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Teaching Game for Understanding in Physical Education: A Theoretical Framework and Implication

ABSTRACT: *The primary purpose of the present study was to investigate the effects of Teaching Games for Understanding (TGfU) approach to improve students' learning outcome of tactical game performance in physical education. By applying the constructivism learning theory, the study wants to investigate whether the students learning outcome in tactical game performance can be improved with the TGfU approach. The participants in this study were 10 years old primary physical education students. The Game Performance Assessment Instrument (GPAI) was used to measure students' tactical understanding of game performance. The results of the validation studies showed that the instruments developed for the purposes of this project were valid indicators of tactical game performance. The ANCOVA results revealed that there was a significant difference between the students who were exposed to TGfU approach and students with traditional skill approach on the post-test (F [1, 69] = 248.83, p < .05). This result indicated that the experimental group with TGfU approach has significant main effects on student learning outcome compared to the traditional skill approach. The findings of this study showed that constructivism theory improved primary physical education students learning outcome in physical education.*

KEY WORD: *Teaching games for understanding, constructivism, tactical understanding, and primary physical education.*

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INTRODUCTION

Physical education program learning experience has unique contribution to students' well being (Cai, 1998; Darst & Pangrazi, 2006; and Wuest & Butcher, 2006). Goals of primary school physical education programs are to develop students' total learning outcome. Learning outcome includes cognitive, affective, and psychomotor domains by providing students developmentally appropriate programs (Butcher & Wuest, 1999; and Griffin & Sheehy, 2004). Through the games, students can develop tactical understanding of rules, limitation, strategies, and important alertness to behave in a variety of competitive situations (Richard & Wallian, 2005; Pangrazi & Casten, 2007; and Sanmuga, 2008). Literatures have shown that games are a significant component of the physical education curriculum worldwide and can be used as a pedagogical approach to motivate students participation in game performance outcome (Mauldon & Redfern, 1981; Werner & Almond, 1990; Werner, Thorpe & Bunker, 1996; Light, 2006; and Sanmuga, 2008).

Previous studies in physical education games setting focused on psychomotor domain of technical aspects of game learning outcome (Bunker & Thorpe, 1986; Holt, Stream & Begoechea, 2002; Hopper, 2002; and Tan, 2005). However, developing game understanding of cognitive domain as well as the TGfU (Teaching Games for Understanding) has gained far less attention. Research has shown that the TGfU approach is a pedagogical approach aimed at generating understanding of all aspects of games (Bunker & Thorpe, 1982; Mitchell, 2005; and Webb & Pearson, 2008). TGfU places emphasis on the game that students are playing, where tactical and strategic problem are posed in a modified game environment, eventually drawing them to make decisions (Webb & Pearson, 2008).

TEACHING APPROACH OF GAME PERFORMANCE IN PHYSICAL EDUCATION

Traditional skill approach is widely utilized in games teaching as the direct instructional approach (Mezler, 2000). Teaching games has traditionally emphasized the teaching of individual skill in organizational drill patterns without consideration of games themselves (Bunker & Thorpe, 1986). The traditional skill approach was based on the assumption that skills must be learned before a game can be played (Turner & Martinek, 1999). The teaching of techniques or skills was seen as the critical part of the lesson (Bunker & Thorpe, 1982); and each week new skills were learned and assessed. The

traditional lesson plan was highly structured and teacher directed (Thorpe & Bunker, 1997). The lesson starts with an introductory or warm-up activity to develop student fitness. This is followed by a skill or technique practiced and refined by the teacher (Werner, Thorpe & Bunker, 1996).

Physical education researchers in Malaysia have debated the role and function of the physical education curriculum and how the pedagogy needs to be taught in school (Salleh, 1997; Jani, 2000; Wee, 2001; Rengasamy, 2006; and De Vries, 2008). Therefore, new intervention in teaching and learning pedagogy is needed to make physical education more interesting for students' learning outcome (Wee, 2008).

Constructivism perspective is relevant to physical education, to be specific in games teaching for several reasons. Firstly, the cognitive construction of movement because it supports Malaysian primary physical education objectives that students' active participation in physical activity will enable them to express their mental process, emotion, and foster healthy relationship with their friends and carry out physical activity in a safe and conducive environment (MoE Malaysia, 2001). Learning is an active discovery whereby learners actively engage in constructing tactical understanding. By getting students involved in tactical understanding, problem solving and decision making in games, teachers can promote students' active participation (Rovegno & Dolly, 2006).

Secondly, the Malaysian national educational philosophy explicitly gives importance to student's decision making and problem solving skill (Kaur, 2001; and Sharifah, 2007). Once the solution to a situation has been developed through insight with constructivist learning, it can be repeated promptly and also transferred to a similar game situation (Piipari *et al*., 2009). Accordingly, TGfU (Teaching Games for Understanding) emphasize insightful learning rather than pure memorization or mechanical skills and thereby encourages problem solving learning outcome (Griffin & Sheehy, 2004). Therefore, the learning environment in games that teachers plan plays a significant role in student's learning outcome.

Finally, constructivism perspectives research shows that successful learning results in: (1) deep understanding of a body of knowledge; (2) meaningful and important concepts within the domain; and (3) knowledge that can be flexible and transferred to other context. Research needs to consider to what extent this perspective is applicable in the physical education games teaching. Therefore, researchers can use theory and method especially the TGfU approach to attract student engagement to be active to participants in games (Dodds, Griffin & Placek, 2001).

THEORETICAL FRAMEWORK

Constructivism is an active learning approach whereby the students personally construct and interpret given information based on their experiences (Allison & Barrett, 2000). Recent research had shown the direction of the relationship between students and how they actually learn with the constructivist perspectives (Griffin & Sheehy, 2004; Richard & Wallian, 2005; and Rovegno & Dolly, 2006). In this context, J. Piaget (1973) described also how children perceive their environment and represent it cognitively.

Teaching student understanding is associated with the constructivist perspective of teaching and learning (Rovegno & Dolly, 2006). Constructivism is a student centered approach based on the notion that the learning environment should support multiple perspective of reality, knowledge, and experience based activities (Butler & McCahan, 2005; and Richard & Wallian, 2005). The development of understanding of learning activities can be expressed diagrammatically as in figure 1.

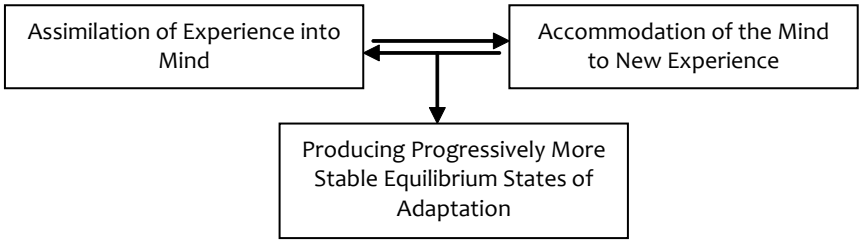

Figure 1:
Development of Understanding
(Source: J. Piaget & B. Inhelder, 1969).

Students develop as they confront new and unfamiliar features of their environment that do not fit with their existing view of the world (Piaget & Inhelder, 1969). When this happens, a disequilibrium occurs which the child seeks to resolve through adaptation. The student fits in the new experiences into his or her existing view of the world through development of assimilation or changes the cognitive structure to incorporate the new experiences by accommodation. The development of understanding describes how adaptation will work in practice. The developments continue for every new environment presented to the students.

With respect to the above discussion raised about constructivist learning theory, a theoretical framework on TGfU (Teaching Games for

Understanding) was presented in this study. Research which can facilitate philosophical and psychological understanding of games can contribute to students' tactical understanding and decision making (Griffin & Sheehy, 2004; and Rovegno & Dolly, 2006). This study proposed a game centered and student centered approach, with the intent to allow every student to participate in decision making based upon the tactical problem (Griffin & Sheehy, 2004; and Webb & Pearson, 2008). The constructivist learning approach allows students to be engaged in activities that require higher level thinking. Students will be able to demonstrate their understanding by applying the new knowledge in a new situation (Lemlech, 1998).

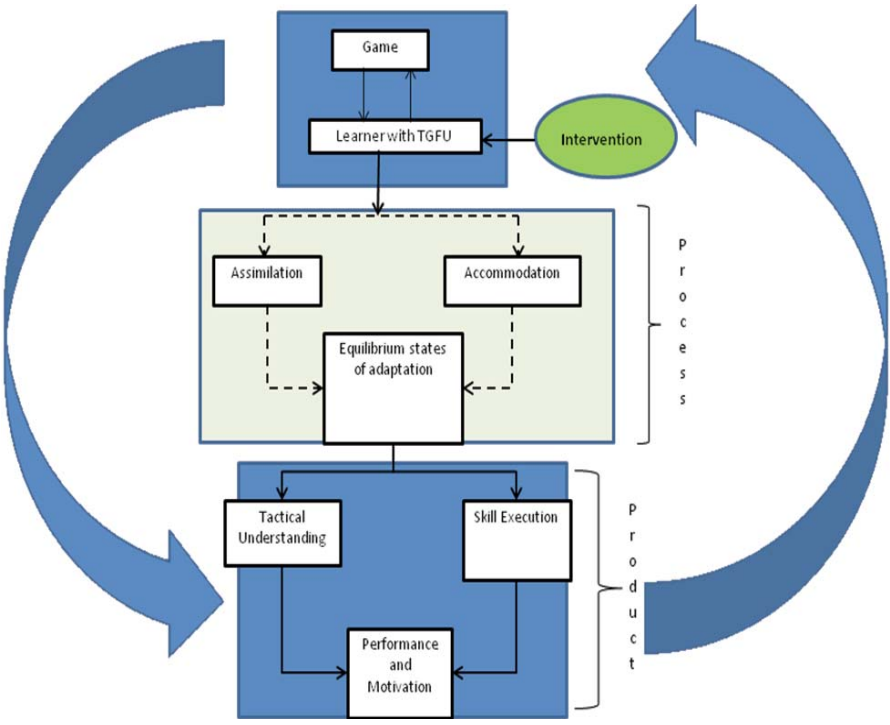

Figure 2:
Theoretical Framework Proposed for the Study.

The proposed framework, as illustrated in figure 2, suggests that teaching commence with a game which is modified for adult game to present the learner with a tactical problem (Thorpe, Bunker & Almond, 1984). A modified game is one in which the number of players, rules, and the condition of the game is introduced which represent the rules and standards of the official game. When the modified game is introduced to the

students, they will go through a state of disequilibrium of new experience. Disequilibrium is a state of cognitive conflict when expectations were not confirmed with experience.

Students will try to assimilate the stimulus which is the game tactics into their existing schema of knowledge. Then they begin to adapt the property of game knowledge with the question "*what must I do to succeed in this situation?*" The student, then, fits this new tactical problem into the existing schema of knowledge of games they already played in previous years. For example, by establishing an appropriate game form of passing in handball such as two versus two in a restricted playing area with the objective of making a specific number of consecutive passes, students were forced to confront the problem of what they must do to maintain possession. Through playing the modified game, students soon will realize that the accurate passing and swift ball control were essential skills to problem solve for successful passing.

Developing tactical understanding of game knowledge continues with additional modification to the games so that new aspects of tactical understanding can be explored. In a new situation of modified game of three versus three of game form in handball passing will be introduced later so that students confronted the additional necessity of effective support for the player with the ball. With this new modified game, the students assimilate the new knowledge of handball passing into the old such as two versus two. When the tactical understanding is taught in progressive elements related to development and experience, the student's adaptation of tactical understanding becomes wider and more stable. The modified game presented allows students multiple opportunities to problem solve and practice the appropriate tactical response (French & McPherson, 2003). When the tactical understanding of the games will be introduced in another modified game, the assimilation continues and the accommodation of the tactical understanding will not be difficult. The adaptation is acquired by the students after a considerable accommodation of understanding (Mitchell, Oslin & Griffin, 2006).

Student's tactical understanding and skill acquisition will develop after engaging in more game activities that present opportunities for tactical problem solving. Modification of game and asking appropriate questions will develop students' thinking. This enables the student to come into contact with more instances of disequilibrium of tactical understanding so that their cognitive structure will be in a constant state of assimilation and accommodation. By engaging in tactical understanding activities, students have the opportunity to apply their tactical understanding, improved

skill, problem solving, and decision making in real game situations as recommended in past studies (Griffin & Sheehy, 2004; and Mitchell, 2005). Much research supported J. Piaget's conceptualization of how children's understanding emerged in game play (Grehaigne & Godbout, 1998; Jones & Forrow 1999; Grehaigne, Godbout & Bounthier, 2001; Rovegno, Nevett & Babiaz, 2001; Kirk & McPhail, 2002; Harvey, Wegis & Mars, 2006; and Mitchell, Oslin & Griffin, 2006).

METHODOLOGY

In this study, Year Four students were selected as the population of interest. According to the Malaysian physical education syllabus, Year One, Two, and Three are in Level 1; and Year Four, Five, and Six are in Level 2. Students in Level 1 learn the fundamental movement skills of locomotor, non-locomotor, and manipulative skills (MoE Malaysia, 1998). The syllabus introduces games and sport skills at Level 2 after students have gone through the basic movement skills in Level 1. Therefore, Year Four students were selected as the population of the study because these students are at the beginning stage of learning game skill in Level 2.

The sample was selected from the target population of one Primary School in a district in Selangor, Malaysia. Target population of schools in this study is important, as other schools in Malaysia have the common defining characteristics. One school was randomly selected from those having common defining characteristics. From the school four physical education classes were randomly selected. Intact sampling method was applied where two classes were randomly assigned as the control group and another two classes as the experimental group.

A total of 72 students from the two experimental and two control groups underwent the primary physical education syllabus for handball as invasion game. The experimental groups underwent the TGfU (Teaching Games for Understanding) approach as an intervention program. Before the first lesson, the experimental and the control groups were tested for their initial game performance learning outcome in three versus three for overhead passing and dribbling in handball game with GPAI (Game Performance Assessment Instrument) as a pre-test score. The GPAI instrument was used to observe students' cognitive domain of tactical understanding such as adjust, support, cover, guard, and decision making. Two observers observed students' game performance learning outcome using the GPAI in a modified handball game of three versus three game situations.

The field study started with the time table regulation set by the Malaysian Ministry of Education. There were four weeks of handball game units, which was carried out for both experimental and comparison group in a 20 x 40 meter field. The control group underwent learning of overhead pass and dribbling in a handball game using the traditional skill approach. The experimental group went through learning of overhead pass and dribbling in handball game with the TGfU approach. After four lessons of handball game, the GPAI was administered the following week in a three versus three game situations for post-test score. Previous study has shown that the GPAI has shown validity for tactical understanding component of game performance (Blomqvist, Luhtanen & Laakso, 2001; Richard & Griffin, 2003; Harvey, Wegis & Mars, 2006; and Memmert & Harvey, 2008).

RESULTS AND DISCUSSIONS

The effects of TGfU (Teaching Games for Understanding) on students learning outcome were analyzed using the ANCOVA analysis. An ANCOVA analysis statistic was conducted after all the ANCOVA assumptions were met to evaluate the effects of the TGfU approach and traditional skill approach on students' learning outcome. The results of ANCOVA analysis are presented in table 1 as follows:

Table 1:
Analysis of Co-Variance Summary

Source	Sum of Squares	df	Mean Square	*F*	Sig.	Partial Eta Squared
Pretest	19.09	1	19.09	12.35	.001	.152
Group	384.41	1	384.41	248.83	.000	.783
Error	106.59	69	1.54			

**$p < .05$

The results in table 1 reveal that there was a significant difference between students with TGfU approach and students with traditional skill approach in the post test total score (F [1, 69] = 248.83, $p < .05$). This result indicated that the experimental group with TGfU approach has significant main effects on student learning outcome compared to the traditional skill approach.

Table 2:
Estimated Marginal Means on Cognitive Game Performance

Group	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Experimental	15.797[a]	.215	15.368	16.226
Control	10.828[a]	.215	10.399	11.257

Table 2 reports that the overall mean of students with TGfU approach (Adjusted Mean, *M* = 15.79) was significantly better than students taught with the traditional skill approach (Adjusted Mean, *M* = 10.82). Therefore, there were significant differences in students learning outcome between students exposed to TGfU approach and students under the traditional skill approach.

The research design of this study was guided by student centered constructivism learning theory in physical education. The TGfU approach focuses students' learning environment with constructivism learning. The activity organized for students in game situation were in a small groups and task based where the focus was on the tactical aspect of game learning outcome. The constructivism learning approach focused on students' tactical movement of decision making in games activity based on the playing environment and not by students standing in a row and waiting for their turn for skill practice as seen in the traditional skill approach. The modified activity in game situation required students to actively participate to reconsider their prior knowledge that they have in presence of the new information. Students used their experience to create cognitive structure of the new information and deep understanding of the new knowledge occurred. In the playing game situation of three versus three, students' skill was in negotiating, compromising, and learning developed through a team work.

With the intervention of the TGfU approach, students were exposed to varieties of tactical problem solving activity of two versus two and three versus three in different modified activity. With the new tactics of two and three opponents, the students adapted the game learning of passing. Students then applied this experience in the three versus three game situations. The students confronted their understanding of what they encountered in the new learning situation. When what they encountered was inconsistent with their current understanding, they then change their cognitive knowledge to accommodate the new experience. The students

remain active throughout this process of game learning experience. They applied the current understandings and note relevant elements in the new learning experiences. During the game situation, students were able to react to the unexpected situation which they may not practice during their training session. The TGfU approach provided an appropriate action to be taken by the students' in actual game playing situation based on their prior knowledge.

Based on the constructivist theory, students learn best when actively engaged in the learning process by connecting their prior knowledge to new knowledge and making meaning in real world experience. This study represents one such program whereby the pedagogy of TGfU approach and particular elements of constructivism are incorporated in games learning to improve students' learning outcome and motivation (Griffin & Placek, 2001; and Chen, Rovegno & Iran-Nejad, 2002). Within the structure of the TGfU approach, the learning environment produced for students was not in isolation from their peers or teachers as compared to the traditional skill approach as claimed in past studies (Hopper, 2002).

The TGfU approach focused on learning experiences for students to acquire tactical understanding of major games through playing modified versions of the games in a game situation. Students had opportunity to create and modify games to display skills such as leading, following, and decision making (Pangrazi & Casten, 2007). Students were actively engaged in learning experiences which provided them with appropriate information for their own learning (Kirk & MacPhail, 2002; and Light, 2002). Hence, the TGfU approach provided positive interaction among peers and between student and teacher; it was noted that student enjoyment of participation and motivation increased (Holt, Stream & Begoechea, 2002; and Hopper & Kruisselbrink, 2002). Therefore, it can be concluded that to generate a whole child concept with cognitive, psychomotor, and affective domain, TGfU approach is an effective approach.

CONCLUSION

This paper discussed the theoretical framework and implication of using the TGfU (Teaching Games for Understanding) approach on primary students' learning outcome with constructivism learning theory. TGfU meets all the developmental needs of students for successful game play by providing tactical understanding of games in game situations.

The implication of the theory has shown practical contribution to the field of game teaching in physical education. With this practical significance

of the study, practitioners can develop an interest in primary physical education sports, such that when the students go to Secondary School, they will have improved ability and desire to continue participation in games.

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