

Small-Sided Games: 6v6 a Positive Progression for the Development of Junior Netball?

K.N.SPENCER AND S.E.WOLF

*Sport Performance Research Institute New Zealand, Sports and Recreation, AUT Millennium
17 Antares Place, North Shore, Auckland, New Zealand*

Abstract

The aim of this study was to understand if the expected benefits of playing small-sided games with modified rules (more individual time on varied tasks in a game and more opportunities to explore skills) actually exist. Fifty-six participants from Year 5 & 6 were used in this study and came from the five zones within New Zealand. Each participant played the 6v6 modified game which has contrasting rules and equipment compared to the traditional game. The themes fast, change and focus were all coded for using SportsCode Elite™, and motivation was measured through a Basic Motivational Needs Questionnaire. Results show that pass completions by position ($F_{(2, 138)} = 8.321$; $p = 0.001$; $\eta^2 = .108$) and player distraction between zones ($U=21.409$; $z=2.998$; $p = .002$) were both significantly different. The broad body of this research emphasises the value in modifying games for the benefit of developing players.

Key words: *performance analysis, decision-making, constraints, player development, coaching, talent ID*

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 Year 5 & 6 is a small-sided modified game, with a philosophy to maximise involvement, optimise player opportunity and advance skills through the use of task constraints (Vilar et al., 2014). Small-sided games (SSG) imitate specific characteristics of full-sided games, whilst 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 (Newell, 1986). These are more closely related to performance and hold high significance in learning, they include; rules of the game, equipment used, pitch size, player numbers, task goals and instructions given to players (Glazier, 2010),¹ these 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 require 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 adults 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

Correspondence: K.N. Spencer, Sport Performance Research Institute New Zealand, Sport and Recreation, AUT Millennium, 17 Antares Place, Rosedale, North Shore, Auckland, 0632, New Zealand. E-mail: kspencer@aut.ac.nz

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 of football allows players to further the opportunity to groove basic skills and gain more experience tactically in situational contexts (Almeida, Ferreira, & Volossovitch, 2013; Clemente, Couceiro, Martins, & Mendes, 2012).

Environmental constraints include physical and social factors, which have great impact upon young learners. Aspects such as peer groups, social and cultural expectations are of appropriate relevance 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 and through this social interaction develops (Koekoek & Knoppers, 2015). Krustup, Dvorak, Junge, and Bangsbo (2010) studied the psychological effects of football training in small groups of 10-20 participants who had limited skill 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 found to improve through SSG as well as decision-making aspects too, therefore enhancing players technical and tactical performance (Aguiar et al., 2012). The Team Performance Assessment Procedure (TPAP) (Grehaigine & 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, Aşçi, Koçak, Alemdaroglu, and Dündar (2011) 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 the 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 enable coaches to heighten the capacity of players to perform in elaborate performance environments (Almeida et al., 2013; K. Davids, Araújo, Correia, & Vilar, 2013). In terms of SSG within netball, it will allow the game to slow down 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 to the advanced form. Therefore the objective of the study is to see whether modified games improve player perception and performance as well as their cognitive, physical and social attributes more so than the traditional game would.

Method

Participants

The 56 participants in this study were in Year 5 & 6 from the five constituting zones in New Zealand; Central, Northern, South, Mainland and Waikato. Each team consisted of 6 players with rolling substitutes. Positions in the 6-a-side game of netball are comprised of two attackers, two links and two defenders. For the purpose 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, and others were novice. Each participant and parent were informed of the study's purpose before filming and data collection commenced and gave their consent/assent to Netball New Zealand (NNZ).

Procedure

All matches were filmed during 2015 in a six week segment. Each quarter lasted eight minutes, in which rotations of positions occurred. The 6-a-side game is played on a traditional sized court (30.5m x 15.25m), however it amalgamates 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 side line 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 Sportscode Elite (Sportscode Elite™, Hudl, USA), to be consistent with previous years research. The data is presented as a whole 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 ie 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 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 occur. 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'.

Table 1. Mean \pm S, P values, ES and precision 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. Letters under ES

figures are zones and positions, S = South, W = Waikato, C = Central, M = Mainland, N = North, D = defence, A = attack and L = link.

*significant at $p < .05$; # significant at $p < .01$

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 (<i>zone</i>)	14.6 \pm 5.43	0.123*	13.13 to 16.94	0.65 C & W
Passes intercepted (<i>zone</i>)	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 (<i>position</i>)	14.6 \pm 5.43	0.001#	11.13 to 18.06	0.82 D & L
Passes intercepted (<i>position</i>)	3.05 \pm 2.09	0.001#	1.03 to 5.08	0.78 A & L
Engaged (<i>zone</i>)	99.4 \pm 55.4	0.02*	59.69 to 139.11	1.2 C & N
Distracted (<i>zone</i>)	8.35 \pm 7.01	0.028*	5.73 to 11.08	1.01 W & N

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.

Fast

Spatial Distribution, Whistle Blows & Transitions

The visual representation of spatial distribution in Figure 1 suggests players are maintaining

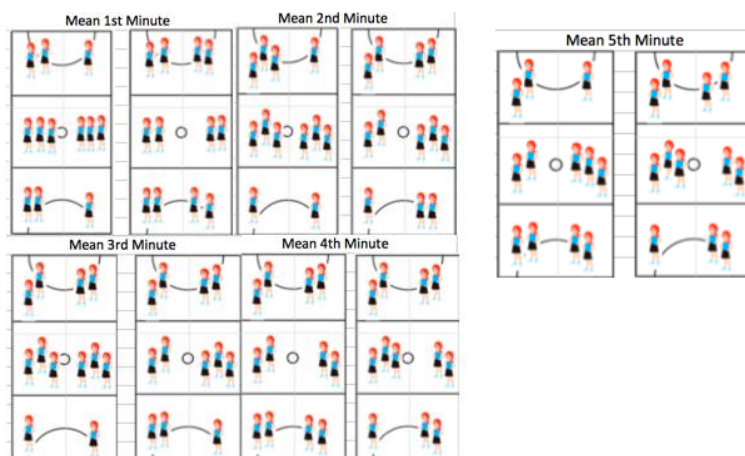


Figure 1. In order to understand the spatial distribution of the players in the 6v6 game an average snapshot of player position was calculation every 30 seconds for a 5-minute period.

an even distribution throughout the game. Therefore providing an environment for players to learn the skill of a balanced court. One-way ANOVA results revealed 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.

Passing & Shooting

Pass completions between positions were statistically significant ($F_{(2, 138)} = 8.321, p = 0.001, \eta^2 = .108$), with link players having notably more completed passes. There were no significant differences in the amount of completed passes between zones ($F_{(4, 132)} = 1.848, p = 0.123, \eta^2 = .052$). 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 ($U = -20.191, z = 2.429, p = .015$) were significantly higher than those of attack. Likewise, significant differences occurred between the zones for passes intercepted ($p = 0.046$), Waikato had significantly less interceptions ($U = -42.229, z = -2.964, p = .003$) than South. Passes to nowhere showed significant differences ($p = 0.023$), North had significantly less 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) in (Figure 2) suggests there is more involvement from players when playing the 6v6 format of the game.

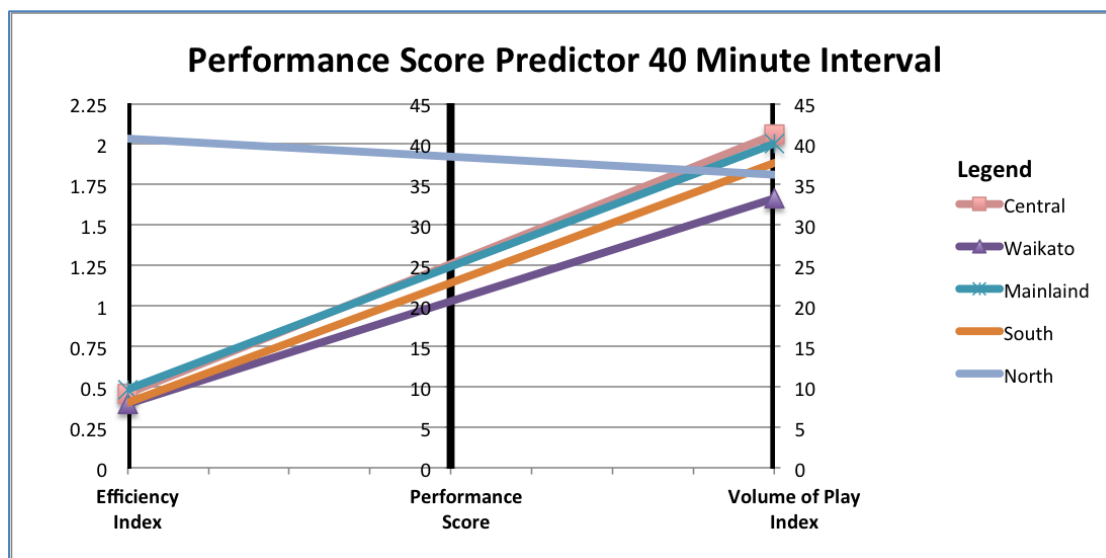


Figure 2. TPAP Performance, Efficiency and Volume of Play - Average Scores Per Player per 40 mins of Game Play by Zone (2015, 6v6)

Variations occur among zones when analysing performance score, efficiency and volume of play index, however players in the North score 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.

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 ($p= 0.431$) appeared.

Motivation

A t Test was performed on the basic motivational needs of all players among zones, analysis shows that statistical differences occur (table 2).

Table 2. Mean Motivation Scores 6v6 zone and 7v7 zone.

Formats	Zones									
	North ($N = 36$)		Central ($N = 86$)		Mainland ($N = 54$)		Waikato ($N = 27$)		South ($N = 25$)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
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

*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, which contrasts the perspective of the players from the Waikato zone.

Discussion

The aim of this study was to find out whether modified games will give players more individual time on varied tasks and opportunity to explore skills. A question to be addressed is whether modified games are in effect simplified games with long-term benefit to players.

Analysis shows that the 6-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), this can be seen from the results of this study. Training with the 6v6 game allows a coach to incorporate a high frequency of turnover and ball contacts per player, whilst developing their tactical and technical movement patterns; using solely 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, players had a greater period of time when they were engaged and less time distracted. Therefore players can develop their decision-making and anticipatory characteristics due to the greater length of engagement thus having a positive effect on their development. It's important that player attention is set 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 opponents' intentions (Mann et al., 2007).

When looking at TPAP results players have more opportunities to practice passing, shooting and intercepting, thus creating more of an involvement in the game compared to the traditional format. The skill of making appropriate decisions has been found to be an important step on the road to developing player excellence (Baker, Cote, & Abernethy, 2003).

Players in the South are more intrinsically motivated than other zones based on the Basic Needs Satisfaction Questionnaire. This could be a result of the fact that players get more time on the ball, which allows them to groove skills and develop further as a netball player, consequently providing them with motivation to succeed. These results are consistent with those of Flanagan and Merrick (2013) who suggested that improvement of technical and tactical skills with greater motivation comes through the use of small-sided games.

This study has some limitations when regarding the ability of players who participated. All players were of varying ability, some had been part of a team who train regularly and compete, and others were novices to netball. The rule of rotation was not seen to be completed by all zones, therefore players played in their preferred positions and did not experience the variation which the 6-a-side game offers.

Conclusion

The results of this study support the view that 6-a-side as a modified game can provide a viable supplement to Netball. The game modifications simplify it yet also speed it up creating pressure 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 6-a-side is not perfect; passing and engagement data suggests that it favours link players, therefore variations or rule changes need to address this. The broad body of this research emphasises the value in modifying games for the benefit of developing players. This is not a goal exclusive to 6-a-side but rather a concept that merits greater emphasis in the development of coaches at all levels.

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