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Effect of Pedagogical Model on Indian and Malaysian Junior Hockey Players' Decision Making and Skill Execution

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Abstract

Background: This paper reports comparison of two studies investigated across Malaysia and India using merged pedagogical model (combination Teaching Games for Understanding (TGfU) with Tactical Game model (TGM)) termed as Tactical Model (TM) was compared to a semi traditional model termed as Skill Drill Technical (SDT). Objective: The objectives of these two studies were to investigate the effect of these two pedagogical models across two countries using mini-games of 5 versus 5, examining: decision-making and skill execution game situations among junior hockey players in coaching context. Methodology: These two quasi experimental studies comprised of Indian and Malaysian junior elite hockey players age 14±3 years old whereby n =30 players in each country was randomly selected and assigned equally to an quasi experimental group (TM, n= 15), and to SDT group (n=15) players. Result: Results for decision-making on whether to dribble, pass, tackle and score significant improvement using TM (6.93±6.58) compared to SDT (2.42±3.01), among Indian junior hockey players, $F(2,28) = 5.84$, $p<0.05$ after intervention. Similar results observed among the Malaysian players too whereby posttest score revealed TM (3.28±.311) while SDT (2.96±4.61). Whereas skill execution result for dribbling, passing, tackling and scoring indicated a significant improvement among Indian hockey players, $F(1,28) = 10.00$, $p < 0.05$ via TM (4.62±2.16); compared to with SDT (1.70±1.43). In contrast indicated, TM recorded no significant improvement compared to SDT after intervention $F(1,28) = 1.64$, $p>0.05$ among Malaysian players. Conclusion: TM seems to be suitable pedagogical model, however further research should address other parameter of game play in particular the relationship between agility and decision making of hockey game play, and coaches perception, understanding and usage of TM across other Asian countries

Keywords: Tactical model, Teaching Game for Understanding, Tactical Game Model, decision-making, skill execution

1. Introduction

Recent developments in the coaching and teaching of team sports especially in sports advanced countries such as European countries, Australia, United States, and New Zealand have highlighted the importance of Game Based Approaches (GBA^s) such as Teaching Games for Understanding (TGfU) as a pedagogical tools or instructional methodology for developing individual players and team game intelligence (Wein, 2004). Game intelligent and tactical creativity can be developed through divergent tactical thinking and convergent tactical game thinking skills. Therefore teachers ought to plan their lessons or coaching units utlising problem solving, questioning strategy in their game lessons or in coaching units as early stages of youth sports development especially for invasion game such as rugby, soccer, basketball, hockey, and handball. It has been proved from research that TGfU model seems to promote a high level of game creativity and intelligence among players (Memmert, Baker, and Bertsch, 2010).

As for many GBA researcher and theory generator, there is no importance of comparing which model is better game based pedagogical model or skilled based or technical model, this notion was said by Prof David Kirk to the principal researcher. However, this notion very much applicable to more advanced countries in Sports. From anecdotal reports, observation team training at large hockey-playing countries from ages such as India, Pakistan, Malaysia and other Asian countries as their coaches and school teachers emphasize on skill-based teaching known as Technical Model (Rink, 2002). As for (GBA^s) such as TGfU, Game Sense at the early stage of implementation in these Asian Countries. This indicates that these Asian countries need to look back to their teaching methodologies, perhaps they need a more holistic coaching methodology perhaps merging few GBA approach is vital, in order to improve their countries international rankings. Some Asian such Singapore very much early adapted the Game Concept approach alike TGfU as well Hong Kong adopting TGfU model, but through anecdotal evidence their team game achievement in international competition be it junior or senior team still taking back seat

More than 20 years, it has been argued the importance of decision making in game play, therefore how far players in this Asian region able to make good game decision still at large uncovered. Players' game competence, including decision-making through game knowledge is a major challenge that coaches face (Rink, French and Tjeedsma, 1996). Hockey, soccer, and basketball, teaching or in coaching context players need not only good command of game knowledge for quick decision-making as noted by Godbout and Bouthier, (2001) and Light,(2003) to to certain extent need physical agility to support decision making attributes. Therefore, to execute "what to do" and "how to do" as well as "when to do" or utilsed the tactics, with speed and accuracy in executing skills at the right time in a game play, physical agility do play an important role (Germaine, Godbout and Bouthier, 2001; Light, 2003; Siedentop, 2001). In light of that coaches especially among Asian hockey playing countries should immaculate some form action based research, perhaps using interviews and field notes reflection to help their young players hockey players to be more creative and critical players.

In a bigger picture, be it in teaching-learning or in a coaching context, players playing well depends on myriads of factors viz game knowledge, tactical decision-making, and skills execution but to certain extent game play attributes of agility, cardiovascular fitness, coordination, physical flexibilities, anaerobic stamina, speed and accuracy do play important role in game configuration (Drewe, 2000; Wassmer and Mookerjee, 2002; Wilsmore and Curtis, 1992; Nathan, 2008; Nathan & Khanna, 2012). Rink, French, Graham (1996) and Rink (2002) since more than 12 years ago coined the notion of importance research based teaching to produce able game players. It has been suggested that TGfU is popular model for teaching and coaching games compared to the traditional linear model of a technical led or skills-based model. The TGfU model seems to be popular too among researcher and theory developer (Kirk and Macphail, 2002; Hopper, 2002). Based some study recent study TGfU do have some similarities with Dynamic System Theory (with three constraints task, performer and environment) or the nonlinear pedagogy the rate of learning and performance of decision making and skill acquisition depends on the capacity for self-organization, stabilities and instabilities of individual (Renshaw, Davids, Shuttleworth, and Chow, 2009). To prove this similarity activity or task provided in TGfU model such mini game situations via problem solving as constraints do influence the player or performer

The linear model of skill-based or technical model, from many lesson plan and practical observation, revealed the pedagogical model seems to be teacher or coach centered. Structured and linear approaches teaching games from warming-up activities and, demonstration of skill, followed with skill drills as the main components, but these structured lesson deprive students of substantive opportunities to engage in game play. In another word technical model can be assume as linear type of pedagogy (Renshaw, Davids, Shuttleworth, and Chow, 2009). The emphasis of this technical model is on acquiring skills for game play, while cognitive skills which are essential for effective participation are often undermined (Tuner and Martinek, 1999; Nathan 2008). In contrast Smith (2004) recent paper highlighted that that the tactical and technical of skill as complimentary part (Smith, 2014) Many researchers and theory generators believes that However the theory and TGfU model researcher suggest that exposing teachers and students to game-like experiences early in the teaching-learning process helps them acquire substantive procedural knowledge, making tactical decision-making possible during game play. (Crespo, Reid and Mileyo, 2004; Grehaigne and Godbout, 1995; Mitchell, Griffin and Oslin, 1994; Turner, 1996; Turner and Martinek, 1999; Nathan, 2008). It further supports with the TGfU revised model by Kirk and Macpahail (2002) extended the model with situational learning theory perspective.

In term of TGfU evolution, coined by Thorpe in 1964 as he was influence by education gymnastic and small game and he was feed up with traditional set with warming up activities, technique/skill, and game which taught dedicatedly whereby thinking aspect by the students was omitted. In 1970, the idea of TGfU was further supported by David Bunker and Len Almond using pre service teachers in research context and in 1990 TGfU extended prominence in USA, Europe and in Australia as Game Sense (Thorpe, 2013). This approach is in contrast to traditional linear approaches of skill drills or models focusing on technical development before applying such techniques to a game situation (Hopper, 2002; Martin and Gaskin, 2004). Research findings using technical model teaching and coaching context. A tactical model such as Teaching Games for Understanding (TGfU) contains many attributes of constructivism, which is a cognitive learning theory (Kirk and Macphail, 2002). This theory contends that learners use their knowledge to foster an understanding-not just the simple recall - of memorized facts or the execution of static skills. The use of tactical problems in a situated game scenario emphasizes improved cognitive learning with motor performance. TGfU is a cyclical approach which introduce tactics and skills through questioning and discussion before the players or students apply tactics and skills in modified game situations and therefore enable students to understand the relevance of skills to game situations (Smith, 2014). The model as Figure 1, as illustrated the original model of TGfU (Bunker and Thorpe, 1982) consists of six steps: step 1: understanding game form; step 2: game appreciation; step 3: tactical awareness; step 4: making appropriate decisions, what types tactics to apply in game situations and how to utilized appropriate skills to match with selected chosen tactics by the players; step 5: how to execute skill execution; and step 6: upgrading game performance. On the other hand, to make the original TGfU model to be simpler and to enable teachers and coaches to utilized with ease, therefore a Tactical Game Model (TGM) was developed. TGM was simplified in term of (i) game form- representation/exaggeration, (ii) tactical awareness and (iii). skill execution and added value in term of invasion game framework of scoring, preventing scoring and restarting play by players with ball and players without the ball (Mitchell, Oslin and Griffin, 2005) as Figure 2.

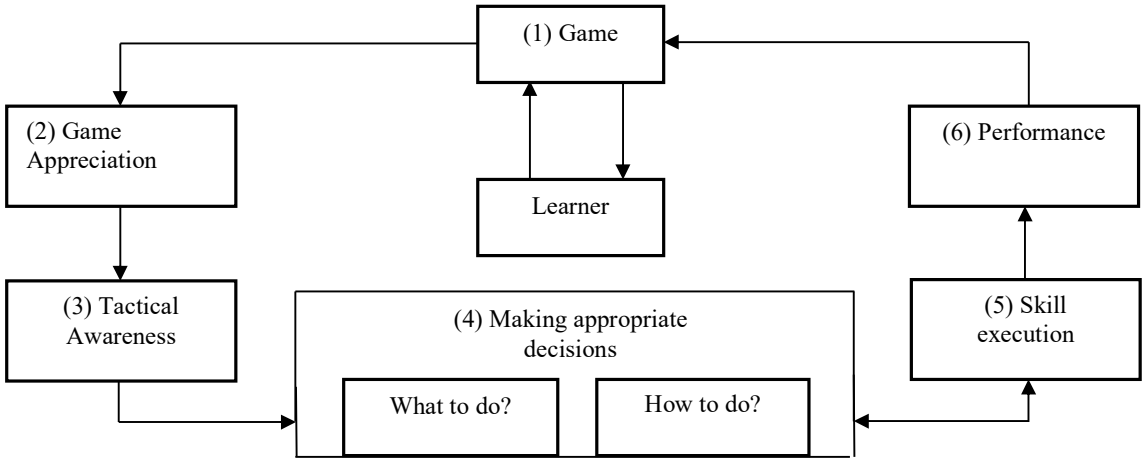

Figure 1. Original TGfU model (Bunker & Thorpe, 1986)

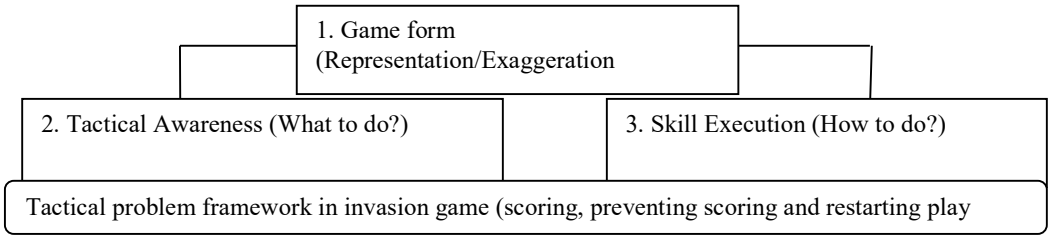

Figure 2. Tactical Game Model (TGM) adapted with permission (Mitchell, Oslin and Griffin,2005)

It does this in order for them to comprehend how to play the game and creates a better model (Bunker and Thorpe, 1986). TGfU model more to tactical-to-technical in approach that is contrast to traditional linear approaches of skill-based, skill-drills or the technical model, which focuses on technical development before applying tactics to a game situation (Hopper, 2002; Martin and Gaskin, 2004). The evidence indicated TGfU as better based reports from Game Sense approach emphasizes learning the game, and game play is complex, dynamic, at times unpredictable and even chaotic. GBAs such TGfU, Game Sense aligned with social constructivist approach and situated learning theory due to its alignment with knowledge construction within a social context as well as development of skill emerging from constraints on game behavior is a feature of ecological models of skill learning and a constraint-led approach to skill acquisition and learning Zuccolo, Spittle and Phill (2014, p.21-22) and Light (2013). Even though lately emphasis given to game based approaches (GBAs) such TGfU by the researchers' and theory generator, but it seems the perception among coaches and teachers still unclear (Stolz and Phill, 2013).

As mentioned earlier in this paper skills-based or technical model consists structured lessons and teachers centered teaching, therefore this structural or linear pedagogy in this research termed SDT model from now in this paper, are considered too structured, with warming-up activities and skill drills being the main components and play. Technique is physical movement and it only becomes skills if it is done in context (Thorpe, 2013). Traditional the technical model give importance acquiring technical skills before the players allowed for a game play, while cognitive skills which are essential for effective participation are often overlooked. Findings since as early as 1990's indicated that students fail to transfer the skills and knowledge, tactical decision-making elements of game performance to game plays via traditional skilled-based model (Tuner and Martinek, 1999; Nathan , 2008). Researches methodology that compares TGfU and technical models shows that this model has been effective in teaching and coaching hockey, tennis and basketball (Turner and Martinek, 1999; Turner, 1996; Crespo *et al*., 2000; Light and Fawns, 2003; Nevett, Rovegno, Babiarz, and McCaughtry, 2001; Nathan, 2008). Findings too indicated game play attributes such as decision making in badminton game play, ball control and decision-making in hockey and able to upgrade players game knowledge of declarative (rules and regulation of games) and procedural, known action knowledge via TGfU (French, Werner, Taylor, Hussey, and Jones, 1996; Turner and Martinek, 1999). Finding by Evans (2012), revealed that Game Sense in rugby coaching, there were improvement in transfer from practice to the game context, players able to work with ball and players able to upgrade their motivation even though it takes long period of time. On the other hand Evans and Light (2010) through their collaborative action research with ruby with coach's in implementing Game Sense, it was difficult to implement questioning task, but the players cooperation improved. Pill (2013) reported in inquire, exploring Australian coaches

'experience with game sense coaching using two coaches. Findings indicated through their reflections notes appreciate the "holistic" nature of game play involves on-the-ball and off-the-ball coaching. By the way, Game Sense able to improve game improvement. Again previous research findings reported that it only improved players' general skills such speed accuracy executing general hockey skills and, players failed to transfer the learned skills in real game situations (Turner and Martinek, 1999; Nathan, 2008). In contrast, research findings using the tactical TGfU model indicated players were able to make correct decisions and improve their game declarative and procedural game knowledge (Turner and Martinek, 1999). Cushion (2013) through his findings in term of coaching context in term of implementation using Game Centered Approaches (GCAs) such as TGfU more difficult. This findings was proven through based Windschitl's framework in addressing the TGfU difficulties. Cushion (2013) revealed that practitioners still having problem implementing TGfU in term understanding TGfU, implementing the pedagogical approach, belief , as well cultural settings and acceptance by the political. As he pointed out its heuristic, critical, therefore coaches need help in implementing TGfU.

Traditionally, the common practice of coaches and teachers was to use the skill approach which was also known as the direct instructional approach (Metzler, 2005). As Metzler noted skill based approach is direct instruction which is a coach or teacher-centered approach where learners follow or undertake, directed engagement patterns. The skill based approach the coach has a clear set of learning goals. Furthermore the coach presents the players with the desired movement, skill or concept. Moreover the coach organizes the activities into blocks of time that are arranged to provide high rates of feedback during practice. The direct approach or traditional approach giving the students as many practice or skill drills opportunities as to enable the coach or teacher can observe the skill attempts and provide appropriate feedback (Metzler, 2005; Turner and Martinek, 1999). However based on much anecdotal evidence and observations at large, the problem in India and Malaysia as for teaching and coaching context fancied skill-centered or technical approach This is an authoritarian coaching model as the coaching unit begins with the traditionally structured lesson comprising warming up, followed by skills teaching using demonstration technique and skill drills, mini game play towards the end of training unit and finally limbering down activities (Turner and Martinek, Nathan, 2008). Bhaskaran (2003) the former India hockey suggest the importance of Game Sense akin to TGfU approach via mini game activities such 1 vs. 1, 2 vs. 2, 3 vs. 2 and so on. However, at large number of coaches in India and Malaysia prefer the skill orientated approach through anecdotal findings. As a result most Malaysian and Indian junior hockey players are unable to make the correct decisions on tactics and skills in game situations, based anecdotal observation. Herewith stand, so far no research either in Malaysian or in India, no researcher have investigated the effectiveness merged pedagogical tactical model of TGfU and TGM as these two model which emphasizes tasks in term of game situations, guided discovery method of teaching, using game strategy of scoring, prevention of scoring and restarting of play in coaching units. In this research the merged model of TGfU and TGM know as Tactical Model (TM) as in Figure 3. On the other hand many of the practitioners especially coaches have instead relied on the structured model and linear model of skills-based technical (SDT) approach to upgrade the players' game performance in term of skill execution, fitness and at times neglect the importance of decision making to solve game situational problem.

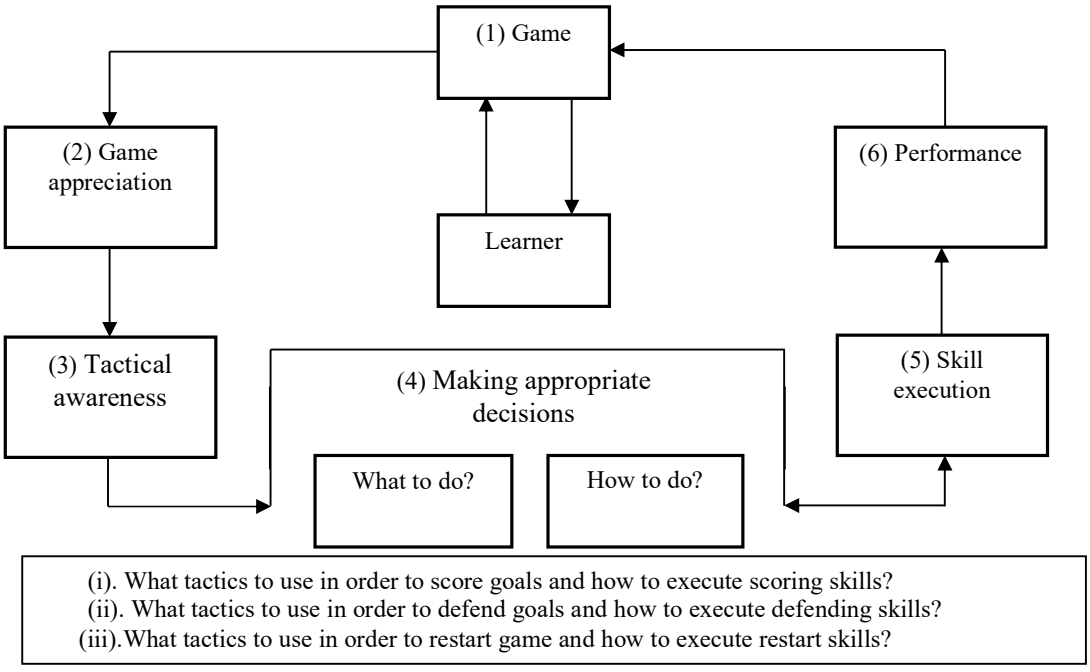

Figure 3. The merging of TGfU and TGM as Tactical Model (TM) in this study

This study investigates the difference in pedagogical model's influence using the pedagogical model of TM compared to SDT in 5 versus 5 mini game play. The effectiveness of these two models were evaluated in term of tactical decision-making (passing, dribbling, tackling and scoring), and skill execution (passing, dribbling, tackling and scoring) are measured among Malaysian and Indian elite junior hockey players. This study investigated the following research questions: Compared to SDT, is the TM more effective in term of players tactical decision-making of passing, dribbling, tackling and scoring in 5 vs. 5 game plays? Furthermore, is the pedagogical model of TM more effective than the SDT model in executing skills of passing, dribbling, tackling and scoring in 5 vs.5 game situations or mini game play?

2. Methods

The methodology employed in this study is the Quasi-experimental balanced group design pre-and post-test semi control group (Gray and Airsan, 2003; Nathan & Khanna, 2012). Even though the samples were selected via simple random sampling, but there was limitation in controlling extraneous factors, therefore quasi experimental research was considered as a more appropriate design. Why the SDT was considered semi-control group as the traditional intervention training units was prepared by principal researcher from anecdotal findings. This particular research method has been chosen to frame the analysis assisting the determination of the effect of the model on tactical decision-making of passing, tackling, dribbling, shooting) and skill execution of passing, tackling, dribbling and shooting in 5 vs. 5 game play situations. The intervention was conducted over a period of 5 weeks (12 hockey lessons) out 7 weeks research period across Malaysia and India.

2.1 Participants

A total of n= 30, Malaysian subjects elite school hockey players aged 14±3 were selected via simple randomly technique out of a total n = 45 players and the usage of 30 samples was limitation of this study. The random selected samples were assigned equally into two groups; TM, n = 15 and SDT model, n = 15. The players had been taught hockey using the skill-based approach. Informed consent was collected from all 30 players featured both in Malaysia and India from their parents or guardians through their coaches. The Indian subjects also consists of n = 30 players chosen from a total of 60 academic junior hockey players aged 14±3 who were selected and assigned to groups of TGfU, n = 15 and SDT, n = 15. These players also were previously taught hockey using the traditional skill-based approach. Again, informed consent to participate in the research was obtained from these participants and their parents or guardians through their respective coaches. Safety and medical precautions measures were taken to minimize the injury level by stationing qualified physiotherapists to monitor any issues related to injury in line with ethical principles when using people in research approved by ethical board of Ministry of Education for Malaysia.

By the way, two qualified and experienced hockey coaches, coaching more than 10 years from Malaysia and India were selected to coach the subjects using the two pedagogical models. In term of maintaining the fidelity of this intervention, the following precautions were taken. Firstly as usual research practice, a simultaneous briefing session was conducted by the principal researcher on how to implement these two pedagogical models. The two countries' coaches were given modules and a checklist on implementing the two training models. Before staring the actual intervention, piloting procedures was conducted by the researcher on how to implement these two pedagogical models interventions and the method for measuring the required tests. Next the principal researcher conducted pre-interview to ensure these coaches conducted the training or coaching units correctly, based on intervention protocol

The players underwent three teaching and training sessions per week (for five weeks as the intervention), and each session lasted 2 hours. The experimental received TM as a training treatment while another group, the SDT model received semi-traditional skilled-based pedagogical treatment. The TM treatment group uses mini games activities as its main activity to improve students' tactical strategy and skill execution via discussion and application in mini game situations, physical conditioning and skills in mini games context. In contrast, the intervention or treatment contents of SDT model predominantly utilized the skill drills activities and given chance to play mini games activities towards end of each lesson. The implementation of these two models was based on sports training principles and motor learning principles (Bompa, 1999; Fitts& Posner, 1967; Nathan, 2008; Nathan and Khanna, 2012). The study utilized the following instruments to measure the effect of interventions on all the dependent variables of game play: decision-making (passing, dribbling, tackle and scoring) and skill execution (passing, dribbling, tackle and scoring) players with the ball. These two approaches, as shown in the conceptual framework in Figure 4. The content of TM as suggested by Bunker and Thorpe (1982) in this intervention consists of: firstly, six teaching steps from the TGfU original model viz game form, game appreciation, tactical awareness, decision making of what to do (tactics) and how to do (skills), skill execution and game performance developed by Bunker and Thorpe (1982); and secondly, scoring strategy, prevention of scoring, and restarting play based on the TGM model developed by Mitchell, Griffin and Oslin (2005). While the semi traditional SDT model, the content consists of linear pedagogy of structured lesson emphases on skill drills activities, and as well as adapting some TGM activities such scoring, preventing scoring and restarting play which were done skill drills form. Both these two model were experimented in field hockey mini game play 5 vs.5

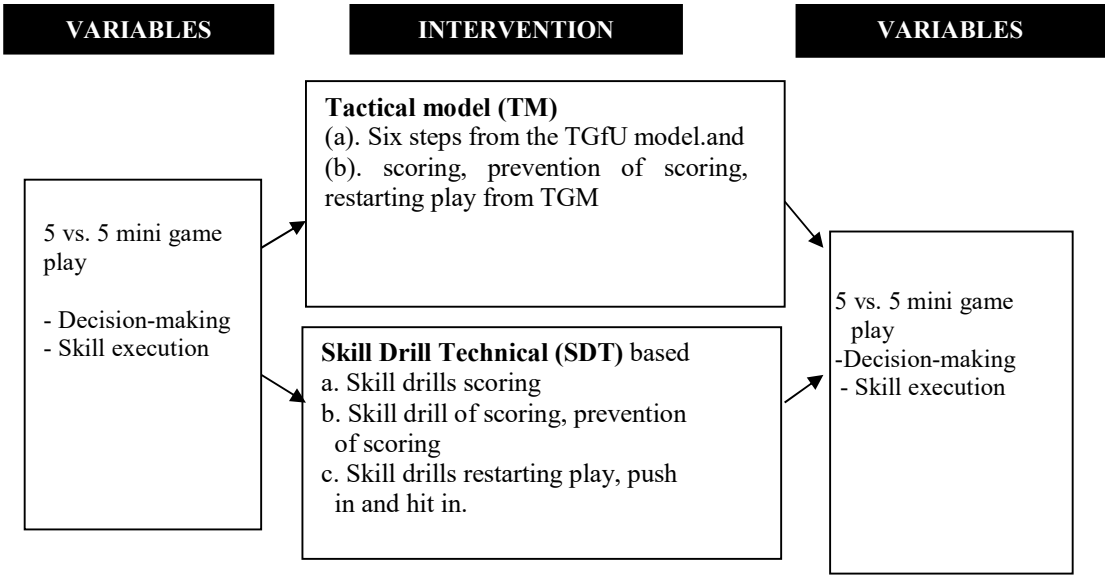

Figure 4. Conceptual Framework for the TM and SDT interventions

2.2 Instrumentation

This study adopted the habitual game play observational instrument developed by Turner and Martinek (1999), Mitchell, Oslin and Griffin (2005) and Nathan & Khanna (2012). Players' ball control, decision-making and skill execution were evaluated using the Game Play Observation Instrument. The dependent variables: decision making in term of passing, dribbling, tackle and scoring, and skill execution (passing, dribbling, tackle and scoring) were coded 5,4,3,2 and 1 (5-very effective performance; 4-effective performance, usually; 3-moderateely effective performance, sometimes; 2-very weak performance and 1-very weak performance, never). The research assistant who also a qualified Malaysia Sports School hockey coach was trained to code all the dependent variables using the game play observational instrument by watching all the video-taped 5 versus 5 game play situations. With akin reference to inter coder reliability, based on the *n*= 20 players featured in two game of 5 versus 5 game scenarios, the agreements between the coder and principal researcher were 81% for decision-making (passing, dribbling, tackle and scoring) and 88% for skill execution (passing, dribbling, tackle and scoring) (Nathan & Khanna, 2013)

2.3 The Experimental Group

The TM is an approach teaching lessons built on 'what to do' and 'how to do' via the guided discovery approach alike style F proposed in Mosston Teaching Styles (Mosston & Asworth, 2002). Here players adopt the learner centered coaching and was implemented via mini game situations (Bunker and Thorpe, 1986; Mitchell, Griffin and Oslin, 2005). Each training unit was ere carried out in the following sequence over 5 weeks: firstly, warming up session (10-12 minutes); secondly, short briefing on tactics, continuing with game situation 1 (12-14 minutes);thirdly, short briefing with short recovery, followed by game situation 2 (12-14 minutes); and fourthly and finally cooling down activities, feedback activities as well (7-10 minutes). The TM lessons were carried out using the tactical approach, of scoring, prevention of scoring and restarting of play via a guided problem-solving in each game situation method. These training units were divided into scoring tactics for two weeks of intervention, followed another two weeks prevention of tactics and the finally one week with restarting play tactics.

2.4 The semi control group

The control group termed SDT, through anecdotal observation is commonly employed in Malaysia and India, used a combination of skill drills activities. Towards the end it involved players in a mini game situation. Skill drills activities based on the technical model proposed by Rink (2002) emphasized the importance of teaching and learning skills prior to game play through skill drills practice (French, Werner, Rink and Taylor, 1996). The training unit even though followed the traditional skilled based unit, towards the end of each training units the coach in the SDT group to utilized freely tactical game framework of scoring strategy, prevention of scoring and restarting play strategy(Mitchell, Oslin and Griffin, 2005).

2.5 Data Collection and Analysis

Decision-making in term of passing, dribbling, tackling and scoring and skill execution of passing, dribbling, tackling and scoring in 5. vs. 5 game play were calculated based on successful and unsuccessful responses (5-1 mark range) for each dependent variable (Turner and Martinek,1999; Mitchell, Oslin and Griffin, 2005; Nathan & Khanna, 2012). The collected data of the TGfU and SDT interventions at pre-test (before 5 weeks of training intervention) and post-test (administered immediately after 5 weeks interventions) were analyzed with inferential statistic of ANOVA and

ANCOVA using SPSS software SPSS version 19. ANCOVA. was employed to confirm the results when significant differences occurred at the base line level and alpha was set at 0.05 level

3. Results

Decision-making

Indian junior hockey players

Results for decision-making univariate ANOVA indicated no significant difference between the TM and SDT models at pre-test, $F(1,28)=1.53$, $p>0.05$ (5.53±6.23) and SDT (3.31±3.03). However, overall post-test results for decision-making revealed a significant difference and in favor to TM, (6.93±6.58) and SDT (2.42±3.01) with $F(1,28)=5.84$, $p<0.05$ as illustrate in Table 1.

Table 1. India pre-test and post-test score for decision-making

Model	*Mean*	*SD*	*N*	*P*
Pre-test				
TM	5.53	6.23	15	$F(1,28)= 1.53$, $p> 0.05$
SDT	3.31	3.03	15	
Post-test				
TM	6.93	6.58	15	$F(1,28)=5.84$, $p< 0.05$
SDT	2.42	3.01	15	

Malaysian junior hockey players

Regarding overall decision-making, ANOVA indicated no significant difference between the TM and SDT models at pre-test, $F(1,28)=3.32$, $p>0.05$ (TM: 2.90±.351) and SDT (2.65±.398). However, overall post-tests are that results for decision-making indicated there was a significant difference between the TM (3.28±.311) and SDT models(2.96±.461), $n = 15$, with $F(1,28)=1.64$, $p>0.05$. Table 2 illustrates the results' mean and SD for decision-making.

Table 2. Malaysia pre-test and post-test for decision-making

Model	*Mean/SD*	*N*	*P*
Pre-test			
TM	2.91±.351	15	$F(1,28)= 3.32$, $p> 0.05$
SDT	2.65±.398	15	
Post-test			
TM	3.28±.311	15	$F(1,28)=4.85$, $p< 0.05$
SDT	2.96±.461	15	

Based on the results in term of decision-making performance for Indian and Malaysian junior hockey players after intervention clearly indicated TM was better pedagogical model compared to SDT. In addition to that, based on mean score performance, Indian junior hockey players (6.91±6.58) seems to achieve better performance compared to Malaysian (3.28±.31) counterpart via TM pedagogical model in their hockey training context.

Skill execution

Indian junior hockey players

Univariate ANOVA, $F(1,28)=.3.91$, $p>0.05$ indicated that in terms of skill execution (passing, dribbling, tackling and scoring) at pre-test there was no significant difference between the TM (3.82±2.56) and SDT models group of players (2.28±1.58). The ANOVA indicated a significant difference for skill execution at post-test, $F(1,28) =10.0$, $p<0.05$ between the TM (4.62±2.16) and SDT models (1.70±1.43). This outcome was confirmed using analysis covariate (ANCOVA) which also indicated a significant difference between these two models for decision-making, $F(2,27) =2.31$, $p<0.05$. The results of ANCOVA are presented in Table 3 and the estimated marginal means for post-test decision-making represented in Table 4.

Table 3. Analysis of covariance summary for skill execution

Source	Sum Square o	*Df*	Mean Square	*F*	Sig
Group	63.74	1	63.74	18.64	0.01

**$p<0.05$

Table 4. Estimated marginal means for skill execution

			95% Confidence Interval	
Program	*Mean*	*SE*	Lower Bound	Upper Bound
TM	4.71[a]	.494	3.701	5.73
SDT	1.60[a]	.494	..589	2.62

Skill execution

Malaysian junior hockey players

Inferential statistics, ANOVA indicated $F(1,28)=.5.32$, $p<0.05$ indicated that for skill execution (passing, dribbling, tackling and scoring) at pre-test there was a significant difference between the TM (2.90 ±3.11) and SDT training models (2.63±.281). Univariate ANOVA indicated no significant difference for skill execution at post-test with $F(1,28) =1.64$, $p>0.05$ between the TM (3.30±.329) and SDT training models (3.11±.45). Table 5 illustrates the results mean and SD for skill execution. This outcome was confirmed using analysis covariate (ANCOVA), and the results also indicated no significant difference between these two models for skill execution, $F(2,27) = 0.15$, $p>0.05$. The results of ANCOVA are presented in Table 6 and the estimated marginal means for post-test skill execution are presented in Table 7.

Insert Table 5 Pre-test and post-test score for skill execution

Table 5. Pre-test and post-test score for skill execution

Model	*Mean/SD*	*N*	*P*
Pre-test			
TM	2.90±.311	15	$F(1,28)= 5.32$, $p< 0.05$
SDT	2.63±.281	15	
Post-test			
TM	3.30±.330	15	$F(1,28)= 1.64$, $p> 0.05$
SDT	3.11±.45	15	

Table 6. Analysis of covariance summary for skill execution

Source	Sum of Squares	Df	Mean Square	F	Sig.
Model	.002	1	.002	.015	.904

**$p<0.05$

Table 7. Estimated marginal means for skill execution

			95% Confidence Interval	
Model	Mean	SE	Lower Bound	Upper Bound
TM	3.22[a]	.095	3.02	3.41
SDT	3.20[a]	.095	3.00	3.39

Above mentioned results indicated a significant difference emerged in skill execution between TM and SDT at post-test level for the Indian junior hockey players. Conversely there was no significant difference between TM and SDT for the Malaysian junior hockey players.

4. Discussion

These findings exhibits that TM pedagogical model can be suggested as a effective as pedagogical model that can be employed in hockey coaching context. Especially in improving player's tactical decision-making on 'what to do' and 'when to do' in 5 versus 5 game plays. As this has been proven in this research among Malaysian and Indian hockey players. With reference to skill execution the findings indicate TM was significantly better than SDT for Indian players. However, there were no significant differences concerning the Malaysian hockey players, perhaps Malaysian player needs longer amount time to work on their skill acquisition, whatever pedagogical model being employed by the coaches.

It can be argued in various reasons, as why the tactical decision-making in 5 vs. 5 game plays improved among the Indian and Malaysian players via TM model. Firstly, this may due the TM model advocating a guided discovery method of coaching where players have to think and read the game in advance so that they can solve game problems. Secondly,

the modus operandi of TM model appeared to support and assists the players in improving their thinking abilities that enaqbles them to make right tactical decision-making. As well as to some extent enable the players to execute passing, dribbling, and scoring in 5 versus 5 game plays (Nathan and Khanna, 2012). Futhermore, this present findings too revealed that Indian and Malaysian elite junior hockey players had tactical and skill and understood not only "what to do" and "how to do" as well as "when to do" prompts and equates with earlier findings (Mitchell, Griffin and Oslin, 1994; Grehaigne and Godbout, 1995; Turner & Martinek, 1999; Nathan, 2008). Furthermore this findings indicated the improvement not only by axiom 'what to do" and "how to do" by Indian and Malaysian players. But through discussion at every training lesson using the framework of scoring, defending and restarting strategy enhance players prompt decision making in game play via TM. These assisted them when to make right decisions for passing, dribbling, tackling and scoring. This present findings on improvement in term of tactical decision-making through TM in 5 versus 5 mini games play agree with previous findings for soccer and hockey (Nathan and Khanna, 2012; Nathan, 2008; Harvey, 2003; Light and Fawns, 2003; Turner and Martinek, 1999) and badminton (French, Werner, Taylor, Hussey, and Jones, 1999).

Generally it can be argued that Malaysian and Indian cultural setting did not prevent players from improving their decision-making when they employed the Tactical model (TM). Again this present findings is similar with previous findings of Turner and Martinek (1999) concerning hockey. Similar findings were reported by Psotta and Martin (2011), indicating that the tactical model of CTA: 0.81±0.12, $p<0.05$) achieved a significantly higher mean score after intervention compared to the Technical model (CTE: 0.75±0.12, $p<0.05$) in women's soccer in the Czech Republic. This present finding supports the contention that the TM is an important one for learning because it develops higher order of thinking, as in line with Malaysian School Curriculum vision and mission. This present findings do support the information processing theory and TM pedagogical model able link information-movement via skills and decision-making (Bunker and Thorpe, 1986; Light, 2003). Improvement in players' decision-making on how to pass, drible, tackle and score in 5 versus 5 game play situation due to the content knowledge being taught to them not only "what to do" and "how to do" dan "when to do" in their 5 weeks training with the TGfU model, this represented the fourth step in original TGfU model. This finding was consistent findings of Turner & Martinek (1999) and further supports the motor learning theory framework of the TGfU model. The findings do support TGfU do have some similarities with Dynamic System Theory or the nonlinear pedagogy the rate of learning and performance of decision making and skill acquisition depends on the capacity for self-organization, stabilities and instabilities of individual (Renshaw, Davids, Shuttleworth, & Chow, 2009). As the hockey training task contains many elements of problem solving activities in term of tactics, and the different environments constraints Malaysia and India prove positive in outcome in enhancing decision making and skill execution among the performer Malaysian and India's elite school hockey players. As Thelen (1989) pointed out learning from ecological perspective learning depends on multiple sub-system of within the person, task and environment (Thelen, 1989). Therefore on how, Dynamic System Theory associate it TM pedagogical model it needs further research.

This study do give some information for overall skill execution of passing, dribbling, scoring and tackling, there was a significant difference between using TM model among Indian hockey players compared Malaysian player. This findings of upgrading players skill execution indicated that TM supports GBAs such TGfU previous findings: hockey (Turner and Martinek, 1999), badminton: (Lawton, 1989), soccer: (Mitchell, Oslin, and Griffin 1995), and volleyball: (Griffin, Oslin, & Mitchell, 1995). In contrast, however, the Malaysian players experienced no significant differences between the TM and SDT models. It is possible that the Malaysian players may require longer period of intervention in order to evaluate the effectiveness of TM in terms of executing skills. Perhaps the Malaysian junior hockey players may have less exposure in skill acquisition compared to their Indian counterpart. Furthermore, the Indian players benefited in their skill execution (passing, dribbling, tackling and scoring through combination of TGfU and TGM as term TM pedagogical model.

5. Conclusion

In conclusion, teachers and coaches in Asian countries and especially in Malaysia and India should think outside the box, may need to adopt a pedagogical model as an important tool in their coaching planning. Herewith recomend a merge pedagogical model such as model TM (combination of TGfU and TGM) which comprises questioning and discussion of invasion game strategy of scoring, prevention of scoring or defending and restarting game play strategy can develop game intelligent players. A game inteligent players are able to play well by making right game tactical decision making and execute skill technically sound whether as individual player or as a team players in any game situations. Therefore, intelligent coaches should organize variation of mini game activities such 1 vs. 1, 2 vs. 2, 3vs. 3, 3vs.4, 4vs.4, 5 vs. 5 or other variation as proposed in pedagogical model of TM to produce intelligent game players. Herewith standing the importance of mini game, as findings by Sepell, Yoing and Fird (2011) supports the importance of mini game to enhance agility is an open motor skill; requiring change of direction speed (CODS) and perceptual and decision-making ability. Findings indicated perceptual and decision-making component of agility can be trained. Coaches should utilized the mini game activities often as agility do play important role players on what and how, when tactics and skilled to be as play their game. However, more research is required on how TM can improve the present outcomes or other parameters of game play performance such as relationship between agility and decision making. In order to disseminate the knowledge of GBAs model such TM, understanding and perception among coaches, teachers and parctioner across different cultural settings ought to be addressed.

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