

Effect of Teaching Games for Understanding Approach on Students' Cognitive Learning Outcome

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Abstract— The study investigated the effects of Teaching Games for Understanding approach on students' cognitive learning outcome. The study was a quasi-experimental non-equivalent pretest-posttest control group design whereby 10 year old primary school students ($n=72$) were randomly assigned to an experimental and a control group. The experimental group students were exposed with TGfU approach and the control group with the Traditional Skill approach of handball game. Game Performance Assessment Instrument (GPAI) was used to measure students' tactical understanding and decision making in 3 versus 3 handball game situations. Analysis of covariance (ANCOVA) was used to analyze the data. The results reveal that there was a significant difference between the TGfU approach group and the traditional skill approach group students on post test score ($F(1, 69) = 248.83, p < .05$). The findings of this study suggested the importance of TGfU approach to improve primary students' tactical understanding and decision making in handball game.

Keywords— Constructivism, learning outcome, tactical understanding, and Teaching Game for Understanding (TGfU).

I. INTRODUCTION

The physical education program experience has its unique contribution to students' well being [1], [2]. Increasing attention paid to students learning theory in physical education pedagogy has contributed interest in the Teaching Games for Understanding (TGfU) approach in games teaching and learning [3], [4], [5], [6], [7]. TGfU is a student centered pedagogical approach aimed at generating understanding of all aspects of games [3], [7], [8]. TGfU approach is based on the constructivist concept that encourages students to participate in learning activities and develop their own understanding with the game situation [6].

Games are one of the important components in the physical education curriculum because 65 percent of time spent in physical education is allotted to games teaching and learning [9]. Games are competitive by design, intent to test one's physical ability against another. The purpose of teaching games

is to enable students to construct meaning in a game education [4], [10]. Meanwhile according to Werner [9], the purpose of teaching games in physical education is to improve students' game performance and to improve their enjoyment and participation in games, which will lead them to a better healthy lifestyle.

Past research argued that the effects of pedagogical problems on student's cognitive aspects of understanding, knowledge about games, decision making in real game situation [11], [12], [13]. Teaching games in schools has traditionally emphasized the teaching of individual skill in organizational drill patterns without consideration of games themselves [11]. The traditional skill approach developed teacher or coach dependent student who failed to use decision making ability in game situations [10], [14], [15]. Furthermore students' game performance showed less improvement and they were not motivated enough to make games a part of their healthy lifestyle [7], [12], [14], [16]. Therefore game learning outcomes in the physical education programs were unable to give impact for students' cognitive aspects of tactical understanding and decision making to continued participation in secondary [10], [14], [17].

Some of the pedagogical physical education programs also were reported in Malaysia by [18], [19], [20], [21], [22]. The role and function of the physical education curriculum and how the pedagogy needs to be taught in school were reviewed in these studies [18]-[22]. The preliminary study finding suggested a need for different approach as compared to the traditional skill approach for effective games learning outcome. Therefore this study investigated the effects of student's cognitive aspects of tactical understanding and decision making in 3 versus 3 handball game situations.

II. METHOD

The study employed a quasi experimental non-equivalent control group design. Two primary schools with common defining characteristics were randomly selected from a district in the state of Selangor, Malaysia. 10 year old primary school boys (grade four) were selected as a population of the study. Two physical education classes were randomly selected from each school as an intact group for the study. Intact sampling method was applied where by one class was randomly assigned as an experimental group and another class as a

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control group. Both the experimental groups ($n = 36$) and control groups ($n = 36$) went through primary physical education lesson modules of Year Four handball game syllabus set by the Malaysian Ministry of Education. On the first week the experimental group and the control group were pre tested for their initial game performance learning outcome with the Game Performance Assessment Instrument (GPAI) instrument on passing and dribbling in a handball game as a pre-test on five component of adjust, cover, support, guard and decision making before the intervention.

The control group ($n= 36$) then went through the regular physical education syllabus for handball game using the traditional skill approach without the intervention for four weeks. The experimental group ($n= 36$) underwent the physical education syllabus for handball with modified game using the intervention of TGfU approach for four weeks. On the sixth week post test of students learning outcome were administered with GPAI instrument after the fourth game lesson in three versus three game situations for both groups. Two inter raters were used to collect both the pre and post test data on student learning outcomes such as adjust, support, cover, guard and decision making in three versus three game situation. The quantitative data were analyzed with SPSS Windows 16 for Means and standard deviation. Further ANCOVA test were carried out to determine the significance of the mean difference between the control and experimental group on the cognitive game performance learning outcome.

III. RESULT

The effects of TGfU 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. The estimated marginal means were presented in table 2.

TABLE I
ANALYSIS OF COVARIANCE SUMMARY

Source	Sum of Squares	df	Mean Square	F	Sig.
Pretest	19.09	1	19.09	12.35	.001
Group	384.41	1	384.41	248.83	.000
Error	106.59	69	1.54		

** $p < .05$

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

The results in table 1 reveal that there was a significant

difference between the experimental group and the control group in learning outcome on 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 learning outcome compared to the traditional skill approach. Table 2, reported that the overall mean of students with TGfU approach (Adjusted mean $M = 15.79$) was significantly better than students with traditional skill approach (Adjusted mean $M = 10.82$).

IV. DISCUSSION

The study reported there were significant differences in the TGfU approach students' cognitive aspects of tactical understanding and decision making learning outcome compared to students with traditional skill approach. When the tactical understanding aspects of adjust, support, cover and guard were continuously applied with the TGfU approach in a modified game situation, students' understanding improved. Students progressively were able to understand their prior knowledge about the tactical aspects of offensive and defensive game tactics and apply the knowledge in a new game situation. The findings of the current study agree with those of Griffin [23] that the tactical aspects of TGfU when taught in progressive related activity, students' experience facilitated their understanding. Researchers such as Mitchell [8] and Hopper [14] also uphold that once tactical understanding was realized by the students, then they use the strategies in another game situation.

Students' decision making processes in games were considered as difficult task for most physical education teachers to facilitate in school. However in this study, when the decision making in game practice were planned for students with TGfU approach in the range of activities from two versus two to three versus three, the students' had the opportunity to make decision of what to do with the ball. In a few modified game situations in the one lesson students' were required to make creative decisions, to challenge themselves and each other much like how they make decisions when they are playing a game. The result of this study is similar to the result in Sanmuga [20] and Capel [24] and that students taught with TGfU approach performed better decision making compared to those using the traditional skill approach. The results also indicated that students with traditional skill approach results appeared to be poor compared to the TGfU approach students because the traditional skill approach provided less activity for student decision making.

The finding of this study contributed knowledge that primary student's decision making in games can be facilitated with TGfU approach. There was research that examined students' decision making with TGfU approach in Malaysia [21]. However the study only reported the decision making of secondary school students. Therefore this study will add new knowledge of primary students' decision making. Past study by Rovegno [17] and Tallir [20] supported that student

learning outcomes of decision making can be enhanced among primary school students through the TGfU approach.

Teaching Games for Understanding approach has a different learning outcome results as compared to traditional skill approach. The approach focused on students learning environment with constructivism learning approach. TGfU approach focused on students centred learning. The activity organised for students were in a small group, task based where the focus was on tactical aspect of game performance. This approach focused on students' movement of executions on the game play and not standing in a row and waiting for their turn as seen in traditional skill approach. The modified activity in game required the students to reconsider their prior knowledge in presence of new information to create cognitive structure and deep understanding occurred. In game situation students' skill in negotiating, compromising and learning developed through team work.

Within the structure of the TGfU approach, the learning environment created for students were not in isolation from their peers or teachers as in the traditional skill approach. The TGfU approach focused on learning experiences for children of the offensive and defensive game tactics of handball game. Through playing modified versions of the games unlike in traditional skill approach the offensive and defensive game tactics were taught over several stages of skill practice. Therefore in the TGfU approach students had opportunity to create and modify game to display skills such as leading, following and decision making which involved active engagement with their environment. Finding of the study has shown a source of effective ways of utilizing the TGfU approach to provide learners with appropriate and effective tools to enhance learning outcome in game performance.

V. CONCLUSION

This paper discussed the effects of TGfU approach on student cognitive learning outcomes in tactical understanding and decision making. By applying the constructivism learning theory, the result of the study revealed that primary students' tactical understanding and decision making can be improved with the TGfU approach. The findings of the study showed that physical education practitioners can develop a game interest in primary physical education by employing the TGfU approach. When the students go to secondary school they will have improved ability and desire to continue participation in games.

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