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IMMEDIATE AND RETENTION EFFECTS OF TEACHING GAMES FOR UNDERSTANDING APPROACH ON BASKETBALL KNOWLEDGE

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Abstract. Teaching Games for Understanding (TGfU) links tactics and skills by emphasizing the appropriate timing and application within the tactical context of the game. It has been linked to the development of enhanced tactical knowledge. The purpose of the study was to determine immediate and delayed effects of TGfU on procedural and declarative knowledge of basketball and to compare it with a technical approach. Experimental group (EG) (11 fifth graders + 18 sixth graders) was taught by TGfU and a control group (CG) (16 fifth graders + 24 sixth graders) was taught by a technical approach for 8 weeks in Physical Education (PE) classes, both. A written test was constructed to evaluate pupils' declarative and procedural knowledge of basketball. The test was applied after the intervention to determine immediate effects and 8 months after the intervention to determine retention effects of the experimental programme. Shapiro-Wilk test, Wilcoxon T-test, Man-Whitney U-test were used for statistical analysis of obtained data. Cohen's d was used to calculate effect size. Generally basketball knowledge was better in EG than in CG after the intervention ($p<0.05$) what confirms moderate effect size. When declarative and procedural knowledge were analysed separately there was no significant difference between EG and CG. Nevertheless, moderate effect sizes indicate that the data are particularly meaningful in terms of school practice. Retention effects of both approaches were similar. Total knowledge and declarative knowledge were worse after 8 months than immediately after the intervention in both groups ($p<0.01$). In both groups, there was no significant difference in procedural knowledge between the test written immediately after the intervention and 8 months later. Differences of changes were not significant between the groups.

Key words: Physical Education, basketball, Teaching Games for Understanding approach

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Introduction

Physical Education has lifelong value and purpose and it lends itself to a creative tool to learning and teaching. Such approach means teaching essential knowledge, skills and understanding within creative contexts where the focus is developing pupils 'capacity to become highly active explorers of knowledge, ideas and strategies and in enabling and motivating them to apply knowledge and skills by making choices and decisions (Pickard and Maude 2014). Despite that, some may think that it is safer to teach in a traditional, didactic manner where learners are viewed as 'empty vessels' (Piaget 1952). Such model of games teaching, known as a technical approach, involves teaching the skills required for a game in isolation before playing the game. This method suits those learners capable of mastering technical skills at that moment in time, but does not always enable less physically competent learners to succeed. While there is an important place for practice and performance technically accurate skills, these alone do not make games players. Griffin and Butler (2005) suggest that pupils would become more proficient players if they learned to understand the decisions to be made during the game. Furthermore, this model of teaching relies more on teacher orders and less on learner participation. However, children enjoy, engage with and learn from creative teachers, and learn most from teachers who support and challenge their thinking (Pickard and Maude 2014).

On the other hand, there is a TGfU which focuses on problem-solving, and situated and pupil-centred learning, thereby maximising player enjoyment (Griffin and Butler 2005). Kirk and MacPhail (2002) argue that TGfU enables the learner to be actively engaged with the learning environment, resulting in an increased ability to make sense of new knowledge, which in turn fosters the development of intelligent game players. Given the active engagement of the learner, the TGfU is an ideal vehicle to help with the development of higher-order cognitive processes. When the TGfU approach is used, the learner develops an appreciation for a game, which serves as a foundation for making good decisions (Oslin and Mitchell 2006). McBride and Xiang (2004) have suggested that the TGfU supports the development of metacognitive processes, such as decision-making, critical thinking and problem solving.

Methods

For better understanding of a research, design there is a figure below (Fig. 1). At the time t_0 basketball skills and somatic characteristics had been measured but this is not relevant to this paper. Afterwards the intervention was conducted in duration of 8 weeks. Importantly,

a knowledge test was applied after the intervention at the time t_1 and the same test was applied 8 months later at the time t_2. Tests of basketball skills and game performance were applied along with the knowledge test but these are not the subject of this study.

The aim of our study was to determine the immediate and retention effects of the TGfU on procedural and declarative knowledge in basketball and to compare it with the technical approach.

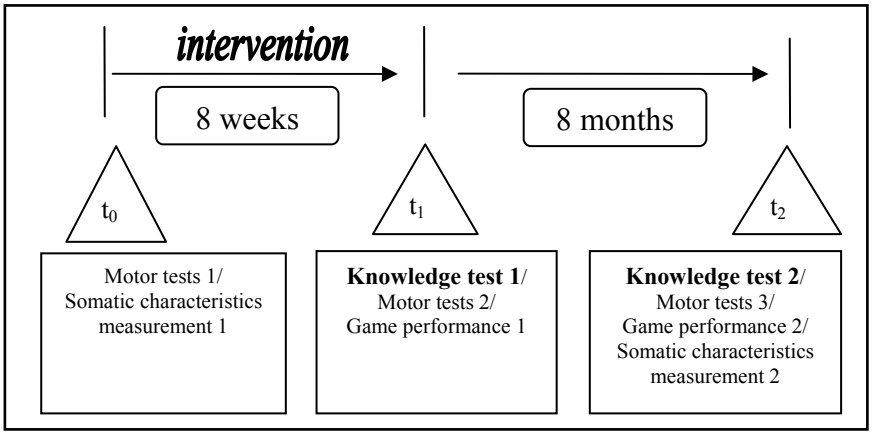

Figure 1

Research design

EG consisted of 11 fifth-graders (year of birth 2002 - 2003) and 18 sixth-graders (year of birth 2001 - 2002) and CG consisted of 16 fifth-graders and 24 sixth-graders. During 8 weeks of the intervention EG was taught by the TGfU approach and CG by the technical approach twice a week for 45 minutes in basketball classes, both. Afterwards both groups continued having regular PE classes for 6 months what was followed by 2-month summer break. To increase the validity of the experiment PE classes during the intervention were conducted by the same teacher in every group and none of the groups played basketball in PE between knowledge test 1 and 2.

To collect data the knowledge test was applied firstly after the intervention (t_1) and secondly 8 months later (t_2). Seven out of 12 questions were concerned to basketball rules (declarative knowledge) and five questions to tactics (procedural knowledge) of basketball. Both closed and open questions were used.

The obtained data were processed by Shapiro-Wilk test to determine normal distribution. Since only 1/3 of the data were normally distributed, nonparametric tests Mann-Whitney U-test and Wilcoxon T-test were applied for further analysis. SPSS Statistics programme, v. 17 was used. Cohen d was used to calculate effect size which was interpreted

as small at cut point of 0.2, moderate at cut point 0.5 and large at cut point 0.8 (Cohen 1988). Declarative and procedural knowledge were evaluated separately and together as total knowledge. A level of significance was set on 5 %.

Results and Discussion

A level of total knowledge was higher by 6.47% in EG than in CG ($p<0.05$). The calculated effect size between EG and CG was moderate ($d=0.5$). The mean value was 9.28 point/pupil in EG and 8.5 point/pupil in CG. Declarative and procedural knowledge were higher in EG than in CG but the difference was not significant (Fig. 2). Nevertheless moderate effects sizes of both declarative ($d=0.4$) and procedural knowledge ($d=0.4$) indicate that the data are particularly meaningful in terms of school practice. Therefore, we can presume that TGfU approach has greater influence on the knowledge in basketball than in the technical approach. Similarly, Turner and Martinek (1999) reported that students in a TGfU group scored higher measures of declarative and procedural knowledge in field hockey than a CG that was taught with more technique-oriented approach. Popelka (2012) identically reported that pupils in a TGfU group scored higher measures of procedural knowledge in volleyball than a CG that was taught with a technical approach. Similarly, Allison and Thorpe (1997) reported that students who were taught invasion games with the TGfU showed improvements in knowledge and understanding of when to pass, shoot or dribble, and how to make effective decisions to provide support off the ball. Grade six students in two separate studies reported higher levels of tactical knowledge in invasion (Mitchell, Griffin and Oslin, 1995) and net/wall games (Griffin, Oslin and Mitchell, 1995). Combined, our research supports the positive influence that TGfU can have on the development of knowledge and understanding across many different types of games.

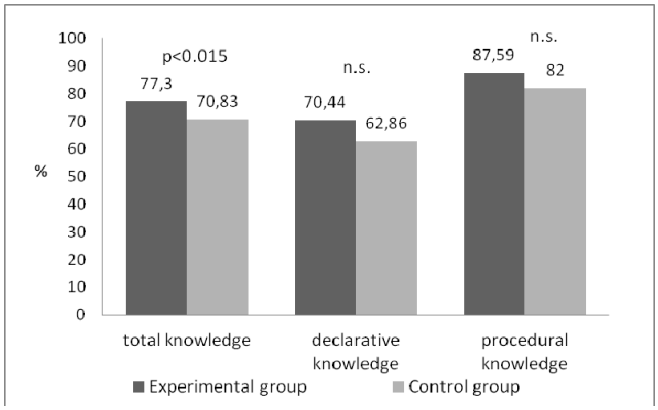

Figure 2

Comparison of basketball knowledge between EG and CG at time t_1

In EG mean value of total knowledge was 9.28 point/pupil after intervention (t_1) and 7.78 point/pupil 8 months after intervention (t_2) what is decrease by 12.5 % ($p<0.01$). The significant decrease is supported by large effect size ($d=1.1$). Mean value of declarative knowledge was 4.93 point/pupil in t_1 and 3.62 in t_2 what is a significant decrease by 18.72 % ($p<0.01$). Calculated effect size was also large ($d=1.1$). Procedural knowledge decreased only by 3.8% what was not significant (Fig. 3). However small to moderate effect size ($d=0.3$) indicates that there might exist some practical significance of the data.

In CG mean value of total knowledge was 8.5 point/pupil in t_1 and 7 point/pupil in t_2 what is a decrease by 12.5 % ($p<0.01$). Effect size was large ($d=0.8$). Mean value of declarative knowledge was 4.4 point/pupil in t_1 and 2.98 in t_2 what is a decrease by 20.36 % ($p<0.01$). Large effect size ($d=1.0$) supports the decrease of basketball rules. Procedural knowledge decreased only by 1.5% what was not significant (Fig. 4). There was no practical significance confirmed by calculation of the effect size ($d=0.1$).

Results showed that during 8 months of not playing basketball pupils generally forgot some basketball rules no matter what approach we have taught them. On the other hand, the level of their procedural knowledge remained almost unchanged. A possible explanation why procedural knowledge did not decrease could be due to a transfer within invasion games (football, floorball, and handball) which pupils were playing in PE classes between test 1 and test 2. It could be interesting to see whether and how much the tactical thinking and decision-making changed in the game and not only in knowledge test.

When comparing EG knowledge changes to CG knowledge changes, EG declarative knowledge decreased by 1.64 % less in comparison with CG. EG procedural knowledge decreased by 2.3 % more in comparison with CG, on the contrary. Total knowledge changes were same in both groups. According to the results, we can see that none of the groups worsened more than the other one in 8-month period without playing basketball. Therefore, we could state that both approaches have similar retention effects on declarative and procedural knowledge in basketball.

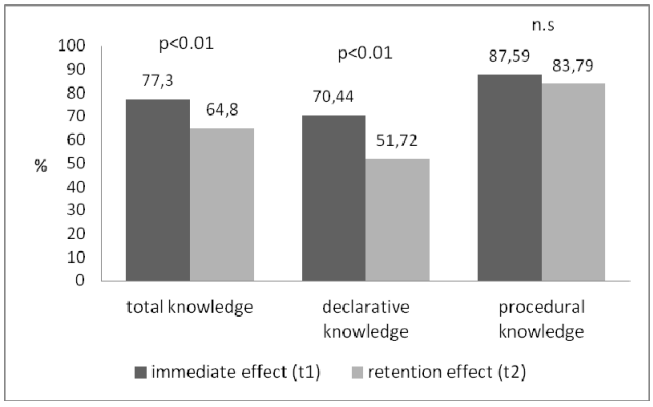

Figure 3

Comparison of basketball knowledge between time t_1 and t_2 in EG

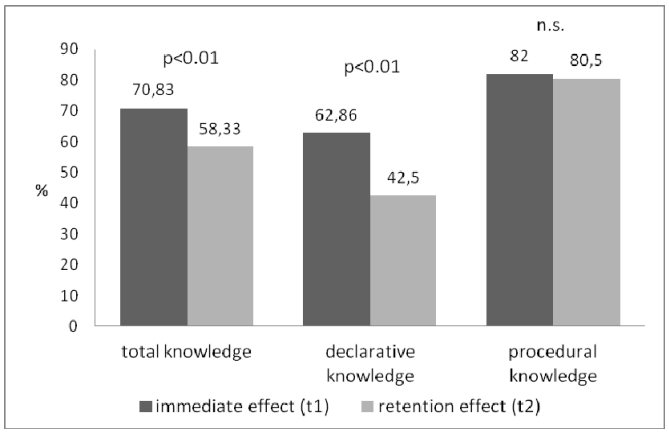

Figure 4

Comparison of basketball knowledge between time t_1 and t_2 in CG

Conclusions and Recommendations

In general, we can confirm that the TGfU approach develops basketball knowledge more than the technical approach. Retention effects of both approaches on basketball were similar, declarative knowledge decreased but procedural knowledge did not change during 8 months without basketball classes. For further research, we can recommend to apply more difficult questions on tactical knowledge and more measuring tools for data collection. For practical basketball settings at school, we could recommend to use game-based approaches, which seem to be more effective in acquiring game knowledge and understanding.

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