

Qualitative techniques of data capture were more prominent than quantitative techniques. The use of semi-structured interview, observation, journal reflections and open-ended questionnaires was reported in 28 of the 44 studies (e.g. Gubacs-Collins 2007). A mixed-method approach was utilised within seven studies (e.g. [Wang and Ha 2012a](#)), and together with the 16 studies that utilised a quantitative only approach, nine recorded descriptive statistics (e.g. Holt, Ward, and Wallhead 2006) and 16 inferential statistics (e.g. [Memmert and Roth 2007](#)). Although Oslin and Mitchell noted the need to shift away from comparative 'whether one model is better than another' (639) research designs to ones that understood 'the processes that contribute to teaching and learning tactics' (639), this review still highlighted 10 of the 44 studies that utilised a comparative research design (e.g. [Gray and Sproule 2011](#)). Following recommendations from Oslin and Mitchell in 2006 that teaching experiments had the 'potential to allow examination of multiple variables' (644), only three studies, one by MacPhail, Kirk, and Griffin (2008), one by Harvey et al. (2010) and one by Lee and Ward (2009), explicitly stated the use of a teaching experiment or practice-referenced approach. Only five studies employed longitudinal research designs (e.g. [Wright, McNeill, and Fry 2009](#)), and the use of learner-centred data collection techniques such as visual methods was also limited, with the exception being the study by Georgakis and Light (2009) that employed student drawings.

Countries/type of GCA employed

Although 16 of the 44 studies reviewed emanated from Australia and the UK, showing an upward trend in GCA research in these two countries since Oslin and Mitchell's review, an increasing number of GCA publications originated from Southeast Asian cultures including Malaysia, Hong Kong and Singapore ($n = 12$; see Table 2). In addition, there was a vast increase in studies from Europe, with 10 of the 44 studies being conducted in Germany, Spain, Portugal and/or Belgium (see Table 2). In comparison, research identified in Oslin and Mitchell's review revealed 27 of 29 studies to be emanating from the USA (21), the UK (4) or Australia (2), with only one emanating from a Southeast Asian site (Singapore) and one from France.

Furthermore, the vast majority of these studies in the previous review focused on either TGfU or TGM, possibly due to the location of the conducted studies. TGfU remained the most prominent GCA researched within the reviewed studies with 22 studies emanating from 10 different countries (see Table 2). Five studies from three different countries focused on GS, while Singapore was the location for six studies (e.g. McNeill et al. 2008). Hong Kong was the focus of five TGfU studies, four by Wang and Ha (2009, 2012a, 2012b, 2012c) and one TGfU study by Li and Cruz (2008). Research using Ball School occurred in Germany and Brazil, while PP (1) and IGCM (2) were the focus of only three studies in the USA (Holt, Ward, and Wallhead 2006), Belgium (Tallir et al. 2007) and Portugal (Mesquita, Farias, and Hastie 2012), respectively (see Table 2). The TDLM was not employed in any of the reviewed studies.

Verification procedures utilised

Articulated verification procedures used by researchers were limited, with only a handful of studies providing specific comments on verification benchmarks used (e.g. Greco, Memmert, and Morales 2010; Harvey 2009; Harvey, Cushion, and Massa-Gonzalez 2010; Harvey et al. 2010; Jarrett 2011; Lee and Ward 2009; Memmert 2006, 2007). It is, however, not our view that verification procedures were absent from all other studies, but simply that specific descriptions of the procedures employed were not specifically articulated.

Assessment against five common content standards***Skill development***

In early comparative research summarised by Oslin and Mitchell (2006), results concerning the development of motor skill execution for those taught with tactical and technical approaches were equivocal. Similar conclusions were drawn in the current review as comparative studies reported no significant differences between technical and tactical treatment groups for the development of on-the-ball skill execution (e.g. Gray and Sproule 2011; Gray, Sproule, and Morgan 2009; Memmert and König 2007; Tallir et al. 2007). Correspondingly, studies conducted by Gray and Sproule (2011), Lee and Ward (2009) and Harvey et al. (2010) provided further evidence that the employment of GCAs improves participants' off-the-ball movement.

In the previous review, Oslin and Mitchell acknowledged the work of Rovegno et al. (2001), who stressed the importance of situating learning in the game, not only to learn off-the-ball movement skills, but also in order to learn tactics *alongside* skills such as throwing and catching. Through an in-depth, contextual and ecological analysis,

Rovegno and colleagues highlighted the interdependence of motor skill execution and decision-making as well as the relational character of games. Drawing on the work of Rovegno et al. and using Lave and Wenger's (1991) concept of situated learning, MacPhail, Kirk, and Griffin (2008) replicated the study of Rovegno et al. with 9-year-old and 10-year-old children in the UK. Similar to Rovegno et al., MacPhail and colleagues considered the game to be the unit of analysis. This meant that learners' active engagement in the game was embedded in physical, social and institutional contexts. Conceptualising learning in this way led MacPhail et al. to explore two notions, the physical-perceptual and social-interactive elements of game play. This required the pupils learning how to 'throw a catchable pass' and 'move into space so as to be able to receive a pass', both making game play easier and thus more enjoyable. This mutuality with the environment, and the interdependence between skill execution, decision-making and social relations between players, determined the pupils' success.

The use of authentic game performance instruments, such as Memmert and König's (2007) use of Game-Test Situations to 'evoke tactical behaviour' (59), highlights what we believe to be the growing recognition of the importance of measuring what Schön (1983) termed 'knowledge-in-action'. Studies by [Gray et al. \(2009\)](#), Gray and Sproule (2011), Harvey et al. (2010), and Tallir et al. (2007) establish clear support for the use of ecologically valid assessment protocols related to the measurement of skill development. In addition, the comparative study by Gray et al. into teachers' and pupils' experiences of basketball also intimated some links between the intellectual and affective aspects of learning. Their study reported that the game-based class discussed game understanding, teamwork, enjoyment and involvement, whereas the skill-focused class only discussed the value of skill learning and evaluation of performance based on successful game skill execution.

Tactical knowledge and game performance assessment

In the previous GCA review, research into the transfer of tactical awareness across games within similar game classification categories was highlighted as a potential benefit of GCAs. Building on findings from Memmert and Roth (2007), Memmert and Harvey's (2010) study into the identification and validation of non-specific tactical tasks in invasion games for 6–7-year-olds supported empirically, for the first time, previous TGfU theorists' proposals about the use of GCAs to facilitate tactical transfer between different invasion games. The notion of transfer was also the focus of Holt, Ward, and Wallhead's (2006) study, but this time these authors studied the transfer of appropriate tactical responses from small-sided (attacking overload) practice scenarios to game play in soccer. Utilising Launder's (2001) PP approach, participants from a university undergraduate soccer class were assessed pre and post intervention (14 sessions over 7 weeks) within 4 vs. 4 game-play scenarios. Analysis of the data demonstrated that the intervention proved effective for the 'more able' participants but not for the 'less able' participants in terms of the percentage of appropriate tactical responses recorded during game play. In a similar study with 12–14-year-old students from an urban middle school in mid-Western USA, Lee and Ward (2009) showed that tactics associated with 'supportive behaviour' in a 20-lesson unit of tag rugby were able to be transferred from 4 vs. 4 instructional games, where teachers used 'freeze-replays' and 'concurrent feedback', to 4 vs. 4 match-play games, where no instruction from teachers was permitted.

These results are supportive of Memmert (2006), who found that the effects of a sport enrichment programme developed the creative thinking of a 'gifted' control group when

compared with a 'non-gifted' treatment group in team ball sports. Moreover, a hybrid TGfU/SE striking and fielding unit of 22 lessons revealed that teams were able to transfer skills to different games (Hastie and Curtner-Smith 2006). In contrast to these positive findings on transfer of learning, Harvey (2009) highlighted the potential for the negative transfer of tactical awareness and decision-making from modified/conditioned games to match-play situations when the coach did not 'get the game right'.

In a comparative study of three instructional groups (i.e. teacher-centred, student-centred with tactical questioning and student-centred without tactical questioning) undertaking a university-based practical course in volleyball in Belgium, Vande Broek et al. (2011) found that the student-centred with tactical questioning group significantly improved from pre-test to both post-test and retention test compared with the two other instructional groups, with male students from all groups showing higher scores than female students, especially at the pre-test and retention test.

The development of tactical intelligence and tactical creativity through Ball School and a game-orientated deliberate play approach was the focus of three longitudinal studies and one cross-sectional study by Memmert (2006, 2007), Memmert and Roth (2007) and Greco, Memmert, and Morales (2010), respectively. Assessment through Game-Test Situations, completed pre and post intervention, developed creative thinking and tactical performance with the lower elementary school-aged (Memmert 2006, 2007; Memmert and Roth 2007) and 10–12-year-old (Greco, Memmert, and Morales 2010) participants studied. These findings extend research since Oslin and Mitchell's review and provide further validation for the benefits of using GCAs with lower elementary school-aged populations, especially over a longitudinal period of time.

Oslin and Mitchell's review was positive about the growing acceptance and expansion of research using authentic assessment contexts. However, research into the actual *assessment* of game performance occurred in approximately a third of the studies ($n = 14$) in the current review. Five studies reported the use of Game-Test Situations to test improvements in skill and tactical performance (Greco, Memmert, and Morales 2010; Memmert 2006, 2007; Memmert and König 2007; Memmert and Roth 2007). In addition, the study by Gutierrez et al. (2011) used a modified invasion game to assess the differences in decision-making between expert and novice invasion game players using the game performance evaluation tool (G-PET), a tool developed from initial work by Nevett et al. (2001). Interestingly, the G-PET allows for the examination of two levels of game performance. At level one, technical and tactical skills are assessed in offence and defence both on and off the ball. At level two, the instrument permits the coding of the 'tactical context adaptation' (877) at the global level as well as in respect of (a) keeping the ball, (b) penetrating the defence, and (c) attacking the goal. Finally, it categorises at this level 'watcher players' (877) who do not 'show tactical intention of involvement in the game' (878).

Although widely cited in the practitioner-based literature (e.g. Harvey 2007), surprisingly³ only three studies in this review reported results from using the game performance assessment instrument (GPAI; Mitchell, Oslin, and Griffin 2006): those of Mesquita, Farias, and Hastie (2012), Harvey et al. (2010), and MacPhail, Kirk, and Griffin (2008), all of which included the measurement of off-the-ball movements. Harvey et al. (2010) found the GPAI to be a 'sensitive and robust' tool in measuring *defensive* off-the-ball game performance. This emphasis on the *off-the-ball* game performance in the GPAI, Memmert's Game-Test Situations, Lee, and Ward's (2009) 'supporting movement' coding instrument and the modified instrument used by Gray and Sproule (2011) provides further justification for the continued development of GPAIs that include elements that examine the contributions of off-the-ball play to both overall game performance *and* involvement.

The G-PET (Gutierrez et al. 2011) is also of interest due to the multi-level coding required, thus, expanding the complexity and possible utility, especially for research, of GPAIs. There were no studies in the reviewed literature that reported using the team sport assessment procedure (Gréhaigne, Richard, and Griffin 2005).

Fitness

Published studies since 2006 directly relating to the use of GCAs and health and fitness development are scarce, a trend consistent within Oslin and Mitchell's review. This lack of research is surprising given evidence within some pre-2006 studies aligning participation within game play with the potential for health and fitness development. For example, Hannon and Ratcliffe (2005) found a relationship between the playing of invasion games and heart rate elevation, and Owen, Twist and Ford (2004) showed that soccer games that had less players (i.e. 3 vs. 3) compared with those that had a higher number of players (i.e. 5 vs. 5) promoted a greater amount of engagement ('touches' on the ball) and higher heart rates. A more recent review of the game-based training literature by Gabbett, Jenkins, and Abernethy (2009) provides further support for the value of games in maintaining physical fitness for team sport athletes. Research by Harvey et al. (2006) has also found that 14–18-year-old soccer players involved in an interscholastic soccer programme gained, on average, about 7000 steps in a 90-minute session, approximating half of the recommended daily step count for young people (Tudor-Locke, Pangrazi, and Corbin 2004). While not included in this review, as it was not an intervention study, Van Acker et al.'s (2010) study found that using modified game forms with simplified rules (arguably reflective of a GCA) has the potential to produce moderate to vigorous physical activity (MVPA) levels that correspond with lesson activity guidelines. Research by Koklu (2012) has also highlighted the physiological responses/benefits of participation in small-sided games in soccer (although these were not GCA-specific intervention studies). Further research is required to expand our understanding of the relationship between the utilisation of GCAs and the potential to develop physical activity and fitness levels.

Personal and social development

A growing proportion of research completed since 2006 has focused on the potential of GCAs to promote learning in the affective domain (i.e. emotion, motivation and fun) as recommended in the previous review by Oslin and Mitchell, following earlier suggestions by Kirk and MacPhail and Holt, Streat, and Benegoechea (2002). However, there were limited studies that specifically focused on personal and social development (i.e. cooperation, fair play, responsibility and ownership, social justice and moral development) via GCAs. Some studies, for example, that of Harvey (2009), described evidence of improved social cohesion, interaction and teamwork when using GS within an interscholastic sport context. Fry et al. (2010) reported similar findings in their school-based physical education context when utilising a GConA.

Building on his previous work in individual sports (e.g. Light 2006), Light (2012) has explored GS pedagogy from an applied ethics perspective within games. Light identifies and examines three core ethical features of GS which, he argues, are closely tied to social and moral development: (a) the provision of inclusive learning experiences, (b) the use of dialogue and the ways in which this redresses issues of power, and (c) the provision of a supportive socio-moral environment. Some anecdotal support for the potential of GCAs to enhance personal and social development, however, has been supplied by

initiatives such as the Salud Escolar Integral programme in El Salvador that use TGfU as a tool to help combat youth violence and promote the development of 'life skills' (see Mandigo 2012). Empirical research that builds on the introduction of these notions is therefore much needed in the future development of GCAs.

Students' attitudes

Gray, Sproule, and Morgan (2009) presented a series of findings supporting the potential of game-focused teaching strategies to promote a mastery-orientated motivational climate. The development of a 'mastery climate' through the employment of GCAs was found in numerous reviewed studies. In their study with 115 upper elementary school pupils in three different games (soccer, volleyball and tee-ball), McNeill, Fry, and Hairil (2011) reported evidence of a strong mastery and a moderate performance climate overall, with pupils identifying success, learning and affiliation as the most significant personal motives for participation in their GCA lessons. This research supported earlier findings by Mandigo et al. (2008), who found high levels of motivation in 759 Canadian primary school pupils (grades 4–7) from 37 different classes through the employment of TGfU-autonomy-supportive games lessons from all four game categories. Girls reported higher levels of enjoyment, perceived autonomy support and optimal challenge than boys and boys reported higher perceived competence. Self-determined motivation was also higher in net/wall game categories, with invasion games receiving the lowest motivational ratings. Jones, Marshall, and Peters (2010) corroborated results reported by Mandigo et al. (2008) in their study of the intrinsic benefits of TGfU with 11–14-year-old pupils in the UK, with girls in particular reporting positive motivational experiences. Fry et al. (2010) also found that 90% of pupils aged 9–13 years old had positive affirmations relating to the perceived development of game skill and game understanding, and Wright, McNeill, and Fry (2009) noted that pupils enjoyed playing games in authentic contexts, similar to what Harvey (2009) noted in interscholastic coaching settings. In elite coaching contexts, Evans and Light (2008) further highlighted that a player perceived greater motivation via autonomy-supportive coaching environments. However, in the study of Mandigo et al. (2008), 17% of students also claimed lessons to be boring.

There is limited discussion within the reviewed papers on the specific development of attitudes towards peers. This was also reflected in Oslin and Mitchell's review that provided only a brief comment on the influence of the student social system on peer involvement in game play. Comments included in the study of Mandigo et al. (2008) highlighted above do, however, provide some insights into the experiences of GCAs and their potential for the development of positive student attitudes towards peers. Research into attitudes towards teachers and coaches is just as limited with Jarrett (2011), in the context of higher education in the UK, providing specific evidence of a positive change in students' attitudes towards their teachers through their experience of a change to GS pedagogy. Evans and Light (2008) have also shown how GCAs can develop positive coach–player relationships in Australia. However, Roberts (2011) did not substantiate these findings with UK cricket coaches who reported tensions in player–coach relations through the employment of GCAs.

Values

Research surrounding the development of values associated with the experiences of GCAs is also scarce and mostly limited to studies exploring how different cultural meanings shape participants' interpretations. Oslin and Mitchell provided a similar comment in their review,

acknowledging that GCA research shows the impact that cultural interpretations of sport can have on the perceptions of game play. Insights into the interpretations of GCAs from around the world were provided within the current review in various studies (Díaz-Cueto, Hernández-Álvarez, and Castejón 2010; Li and Cruz 2008; Light and Tan 2006; Peters and Shuck 2009; Wang and Ha 2009; Wright, McNeill, and Fry 2009), which all highlight the influence of culture on the experiences of GCAs. For example, Light and Tan (2006) identified how different cultural meanings attached to the experiences of sport shaped Australian and Singaporean generalist primary teachers' interpretations and understanding of TGfU and the GConA, respectively.

In relation to youth and community sport, Oslin and Mitchell highlighted traditional dominant values as potential barriers for coaches to use GCAs. Roberts (2011) found a similar dominance in his study into participation cricket coaches' use of TGfU. The difficulties and challenges reported by coaches in this study reflected cultural dilemmas associated with a reluctance to involve players in decision-making and a compromised position of coaching authority. Furthermore, if the desire to win dominates the culture of youth sport, then a focus on development and learning is potentially lost. Thus, further cross-cultural and intra-cultural analysis of GCAs is warranted to explore the relationship between GCA use and opportunities to challenge traditional dominant values often associated with youth and elite sport. The same issues with the culture of youth sport and youth sport structures have been highlighted in the case of another pedagogical model, SE, where the context of youth sport may be preventing significant developments in the implementation of the model (see Penney and Chandler 2000).

Teachers'/coaches' perceptions of GCAs

Twenty-three studies in this review were either specifically focused on teachers'/coaches' perceptions of employing GCAs or included teachers'/coaches' responses to their implementation of GCAs. The predominant amount of studies ($n = 9$) focused solely on pre-service teachers, in both elementary and secondary school contexts. Three studies included only in-service teachers and four included a combination of pre-service and in-service teachers, one with primary generalist teachers. Three included higher education teachers' reflections on employing GCAs, and another three studies included coaches' responses to GCAs. One study included beginner teachers.

In 2002, Holt et al. made reference to GCA research contributions emanating from the UK, North America and France. The origins of research since then have expanded. Studies on teachers'/coaches' perceptions were conducted in seven countries, with the UK and Australia being the most popular with six each and Hong Kong and Singapore with five and four, respectively.

In terms of pre-service teachers, there were positive reports of GCAs in some studies. In Hong Kong, Li, and Cruz (2008) reported that pre-service teachers perceived that TGfU was a viable pedagogical model that contributed to pupils' cognitive development and the provision of fun. Similarly, Wang and Ha (2009) confirmed that the majority of pre-service teachers were likely to use TGfU in the future due to perceived enhancement of student engagement, tactical development and inclusivity. Other studies from a range of different countries have shown that effective support is one of the key issues for pre-service teachers' continued use of GCAs (Nash 2009; Wang and Ha 2012b; Wright, McNeill, and Fry 2009). For example, Nash (2009) found that using a community of practice helped primary generalist teachers to develop their conceptual understandings of TGfU and self-confidence, which led to improvements in their communication skills and

behaviour management strategies. In contrast, [Wang and Ha \(2012c\)](#) showed that 10 pre-service teachers' support was limited by their 10 cooperating teachers' lack of knowledge of TGfU. Support for conceptual knowledge development came more from the four university supervisors, although pre-service teachers also noted how some advice given by the university supervisors was idealistic as they were unfamiliar with the school context and because they lacked school teaching experience.

Other studies also reported developments in self-confidence, for example, [Light and Georgakis' \(2007\)](#) study of primary specialist teachers and [Roberts' \(2007\)](#) study with secondary pre-service teachers who were taught a hybrid TGfU/SE approach. These two studies further reported positive affective development related to the pre-service teachers' learning experiences with GCAs. Concerns that dominated the literature on pre-service teachers' perceptions included conceptual and instructional difficulties (e.g. [Dudley and Baxter 2009](#)), lack of perceived behavioural control ([Wang and Ha 2009](#)), an entrenched mindset and personal experience stemming from exposure to more traditional approaches to learning (e.g. [Light and Georgakis 2007](#)), effects of culture ([Light and Tan 2006](#)), problems with high level questioning (e.g. [McNeill et al. 2008](#)) and the fact that pupils' experiences were mediated by pre-service teachers' competence ([Wright, McNeill, and Fry 2009](#)).

In terms of in-service teachers, [Casey and Dyson \(2009\)](#) reported the pedagogical and time constraints associated with planning and delivering a hybrid TGfU–Cooperative Learning unit. Similar to [Díaz-Cueto, Hernández-Álvarez, and Castejón \(2010\)](#), [Casey and Dyson \(2009\)](#) further described the feelings of insecurity and apprehension when orchestrating pedagogical change, with the latter noting the need to provide students with a short 'crash course in how to be taught this way' (190). [Rossi et al. \(2007\)](#) also highlighted the confusion felt by in-service teachers, especially in relation to the different forms of GCAs that they were exposed to. They suggested that the regulative discourses framed by governmentality in Singapore meant that the implementation of the GConA was paradoxical in terms of the expectations of teachers in a climate of control. This is a stark reminder of the challenges that many teachers face. [Light and Tan \(2006\)](#) noted significant cultural implications when implementing GCAs in societies with differing social conventions with the resultant impact potentially affecting the interpretation, use and effectiveness of the approach adopted. On the positive side, the professional development initiative in the study of [Rossi et al. \(2007\)](#) meant that "new" ideas about the GCA were both welcomed and sought' (108) by in-service teachers. [Díaz-Cueto et al.](#) also noted that the initial apprehension felt by the in-service teachers was altered as they saw the positive changes in pupils' decision-making and tactical performance.

In the minimal coaching literature on GCAs, [Harvey, Cushion, and Massa-Gonzalez \(2010\)](#) found that TGfU challenged coaches' values, beliefs and dispositions. Similar to [Evans and Light \(2008\)](#), GCAs were perceived to have the potential to develop players' learning. [Roberts' \(2011\)](#) study of five UK cricket coaches highlighted a number of dilemmas: pedagogical, conceptual, cultural and political. All three studies noted the need for coaches to develop higher level questioning and other pedagogical skills, one of the cited rationales for the study by [Harvey, Cushion and Massa-Gonzalez](#). Similar issues to other contexts were found in the implementation of GCAs in higher education settings by [Jarrett \(2011; e.g. developing higher level questioning\)](#), [Peters and Shuck \(2009; e.g. culture inconsistent with GCAs\)](#) and [Gubacs-Collins \(2007; e.g. increased interest and excitement due to participation with GCAs\)](#).

The abundance of relatively short induction periods with limited support that did not permit developments in pedagogical content knowledge (e.g. [Wright, McNeill, and Fry 2009](#)) sufficient enough to reduce the 'epistemological gap' ([Light 2008](#)) between their

understanding and actual practice could be considered to be indirectly attributable to many teachers' and coaches' difficulties in both conceptual understanding of GCAs and in their implementation. For example, [McNeill et al.'s \(2008\)](#) study on the Singapore Government's mandated introduction of a GConA to physical education teaching reported the need to challenge the idea that a GCA was 'a recipe'. The need for additional GCA induction and development measures not only within physical education teacher education programmes but also in the professional development of newly qualified and in-service teachers and in coach education is therefore required with the underpinning development of constructivist and autonomy-supporting pedagogies at its core (see Light 2008). An area that we believe worthy of further development in future research is the use of active communities of practice to support teachers' and coaches' conceptual and pedagogical content knowledge of GCAs highlighted by Nash (2009). This is a form of development that is perhaps under-utilised, especially in a climate where technology is becoming increasingly advanced, thus making these types of active communities more accessible to teachers and coaches.

Trends and limitations in GCA research since 2006 and recommendations for future research

After conducting an analysis of the methodological and substantive nature of the various studies included in the review, a number of key trends and limitations in GCA research since 2006 as well as recommendations for future research were identified, which are now discussed under six emergent themes. An overview of the recommendations for future research is outlined in Table 3.

Expansion of research

One of the main recommendations for future research from Oslin, and Mitchell's review in 2006 was the need to extend inquiry about GCAs into coaching contexts. The infusion of GCAs into coaching settings may have developed in recent years (as evidenced by Slade's (2011) involvement with an elite-level women's field hockey team⁴), yet there is still very limited empirical research in this domain. Various studies provided an insight into coaches'

Table 3. Recommendations for future research.

Recommendation theme	Specific recommendations
Expansion of research	(1) Extended inquiry about GCAs in coaching contexts (Oslin and Mitchell's question of 'Can GCAs be used to transform community sport contexts?' still remains largely unanswered) (2) More research into 'newer' GCAs (i.e. PP, IGCM and TDLM) (3) The examination of GCAs in terms of fitness and special populations (4) Further assessment of tactical awareness development associated with GCA interventions
Research design	(5) The planning (and articulation) of more robust GCA verification procedures (6) The use of longitudinal research designs
Intervention practice	(7) The optimal length of GCA induction and training for pre-service and in-service teachers and coaches

(e.g. Evans and Light 2008) and players' perceptions (e.g. Harvey 2009) on GCAs, yet further research is required especially in sport clubs and enrichment programmes. Oslin and Mitchell's question of 'Can GCAs be used to transform community sport contexts?' therefore remains largely unanswered, as it does with other models such as SE.

The growing emergence of GCA research from Southeast Asian countries has been noticeable since 2006. The mandated practice of using the GConA within Singaporean curriculum is a driving force behind some of the increased GCA research in this continent (see McNeill et al. 2008; Rossi et al. 2007). Comparative studies exploring the impact of culture on GCA interpretation from a Malaysian/Australian perspective (Peters and Shuck 2009) and a Singaporean/Australian perspective (Light and Tan 2006) have also provided further insights into the cultural interpretations of GCAs. Studies of Hong Kong pre-service teachers' perceptions of TGfU (Wang and Ha 2009, 2012a, 2012b, 2012c) and occupational socialisation experiences of using TGfU during field experience (Li and Cruz 2008) have helped highlight the importance of this understanding.⁵ Of significance is the decrease in the number of studies completed in North America.⁶ This corresponds with a decreased output of TGM research with its origins in North America. Reasons why this may have occurred are difficult to address and should be left for GCA researchers from that region to comment. There were also no GCA studies from New Zealand, where a notable publication on athlete-centred coaching has emanated (Kidman 2005).

Another challenge for GCA researchers is also to begin to identify and correlate findings with research from non-English-speaking countries (e.g. Spain and France). Studies by Tallir et al. (2007), Díaz-Cueto, Hernández-Álvarez, and Castejón (2010), Memmert (2006, 2007), Gutierrez et al. (2011) and Vande Broek et al. (2011) have enhanced our understanding of GCAs from a European perspective, yet a wealth of additional GCA research remains unseen, particularly literature in French on the TDLM, preventing further exploration of interpretations and use in this particular paper. More research into the use of GCAs to develop learning within target games (and to a lesser extent striking and fielding games), individual/dual sports (e.g. tennis and badminton) and non-game activities (e.g. swimming) is also warranted.

The implementation of hybrid pedagogical approaches (e.g. TGfU and Cooperative Learning) is discussed in Oslin and Mitchell's review in terms of how multiple pedagogical approaches can address multiple curricular goals. There were only four hybrid studies in the current review (Casey and Dyson 2009; Hastie and Curtner-Smith 2006; Mesquita, Farias, and Hastie 2012; Roberts 2007). Having said that, research results were positive, suggesting that multiple instructional approaches can be utilised to enhance teaching and learning process. More research is warranted, however, particularly in contexts outside of physical education.

Increased amount of research into learning in the affective domain

Since 2006, an increased volume of GCA research has explored the development of learning in the affective domain. Research into the affective domain has been considered under four auspices: (a) psycho-social research into autonomy-supportive learning environments, (b) teachers' and learners' attitudes/perceptions of GCAs, (c) values and culture, and (d) personal and social development. The largest contributor in this research has been from learners' perceptions/attitudes and teachers' perceptions of using GCAs, however. The studies of Mandigo et al. (2008) and Jones, Marshall, and Peters (2010), which were specifically focused on the psycho-social aspects of GCAs, provided further support to the notion that game-based approaches can be more fun than doing drills and that students can be

motivated when being taught with these approaches. The research into how cultures and values affect the receptivity to GCAs has also expanded (see previous discussion), but research into personal and social development, in particular, ethical and moral development, is still sparse.

Although there is a need to celebrate the increase in research in the affective domain, the authors would also like to note that while at least seven studies reported findings across the psycho-motor, cognitive and affective domains, all but one, that of MacPhail, Kirk, and Griffin (2008), failed to effectively consider the relationships between these domains (Holt, Streat, and Benegoechea 2002), at least in regards to their theorising. This holistic view of learning within games (Light and Fawns 2003; MacPhail, Kirk, and Griffin 2008) is still not abundant in the GCA literature, although notions of game affect (Lloyd and Smith 2010) and game literacy (Mandigo and Holt 2004) have been discussed in the theoretical literature in GCAs. This importance of intertwining the relationships between the psycho-motor, cognitive and social aspects of learning, such as relations between players and aspects of emotion, was a key finding in the study of Georgakis and Light (2009), where they used student drawings to examine the affective, embodied aspects of learning via GS.

The use of research designs and data collection techniques that aid the examination of different philosophical understandings of GCAs (e.g. ethnographic, phenomenological and psycho-phenomenological) is paramount to the further exploration of 'who the individual is' and 'how the learner is motivated to continue to participate' (Holt, Streat, and Benegoechea 2002, 164) in GCAs and further permits the in-depth, contextual and ecological analysis of GCA interventions that Oslin and Mitchell recommended in their previous review. Moreover, the adoption of varied research methodologies and data collection techniques such as participatory action research by Gubacs-Collins (2007) and collaborative action research by Evans and Light (2008) and the use of visual data collection methods (such as student drawings used by Georgakis and Light 2009) have gone some way to opening GCA research for further academic scrutiny. However, more creative research designs, methodologies and data collection techniques such as those mentioned above in order to explore possible higher states of affect such as 'delight' (Kretchmar 2005) are required both in physical education and in sport coaching contexts, which has seen little research within the affective domain due to its infancy. Such research reflects Oslin and Mitchell's call to investigate the potential of GCAs to promote fun and enjoyment within lifelong participation in sport.

Limited research on the authentic assessment of skill development and tactical awareness

Although there are numerous practitioner-orientated journal articles and books showcasing different modes of assessment and assessment practice associated with GCAs (e.g. Harvey 2007), we identified only 14 studies in this review that used authentic assessment procedures to evaluate the effects of their interventions. Indeed, Oslin and Mitchell highlighted research into numerous performance analysis instruments in their previous review, yet only three studies have, for example, used the GPAI (Harvey et al. 2010; MacPhail, Kirk, and Griffin 2008; Mesquita, Farias, and Hastie 2012). The study by Harvey and colleagues provides us with the only evidence since 2006 that the GPAI 'is an instrument with sufficient sensitivity to detect the changes in defensive off-the-ball game performance' (49). Oslin and Mitchell also alluded to the abundance of specific, technical and complex GPAIs identified as being more appropriate for elite sport coaches and athletes. Thus, with respect to the

comments made by Holt, Ward, and Wallhead (2006) suggesting ‘the need for manageable assessment tools for instructors to gain accurate information of the performance of their learners’ (117), Memmert’s (2006, 2007) and Greco, Memmert, and Morales’ (2010) utilisation of Game-Test Situations to assess the development of tactical intelligence and tactical creativity in elementary school-aged children might be worthy of expansion as a generic school-appropriate assessment instrument. The importance of authentic assessment of game performance in studies of GCAs cannot be understated. Authors such as Light and Fawns (2003) have cited the need to assess *knowledge-in-action* (Schön 1983) as, in this way, researchers can assess the body thinking. Thus, if authors in future studies are to claim improvements in game performance, supporting these with game performance assessment results would be recommended. Infusion of Francophone research and perspectives on GCAs could drive these developments (see Gréhaigne, Richard, and Griffin 2005).

Length of intervention and induction practices

Although an expansion of research sites can be acknowledged in the literature since 2006, the length of intervention/time scales used in GCA-related research designs is still limited. Typically, intervention length ranged between 4 and 8 weeks for research designs exploring in-service teachers’ perceptions and less than 3 months (predominantly 7–12 sessions) for the exploration/measurement of students’ perceptions/development, with some exceptions (e.g. 20 sessions in the case of the study by Lee and Ward 2009 and 22 sessions in the study by Mesquita, Farias, and Hastie 2012). In contrast, studies by Wright, McNeill, and Fry (2009), Memmert and Roth (2007), Memmert (2006, 2007) and Roberts (2011) ran for 5 years, 15 months, 6 months and 12 months, respectively. These studies begin to offer a more long-term perspective on not only teachers’ and coaches’ perceptions of prolonged GCA use, but also on the development of participants’ tactical creativity. Longitudinal GCA research also acknowledges that learning is complex and takes time (Gréhaigne, Richard, and Griffin 2005).

A prominent feature of the reviewed research was the short induction periods made available to teachers and sport coaches. In the case of pre-service teachers, induction programmes typically align to a set unit of work on a university unit prior to a practicum experience. For example, in the study of McNeill et al. (2008), this was an 18-hour unit of work. From a teaching perspective, more sophisticated research designs encompassing initial exposure, induction, trialling and acceptance/avoidance of GCAs are warranted (see Kinchin 2006) to permit the development of conceptual understandings and pedagogical content knowledge needed to teach GCAs to improve the quality of the learners’ experience (e.g. Wright, McNeill, and Fry 2009).

There were limited studies (e.g. Rossi et al. 2007) that provided any discussion relating to the use (and effectiveness) of GCAs in a professional development programme for in-service teachers. Here the authors used composite narratives to highlight confusion caused by multiple interpretations of GCAs that were apparent after a weeklong professional development and mentoring programme. The perceived success of Nash’s (2009) use of structured communities of practice to enable participants to exchange and draw on peers’ experiences of TGfU implementation in local schools with pre-service teachers warrants further research, not only with pre-service teachers, but also with in-service teachers and coaches. The use of communities of practice to enhance professional development through active online communities of practice could further foster the development of GCA use and again warrants further investigation. The use of mentoring programmes involving pre-service and in-service teachers could also be utilised. Wang and Ha’s (2012c) recent research into the mentoring of pre-service teachers’ implementing a TGfU approach

suggested that such mentoring programmes have the potential to be more beneficial for the professional growth of in-service cooperating teachers as they extend their understanding of developments in GCA intervention options.

Lack of verification processes

The authors believe that the inclusion of verification procedures will add further value to the body of GCA research to be developed in future and help quality assure the learning and use of GCAs by teachers and coaches. Furthermore, the authors believe that expanded explanations of research contexts as well as the type/form of GCAs used (i.e. PP, TGfU and TGM) will also help further teachers' and coaches' acceptance and use of GCAs in specific circumstances. The recent development and validation of the system for observation of the teaching of games in physical education by [Roberts and Fairclough \(2012\)](#) may ensure that all researchers conduct this process in future GCA research.

Limited focus on the links between GCAs and fitness

We have noted the dearth in research relating to fitness and health provision via GCAs, which is surprising given research that suggests high MVPA levels for children playing games (see Hannon and Ratcliffe 2005). The investigation by [Van Acker et al. \(2010\)](#) into the potential of modified game forms to promote sex equity in physical activity engagement is the only post-2006 study that provided specific comments on the link between the use of a GCA and the levels of MVPA. Having said that, the authors note that the primary aim of GCAs may not be raising fitness levels, but may be educating students to become intelligent game players. Nevertheless, links between games and the promotion of lifelong physical activity, previously highlighted in Oslin and Mitchell's review, cannot be understated, particularly in the case of legitimising the use of GCAs in a performative culture focused on accountability, assessment and the achievement of standards (e.g. [Rossi et al. 2007](#)).

GCAs for specific populations

Following on from a lack of research on gendered perceptions discussed in Oslin and Mitchell's review, a limited number of reviewed studies since 2006 provided insights into the gendered perceptions of GCA use. [Mandigo et al. \(2008\)](#) reported gender differences found in motivation and challenge following autonomy-supportive games lessons with the suggestion that gender should be a consideration for future autonomy-supportive physical education game interventions. Jones, Marshall, and Peters (2010) reported similar findings in their study into the intrinsic benefits of TGfU, stating that 'girls perceived TGfU-related activities to fulfil individual needs and provide satisfaction more than the boys' (61). Other studies have highlighted the differential effects on the tactical development and game performance on girls when employing GCAs (i.e. Lee and Ward 2009; Vande Broek et al. 2011) or hybrid versions (i.e. Mesquita, Farias, and Hastie 2012). Of note is the lack of studies investigating GCAs and the development of tactical and/or game performance knowledge of students with special educational needs or within disabled populations in both physical education and sport club contexts (e.g. wheelchair basketball clubs). Thus, when considering Ennis' (1999) view that teaching-dominant approaches emphasising the mastery of technique before playing games can marginalise and exclude less gifted or confident individuals, further research into the GCA intervention and its influence on specific populations is required.

Conclusions

This review of GCA literature published since 2006 provided an assessment of research findings relating to five common aims of physical education and sport programmes. Perceptions of motor skill development gained through GCA interventions were discussed, and further research that provided evidence for the use of GCAs in supporting skill development, particularly off-the-ball movements, was identified. However, less than a third of the studies in the review assessed game-play performance.

The potential of GCA interventions to develop tactical knowledge and performance was identified in numerous studies. New research that empirically highlighted tactical transfer in invasion games emerged and research also suggested notions of positive transfer from game-situated practices to match play, albeit not for less able pupils/players. Having said that, notions of negative transfer were also found between game-situated practices and match play if the coach did not 'get the game right' (Harvey 2009).

Limited research explored the relationship between the utilisation of GCAs and the development of fitness and/or physical activity levels. Learners' perceptions of GCA interventions were positive as they created positive motivational climates through their focus on mastery. Research focusing on GCAs and the ways in which they encouraged personal and social development was limited as was the breadth of research exploring the development of students' relations to their peers and teachers/coaches. In contrast, some research highlighted the positive perceptions of a greater sense of autonomy that GCAs offer (e.g. Evans and Light 2008). Further research into values and culture is also needed.

The research on teachers' perceptions of GCAs exemplified the growing number of research contributions from new continents including Europe and Southeast Asia. These highlighted some concerns about the delivery of GCAs by pre-service and in-service teachers and coaches. This included a lack of confidence in their ability to engage students with high-level questioning, conceptual and instructional difficulties, an entrenched mindset, perceived behavioural control, and pedagogical and time constraints associated with planning and delivery.

Trends and limitations in GCA research published since 2006 were presented, and recommendations for future GCA research include (a) the need for improved articulation of GCA verification procedures; (b) further assessment of tactical awareness development associated with GCA interventions; (c) extended inquiry about GCAs in coaching contexts; (d) more research into 'newer' GCAs such as PP and those with heritage within Europe such as IGCM and TDLM; (e) the use of longitudinal research designs; (f) inadequate length of GCA induction and training for teachers and coaches; (g) examination of GCAs in terms of fitness and special populations; and (h) further expansion of research methodologies and data collection techniques, such as those which can generate information related to the participants' subjective experiences of learning with GCA pedagogies (e.g. ethnography, autoethnography and phenomenology). The employment of GCA pedagogies within physical education and youth sport are of significant importance as they have the potential to promote change within current adult-centric cultures of youth sport and encourage engagement in physical activity over the life course.

Notes

1. These approaches include TGfU (Bunker and Thorpe 1982), the TGM (Mitchell, Oslin, and Griffin 2006), PP (Lauder 2001), GS (Light, 2004), the TDLM (Gréhaigne, Wallian and Godbout 2005), the Ball School model (Mummert, and Roth, 2007), the GConA (McNeill et al. 2008) and the IGCM (Tallir et al. 2007).

2. The inclusion/exclusion criterion of 'intervention' refers to research data generated as a direct result of a GCA to teaching or coaching being utilised as part of a research design. The use of 'GCA intervention' as an inclusion/exclusion criterion acknowledges discussion in Oslin and Mitchell's (2006) review which centres on the desire to 'explore the potential of GCAs to impact learning and performance' (630). The authors believe that this necessitated a focus on research specific to the use and analysis of GCA intervention practices.
3. This term has been used to explain the authors' surprise at the disproportionate relationship that exists between the relative growth in practitioner-based research dedicated to the GPAI and the lack of research conducted with it as a means of assessing game performance development. The authors also recognise that the limited number of identified studies that focus on the use of a GPAI could be related to set inclusion/exclusion criteria, that is, exclusion of dissertations.
4. Slade's (2011) study was not an empirical one, thus is not included in the list of reviewed papers.
5. Although not an empirical study, King and Ho's (2009) study provides a historical and cultural commentary on the relationship between Western philosophy and Eastern practice with respect to the use of a TGfU approach in Sydney and Hong Kong.
6. The authors note, however, that this could be related to set inclusion/exclusion criteria.

References

- Alexander, K., and J. Luckman. 2001. "Australian Teachers' Perceptions and Uses of the Sport Education Curriculum Model." *European Physical Education Review* 7 (3): 243–267.
- Bunker, D., and R. Thorpe. 1982. "A Model for the Teaching of Games in Secondary Schools." *Bulletin of Physical Education* 18 (1): 5–8.
- Cale, L., and J. Harris. 2009. "Fitness Testing in Physical Education – A Misdirected Effort in Promoting Healthy Lifestyles and Physical Activity?" *Physical Education and Sport Pedagogy* 14 (1): 89–108.
- *Casey, A., and B. Dyson. 2009. "The Implementation of Models-Based Practice in Physical Education Through Action Research." *European Physical Education Review* 15 (2): 175–199.
- *Díaz-Cueto, M., J. Hernández-Álvarez, and F. Castejón. 2010. "Teaching Games for Understanding to In-Service Physical Education Teachers: Rewards and Barriers Regarding the Changing Model of Teaching Sport." *Journal of Teaching in Physical Education* 29 (4): 378–398.
- *Dudley, D., and D. Baxter. 2009. "Assessing Levels of Student Understanding in Pre-Service Teachers Using a Two-Cycle SOLO Model." *Asia-Pacific Journal of Teacher Education* 37 (3): 283–293.
- Ennis, C. 1999. "Creating a Cultural Relevant Curriculum for Disengaged Girls." *Sport, Education and Society* 4 (1): 31–50.
- Evans, J. 2006. "Elite Rugby Coaches' Interpretation and Use of Game Sense." *Asian Journal of Exercise and Sport Science* 3 (1): 17–24.
- *Evans, J., and R. Light. 2008. "Coach Development Through Collaborative Action Research: A Rugby Coach's Implementation of Game Sense." *Asian Journal of Exercise and Sports Science* 5 (1): 31–37.
- Fraser-Thomas, J., and J. Côté. 2006. "Youth Sports: Implementing Findings and Moving Forward with Research." *Athletic Insight* 8 (3): 12–27.
- *Fry, J., C. Tan, M. McNeill, and S. Wright. 2010. "Children's Perspectives on Conceptual Games Teaching: A Value-Adding Experience." *Physical Education and Sport Pedagogy* 15 (2): 139–158.
- Gabbett, T., D. Jenkins, and B. Abernethy. 2009. "Game-Based Training for Improving Skill and Physical Fitness in Team Sport Athletes." *International Journal of Sports Science and Coaching* 4 (2): 273–283.
- *Georgakis, S., and R. Light. 2009. "Visual Data Collection Methods for Research on the Affective Dimensions of Children's Personal Experiences of PE." *ACHPER Healthy Lifestyles Journal* 56 (3/4): 23–27.
- *Gray, S., and J. Sproule. 2011. "Developing Pupils' Performance in Team Invasion Games." *Physical Education and Sport Pedagogy* 16 (1): 15–32.
- *Gray, S., J. Sproule, and K. Morgan. 2009. "Teaching Team Invasion Games and Motivational Climate." *European Physical Education Review* 15 (1): 65–89.
- *Greco, P., D. Memmert, and J.C.P. Morales. 2010. "The Effect of Deliberate Play on Tactical Performance in Basketball." *Perceptual and Motor Skills* 110: 849–856.

- Gréhaigne, J. F., J.-F. Richard, and L. Griffin. 2005. *Teaching and Learning Team Sports and Games*. New York: Routledge Falmer.
- Gréhaigne, J. F., N. Wallian, and P. Godbout. 2005. "Tactical-Decision Learning Model and Students' Practices." *Physical Education and Sport Pedagogy* 10 (3): 255–269.
- *Gubacs-Collins, K. 2007. "Implementing a Tactical Approach Through Action Research." *Physical Education and Sport Pedagogy* 12 (2): 105–126.
- *Gutierrez Diaz del Campo, D., S. G. Villora, L. M. G. Lopez, and S. Mitchell. 2011. "Differences in Decision-Making Development Between Expert and Novice Invasion Game Players." *Perceptual and Motor Skills* 112 (3): 871–888.
- Hannon, J., and T. Ratcliffe. 2005. "Physical Activity Levels in Coeducational and Single Gender High School Physical Education Settings." *Journal of Teaching in Physical Education* 24 (2): 149–164.
- Harvey, S. 2007. "Using a Generic Invasion Game for Assessment." *Journal of Physical Education, Recreation and Dance* 78 (4): 19–25 & 48–50.
- *Harvey, S. 2009. "A Study of Interscholastic Soccer Players Perceptions of Learning with Game Sense." *Asian Journal of Exercise and Sports Science* 6 (1): 1–10.
- *Harvey, S., C. Cushion, and A. Massa-Gonzalez. 2010. "Learning a New Method: Teaching Games for Understanding in the Coaches' Eyes." *Physical Education and Sport Pedagogy* 15 (4): 361–382.
- *Harvey, S., C. Cushion, H. Wegis, and A. Massa-Gonzalez. 2010. "Teaching Games for Understanding in American High-School Soccer: A Quantitative Data Analysis Using the Game Performance Assessment Instrument." *Physical Education and Sport Pedagogy* 15 (1): 29–54.
- Harvey, S., H. van der Mars, H. Wegis and M. Beets. 2006. "Physical Activity Levels of High School Male Soccer Players During Team Practice." Poster presented at 2006 AAHPERD National Convention and Exposition, Salt Lake City, UT.
- *Hastie, P., and M. Curtner-Smith. 2006. "Influence of a Hybrid Sport Education – Teaching Games for Understanding Unit on One Teacher and his Students." *Physical Education and Sport Pedagogy* 11 (1): 1–27.
- Hastie, P., D. M. de Ojeda, and A. C. Lucquin. 2011. "A Review of Research on Sport Education: 2004 to the Present." *Physical Education and Sport Pedagogy* 16 (2): 103–132.
- Holt, J., W. Streat, and E. Benegoechea. 2002. "Expanding the Teaching Games for Understanding Model. New Avenues for Future Research and Practice." *Journal of Teaching in Physical Education* 21: 162–176.
- *Holt, J., P. Ward, and T. Wallhead. 2006. "The Transfer of Learning from Play Practices to Game Play in Young Adult Soccer Players." *Physical Education and Sport Pedagogy* 11 (2): 101–118.
- *Jarrett, K. 2011. "Undergraduate Sport Students' Perceptions of a Change to Game Sense Pedagogy." *Asian Journal of Exercise and Sport Science* 4 (1): 1–17.
- *Jones, R., S. Marshall, and D. Peters. 2010. "Can We Play a Game Now? The Intrinsic Benefits of TGfU." *European Journal of Physical and Health Education* 4 (2): 57–63.
- Kidman, L. 2005. *Athlete-Centered Coaching: Developing Inspired and Inspiring People*. Christchurch: Innovative Print Communications.
- Kinchin, G. D. 2006. "Sport Education: A View of the Research." In *The Handbook of Physical Education*, edited by D. Kirk, D. Macdonald, and M. O'Sullivan, 596–609. London: Sage.
- King, W., and Y. Ho. 2009. "Western Philosophy and Eastern Practice in Physical Education – A Study of the Games Teaching Approach in Sydney and Hong Kong." *International Journal of Physical Education* 46 (3): 28–38.
- Kirk, D. 2005. "Future Prospects for Teaching Games for Understanding." In *Teaching Games for Understanding: Theory, Research and Practice*, edited by L. Griffin and J. Butler, 209–223. Champaign, IL: Human Kinetics.
- Koklu, Y. 2012. "A Comparison of Physiological Responses to Various Intermittent and Continuous Small-Sided Games in Young Soccer Players." *Journal of Human Kinetics* 31: 89–96.
- Kretchmar, R. S. 2005. "Teaching Games for Understanding and the Delights of Human Activity." In *Teaching Games for Understanding: Theory, Research and Practice*, edited by L. Griffin and J. Butler, 209–223. Champaign, IL: Human Kinetics.
- Lauder, A. 2001. *Play Practice: The Games Approach to Teaching and Coaching Sports*. Champaign, IL: Human Kinetics.
- Lave, J., and E. Wenger. 1991. *Situated Learning: Legitimate Peripheral Participation*. New York: Cambridge University Press.
- *Lee, M.-H., and P. Ward. 2009. "Generalization of Tactics in Tag Rugby from Practice to Games in Middle School Physical Education." *Physical Education and Sport Pedagogy* 14 (2): 189–207.

- *Li, C., and A. Cruz. 2008. "Pre-Service PE Teachers' Occupational Socialization Experiences on Teaching Games for Understanding." *New Horizons in Education* 56 (3): 20–30.
- Light, R. 2004. "Coaches' Experiences of Games Sense: Opportunities and Challenges." *Physical Education and Sport Pedagogy* 9 (2): 115–131.
- Light, R. 2008. "Complex Learning Theory – Its Epistemology and Its Assumptions about Learning: Implications for Physical Education." *Journal of Teaching in Physical Education* 27 (1): 21–37.
- Light, R. L. 2006. "Situated Learning in an Australian Surf Club." *Sport, Education and Society* 11 (2): 155–172.
- Light, R. L. 2010. "Children's Social and Personal Development Through Sport: A Case Study of an Australian Swimming Club." *Journal of Sport and Social Issues* 34 (4): 266–282.
- Light, R. L. 2012. "Game Sense Pedagogy in Youth Sport: An Applied Ethics Perspective." In *Ethics in Youth Sport: Policy and Pedagogical Applications*, edited by S. Harvey and R. L. Light, 92–106. London: Routledge.
- Light, R., and R. Fawns. 2003. "Knowing the Game: Integrating Speech and Action in Games Teaching Through TGfU." *Quest* 55: 161–175.
- *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 (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 (1): 99–117.
- Lloyd, R., and S. Smith. 2010. "Feeling Flow Motion in Games and Sports." In *More Teaching Games for Understanding: Moving Globally*, edited by J. I. Butler and L. L. Griffin, 89–103. Champaign, IL: Human Kinetics.
- MacPhail, A., T. Gorley, and D. Kirk. 2003. "Young People's Socialisation into Sport: A Case Study of an Athletics Club." *Sport Education and Society* 8 (2): 251–267.
- *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 (1): 100–115.
- MacPherson, S., and M. Kernodle. 2003. "Tactics, the Neglected Attribute of Expertise: Problem Representations and Performance Skills in Tennis." In *Expert Performance in Sports: Advances in Research on Sport Expertise*, edited by J. Starkes and K. Anders Ericsson, 137–167. Champaign, IL: Human Kinetics.
- Mandigo, J. 2012. "El Salvador – Salud Escolar Integral." Accessed February 24. [HTTP:// www.tgfu.info/research/projects](http://www.tgfu.info/research/projects).
- Mandigo, J., and N. Holt. 2004. "Reading the Game: Introducing the Notion of Games Literacy." *Physical and Health Education Journal* 70 (3): 4–10.
- *Mandigo, J., N. Holt, A. Anderson, and J. Sheppard. 2008. "Children's Motivational Experiences Following Autonomy-Supportive Games Lessons." *European Physical Education Review* 14 (3): 407–425.
- *McNeill, M., J. Fry, and M. Hairil. 2011. "Motivational Climate in Games Concept Lessons." *ICHPER – SD Journal of Research in Health, PE, Rec, Sport and Dance* 6 (1): 34–39.
- *McNeill, M., J. Fry, S. Wright, C. Tan, and T. Rossi. 2008. "Structuring Time and Questioning to Achieve Tactical Awareness in Games Lessons." *Physical Education and Sport Pedagogy* 13 (3): 231–249.
- *Memmert, D. 2006. "Developing Creative Thinking in a Gifted Sport Enrichment Program and the Crucial Role of Attention Processes." *High Ability Studies* 17 (1): 101–115.
- *Memmert, D. 2007. "Can Creativity Be Improved by an Attention-Broadening Training Program? – An Exploratory Study Focusing on Team Sports." *Creativity Research Journal* 19 (2–3): 281–291.
- *Memmert, D., and S. Harvey. 2010. "Identification of Non-Specific Tactical Tasks in Invasion Games." *Physical Education and Sport Pedagogy* 15 (3): 287–385.
- *Memmert, D., and S. König. 2007. "Teaching Games at Elementary Schools." *International Journal of Physical Education* 44: 54–67.
- *Memmert, D., and K. Roth. 2007. "The Effects of Non-Specific and Specific Concepts on Tactical Creativity in Team Ball Sports." *Journal of Sports Sciences* 25 (12): 1423–1432.
- *Mesquita, I., C. Farias, and P. Hastie. 2012. "The Impact of a Hybrid Sport Education–Invasion Games Competence Model Soccer Unit on Students' Decision Making, Skill Execution and Overall Game Performance." *European Physical Education Review* 18 (2): 205–219.

- Mitchell, S., J. Oslin, and L. Griffin. 2006. *Teaching Sport Concepts and Skills: A Tactical Games Approach* (2nd ed.) Champaign, IL: Human Kinetics.
- *Nash, M. 2009. "Using the Idea of 'Communities of Practice' and TGfU to Develop Physical Education Pedagogy Among Primary Generalist Pre-Service Teachers." *Asian Journal of Exercise and Sports Science* 6 (1): 15–21.
- Nevett, M., I. Rovegno, M. Babiarz, and N. McCaughtry. 2001. "Changes in Basic Tactics and Motor Skills in an Invasion-Type Game after a 12-Lesson Unit of Instruction." *Journal of Teaching in Physical Education* 20 (4): 352–369.
- Oslin, J., and S. Mitchell. 2006. "Game-Centred Approaches to Teaching Physical Education." In *The Handbook of Physical Education*, edited by D. Kirk, D. MacDonald, and M. O'Sullivan, 627–651. London: Sage.
- Owen, A., C. Twist, and P. Ford. 2004. "Small-sided Games: The Physiological and Technical Effect of Altering Pitch Size and Player Numbers." *Insight – The Football Association Coaches Association Magazine* 7 (2): 50–53.
- Penney, D., and T. Chandler. 2000. "Physical Education: What Future(s)?" *Sport, Education and Society* 5 (1): 71–87.
- *Peters, J., and L. Shuck. 2009. "Breaking Down the Barriers: Insights into Using a Student Centred Games Approach in Australian and Malaysian Pre-Service Settings." *ACHPER Healthy Lifestyles Journal* 56 (3/4): 29–35.
- Randall, L. 2008. "Implementing TGfU in the Field." *Physical and Health Education Journal* Spring: 16–20.
- *Roberts, S. 2007. "The Motivational Effects of Incorporating Teaching Games for Understanding Within a Sport Education Season." *Physical Education Matters* 2 (2): 41–46.
- *Roberts, S. 2011. "Teaching Games for Understanding: The Difficulties and Challenges Experienced by Participation Cricket Coaches." *Physical Education and Sport Pedagogy* 16 (1): 33–48.
- Roberts, S., and S. J. Fairclough. 2012. "A Five Stage Process for the Development and Validation of a Systematics Observation Instrument: The System for Observing the Teaching of Games in Physical Education (SOTG-PE)." *European Physical Education Review* 18 (1): 97–113.
- *Rossi, T., J. Fry, M. McNeill, and C. Tan. 2007. "The Games Concept Approach (GCA) as a Mandated Practice: Views of Singaporean Teachers." *Sport, Education and Society* 12 (1): 93–111.
- Rovegno, I., M. Nevett, S. Brock, and M. Babiarz. 2001. "Teaching and Learning Basic Invasion-Game Tactics in 4th Grade: A Descriptive Study from Situated and Constraints Theoretical Perspectives." *Journal of Teaching in Physical Education* 20 (4): 370–388.
- Schön, D. A. 1983. *The Reflective Practitioner: How Professionals Think in Action*. New York: Basic Books.
- Slade, D. 2011. "Teaching Field Hockey for Understanding Using Constraining Games in a TGfU Model of Instruction." *Active and Healthy Magazine* 18 (2): 23–27.
- Strachan, L., J. Côté, and J. Deakin. 2009. "An Evaluation of Personal and Contextual Factors in Competitive Youth Sport." *Journal of Applied Sport Psychology* 21 (3): 340–355.
- *Tallir, I., M. Lenoir, M. Valcke, and E. Musch. 2007. "Do Alternative Instructional Approaches Result in Different Game Performance Learning Outcomes? Authentic Assessment in Varying Conditions." *International Journal of Sport Psychology* 38 (3): 263–282.
- Tudor-Locke, C., R. Pangrazi, and C. Corbin. 2004. "BMI Referenced Standards for Recommended Pedometer Determined Steps/Day in Children." *Preventative Medicine* 38 (6): 857–864.
- Van Acker, R., F. da Costa, I. De Bourdeaudhuij, G. Cardon, and L. Haerens. 2010. "Sex Equity and Physical Activity Levels in Coeducational Physical Education: Exploring the Potential of Modified Game Forms." *Physical Education and Sport Pedagogy* 15 (2): 159–173.
- *Vande Broek, G., F. Boen, M. Claessens, J. Feys, and T. Ceux. 2011. "Comparison of Three Instructional Approaches to Enhance Tactical Knowledge in Volleyball Among University Students." *Journal of Teaching in Physical Education* 30: 375–392.
- Wallhead, T., and M. O'Sullivan. 2005. "Sport Education: Physical Education for the New Millennium?" *Physical Education and Sport Pedagogy* 10 (2): 181–210.
- *Wang, C. L., and A. S. Ha. 2009. "Pre-Service Teachers' Perception of Teaching Games for Understanding: A Hong Kong Perspective." *European Physical Education Review* 15 (3): 407–429.
- *Wang, C. L., and A. S. Ha. 2012a. "The Theory of Planned Behaviour: Predicting Pre-Service Teachers' Behaviours Towards a Constructivist Approach." *Sport Education and Society* 18 (1): 47–61.

- *Wang, C. L., and A. S. Ha. 2012b. "Factors Influencing Pre-Service Teachers' Perception of Teaching Games for Understanding: A Constructivist Perspective." *Sport, Education and Society* 17 (2): 261–280.
- *Wang, C. L., and A. S. Ha. 2012c. "Mentoring in TGfU Teaching: Mutual Engagement of Pre-Service Teachers, Cooperating Teachers and University Supervisors." *European Physical Education Review* 18 (1): 47–61.
- *Wright, S., M. McNeill, and J. Fry. 2009. "The Tactical Approach to Teaching Games from Teaching, Learning and Mentoring Perspectives." *Sport, Education and Society* 14 (2): 223–244.