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Australian School Students' Responses to Game Based Pedagogy: an Analysis of Tactical Awareness and Enjoyment by Gender

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Abstract

ABSTRACT

One of the most dominant themes in physical and coach education research has been the focus on pedagogy. Scholars have for more than two decades focussed on examining effective methods of teaching and coaching. Casey and Kirk (2020) provide a comprehensive synthesis of over 40 years of research on pedagogy and models in physical education, clearly reinforcing the centrality and scope of this research. One of the prominent pedagogical models examined and promoted in the literature is the game-based approach and its various derivatives (Teaching Games for Understanding, Game Sense, Play Practice). So pervasive has this stream of research been, that in 2020, the pandemic year, there were more than a dozen publications promoting the merits of this approach; the most pertinent example being an edited book (Pill, 2020). In this volume there are entries examining and promoting the merits of the approach in wide and varied coaching settings, but very little presenting student or player participant perspectives. Much of this edited book and the literature in general has focussed on responses from teachers, pre-service teachers or coaches but very few studies have documented the use and impact of the pedagogy from students or players perspectives. There are of course exceptions and much of the recent interest has emerged from Europe (Braco, Lodewyk & Morrison, 2019; Alcala & Carijo, 2017; Morales-Belando, Calderon & Arias-Estero, 2017).

While there is no doubt that game-based pedagogy has made a significant impact on the Australian teaching and coaching landscape, there has been very little primary source research evaluating the impact in the school or youth sport setting. This research attempted to address some of this neglect, by examining Year 8 student responses to game based pedagogy focusing on tactical awareness and enjoyment. Students were randomly allocated into twomixed classes and received a 10-weekbasketball and soccer unit using a game-based approach. Once the intervention was completed, measurement instruments were used to quantify tactical understanding and enjoyment.Results highlighted that students generally demonstrated improved tactical awareness and increased enjoyment using the game-based approach. While enjoyment levels were similar between boys and girls,in the tactical understanding component of the research, girls reported higher levels that boys. While it is important to explore the experiences of teachers and coaches who have chosen to use game-based pedagogy, this paper argues that morefocus and attention needs to be directed to the responses of students and players. Giving voice to these participants is a more effective and authentic method of evaluating this mode of pedagogy.

BACKGROUND INFORMATION

It is commonly understood that pedagogy is significant in addressing educational and coaching outcomes (Bhowmik, Banerjee & Banerjee, 2013; Pill, 2020). In Australian physical education, there is pressure on teachers to further develop their pedagogy to support student educational outcomes (Sicilia-Camacho & Brown, 2008). This is an important considerationgiven the decrease in physical activity participationin recent years. This is a serious concern as participation in youth sport has shown to have a positive influence on youth's physical activity patterns later in life (AIHW, 2019). Conversely, negative experiences in sport can often be detrimental in shaping people's lifelong attitudes to physical activity. One perceived solution to encourage students to take part in sport and curb the decrease in participation is to make participation more enjoyable.Thegame-based approach has been acknowledged in the literature as being an effective approach in eliciting higher levels of enjoyment (Curry & Light, 2007; Light, 2013; Pearson, Webb & McKeen, 2006). The research has also demonstrated that tactical understanding is also an important consideration in generating significance and meaning in physical education and sport. Game understanding is considered a significant

principle for various game-based teaching tools because of their consistent emphasis on developing tactical understanding and tactical awareness (Stolz & Pill, 2014; Kinnerk, Harvey, MacDonncha & Lyons, 2018).The overriding issue that stems out of the publishedresearch, is the limited research that teststhe merits of the pedagogical approach in the real-world setting.The purpose of this study was to examine Year 8 students' tactical awareness and enjoyment levels (overall and by gender) after the implementation of a 10-weekgame-based pedagogy intervention.

Game based pedagogy is an adaptation of Teaching Games for Understanding (TGfU) and has been viewed as an approach which influences and promotes lifelong participation in physical activity (Light & Evans, 2010). TGfU was designed as a resistance to participants' perceived dissatisfaction with technique skill-based lessons. Game based pedagogy is a student-centred rather than teacher-centred approach where there is an emphasis on learning within modified games and game-like situations (Light & Evans, 2010).Specific goals are set for the students who attempt to solve the problems that arise from playing the games to achieve specific learning outcomes and objectives guided by the questioning of the teacher. Kidman (2001) indicated that the use of the questioning technique is key for encouraging student empowerment. Compared to the traditional approach to teaching physical education, game-based pedagogyfocuses on developing an understanding of the game (tactical awareness) rather than repeating a skill to improve technique. The pedagogy also aims to motivate, develop decision making, and increase enjoyment amongst students. Skill and technique acquisition and development is not lost in game-based pedagogy, but rather skills are developed within the game rather than in isolation (Pill, Penney & Swabey, 2012). Forrest (2015) noted that: in a [game based] lesson, it is theorised that knowledge construction occurs through active student involvement in games and game play that pose problems, questioning and discussion, and reflection on play and progressions on the games to develop this. Through this, students continually construct and reconstruct knowledge about the problems presented. (p.146)

Therefore, this study examined the impact of game sense pedagogy on Year 8 students enrolled in an Australian government high school. More specifically, the research tested the hypothesis that game-basedpedagogy promotes tactical understanding and enjoyment. These two variables were also examined by gender.In order to understand the impact that the game-based approach has on Year 8 students in PE, the following questions were addressed:

1. What impact does game-based pedagogy have on student tactical awareness and enjoyment?
2. Are there gender differences in the student tactical awareness and enjoyment results?

Literature Review

The extensive literature agrees that pedagogy underpins educational outcomes (Stephen, 2006) and to maximise student-learning potential, the form of pedagogy plays a crucial role (Dyson, Grineski, Smith & Markley, 1997). This interest is best summed up by Leach and Moon (2008) who noted, "Pedagogy goes beyond simply forming a specific teaching practice, but it is a powerful tool that ultimately determines the development of student learning" (p.2). Much of the content related to physical education pedagogy has focused on sport-related games, which have been taught using various modes of instruction. Since games are such a major part of the curriculum in Australia and the game-based approach is mandated in the current NSW 7-10 PDHPE syllabus (NSWBOS, 2003), there has been an increasing interest into the study of the game based pedagogical approach. Kirk and MacPhail (2002) and Mitchell, Oslin and Griffin (2006), amongst a myriad of other literature, exhibit reasoning showing the game-based approach the most significant for learning and enjoyment.It is through research such as the above that physical educators' understanding of how students think and learn through games and their feelings towards games develop one's own pedagogy. At the same time, there is a necessity for further in-depth research to provide more authentic evidence of the game-based approach's impact on student learning and overall engagement.Although the effectiveness of a pedagogical approach in physical education can be judged on many aspects, this review will focus on two themes that emerge prominently throughout literature and are key determinants for effective physical education pedagogy (Alexander & Luckman, 2001). These themes are tactical awareness and enjoyment.

TACTICAL AWARENESS

For more than a decade, the most acclaimed physical education pedagogical research such as Oslin and Mitchell (2006) have clearly documented the importance of tactical understanding. Tactical awareness is one "main aim that physical education pedagogy should encompass" (Alexander & Luckman, 2001, pp.255). Students are more likely to show interest and participate in a game or sport if they develop a tactical understanding of the game early (Light, 2013). In identifying the importance of tactical awareness for students in physical education, it is necessary to understand game-based pedagogy's ability to developing tactical awareness amongst participants. The literature agrees that game-based pedagogy is beneficial for tactical awareness. Oslin and Mitchell (2006) demonstrate that learning through a game-based approach, students develop creative thinking and sound tactical performances that are transferrable across a range of sports. Similar conclusions are shown in Memmert and Roth's (2007) study into the identification and validation of non-specific tactical tasks in games that support the notion that a game-based teaching approach facilitates the transfer of tactical knowledge of the game. Building on these findings, MacPhail et al. (2008) displayed that the development of tactical awareness and tactical creativity through a game-based approach was not limited to players with the ball but off-the-ball play including both defence and attack. As discussed, much of the literature relating to game-based pedagogy indicated that tactical awareness is developed and facilitated through this approach. Furthermore, studies such as Ullrich-French and Smith (2009), and Van Beurden et al. (2003) give support to game based pedagogy being the most effective approach for tactical awareness after concluding that skill based pedagogies often teach skills in isolation which poses issues in meeting objectives for learning to play a game or the understanding of tactics and game awareness. Allison and Thorpe's (1997) comparative study, showed the game-based approach has a significant impact on tactical awareness in basketball and hockey. French et. al. (1996) demonstrated a similar finding when adopting this approach in a badminton unit. There is strong evidence not only suggesting the game-based approach's ability to evoke tactical awareness but also that it is the most superior pedagogical approach in relation to that. Harrison et al. (2004) however, found no defined difference in tactical awareness of the students post implementation of the game-based approach.

While the literature identifies the link between game based and tactical awareness, there has been no analysis on the gender differences relating to these factors. What does exist is a limited number of studies that have focused on the impact game-based pedagogy has on school-age girls alone (Chatzopoulos, Drakou, Kotzamanidou& Tsorbatzoudis, 2006).

ENJOYMENT

Like tactical understanding noted above, there is also considerable research reinforcing that student enjoyment is an essential part of any effective pedagogy (Alexander & Luckman, 2001). Some scholars highlight the link between tactical understanding and enjoyment. Gordon (2020) for example noted that: "Tactical understanding is also an area of games and sports thatmany participants find both challenging and engaging, and gaining tacticalappreciation adds an element of enjoyment to the experience."As enjoyment is key to learning and participation in physical education, it is important to recognise the influence game-based pedagogy can have on student enjoyment levels.Light (2013) highlights that game-based pedagogy fosters enjoyment by encouraging the development of resilience, self-confidence and creativity through inclusivity and team learning. Similarly, Oslin and Mitchell (2006) state that student enjoyment is a key outcome of the game-based approach and their study shows that while an effective game-based approach produces enjoyment, students perceived as 'less able' have the highest levels of enjoyment. Allison and Thorpe's (1997) comparative study corresponds with Oslin and Mitchell's (2006) findings where pupils with lower abilities had higher levels of enjoyment with the game-based approach. Research by Pearson, Webb, and McKeen (2006) support the increased enjoyment of students when participating in a game-based approach and even add that students that are more tactically aware usually make better decisions during gameplay and this therefore adds to their enjoyment. In French et al. (1996) and Harrison et al. (2004) studies there was no significant difference in enjoyment levels for the game-based teaching method as results were inconclusive. The research on student

enjoyment gives reason to believe that the game-based pedagogy is linked with high enjoyment levels however, with a lack of research in this area combined with the importance of student enjoyment to learning and participation, more comprehensive research is required. It is also necessary to determine if game-based influences enjoyment levels differently for boys and girls.

What can be ascertained from the literature review above is the lack of research into evaluating the effectiveness of game-based pedagogy in the Australian education setting. Focussing on components (tactical understanding and enjoyment) which the research acknowledge is very important to effective teaching,this research aims to address the gaps in the literature and develop on existing research to determine the impact that game based pedagogy has on eliciting student tactical awareness and enjoyment, and whether there aregender differences.

METHODOLOGY

In order to address the gap in the literature as well as the research questions this project adopted quantitative research measures. Two instruments were used to measure tactical understanding and student enjoyment. To assess tactical awareness the Team Sport Assessment Procedure (TSAP) instrument was used to test different tactical aspects of students within a designed game. Light (2013) categorises TSAP as an effective and authentic tool in testing for tactical knowledge and understanding of the game and provides an opportunity for students to reflect upon the aspects of game play. The TSAP instrument was used to measure the tactical output in the modified basketball and soccer games. Following in the implementation of the TSAP instrument, a table was created that comprised of three levels of tactical understanding which were proficient, adequate and below average. Student levels were determined by their TSAP scores combined with what the researchers perceived through observation throughout the course of the study.

To test student enjoyment the study used a survey with close-ended questions, adapted from Hashim, et al. (2008) survey on enjoyment in PE. Hashim et al. (2008) survey included a five-point Likert-scale where responses ranged from strongly disagree (1) to strongly agree (5), which this survey similarly utilised. Hashim et al. (2008) survey consisted of 20 questions.

Before any research was initiated, approval from the New South Wales Department of Education and University of Sydney were obtained. Due to the nature of the study, strict ethical guidelines and school policy were followed when conducting research.After the various ethics approvals were cleared,an expression of interest was sent out to principals of several schools.The school selected was a typical coeducational NSW school and adhered to the PDHPE syllabus. This school was in the area known as 'the inner west' of Sydney and had a school population of 1,000 students. The school represented a typical government school in Australia with varying levels of ability and diversity. After being accepted into the school, dates were then organised to conduct the research. The research was conducted on the school grounds.

The sample included two mixed classes consisting of 48 students (25 boys and 23 girls, aged 13-14 years) participated in the study. These two classes met once a week for 70-minutes over a period of 10 weeks. Students completed a 5-week basketball unit and a 5-week soccer unit. The content of basketball and soccer units were assembled by the researchers who were qualified coach educators in both sports. What also assisted the development of the units was that both sports in Australia had moved towards adopting a game-based approach. The researchers had coaching qualifications in each of the sports and had both taught in schools and coached in the community setting.The game-based lessons were structured by beginning with less challenging activities that progressively increased in difficulty.

Prior to the study a pilot study was undertaken to test and refine the instruments that were to be used. The pilot test used 50 pre-service teachers taught soccer using game-based pedagogy. The pre-service teachers were tested on their tactical awareness using the TSAP instrument and enjoyment using the same survey used for this study. The pilot study highlighted issues associated with time taken to collect data as well as the practicalities of conducting the tests.

PROCEDURE

School students participated in a 10-week basketball and soccer unit taught by the researchers using a game-based teaching approach. Jacobson, Kim, Pathak and Zhang's (2013) study demonstrated that it was possible to show the benefits of an intervention after only

four sessions. Although Jacobson et al. (2013) work was completed in an indoor setting with different variables and not part of the physical education field, it still highlights that interventions can influence learning outcomes over a four-week period. The all-boys and all girls 'classes were taught both soccer and basketball (5 weeks each). These two sports were selected because they formed a mandated part of the NSW PDHPE syllabus (Board of Studies, 2003) and were chosen in recognition of basketball and soccer being two of the most common sports taught in physical education. Furthermore, the fact that these sports are ranked high in participation rates and popularity in Australia means most students would have had background knowledge of the games (ABS, 2019).

On the 5th and final week of each sport unit, student tactical awareness was measured using either a modified game of basketball or soccer through which the TSAP instrument was implemented to record student scores. During the week five games researchers used the TSAP instrument to grade students' tactical awareness. Every time a student made a specific play relating to the game, they would get a tally, for example in basketball every successful pass would receive a tally mark. At the end of the game an equation was used to calculate the level of tactical awareness each student demonstrated during the game. Subsequent to this, students that were present on this final day were handed the enjoyment survey in which they then completed.

RESULTS

The results of the study are reported below in two parts. The first part looks at tactical awareness while the second part focuses on enjoyment. While the original sample for the project consisted of 48 students, during the tactical awareness and enjoyment data collection only 40 students were recorded. The eight students that were not accounted for were not present (five students) or injured (three students).

Tactical Understanding

Table1. *Tactical Awareness Levels*

Tactical Awareness	Not Adequate	Adequate	Proficient
Girls Basketball	15%	30%	55%
Boys Basketball	20%	40%	30%
Girls Soccer	25%	50%	25%
Boys Soccer	20%	40%	20%

The results in the table above coincide with MacPhail et al. (2008), Memmert and Roth (2007), and Oslin and Mitchell (2006) who identify how game-based pedagogy is beneficial for student tactical awareness. Most students demonstrated positive scores in relation to tactical awareness in both sports. In the modified basketball game, the girls' performance average score was 21.7, while the boys average score was 15.6. In the soccer, the boys' performance scores averaged 19.3, while the girls averaged 17.7. What characterised the tactical understanding evaluations was the observation that all students in both the soccer and basketball games were keen to involve themselves in the matches; there were no students who didn't attempt to demonstrate what they had learnt in the various units.

Although there is no scale that determines the level of tactical awareness one displayed during gameplay, the table above highlights the levels of tactical awareness that the students demonstrated during the TSAP coding. With reference to the efficiency index, a rating above 12.5 would indicate that a student possessed a competent level of tactical awareness in relation to basketball. As such, 37 out of 40 students that were present during the TSAP procedure reached a score of 12.5 on efficiency index and large number exceeded that score significantly. By using the efficiency index as a measure of competency levels for tactical awareness, the findings show that most of the students displayed above average output in their tactical understanding. Coinciding with this, the results demonstrated a tactical awareness level that would allow them to actively and effectively participate in a game of similar nature. As such, these findings demonstrate MacPhail et al. (2008) and Oslin and Mitchell's (2006) conclusion that game based pedagogy positively influences tactical awareness. Furthermore, these results oppose Harrison et al. (2004) findings who found game-based had no defined impact on tactical awareness and therefore it is possible that the use of pre-service teachers in that study justifies that outcome. As evidenced in the above girls demonstrated a stronger

tactical understanding of basketball compared to boys. Although most boys demonstrated a level of tactical awareness that is at least adequate to participate effectively in the soccer, girls showed significantly higher levels of tactical awareness overall in basketball.

The results show thatoverall girls exhibit a higher volume of play in basketball, which is the general involvement within the game. Furthermore, the girl's efficiency ratings as a group are significantly higher than that of the boys. Such a result would indicate that the girls were in fact more engaged in the games in terms of making the right play rather than the low percentage play. This is further exemplified when comparing the total sum of lost balls (turnovers); girls had a combined total of 62 whereas the boys almost doubled that figure with 103turnovers. As such, girls showed a higher tactical awareness level than boys in this study. This notion is also evidenced when looking at the total number of passes during each game. In the basketball for example, girls made 89 passes, which equates to 15.8 passes per minute and boys made 55, which is 11 passes per minute.

The findings indicate that game based is significantly more effective in eliciting tactical awareness in Year 8 girls than boys in the sport of basketball. These findings are of high value for physical education pedagogical studies as they highlight that game-based pedagogy is a powerful tool when teaching girls however, it is necessary for further study into this area to validate these findings.

ENJOYMENT

The enjoyment questionnaire consisted of seven items which students completed at the end of each of the two units. The items were: I like the way activities were explained to me; I was enthusiastic about playing basketball/soccer before participating in these lessons; I am now enthusiastic about playing basketball/soccer; I was enthusiastic about the basketball/soccer activities in these sessions; I liked the action and excitement of the basketball/soccer activities; The basketball/soccer classes was an interesting experience for me; and I enjoyed the basketball/soccer units. For the two sets of variables which were examined (overall and gender) the results demonstrated a very strong satisfaction level. For example, for overall enjoyment (80 questionnaires in total) more than 80% of students reported strongly agree and agree for all seven questions. The standard deviation (1-7 mean) and (overall mean) was 4.35 and 4.37 respectively. The figures for gender breakdown was also very similar; the standard deviation (1-7 mean) and (overall mean) for boys was 4.28 and 4.32 and for girls was 4.38 and 4.40. The item which had the highest schools reported for both boys and girls were item "I am now enthusiastic about playing soccer/basketball". The item with the lowest score was "I like the way activities were explained to me".

Results show that enjoyment levels were high in students after experiencing game-based pedagogy which Allison and Thorpe (1997), Oslin and Mitchell (2006), and Pearson, Webb and McKeen (2006) similarly identified. Overall both groups indicated that they enjoyed the game-based pedagogy with only a small minority indicating they did not like the unit. Levels of enjoyment could also be related to the fact that they are more involved in lessons. Looking at the volume of play from the TSAP results it is evident that most students were actively taking part in the activity. All but one student of either group did not like the way in which activities were explained which gives indication to how the game-based pedagogy influences student engagement through the less traditional approach of letting the game do most of the talking and students learn through questioning (Light & Evans, 2010).

As there is a lack of research that focuses on gender differences in enjoyment levels, these findings give no indication that game based is geared towards a specific gender however, it is necessary for further study in this area.

CONCLUSION

While game-based pedagogy forms an important and well-documented part of physical education scholarship, there has been relatively little research conducted in the school setting. This study attempted to address some of this neglectby examining the impact game-based pedagogy had on eliciting tactical awareness and enjoyment in male and female students. The implementation of the TSAP instrument to measure tactical awareness levels and a survey to measure enjoyment were adopted. In this typical Year 8 Australian high school, the results of the study highlighted that there was a clear and significant link between game-based pedagogy and the impact it had on student tactical awareness and enjoyment. Overall,

game-based pedagogy positively influenced the tactical awareness of both boys and girls, with most students exhibiting at least an adequate level of tactical awareness. However, when comparing the boys' tactical awareness with the girls', the girls show significantly superior levels of tactical awareness in the basketball unit. Whilst this is a key finding that has implications for physical education policy and practice, it is also necessary for further research to delve deeper into this neglected gender area. In terms of enjoyment level, overall students demonstrated a very positive attitude towards game-based pedagogy and there was no significant difference when comparing genders. As aforementioned, enjoyment is a key factor that is necessary for any successful pedagogy and thus, the results identify that game-based pedagogy is in fact enjoyable for most students.

This small research study investigated the influence of game-based pedagogy on tactical understanding and enjoyment in a typical Australian high school. More research needs to be undertaken in practical settings examining all aspects of this model including skill development. Although there is limited evidence that game-based coaching is superior to drill-based teaching and coaching for skill development (Chatzopoulos et al., 2006; Miller et al., 2017) there is also no evidence to suggest that skill development is hindered by the use of game based pedagogy (Kinnerk, Harvey, MacDonncha & Lyons, 2018). Both teachers and coaches have an opportunity to be innovative in their adoption of game based activities as they attempt to develop decision making (Miller et al., 2017; O'Connor et al., 2017), tactical understanding (Chatzopoulos, Drakou, Kotzamanidou & Tsorbatzoudis, 2006; Light & Robert, 2010), skill development (Klusemann, Pyne, Foster & Drinkwater, 2012), and physiological development (Hoffman, Reed, Leiting, Chiang & Stone, 2014). Findings in this study have demonstrated that incorporating a ten-weekgame-based program in two sports resulted in an improvement in tactical understanding and increased enjoyment.

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