

SMALL-SIDED GAMES: IS 6V6 A POSITIVE PROGRESSION FOR THE DEVELOPMENT OF JUNIOR NETBALL?

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INTRODUCTION

In New Zealand, netball is a sport that reigns supreme (Jackson & Andrews, 1999), and almost 50% of registered netball players in New Zealand are part of Junior Netball. The 2015 pilot for Years 5 & 6 is a small-sided modified game, with a philosophy aimed at maximising involvement, optimising player opportunity and advancing skills through the use of task constraints (Vilar et al., 2014). Small-sided games (SSG) imitate specific characteristics of full-sided games, while allowing development of social, physical, technical and tactical elements (Chow et al., 2006).

Coaches can maintain these elements by using task constraints based on the constraints-led approach to sport (Newell, 1986). These are more closely related to performance and are very significant for learning; they include the rules of the game, equipment used, pitch size, player numbers, task goals and instructions given to players (Glazier, 2010). These elements can channel player and team behaviour towards new levels of performance (Aguiar, Botelho, Lago, Maças & Sampaio, 2012; Vilar et al., 2014). Effective manipulation of such variables requires coaches to acquire a proficiency of experience and knowledge in various sports to allow learners to discover decision-making behaviours and functional coordination patterns (Dyson, Griffin & Hastie, 2004; Hill-Haas, Dawson, Impellizzeri & Coutts, 2011; Renshaw, Jia Yi, Davids & Hammond, 2010).

Reducing the number of players is a common strategy in invasion games, as they lessen the attentional demands on players (Rampinini et al., 2007) and increase technical actions (Capranica, Tessitore, Guidetti & Figura, 2001). However, reluctant adult supporters are sceptical, as they want to see their children play the 'adult version' as soon as possible. The importance of using SSG during youth has been highlighted by Fenoglio (2003) in a report on the use of 4 vs. 4 at the Manchester United Academy. Results showed that by playing 4 vs. 4 rather than 8 vs. 8, players made 135% more passes, scored 500% more goals and had 260% more attempts at goal (Fenoglio, 2003). The heightened frequency of these essential performance indicators in football allows players to further their opportunities to bed in basic skills and gain more tactical experience in situational contexts (Almeida, Ferreira & Volossovitch, 2013; Clemente, Couceiro, Martins & Mendes, 2012). To date, there has been no published research on SSG in netball. This study therefore provides a unique contribution to the training and preparation of young netball players.

In youth sport, environmental constraints include physical and social factors, which both have a great impact on young learners. Factors such as peer groups and social and cultural expectations are most relevant to young athletes, as motor learning is highly influenced by team-mates and coaches (Davids, 2010). SSG help players to learn new skills in manipulated environments, leading to the development of social interaction (Koekoek & Knoppers, 2015). Krustup, Dvorak, Junge & Bangsbo (2010) studied the psychological effects of football training in small groups of 10-20 participants who had limited skills and experience, and found that reduced numbers in training made the activity substantially more fun and rewarding (Parr & Oslin, 1998).

Fitness components such as strength, speed, flexibility and aerobic capacity have all been found to improve through SSG, as well as decision-making skills, thereby enhancing players' technical and tactical performance (Aguiar et al., 2012). The Team Performance Assessment Procedure (TPAP) (Grehaigne & Godbout, 1997) provides information

that quantifies offensive performance in selected invasion sports which reflect both technical and tactical characteristics of successful game play, making it a valid measurement of player performance. Köklü, Aşçı, Koçak, Alemdaroglu & Dündar (2011) have suggested that individual constraints need to be appreciated in order for modified aspects to have a positive effect on performance and allow for progression from SSG to the full-sided game (McCormick et al., 2012).

SSG are a viable example of how the constraints-led approach to acquisition of movement and decision-making skills enables coaches to heighten the capacity of players to perform in elaborate performance environments (Almeida et al., 2013; Davids, Araújo, Correia & Vilar, 2013). In netball, SSG allow the game to slow in pace and momentum in order to increase game appreciation and tactical awareness. Dyson et al. (2004) suggested that coaches should view SSG as developmental building blocks for progression to the advanced form of the game. The objective of the present study is to determine whether using modified games with young netballers improves player perception and performance, as well as cognitive, physical and social attributes, when compared to the traditional game.

METHODS

Participants

The 56 participants in the study were all in Years 5 & 6, and were drawn from the five constituent netball zones in New Zealand: Central, Northern, South, Mainland and Waikato. Each team consisted of six players, with rolling substitutes. Positions in the six-a-side game comprise two attackers, two links and two defenders. For the purposes of analysis, in this study 'C' was classified as a link player. The competency of participants varied significantly; some had been playing for two years at club level, while others were novices. Each participant (and parent) was informed of the study's purpose before filming and data collection commenced, and gave their consent to Netball New Zealand (NNZ). Inclusion criteria were that the participant was a playing member of their Years 5 & 6 team in the Netball NZ six-a-side competition.

Procedure

All matches were filmed during 2015 in a six-week segment. Each quarter lasted eight minutes, in which rotations of positions occurred. While the six-a-side game is played on a traditional court (30.5m x 15.25m), it uses different rules and equipment compared to the traditional game:

1. Centre pass goes to the non-scoring team
2. Time with ball increases from 3 seconds to 5 seconds
3. Link from each team stands on sideline of centre third during centre pass
4. Goal posts are lowered to 2.6m from 3.05m
5. Size 4 ball is used instead of size 5

A five-minute period was selected from each quarter (N=88) using Sportscodelite analysis software (Sportscodelite™, Hudl, USA), in order to be consistent with previous research. The data is presented as a complete total, by zone (N=5) and position (N=3).

The performance indicators measured were:

Fast

Passing (completed, intercepted, too high, too wide, to opposition, to nowhere)

Shooting (successful, unsuccessful)

Whistle blows (frequency)

Transition (uninterrupted passing of ball from end to end)

Focus

Engaged (player watching the players or ball)

Distracted (player watching crowd, sky – i.e., not the players or ball)

Change (TPAP)

Gaining possession (conquered and received ball)

Disposing of ball (offensive ball, lost ball, neutral ball, successful shot)

Motivation

Autonomy

Relatedness

Competence

Statistical Analyses

All data were reported as mean \pm standard deviations. Precision of estimation was indicated with a 95% confidence interval. The criteria for interpreting effect sizes were < 0.2 (small), < 0.6 (moderate) and > 1.2 (large) (Thalheimer & Cook, 2002). The frequency of whistle blows, passes completed and passes high/wide were measured, and the one-way between group analysis of variance (ANOVA) was used to determine significance. A Kruskal-Wallis test was used to determine if the frequency of transitions, passes intercepted, passes to nowhere, player engagement and distraction, as well as successful and unsuccessful shots, were significantly different. A t-test was performed on the basic motivational needs of all the players and the motivation among the zones to see if statistical differences occurred. Data was assessed for normality by inspecting the skewness, kurtosis and Shapiro-Wilk statistic. Statistical analyses were performed using the software package IBM SPSS Statistics (Version 22), and statistical significance was set at $p < 0.05$.

RESULTS

Table 1 shows the descriptive data for the key variables for themes, 'Fast' and 'Focus.' Cohen's practical effect size values for whistle blows, transitions and engagement suggest a high significance, whereas the effect size values for successful and unsuccessful shots suggest a moderate practical significance.

Variables	Mean \pm S	P value	%95 CI	ES
Frequency of whistle blows	5.14 \pm 2.97	0.341*	3.79 to 7.37	1.98 W & S
Frequency of full-court transitions	2.7 \pm 1.61	0.053	1.81 to 4.19	1.23 S & N
Passes complete (zone)	14.6 \pm 5.43	0.123*	13.13 to 16.94	0.65 C & W
Passes intercepted (zone)	3.05 \pm 2.09	0.046*	2.12 to 4.39	1.06 W & S
Successful shots	0.93 \pm 1.82	0.938	0.61 to 1.32	0.38 M & S
Unsuccessful shots	0.77 \pm 1.42	0.697	0.5 to 1.03	0.36 M & W
Passes complete (position)	14.6 \pm 5.43	0.001 [#]	11.13 to 18.06	0.82 D & L
Passes intercepted (position)	3.05 \pm 2.09	0.001 [#]	1.03 to 5.08	0.78 A & L
Engaged (zone)	99.4 \pm 55.4	0.02*	59.69 to 139.11	1.2 C & N
Distracted (zone)	8.35 \pm 7.01	0.028*	5.73 to 11.08	1.01 W & N

Table 1. Mean \pm S, P values, ES and percision of estimation with %95 CI for the frequency of whistle blows, full court transitions, passes complete and incomplete for zones and positions, successful and unsuccessful shots, plus engagement and distraction for zones. ES= effect size, CI= confidence intervals. *significant at $p < .05$; [#]significant at $p < .01$

Key: S= South, W= Waikato, C= Central, M= Mainland, N= North, D= Defence, A= Attack, L= Link

FAST

Spatial Distribution, Whistle Blows and Transitions

The visual representation of spatial distribution in Figure 1 suggests that players were maintaining an even distribution throughout the game, thus providing an environment for players to learn the skills relating to a balanced court. One-way ANOVA results revealed that the frequency of whistle blows was not statistically significant ($p = .102$), indicating that stoppage time was not influenced by zone.

A Kruskal-Wallis test indicated that there were no significant statistical differences between the zones for the number of transitions.

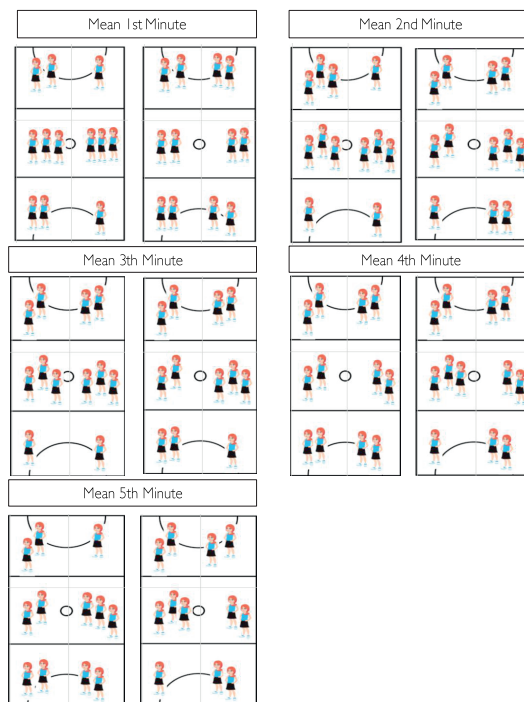


Figure 1. In order to understand the spatial distribution of the players in the 6v6 game, an average snapshot of player position was calculation every 30 seconds for a five-minute period

Passing and Shooting

Pass completions between positions were statistically significant ($F(2, 138) = 8.321, p = 0.001, \eta^2 = .052$), with link players having notably more completed passes. There were no significant differences in the number of completed passes between zones ($F(4, 136) = 1.848, p = 0.123, \eta^2 = .012$). Significant differences occurred in passes high/wide between zones ($F(4, 136) = 3.841, p = 0.005, \eta^2 = .101$). Intercepted passes between player positions were significantly different ($p = .001$); interceptions of link ($U = -34.128, z = 4.105, p = .001$) and defence ($U = -20.191, z = 2.429, p = .015$) passes were significantly higher than those of attack. Likewise, significant differences were found between the zones for passes intercepted ($p = 0.046$); Waikato had significantly fewer interceptions ($U = -42.229, z = -2.964, p = .003$) than South. Passes to nowhere showed significant differences ($p = 0.023$); North had significantly fewer passes to nowhere ($U = -23.641, z = 3.032, p = .002$) than South. No significant differences occurred between the zones for the frequency of successful ($p = 0.938$), and unsuccessful shots ($p = 0.697$).

Change

The Team Performance Assessment Procedure (TPAP) (Bouthier; Grehaigne & Godbout, 1999) utilised in Figure 2 suggests that there is more involvement from players when playing the 6v6 format, as opposed to the traditional game.

While variations were seen among zones when analysing performance score, efficiency and volume of play index, players from North scored highly on all categories of the index.

Focus

Player distraction (PD) exhibited significant differences between zones ($p=0.02$); PD in Waikato was significantly greater ($U=21.409, z=2.998, p=.002$) than PD in the North.

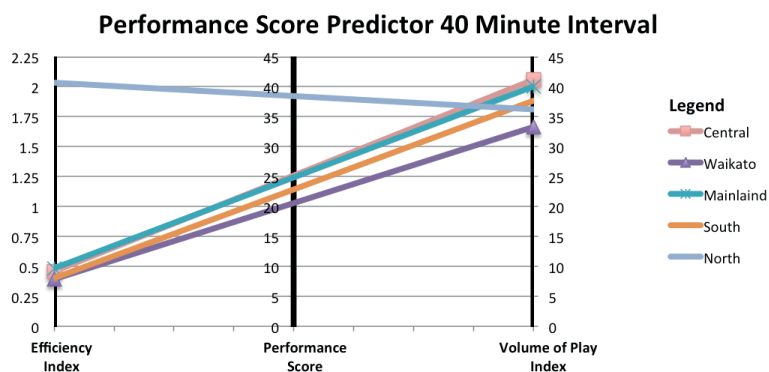


Figure 2. TPAP performance, efficiency and volume of play- average scores per player per 40 minutes of game play by zone (2015, 6v6)

Significant differences occurred for player engagement (PE) between zones ($p=0.028$); PE in Central was significantly greater ($U=20.50, z=2.926, p=.003$) than PE in the North. Nonetheless, no significant positional differences for the frequency of engaged ($p=0.365$) and distracted behaviour ($p=0.431$) were apparent.

Motivation

A t-test was performed on the basic motivational needs of all players among zones; analysis shows that statistical differences occurred (Table 2).

Formats	Zones									
	North		Central		Mainland		Waikato		South	
	(N = 36)		(N = 86)		(N = 54)		(N = 27)		(N = 25)	
	M	SD	M	SD	M	SD	M	SD	M	SD
Competence (6v6)	36.81	3.58	33.56	5.51	29.77	7.40	31.19	4.57	34.96 [#]	3.65
Competence (7v7)	36.81	3.58	33.56	5.51	29.77	7.40	31.19	4.57	29.73 [#]	6.38
Autonomy (6v6)	36.17	6.36	32.21 [*]	5.45	31.28	7.26	34.37 [*]	5.65	34.08 [#]	3.46
Autonomy (7v7)	37.86	4.22	34.62 [*]	6.44	29.04	6.71	27.69 [*]	6.45	28.96 [#]	7.78
Relatedness (6v6)	49.81	4.26	48.61	6.94	41.22	9.78	44.01	7.72	47.92 [#]	4.79
Relatedness (7v7)	50.02	6.78	49.68	7.81	44.10	8.41	41.31	9.38	39.08 [#]	12.06

Table 2. Mean motivation scores, 6v6 zone and 7v7 zone. *significant at $p < .05$; #significant at $p < .01$

Results suggest that 6v6 players in the South are more likely to enjoy higher levels of intrinsic motivation. However, players in Central possess a greater level of autonomy in the traditional 7v7 format of the game, in contrast to the perspective of the players from the Waikato zone.

DISCUSSION

The aim of this study was to determine whether modified games give players greater individual time to perform varied tasks and opportunity to explore their skills. One question to be addressed is whether modified games are in effect simplified games, with long-term benefits for players.

The analysis shows that the six-a-side game is fast-paced, and allows for all positions to experience a high frequency of ball contacts compared to the traditional game. Prevalence of ball contacts is a dominant factor in player development (Piñar, Cárdenas, Alarcón, Escobar & Torre, 2009), due to its positive relationship with high levels of engagement, intrinsic motivation and enjoyment (Toh, Guelfi, Wong & Fournier, 2011). These findings are backed up

by the results of our study. Training with the 6v6 game allows a coach to incorporate a high frequency of turnover and ball contacts per player, while developing their tactical and technical movement patterns; in the traditional game, opportunities for 'end' players are reduced. The modified game is beneficial in providing occasions for adapting movement patterns to the varied and dynamic conditions of competition (Hodges, Edwards, Luttin & Bowcock, 2011).

In terms of focus, we found that players had greater periods of time when they were engaged and less time distracted compared to the traditional game. The greater length of engagement allows players to develop their decision-making and anticipatory skills, thus having a positive impact on their development. It's important that player attention be focused on both the ball and the movements of the opposition, which in turn will help players become more proficient at making decisions, able to predict outcomes, read the game and anticipate their opponents' intentions (Mann et al., 2007).

The analysis of the TPAP results suggests that players in SSG have more opportunities to practice passing, shooting and intercepting, resulting in a greater involvement in the game compared to the traditional format. The skills used in making appropriate decisions have been found to be an important step on the road to developing player excellence (Baker, Cote & Abernethy, 2003).

Based on the Basic Needs Satisfaction Questionnaire, we found that players in the South were more intrinsically motivated than other zones. This could be a result of the fact that players get more time on the ball, which allows them to bed in skills and develop further as netball players, consequently providing them with the motivation to succeed. These results are consistent with those of Flanagan and Merrick (2013), who suggested that improvement in technical and tactical skills as the result of increased motivation is one outcome of small-sided games.

This study has some limitations in relation to the ability of the players who participated. The players were of varying ability levels – some had been part of a team which trained and competed regularly, while others were novices to netball. As the rule of rotation was not upheld by all zones, players often played in their preferred positions and did not experience the variation which the six-a-side game offers.

Future research could consider the positive influence of 'upskilling coaches' as a way of reducing the variation found between zones. The differences found in passing, interception and efficiency levels may have been particularly noticeable in the 6v6 format due to the greater frequency of ball contact and transitions in SSG.

Practical recommendations for coaches include modifying the training environment (Davids, 2010), using an approach which emphasises the skills required for each position in the rotation. This non-linear approach will enable greater individual learning from a given performance, from the cognitive and affective perspectives.

CONCLUSION The results of this study support the view that, as a modified form of the game, six-a-side can provide a viable supplement to traditional netball. The modifications involved both simplify the game and also speed it up, creating pressures and decision-making demands which appear to be consistent with the game at the higher level, all in a motivational context. As a developmental game, six-a-side is not perfect; passing and engagement data suggests that it favours link players. Variations or rule changes need to address this bias. In general, this research emphasises the value of modifying games for the benefit of developing players. This approach is not exclusive to six-a-side, but rather a concept that merits greater emphasis in the development of coaches at all levels.

Kirsten Spencer is a senior lecturer in coaching at Auckland Institute of Technology. Her teaching areas include sports coaching and notational analysis, athlete-centred coaching, SportsCode Elite and Focus notational analysis, and athlete movement and tactical analysis. She completed her BEd (Hons) at Manchester Metropolitan University, and a MSc and PhD (sport and exercise science) at Essex University. Her research interests include coaching behaviours and performance analysis. She is particularly interested in the influence of player/coach gender on coach behaviour; and the use of notational analysis to determine these behaviours in both practice and competitive situations and their influence on tactical decision-making in sport.

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