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A Review of the Game-Based Approaches to Coaching Literature in Competitive Team Sport Settings

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ABSTRACT

Game-Based Approaches (GBAs) have been advocated as a pedagogy to improve decision-making, skill execution, and physical fitness in physical education teaching and sports coaching. To date, no review paper has reported on the use of GBAs in competitive team sport settings. The purpose of this article was to review the research evidence conducted on GBAs specifically within competitive team sport settings and discuss the implications of these findings for sports coaching researchers and practitioners. The current review identified 23 articles investigating GBAs in competitive team sport settings. The review supports the efficacy of GBAs in the development of athlete decision-making and tactical awareness. GBAs promote personal and social development (e.g. player responsibility) along with positive affective outcomes for athletes (i.e. motivation, enjoyment). There was less support for the development of technical skill through GBAs. The review concludes by identifying future research directions and implications for competitive team sport coaches' practice.

KEYWORDS

Game-Based Approaches; coaching; pedagogy; sport; review

Research into coaching practice within game-focused sports commonly reports that coaches employ a “traditional” approach (e.g. Ford, Yates, & Williams, 2010; Harvey, Cushion, Cope, & Muir, 2013). Traditional coaching approaches assume that technique needs to be mastered *a priori* and before game play (Evans, 2006). These approaches focus on the practice of technical skills often in overly simplistic and unpressurized situations that do not mimic the demands of real game play (Ford et al., 2010). This direct approach can create a separation between technique and tactical knowledge, leading to a disconnect between practice and game play where players are not able to respond to game situations (Davids, Renshaw, & Glazier, 2005; Holt, Ward, & Wallhead, 2006; Light & Harvey, 2015; Pill, 2014).

Game-Based Approaches (GBAs) have been suggested as an alternative way of contextualizing learning within game-like activities (Light, 2004). Furthermore, GBAs require the repositioning of the coach to the role of facilitator and using questioning to promote opportunities for player dialogue and reflection (Cushion, 2013; Light & Evans, 2010; Roberts, 2011). First developed in European countries such as France and Germany through the work of Mahlo (1974) and Deleplace (1979), GBAs were first brought to the attention of the English-speaking community when Bunker and Thorpe (1982) proposed the Teaching Games for Understanding (TGfU) Model, primarily as a way for physical education teachers to develop students' game appreciation and tactical awareness,

ultimately leading to improved game performance. Since the introduction of TGfU, several other GBAs have emerged, all with slight variations on the original TGfU model based on the needs of different cultures (Harvey & Jarrett, 2014). These alternative GBAs include: Game Sense (Light, 2004; Australia), Tactical Games Model (Mitchell, Oslin, & Griffin, 2006; USA), Play Practice (Lauder, 2001; Australia), Ball School (Kroger & Roth, 2005; Germany), the Tactical Decision Learning Model (Gréhaigne, Wallian, & Godbout, 2005; France), the Integrated Technical-Tactical Model (López-Ros & Castejón, 1998; Spain), the Invasion Games Competence Model (Mesquita, Farias, & Hastie, 2012; Belgium) and the Games Concept Approach (Rossi, Fry, McNeill, & Tan, 2007; Singapore). Notwithstanding the various cultural versions of different GBAs, Light (2013) proposed GBAs include four common features: (1) the design and manipulation of practice games and activities, (2) the use of questioning, (3) the provision of opportunities for dialogue, and (4) building a supportive sociomoral environment.

Research on the various cultural versions of GBAs has been largely concentrated on investigations in physical education environments (Harvey & Jarrett, 2014). However, reviews of the literature on GBAs in the past decade (e.g. Cushion, 2013; Harvey & Jarrett, 2014; Miller, 2015; Stolz & Pill, 2014) have noted the emergence of research investigating GBAs in competitive coaching settings (e.g. Jones, 2006; Kidman & Hanrahan, 2011). Despite this, no review currently exists examining GBA studies undertaken exclusively in competitive team sport settings. Consequently, the two main aims of the current review were (1) to synthesize the research conducted on GBAs within competitive team sport settings and discuss the implications of these findings for sports coaching researchers and practitioners and (2) to identify trends and gaps in research methodologies, designs, and contexts in which the research took place.

Method

Identification of papers

Literature on GBAs within competitive team sport settings was searched systematically using a three-phase approach (Harvey & Jarrett, 2014). Phase 1 involved searching the EBSCO database from the earliest record related to GBAs in coaching (den Duyn, 1996¹) to November 2017. The initial search was conducted using the pedagogical approach terms associated with GBAs such as “teaching games for understanding,” “game sense,” “play practice” and “tactical games model.” Phase 2 expanded the search to include other closely related terms to GBAs such as: “athlete centered,” “game performance assessment instrument,” and “coaching pedagogy.” Database searches continued until a saturation point was reached at which no new studies were identified. Phase 3 of the search involved assessing the shortlisted publications on their ability to meet the inclusion criteria of: (a) electronically-accessible English language publication with full text availability; (b) experimental/observational, peer reviewed study; (c) study explicitly states that the aim was to investigate a specific form of coaching pedagogy identified as being a GBA (e.g. Game Sense); (d) studies that took place in competitive team sport environments, not physical education classes. The final phase of the search consisted of two elements: (a) emailing authors to clarify specific details regarding the context of some shortlisted studies; (b) reading the reference lists of those articles that met the inclusion criteria to identify additional studies for consideration.

Reliability was ensured by following a three-step process outlined by Gilbert and Trudel (2004) and LaVoi and Dutove (2012). The first step involved all members of the research team agreeing to the paper inclusion criteria. Following agreement on the inclusion criteria, the lead author read and coded all articles. The second step involved attaining inter-observer reliability. This involved the first and fourth author independently coding a random sample of approximately 30% of the papers. Both authors were in agreement on the inclusion and exclusion of chosen articles with the exception of one paper that did not explicitly state the “type” of GBA under investigation (Vinson, Brady, Moreland, & Judge, 2016). A discussion followed where consensus was reached on its exclusion. In a third step, an inductive thematic analysis of all selected papers for the review was carried out and several themes were generated and organized under Light’s (2013) four features of GBAs: (1) the design and manipulation of practice games and activities, (2) the use of questioning, (3) the provision of opportunities for dialogue, and (4) building a supportive sociomoral environment.

Summary of papers

Twenty-three papers investigating GBAs in competitive team sport environments were identified for inclusion in the current review. The identified papers are marked with an asterisk (*) in the references section of the paper. Before moving on to discuss the findings of the review under Light’s (2013) four feature framework of GBAs, the methodological aspects of these studies are reviewed (i.e. research design, research context).

Participants

Thirteen of the papers included in this review were studies using pre-adults. Six of these papers focused on pre-teen groups (aged 12 or under) (e.g. Thomas, Morgan, & Mesquita, 2013) and seven papers on adolescents (13–18 years) (e.g. Nathan, 2015). Of the papers focusing on pre-adult settings, seven were conducted with interscholastic teams. Only seven papers were conducted within an adult coaching setting, five of which belonged to the research of Light and Evans (Evans, 2006, 2012; Evans & Light, 2007; Light & Evans, 2010, 2013). Two studies were set in coach education environments (Reid & Harvey, 2014; Roberts, 2011). The study by Light (2004) used coaches operating in a variety of settings, from grassroots to elite levels. The number of players in each of the included studies ranged from five (Evans & Light, 2007) to 90 players (Miller et al., 2016). In terms of coaches, a number of studies focused on one coach (e.g. Thomas et al., 2013) with Reid and Harvey’s (2014) study including up to 22 coaches.

Research context

Twenty-one of the 23 studies were invasion game-focused sports (see Table 1). Rugby union and soccer were the most popular sports featured in this review. However, it must be noted that three of the eight studies in rugby appear to come from one primary data collection (Evans, 2006; Light & Evans, 2010, 2013), while in soccer two primary data collections accounted for five (Harvey, 2009; Harvey, Cushion, & Massa-Gonzalez, 2010; Harvey, Cushion, Wegis, & Massa-Gonzalez, 2010; Pizarro, Domínguez, Serrano, García-González,

Table 1. Breakdown of studies included in the review by sport, country, and type of GBA.

Research context	Number of studies
Sport	
Rugby	8
Soccer	8
Australian rules	2
Field hockey	2
Netball	1
Cricket	1
Variety of sports	1
Geographical location	
Australia	9
United States	4
United Kingdom	3
Spain	3
Malaysia	2*
Netherlands	1
New Zealand	1
India	1*
Type of GBA	
Game Sense	12
TGFU	8
Tactical Games Model	2
Integrated Technical-Tactical Model	1

*Denotes one study that was situated in two countries.

& Del Villar Álvarez, 2017; Práxedes, Moreno, Sevil, García-González, & Del Villar, 2016) of the eight included studies. Six sports in total featured throughout the review, while one study investigating coaches' experiences of Game Sense (Light, 2004) was conducted across a variety of sports (see Table 1).

With respect to the geographical location of the research, eight countries featured in the review (see Table 1). Nine of the 23 studies were conducted in Australia while notably research on GBAs in the United States was limited to only four studies, three of which belonged to the research by Harvey (2009; Harvey et al., 2010a, 2010b). One study by Nathan (2017) was situated in India and Malaysia.

In terms of the specific GBA, the majority of papers ($n = 20$) focused on either Game Sense or Teaching Games for Understanding. Game Sense was the prominent GBA ($n = 12$; see Table 1). It is possible that there is an association between geographical location and type of GBA. For example, Game Sense originated in Australia and nine of the published papers focused on investigating Game Sense.

Research design and data collection methods

For this review, both observational and intervention study designs were included. The breakdown of the studies included 14 intervention and nine observational studies. The intervention studies ranged in length from 5 weeks to a whole season. Six of the 14 intervention-based studies were conducted throughout a full playing season in their coaching context (e.g. Pill, 2016). Collaborative action research or a closely aligned form of it was the preferred intervention study design. For example, in the study conducted by Evans and Light (2007), the first author acted as a critical friend who helped the

participant coach in introducing Game Sense pedagogy into his coaching. Observational studies conducted by Evans and Light ranged between four months and 24 months.

This current review revealed that researchers employed a range of measurement methods within studies (see [Table 2](#)). Qualitative methods were prominently employed. In particular, interviews were used by GBA researchers in 15 of the 23 studies, one of which also used focus groups (Thomas et al., 2013). Other qualitative methods utilized by researchers in the reviewed studies can be seen in [Table 2](#). There was much variation in how the qualitative data were analyzed across studies with the method of grounded theory ($n = 8$) proving the most popular choice of analysis by researchers, followed by content analysis and a range of other analysis methods (see [Table 2](#)). One study (Atkinson & Harvey, 2017) employed the Leximancer text mining software program to innovatively assist researchers in their analysis of the qualitative data.

Quantitative methods were utilized in seven studies with a number of these studies including multiple quantitative methods (e.g. Miller et al., 2016; see [Table 2](#)). Researchers in six of the seven studies utilized systematic observation instruments to assess potential improvements in participants' game performance (see [Table 2](#)). Three studies used the Game Performance Assessment Instrument (GPAI) (Harvey et al., 2010b; Miller et al., 2016; Nathan, 2017), two studies used the Game Performance Evaluation Tool (GPET) (Pizarro et al., 2017; Práxedes et al., 2016), and in one further study, researchers used the Game Play Observation Instrument (Nathan, 2015). Notably, only one of these studies (Harvey et al., 2010b) used systematic game performance instruments to measure players' defensive off-the-ball performance in conjunction with qualitative methods assessing coach/athlete perceptions of the coach's use of a GBA. Two studies (Karagiannis & Pill, 2017; Miller et al., 2016) utilized coding methods to measure the amount of time coaches spent in various activity types within the coaching sessions. Nathan (2015) employed a

Table 2. Breakdown of research methods applied in studies included in the review.

Data collection methods	Number of studies
Qualitative methods	
Interviews	15
Field notes	8
Questionnaire	5
Reflective journals	4
Focus groups	2
Draw, write and tell	1
Audio recordings of session	1
Analysis of qualitative data	
Grounded theory	8
Content analysis	3
Interpretive analysis	2
Interactivity analysis	1
General inductive analysis	1
Discourse analysis	1
Leximancer text mining	1
Quantitative methods	
Game Performance Assessment Instrument (GPAI)	3
Game Performance Evaluation Tool (GPET)	2
Game Play Observation Instrument	1
Session coding	2
Heart rate	1
Fitness tests	1
Activity levels	1

variety of fitness tests during a baseline-testing phase but they were not used to measure the effects of a GBA intervention. In addition, physical activity levels and heart rate were measured by Miller et al. (2016) and Nathan (2017), respectively. GBA validation procedures of the GBA pedagogy under investigation in intervention studies were only reported by researchers in four studies (Atkinson & Harvey, 2017; Harvey et al., 2010a, 2010b; Miller et al., 2016), while there were no validation measures for checking fidelity of GBA implementation reported by any of the authors of the observational studies reviewed.

Results and discussion

This section presents the results of our review with respect to each of the four features of GBAs highlighted by Light (2013), namely: (1) the design and manipulation of practice games and activities, (2) the use of questioning, (3) the provision of opportunities for dialogue, and (4) building a supportive sociomoral environment. While each of the features are considered individually, we acknowledge the interdependent nature of these four features. In each of the sections, data relative to that feature from the review are presented followed by a short discussion of the findings with respect to that feature.

GBA feature 1 – Design and manipulation of practice games and activities

The first feature involves the coach designing a learning environment that engages the athlete through the use of modified and/or conditioned games as opposed to isolated technically focused drills. Within this feature, our analysis generated four themes: (a) tactical development in GBAs, (b) technical skill development in GBAs, (c) physical activity and fitness development in GBAs, and (d) planning and designing good games.

Tactical development in GBAs

In five of the six studies included in this review that investigated tactical learning/development, researchers reported statistically significant improvements in various aspects of decision-making and tactical awareness (Harvey et al., 2010b; Miller et al., 2016; Práxedes et al., 2016). Harvey et al. (2010b) highlighted positive changes in soccer players' defensive off-the-ball adjusts and covers while Práxedes et al. (2016) and Miller et al. (2016) noted positive changes in players' decision making. Statistically significant improvements in players' support play were found by Miller et al. (2016). Key to the tactical learning highlighted in the studies in this review is the explicit emphasis on off-the-ball movement. This emphasis is absent in "traditional," direct and technically focused instruction (Farrow, Pyne, & Gabbett, 2008).

Creativity and game intelligence are key components in the development of players (Memmert, 2010). Coaches in several studies acknowledged the contribution of games in developing players' tactical intelligence and decision-making (Light & Evans, 2010; Pill, 2015; Thomas et al., 2013), as well as aiding the transfer of practice to competition (Atkinson & Harvey, 2017; Evans, 2012; Light, 2004). Eddie Jones (England Rugby Manager) offers an interesting perspective on this, stating that to create "thinking players" and ensure successful transfer of practice to competition, practice must be contextualized in conditions that replicate the game. In addition, he highlights that the transference of skills taught in isolation to game play is relatively low. Games are complex and dynamic,

and the successful negotiation of the scenarios that confront players in games requires the interaction, and simultaneous application of tactical awareness/knowledge, decision making, and skill execution (Jones, 2015). In other words, these three elements are inseparable (Light, 2013). Consequently, practice sessions need to be planned by coaches with this in mind. The perceptions of the coaches regarding the increased exposure to decision making opportunities through GBA focused sessions is supported by work in the motor learning literature that found players exposed to game-like activities had significantly more decision-making opportunities (Farrow et al., 2008).

Technical skill development in GBAs

Despite the positive findings in this review with respect to tactical development in GBAs, there was limited evidence to support technical skill development as a result of coaches employing a GBA (Harvey & Jarrett, 2014; Oslin & Mitchell, 2006). In only two of the six studies that investigated technical skill execution (Pizarro et al., 2017; Práxedes et al., 2016) did researchers report significant improvements in the area. These latter two studies investigated two technical skill variables, passing and dribbling, finding improvements in passing only. While Miller (2015) highlights that interventions in GBAs to date have focused on tactical and game skill development as opposed to development of technical skills and movement patterns, the holistic nature of GBAs, which requires the interaction of skill, decision making, and tactical awareness makes it difficult to specifically identify technical or skill improvements without reducing the game to component parts (Light & Harvey, 2015). This challenge may underlie the limited evidence to date for the development of technical skills through GBAs. However, we must note that there was also no evidence in the review that technical skill development declined as a consequence of coaches using a GBA.

Physical activity and fitness development in GBAs

Previous reviews highlighted a scarcity of studies investigating physical activity and fitness development in GBAs (Harvey & Jarrett, 2014; Oslin & Mitchell, 2006). While the current review highlighted qualitative evidence through coach interviews and player perceptions that GBA-focused practice sessions were of a high intensity (Evans & Light, 2007; Thomas et al., 2013), there was limited quantitative evidence that supported these perceptions. Indeed, there was no quantitative evidence in the current review that GBAs facilitated players developing and/or maintaining fitness levels. However, the present review noted some emerging quantitative evidence from two studies that coaches' use of GBAs helped players gain high physical activity levels in sessions (Miller et al., 2016; Nathan, 2017). For example, one included study demonstrated that players in GBA-focused netball sessions had significantly higher levels of physical activity (i.e. steps per minute) than those who participated in "traditional" sessions (Miller et al., 2016). A second study recorded field hockey players involved in GBA practice sessions and found they had significantly higher heart rate measurements than those involved in traditional skills practice (Nathan, 2017).

Despite the lack of quantitative evidence, particularly for fitness development when using GBAs, we would like to note that the current evidence base investigating physical activity levels and fitness is largely concentrated on game-based training (i.e. Halouani, Chtourou, Gabbett, Chaouachi, & Chamari, 2014) as opposed to GBA-focused practice sessions that incorporate additional pedagogical features such as questioning, discussion,

dialogue and debate. Thus, additional studies that objectively investigate a validated GBA in relation to its impact on multiple domain-specific variables, including players' physical activity and fitness levels are warranted.

Planning and designing good games

Within several studies, coaches identified the correct design/use of games, and the need for “perfect practice” (Lauder, 2001) as being vital to the success of GBA implementation (Evans, 2006; Harvey et al., 2010a; Pill, 2015, 2016; Práxedes et al., 2016; Thomas et al., 2013). In particular, researchers noted that coaches new to GBA pedagogy encountered difficulties in planning and designing “good” games. For example, Thomas et al. (2013) indicated initial difficulties for the coach in developing game-related content to explore identified themes in practice sessions but as a result of greater time spent in planning, this subsequently improved. Moreover, Pill (2016) discovered it took approximately a year before the coach in his study became cognizant and comfortable with the planning format needed for GBA. These challenges are unsurprising when one considers that coaches tend to rely on their own as “folk pedagogy” (Harvey et al., 2010a), as well as the observation of other coaches for the development of their ideas (Trudel & Gilbert, 2006; Williams & Hodges, 2005).

The increased time spent planning was seen to be a factor affecting the quality of GBA-focused practice sessions (Evans, 2006). One coach in the study by Pill (2015) directly linked the success of his session with the thoroughness in planning. In contrast, Harvey et al. (2010a) cited a lack of planning by one coach as being problematic in his implementation of TGfU. Consequently, evidence from our review suggests that coaches need to devote more time to the planning process when using GBAs because the act of planning can act as a mental model for the upcoming session and help the coach establish an explicit connection between practice, behavior and player learning (Cushion, 2010; Hall & Smith, 2006). Game design fundamentals such as the pedagogical principles of TGfU are seen as crucial components in the development of decision making and offer a planning framework for the effectiveness of GBA-focused activity in improving players' tactical awareness (Serra-Olivares, Gonzalez-Villora, Garcia-Lopez, & Araujo, 2015). The four pedagogical principles of TGfU are sampling, tactical complexity, modification representation, and modification exaggeration (Werner, Thorpe, & Bunker, 1996).

Pedagogical principles such as modification representation and exaggeration have become more commonplace within the broader literature surrounding games teaching through the popularity of non-linear pedagogical approaches such as the “constraints-led approach,” which is underpinned by the theoretical framework of ecological dynamics (Chow, Davids, Button, & Renshaw, 2016). While we see this as a positive move, we contend that coaches must not implicitly let the “game be the teacher” but integrate specific elements of GBA-focused pedagogy to ensure the focus of GBA sessions is explicit to their players, consequently impacting their learning. Findings from some of the reviewed studies provided evidence of coaches using games in a manner that conflicts with the guidelines set out in GBA pedagogy (e.g. Karagiannis & Pill, 2017; Light & Evans, 2010). For example, Light and Evans (2010) identified coaches using games as a closing activity to test skills learned as opposed to GBA guidelines that suggest using games throughout sessions as a dominant activity to stimulate player learning. Coaching sessions such as these, lead to conclusions that coaches use “safe-simulation” (Cushion, 2013;

Hargreaves, 1994; Harvey, Cushion, & Sammon, 2015) with imitations of GBAs practiced with minimal disruption to teaching norms and traditions. Although this is something that we found occurring more frequently in the observational studies included in this review, there are critical differences between “strongly-guided” (Alfieri, Brooks, Aldrich, & Tenenbaum, 2011) GBA-focused pedagogy and “just playing games.” Consequently, a significant task that remains in coach education is moving coaches from “just playing games” to using GBA-focused pedagogy to impact player learning.

GBA features 2 and 3 – The use of questioning and opportunities for dialogue and reflection

The second feature of GBAs involves the coach asking open or divergent questions to stimulate athlete thinking, dialogue and reflection (Forrest, 2014; Wright & Forrest, 2007). Connected with questioning, the third feature involves providing opportunities for athletes collaborating and testing ideas. In this feature, the coach facilitates the dialogue by stopping a game and prompting the athletes within their groups to discuss and debate aspects of the game before returning back into the game to act on points of discussion. Our analysis of the studies included in this review noted these two features occurring in tandem so we therefore present their findings and discussion together. The three themes generated by our analysis were: (a) conceptual shifts, (b) cultural shifts, and, (c) coach education.

Conceptual shifts

Questioning was a centrally discussed feature of GBA pedagogy in all of the included studies. Indeed, a positive association between coach questioning and player learning was evident from the studies reviewed. For example, coaches in Light’s (2004) study highlighted questioning as contributing to the players becoming independent thinkers. Pill (2015) discovered that the Australian football coaches in his study saw the use of questioning as a vital learning tool in their coaching environment, although it required high levels of planning, practice, and perseverance.

Highlighted by researchers throughout the reviewed papers was the significant challenge for coaches making the shift to a questioning approach in their coaching. The referenced difficulties reported by researchers included coaches’ insufficient pedagogical content knowledge when using questioning (Roberts, 2011), ineffective group feedback periods due to lack of pre-planned questions (Karagiannis & Pill, 2017), and player disgruntlement to being asked questions (Pill, 2016). Moreover, Thomas et al. (2013) reported that the coach felt so consumed by the requirement in the Tactical Games Approach to ask questions that he ended up not listening to the responses from players. This resulted in a lack of clarity on the part of the players. This did improve as the 10-week intervention study progressed however. Partington and Cushion (2013) highlight that the root of this problem is in the traditions and culture of coaching that both coaches and players are used to. The coaches’ role is guarded by a powerful and historical view of what coaches should be seen to be doing and what coaching should look like (Cushion, 2013; Cushion, Armour, & Jones, 2003; Cushion & Partington, 2014; Light, 2004). Consequently, coaches feel uneasy in adopting this new style of instruction and equally players feel uneasy in receiving this new style of instruction (Potrac, Jones, & Cushion, 2007).

Cultural shifts

Key to employing the features of questioning and provision of opportunities for dialogue within a GBA, are coaches' skills in adopting a facilitative role. The coach adopting a role as a facilitator draws on the constructivist approach that players should be actively involved in their own learning through problem solving and engagement with ecologically valid practice environments (Ollis & Sproule, 2007). Coach perceptions varied across studies in the review regarding the shift to the role as facilitator. For example, there were a number of studies where researchers indicated coaches new to GBAs saw this shift as a positive one (Harvey et al., 2010a) and experienced GBA coaches seeing guided discovery as an essential component to their coaching and player learning (Pill, 2015). However, in other studies, researchers reported coaches struggling with the cultural shift associated with adopting a GBA. Researchers noted coaches feeling a loss of credibility in adopting this new facilitative role (Roberts, 2011) with a constant dilemma of knowing when to intervene and when not to (Thomas et al., 2013). The difficulties highlighted in this review could be explained by previous research (Casey, 2014; Goodyear & Dudley, 2015) that suggest teachers/coaches may be reluctant to use player-centered approaches due to limited understanding on how to interact when repositioning to the role of a facilitator.

With the exception of the study by Llobet-Martí, López-Ros, and Vila (2017), there was limited evidence within this review of *sustained* periods being made available for discussion, debate and dialogue *following* questioning. One reason for this may be due to the various studies simply reporting on the questioning component of the pedagogy and less so on the opportunities that the coach provided for dialogue/player discussion. A second reason appears to lie in the coaches' perceived environmental pressures and time constraints in competitive team sports. For example, Evans and Light's various studies (e.g. Evans, 2006; Light & Evans, 2010, 2013) highlighted that coaches felt under pressure to win and therefore could not "experiment" as much as they would have liked with new ideas/innovation (see also Pill, 2015; Roberts, 2011). These examples illustrate the pressure coaches in competitive sports are under, which can result in coaches attempting to control as many variables as possible (Potrac et al., 2007).

Coach education

Coach education was the focus of two studies and appeared as a central discussion topic in several other studies. The delivery of GBA pedagogy via formal coach education methods was seen as problematic in the two coach education focused studies included in this review (Reid & Harvey, 2014; Roberts, 2011). For example, Reid and Harvey (2014) highlighted coaches feeling dissatisfaction with the support provided when attempting to implement Game Sense. Coaches in this study firstly noted that there was a lack of opportunity for dialogue, feedback and mentorship. Secondly, they noted that the direct instruction strategies employed in the coach education course staff contrasted with the facilitative athlete-centered approach/philosophy of Game Sense. As National Governing Bodies begin to articulate and promote GBAs in their coach education courses, they must therefore ensure that course delivery aligns with the educational philosophies and learning theories aligned with GBAs (Reid & Harvey, 2014).

Researchers reported that coaches indicated favoring the mentoring approach provided by the study design in all four studies that used collaborative action research (Atkinson &

Harvey, 2017; Evans & Light, 2007; Harvey et al., 2010a; Pill, 2016). For coaches attempting to integrate a new coaching approach such as a GBA into their practice, collaborative action research provides a suitable framework where coaching knowledge and practice can be developed through experiential learning and mentoring (Cushion et al., 2003; Cushion, Ford, & Williams, 2012; Lynch & Mallett, 2006). Moreover, this collaborative method creates a “community of practice” between the coach(es) and an expert pedagogue (Jones, Morgan, & Harris, 2012; Wenger, 1998) where a “critical friend” can promote deeper levels of reflection (Knowles, Gilbourne, Borrie, & Nevill, 2001). Therefore, it seems plausible that coach education providers could adopt an action research framework to assist their coaches in developing competence in using a GBA. A challenge would be the development of coach educators with the expertise to assist in this process.

GBA feature 4 – Building a supportive social and moral environment

The fourth and final feature of a GBA as suggested by Light (2013) requires the coach to provide a supportive learning environment where athletes are encouraged to take risks, be creative and engage in active learning. Our analysis noted two themes aligned to this GBA feature: (a) affective domain development and (b) personal and social development.

Affective domain development

Data from the affective domain was one of the most significant areas of player development discussed in the papers included in the current review. Motivation, fun, and/or emotion were referenced in all five studies where data were specifically collected on players’ perceptions of coaches using GBAs. Players experiencing greater motivation and enjoyment as a result of the employment of a GBA intervention was found by researchers in all five of these studies (Evans & Light, 2007; Thomas et al., 2013). The findings from the study of Thomas and colleagues (2013) aptly summarizes the player perceptions noted across these five studies. For example, through participating in GBA-focused sessions, researchers reported players experiencing greater enjoyment, increased game involvement through small sided-games, and increased motivation through tactical goal setting. These findings are supported by GBA research in physical education where researchers have found that GBA sessions are effective in maintaining player task focus and consequently ensuring players remain motivated and interested (Gray, Sproule, & Morgan, 2009). Positive reports were also noted across the reviewed studies with respect to the strength of the player-coach relationship because of GBA pedagogy (Evans & Light, 2007; Pill, 2016) with players appreciative of the coaches’ attempts to include them in the process. Therefore, the coach positioning himself or herself as a partner and co-participant in learning enhances the learning environment (Davis & Sumara, 1997; Light, 2008). However, Pill (2016) found that while seven of eight players in his study appreciated the change toward more player centered coaching, one player felt the coach was trying to be too friendly.

Personal and social development of players

Personal and social development (i.e. responsibility, ownership, fair play) of players was also observed in several reviewed studies. For example, the transferring of responsibility for learning to the players through a decrease in coach instruction and an increase in time

allocated within sessions for questioning was perceived positively by the coaches who utilized a GBA pedagogy (Llobet-Martí et al., 2017). Moreover, researchers reported that players responded positively to the increased sense of player autonomy and empowerment afforded by the coach. For example, Koekoek, Van Der Kamp, Walinga, and Van Hilvoorde (2014) highlighted players experiencing responsibility to solve tactical problems themselves rather than been given the answer by the coach (see also Evans & Light, 2007). In addition, Harvey (2009) noted players feeling improved communication and teamwork within an interscholastic soccer setting because of a GBA intervention and Pill (2016) reported players being high in confidence in the team's football game plan when the coach used Game Sense. Finally, Atkinson and Harvey (2017) directly linked the coaches' employment of the Tactical Games Model in developing the social and moral environment. They noted players' ability to communicate on the field and team cohesion improving as a result of a wider number of players contributing to discussions during training sessions.

Overall, the reviewed studies demonstrate a positive association between the coach adopting a facilitative approach, which encourages player empowerment and responsibility, and this should therefore be considered a key strength of GBAs. The athlete-centered pedagogies (Kidman & Hanrahan, 2011) associated with GBAs have the potential to create an enjoyable learning environment and promote learning in the affective domain (Harvey & Jarrett, 2014; Miller, 2015). Key to this affective and personal/social development in GBAs is the building of a supportive sociomoral environment where players are motivated to learn, encouraged to test out new ideas, and speak up without fear of failure (DeVries & Zan, 1996). Ryan and Deci (2007) suggest that this motivation is linked to how much freedom and autonomy players have in making decisions.

Trends and limitations in GBA research in competitive team sport settings

The current review indicates that research interest in GBAs is growing as more than half of the studies ($n = 15$) included in this review were conducted in the past 5 years. This trend may be indicative of the recognition and growing support for GBAs in developing a wider range of skills that are vital for success in competitive team sport environments. However, we acknowledge that some studies included in the current review appeared to be based on one primary data collection (e.g. Evans, 2006; Light & Evans, 2010, 2013), arguably reducing the number of included studies from 23 to 18. Further research interest in GBAs is therefore needed so that claims about the efficacy/lack of efficacy of coaches' use of GBAs in competitive team sport settings can be solidified. Future studies are warranted across a broader scope of geographical areas, sport types and coaching contexts than identified through this current review.

Several issues were identified in terms of study designs in this review. Only four studies reported employing benchmark validation procedures of the coaches' use of GBAs. Benchmark validation ensures that the intervention takes place in the true nature in which it was designed and that the intervention being employed was following the steps outlined in that specific GBA. Smith and Ragan (1999) suggest that when conducting any research involving pedagogical models, it is necessary to validate that methods of instruction are aligned with the framework set out by that specific approach. Harvey and Jarrett

(2014) maintain that a greater acceptance of GBAs would be secured by greater reporting of intervention and validation procedures.

There were some notable trends in the measurements employed throughout the studies in this review. Qualitative methods were favored in the reviewed studies while quantitative methods such as systematic observation and objective measurements of coach or player performance were rarely employed and only present in a small number of studies ($n = 7$). Evidence exists to suggest that coaches have a limited awareness of their coaching behaviors and approaches (e.g. Partington & Cushion, 2013) and therefore the inclusion of objective measurements such as systematic observation tools to assess coach behavior (e.g. The Coach Analysis and Intervention System) could be considered in future research (Harvey, Song, Baek, & Van Der Mars, 2016). Moreover, an approach/research design that blends methods from interpretive and positivist paradigms would ensure that different types of data could be generated (Vinson et al., 2016). For example, employing qualitative methods such as interviews can increase the richness of quantitative data collected through systematic observation methods because it offers consideration of the context and situation within which these data were collected (Harvey et al., 2013). Using mixed-method data collections therefore helps researchers in addressing the limitations/strengths of each paradigm.

Numerous studies in this review included intervention periods across a whole playing season and there was evidence of coaches still requiring more time to acclimatize themselves to GBAs. Longer-term intervention periods, therefore, are needed in future studies (Miller, 2015). In addition, we support the view of Gabbett, Jenkins, and Abernethy (2009) for the inclusion of a retention testing period in future studies to advance our understanding of the effectiveness of GBAs in skill and tactical retention.

Finally, the current review highlighted that there is little evidence of examining the coaches' role away from formal practice sessions (e.g. video analysis, tactical group meetings, one-to-one coaching, pre-match/half-time briefings). An examination of practice time alone appears to exclude a significant portion of the coach's work that may involve spontaneous and "creative" efforts (Ford, Coughlan, & Williams, 2009; Groom, Cushion, & Nelson, 2012; Smith & Cushion, 2006). While previous research has been conducted examining how coaches utilize video analysis with players (e.g. Groom, Cushion, & Nelson, 2011), this has yet to be specifically aligned to coaches who use GBAs in practice sessions and its potential effect on player performance and/or learning.

Conclusions

The current review of GBA literature in competitive team sport environments has found that GBAs improve players' tactical awareness and decision-making where games and questioning are effectively employed. Player perceptions were positive regarding affective domain development. Support for GBAs in advancing players' technical skills was limited; however, it is important to note that neither was a decline in skill noted. Limited research explored the relationship between the application of GBAs and the development of fitness, albeit coaches and athletes qualitatively reported progress in this domain. Despite various challenges in utilizing GBAs, coaches can become more comfortable with employing GBAs through a collaborative mentoring approach that emphasizes sustained practice, time, and support for coaches.

Notwithstanding the increase in GBA research, investigations of GBA-use in competitive settings remain in its infancy. The findings from this review highlight several recommendations including the need for future research: (a) within elite coaching settings; (b) examining coaches' use of GBAs in other sports; (c) including and reporting validation procedures to ensure accuracy in delivery of GBAs; (d) employing mixed-method approaches; (e) examining other GBAs such as the tactical games approach; (f) using longer intervention periods along with retention testing; (g) investigating coaches' use of GBA pedagogy away from formal coaching sessions such as video analysis and pre-game/half-time meetings; (h) investigating GBAs and their influence on physical indices (number of accelerations, time active, meters covered, heart rate) and fitness.

Notes

1. However, the earliest study included in the review that met the review criteria was Light's (2004) study.

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