
Teaching Games in Elementary Schools

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Abstract

In the last few years, approaches for teaching invasion and net games have been evaluated at the secondary level in quite a few studies. The purpose of this study was to examine the Teaching Games for Understanding (TGfU) approach in elementary schools, i. e. with children between the ages of about 6 and 11. Pupils from the 1st ($n=14$ pupils), 2nd ($n=14$), and 4th ($n=15$) grades of two elementary schools were taught in a modified TGfU invasion games programme over a period of five weeks (13 lessons). Various pieces of pedagogical information from questionnaires and observations as well as measurements of game ability were chosen as dependent variables. The results show (1) that a rather high acceptance by pupils and school teachers could be registered, (2) that stress caused by the pupils was the biggest problem for (student) teachers, and (3) that the comparison with a control group ($n=14$) indicated an interaction effect between all grades; nevertheless only the 2nd grade pupils exhibited a significant improvement in game ability. Finally, findings are discussed in terms of their implications for teaching and research in elementary physical education.

1 Introduction

Over the past 15 years, many researchers have evaluated approaches for teaching invasion and net games (e.g. French, Werner, Rink, Taylor & Hussey, 1996; Gabriel & Maxwell, 1995; Memmert & Roth, 2007; Mitchell, Griffin & Oslin, 1995; Rink, French & Werner, 1991; Turner & Martinek, 1992). Numerous dependent variables were evaluated in the existing literature, such as decision making, skill acquisition, declarative and procedural knowledge, and general game ability (for a review see Holt, Streat & Bengoechea, 2002). Regardless of the variables studied, it is widely accepted today that the Teaching Games for Understanding approach (TGfU; Bunker & Thorpe, 1982) and the Tactical Games Approach (TG; Mitchell, Griffin & Oslin, 1995) are well-established concepts both in literature and for the use in physical education lessons at the secondary level, because they offer pupils several ways of learning technical and tactical skills in different sport games (cf. Grehaigne, Godbout & Bouthier, 1999).

The next phase of research should go deeper into invasion or territorial games approaches and should include two further important points: On the one hand, little research has yet been conducted to evaluate approaches for teaching invasion games to elementary pupils (cf. Mitchell, 2005). A request from Rink, French and Graham (1996) was taken into consideration here. They suggested the transfer of the TGfU approach to other settings, such as Physical Education lessons in elementary schools. "Elementary teachers report that the model can be adapted suitably to provide a games-based format for the teaching of games in elementary schools" (Mitchell, 2005, p. 67), experiences having not been investigated empirically so far. In a first step Mitchell and Clements (2003) have presented a framework for net/wall games for the elementary level.

On the other hand, as Holt, Streat and Bengoechea (2002, p. 173) pointed out, "physical education is about more than the development of physical skills, and that cognitive and, in particular, affective implications of games teaching should be of paramount importance." Consequently, a study in which cognitive, behavioral, and affective perspectives of game play of elementary aged learners were at the centre of the research to be designed.

To tackle the problem, a study was carried out in which pupils from an elementary schools took part and were studied from a holistic viewpoint. The purpose of this paper is to enrich the debate by offering new aspects for research and discussion of the teaching of games in elementary schools. More specifically, by working with some of the fundamental principles of the TGfU approach, the authors wish (a) to consider the TGfU approach within the context of teaching invasion games to children between the ages of 6 and 11 at elementary schools, and (b) to add two new instructional strategies, namely diversification and self-controlled learning, and (c) to analyze several pedagogical issues (e. g. pupils' acceptance, stress factors

for teachers, practicability) and game ability as new dependent variables on which little research has so far been conducted in teaching games to beginners.

2 Theoretical Framework

Although the introduction of the TGfU approach (Bunker & Thorpe, 1982) is to be regarded as a catalyst for discussions of pedagogical and theoretical aspects of game teaching, empirical research is limited in contrast to analyses dealing with the question of cognitive and psychomotoric outcome (cf. Allison & Thorpe, 1997; Rink, 1996; Turner & Martinek, 1992). To a certain extent this is strange, because, historically, the analysis of game performance is seen as only one part of the TGfU approach. In fact one reason for the introduction of the TGfU model was that British pupils had experienced little success in games upon leaving school due to the emphasis placed on performance (Werner, Thorpe & Bunker, 1996). The following section will therefore deal with the learners' and teachers' acceptance as well as the practicability of the TGfU approach at the elementary level¹.

2.1 Learners' Acceptance

From the very beginning, one vital component of the TGfU model was to put the focus on the learner (Bunker & Thorpe, 1982), in so far as cognitive and psychomotor domains have been reviewed. However, the learners' experience was not central to the academic debate (Holt, Streaan & Bengoechea, 2002), because the learners' affective domain in particular has received little attention from researchers, although there are several studies on affect and enjoyment in sports whose results affirm the importance of affect in the teaching of games (Boyd & Yin, 1996; Kimiecek & Harris, 1996; Streaan & Holt 2000; Wankel, 1997). Many of the processes involved in the affective domain (e.g., having fun) are primary motivators for pupils' engagement in sports and games (Ewing & Seefeldt, 1990; Scanlan & Simons, 1992). Thus, the TGfU approach should not only aim at improving the learners' performance, but also at enhancing their enjoyment and interest in the game (Werner et. al., 1996, p. 32).

Learning is more effective if children enjoy what they do. The TGfU approach therefore offers a natural and game-oriented setting to ball game beginners. Hence, children first of all learn "what to do" and later on "how to do" it. Côté, Baker and Hay (2002) suggested that the sampling years (age 7-12) be characterized by a low frequency of deliberate practice and a high frequency of deliberate play. Self-determination theory (Ryan & Deci, 2000) and Vallerand's (2001) recent hierarchical model of motivation in sports support the assumption that early deliberate play will have a positive effect on intrinsic motivation over time. Within this context, one research study shows that pupils describe games as being more fun than drills in organized sport practice environments (Streaan & Holt, 2000). On the basis of these considerations one conclusion can be drawn: elementary pupils like to participate in and benefit from *deliberate play* – an assumption which still requires empirical proof.

2.2 Stress Factors

An important aspect in instructional theory is researching the teachers' working conditions (for a review, see Schempp & de Marco, 1996) as they impact the teaching/learning process in physical education. Teaching physical education and teaching games have become rather exhausting for several reasons. This can be related to the somewhat complex network in

¹ Empirical findings with reference to deliberate play, implicit learning, and diversification are presented and discussed in connection with the Heidelberg Ball School (Ballschule Heidelberg; Roth, 2004). It is important to mention here that the Heidelberg Ball School is not a distinct instructional model, separate from TGfU and TG. In contrast, it is a small modification of the TGfU approach, in particularly appropriated for young children at an elementary level. The Heidelberg Ball School (Ballschule Heidelberg) approach by Kröger and Roth (2005) is already available in German, Japanese, Portuguese and Hungarian books publications.

which teaching activities, and especially teaching activities in physical education, take place (cf. König, 2004). It is therefore more likely that teachers will accept teaching strategies which reduce stress caused by pupils, by the teachers' own expectations, by institutional factors, and by the subject matter itself.

2.3 Teaching Strategies (1)

Self-controlled learning: General tactics are acquired through playing without direct instructions (e.g., McPherson & French, 1991; Rink, French & Graham, 1996; Thorpe, Bunker & Almond, 1996). Therefore, games have to be constructed so that their "situations speak to the children." Thus, teachers should only set the idea and the rules of the games and nothing more. No special tactical advice or any kind of feedback is given. Consequently, free playing could be encouraged in the TGfU approach at the elementary level. This means that the instructors give less tactical instruction to children during playing and, in doing so, they support explorative (cf. Bakker, Whiting & Van der Burg, 1990), implicit (cf. Reber, 1989), and self-controlled (cf. Wulf & Toole, 1999) learning.

2.4 Teaching Strategies (2)

Teaching units : Mitchell (2005, p. 58) advocated against the direct teaching of games, such as soccer, volleyball, or softball; instead, he preferred teaching units of invasion games, net games, and striking/fielding games placing emphasis on specific tactical problems. Results of recent studies on the development of expertise from childhood to adulthood suggest that a diverse, varied and non-guided "ball sports childhood" has no negative effect on the game ability and is an essential ingredient for the development of comers in sports games. This is verified by findings from baseball (Hill, 1993), basketball, field hockey, netball (Baker, Côté & Abernethy, 2003; Côté, Baker & Abernethy, 2003), and tennis (Côté, 1999). Even today, these experts still profit from varied, uninstructed experience and perception of situations in sports games that they gathered during their childhood. Not only have they learned various sports game techniques (such as throwing, catching or kicking) without guidance or instruction, but they have also solved tactical situations in games with different characteristics (group size, rules, material of the ball) before explicitly knowing specific tactical features. The main purpose of playing games in their free time was to experience fun and excitement through sports, and to develop intrinsic motivation (see Côté, Baker & Abernethy, 2003). Additionally, early specialization can lead to "social isolation" (Wiersma, 2000) and to "burnout" (Henschen, 1998). Hence, it appears to be beneficial for the teaching of games to beginners to care for a broad and diversified approach. This allows the children to take part actively in several sports games and to act in various game situations.

2.5 Viability

Researchers in RT-PE (Research on teaching in Physical Education) look at teachers from several points of view and presented good and multifaceted results (see Schempp & de Marco, 1996; Silverman, 1991). Nevertheless, there are only few findings concerning the evaluation of teaching models by experienced instructors which might enhance the expert-novice approach in RT-PE (cf. Griffey & Housner, 1991). It is obvious that teaching models in physical education in general, as well as in game teaching, have to be evaluated with regard to their viability under the conditions of public schools. More specifically, this means that researchers have to find out if there is adequate equipment and enough space and time for the diversification in the TGfU approach; this is a field which should be classified under Silverman's "Time/mediating product-process research" (1991, p. 356).

Summarizing the fundamental principles having been mentioned so far, the TGfU approach seems to be widely accepted by learners and teachers at the elementary level. Individual types of sports games are not presented to the pupils analytically in the lessons. Instead, various

game forms are played using different forms of motor movement. The pupils act with foot or hand in tactical, technical or coordinative tasks which are fundamental in various team sports. Thus, we hypothesize that by varying the forms of motor movement, and by encouraging deliberate play, pupils both enjoy their games lessons and improve their general game ability. Furthermore, it has still to be proven that teachers favour the TGfU approach because of its viability and its positive effect on reducing stress.

3 Methods

3.1 Participants

A total of 57 pupils, 27 females and 30 males, from two rural elementary schools participated in the study. They attended the 1st ($n=14$), 2nd, ($n=14$), 3rd ($n=14$), and 4th ($n=15$) grades. The 3rd grade functioned as a control group because organizational reasons. They did not have significant differences as to movement experiences in sport games before the study.

3.2 Treatment

Three treatment groups and the control group were compared in the study. The pupils who attended the 1st, 2nd, and 4th grades ($n=43$) received a standardized programme according to the TGfU approach as a treatment in their Physical Education lessons (cf. Silverman & Solmon, 1998, p. 273). The main components of this treatment were different game forms representing only one tactical problem each, e. g. support, attacking the goal or attacking as a team (see Mitchell, Griffin & Oslin, 1995), a concept which has lead to the development of a large number of games and exercises (cf. Kröger & Roth, 2005) so far. Consequently, all the lessons had been constructed with a rather identical structure so that a sample lesson looked as follows:

- (a) For warming -up the pupils were confronted with several coordinative tasks with balls.
- (b) The main part of the lessons covered one or more game forms aiming at one specific game tactic.
- (c) This part was interrupted or finished with a few exercises in which technical components were practiced.

The pupils in the control group ($n=13$) participated in regular Physical Education lessons without emphasizing playing during that time. Both the treatment groups and the control group took part in 13 lessons (each 45 minutes) in five weeks. There were no differences between the two groups concerning the pupils' participation time in practice.

3.3 Verification of Instruction

In order to verify the instructions given in the treatment groups, it was necessary to develop a validation protocol. The protocol included the subject matter of the games and exercises of each lesson, the used motor skill (hand, foot, and hockey stick; *diversification*), and an estimation of the amount of given instructions by the student teachers (*self-controlled learning*). Three lessons (2, 6 and 10) from each group were evaluated by means of videotape. Two coders were able to confirm independently that all lessons proceeded as planned and followed the appropriate principles of the TGfU approach.

3.4 Teachers

In this study, the treatment group was split into three subgroups (1st, 2nd, and 4th grades). Each of these subgroups was instructed by different teachers who were students of sports science gaining first-hand experience of a teacher's life at school. In this context it is important to mention that the student teachers had been specially trained for the programme, insofar as all the games and exercises were introduced to the trainees and they were under obligation to teach these in the given way. In addition, they delivered practical lessons and wrote an examination. Furthermore, in each grade the student teachers were accompanied by regular

school teachers from the elementary schools having no experience in the TGfU approach. Thus, the regular school teachers were able to observe the lessons from a neutral standpoint and could therefore evaluate the TGfU as an approach for teaching games to pupils at elementary schools.

3.5 Instrumentation

In order to cope with the requirements of a holistic view of pupils, a variety of research methods and data collection techniques were used in this project and a special research design consisting of inquiry and testing of game ability was developed.

Questionnaires: Both pupils and teachers (student and in-service teachers) completed questionnaires (see Table 1) regarding the acceptance of the TGfU approach; they had been developed and validated by several experts. The pupils were asked to write answers to open and closed questions that were written in the language they understood. Research members verified that the pupils understood the questions during the administration of the questionnaire. During the project and at the end teacher data were collected by means of two different questionnaires: (i) Each student teacher had to judge 18 items measured on a scale from 1 (very low stress) to 5 (very high) immediately after every lesson he or she had delivered in a standardized list (pencil-paper). The items represented stress factors caused by pupils (SF-PU), by the general conditions (SF-CO), and by the content of the lessons (SF-LE). (ii) Every in-service teacher had to judge if the TGfU approach is practical for elementary schools and if they preferred it to other approaches for teaching games. This was done by means of a standardized questionnaire with questions alluding to the general conditions (e.g. learning time, group size) and the quality of the workplace (e.g. noise, material).

Game-test situations: "Behavior turns out to be much more context-dependent and knowledge-dependent than we used to think. What subjects do in cognitive experiments is often not representative of what they would achieve in other, more familiar settings" (Neisser, 1994, p. 227). In accordance with this recommendation of cognitive psychology, game-test situations were constructed as an instrument for data recording. This instrument contains a context-dependent real world setting which can directly provoke tactical solutions in ecologically valid situations (cf. Nevett, Rovegno, Babiarz & McCaughtry, 2001). In this study two game-test situations were used to evoke tactical behavior in "taking ball near goal" and in "identification of gaps" in recurring comparable situations (see Figure 1). To give a measure of diversification, the game-test situations contain three different kinds of skills (hand, foot, and hockey stick) in a system where the players rotated (two rounds for each person). This means that the positions and the team players/opponents were systematically varied. The idea of the game, the number of players, the rules, and the environmental conditions were stipulated. Game-test situations had already been tested for objectivity, reliability and validity in a lot of preliminary studies (Memmert, 2004; Memmert & Roth, 2003).

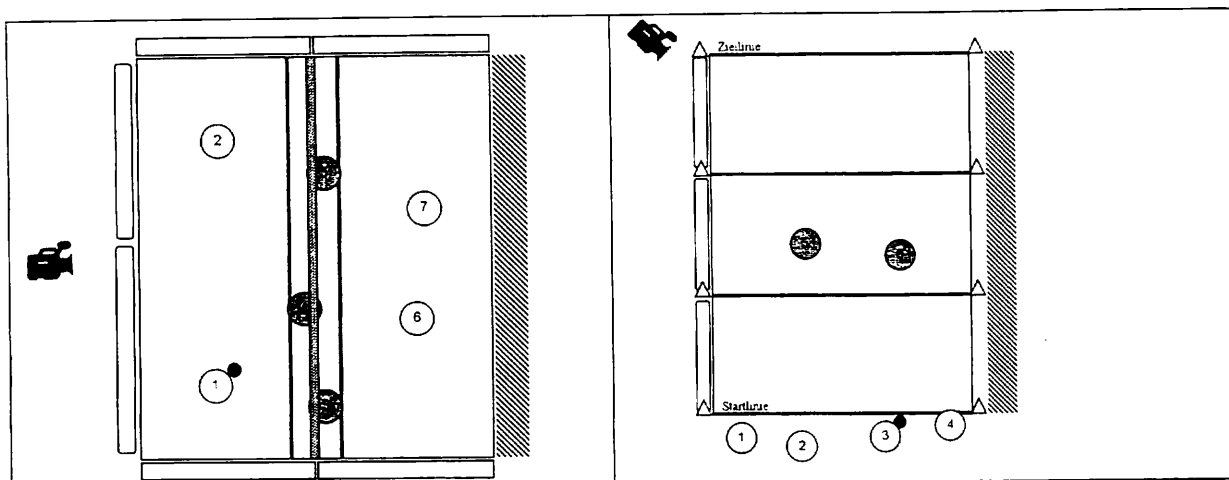


Figure 1: An overview of the game-test-situations „taking ball near goal“ and „identification of gaps“

The pupils' performance in the game-test situations was recorded on videotape and judged using a subsequent concept-oriented expert rating. This means that (i) the experts were given exact observation criteria. The main evaluation criterion concerned the quality of the tactical solution regarding the specific situation (scale 10 to 1); (ii) the experts were trained using special videotapes, and (iii) they underwent a final video-based test to check the quality of their ratings. Only those showing a high reliability compared to a golden standard of ball games experts were chosen for the study. The pupils in the game-test situations were each judged by two ball games experts. Later, these values were averaged. Each child received two game performance values from each of the two experts as a result of the two player rotations. Finally, 58% of the inter-rater reliability coefficients determined for rotations 1 and 2 were very high ($> .95$) and 42% were high ($> .90$). All data were averaged into a value covering two tactical behaviors, which contains each of the two experts, two rotations, and the three kinds of skills.

3.6 Procedure

With reference to acceptance, all pupils ($N=43$) and school teachers ($N=7$; all female) completed questionnaires after the treatment (pencil paper). For the *pupils' acceptance*, the total scores of the items were compared to normal distributions and between grades using χ^2 -statistic procedures for nominally scaled variables. For the evaluation of the *viability* of the approach by in-service teachers qualitative procedures have been used. In contrast, the student teachers ($N=12$; 7 female; 4 in each class) had to fill out questionnaires after each lesson they had taught (pencil paper). For the analyses of the items we used separate analysis of variance (ANOVA), as well as Mann-Whitney-U-Tests, if the sample sizes were too small.

As regards to *game ability*, all pupils were tested before the treatment (first week of the project) and after 13 Physical Education lessons (last week of the project). In the two game-test situations, they were required to play using hand, foot, and hockey stick. To give a measure of diversification, the values of both game-test situations and all motor movements were averaged. In order to evaluate the programme, an examination of game ability was carried out using a 2×4 (measurement time by grades) ANOVA for repeated measures. An alpha level of .05 was preselected for all statistical comparisons and the effect size was calculated.

4 Results (Analysis of Pedagogical Outcomes)

Referring to the introductory pedagogical considerations the data collected were analyzed from three different perspectives.

Pupils' acceptance: A total of 41 questionnaires were available (1st grade = 13; 2nd grade = 13; 4th grade = 15) for this issue. Almost the same number of girls and boys answered the questions (1st grade = 53.8% vs. 46.2%; 2nd grade = 46.2% vs. 53.8%; 4th grade = 53.3% vs. 46.7%). The analysis of the material at our disposal led to the following results (see Table 1):

Table 1. Summary of the results of the questionnaire. The total and grade-specific agreements to the 14 questions are presented (: = $p < .05$, n. s. : = not significant).*

Item	Question	Total agreement	1 st grade	2 nd grade	4 th grade	1 st grade vs. 2 nd grade	1 st grade vs. 4 th grade
1	Did you like playing with the ball?	97.4%*	92.3%*	100%	100%	n. s.	n. s.
2	Would you like to play like that more often?	80.5%*	92.5%*	84.6%*	66.7%	n. s.	n. s.
3	Did you want the lessons to last longer?	78.0%*	100%	53.8%	80.0%*	1 st grade*	n. s.
4	Did you look forward to the next PE lessons?	100%	100%	100%	100%	n. s.	n. s.
5	Do you think that the PE lessons passed quickly?	61.0%	61.5%	61.5%	60.0%	n. s.	n. s.
6	Would you like to play with your friends in the same way?	61.5%	84.6%*	38.5%	61.5%	1 st grade*	n. s.
7	Did anything seem strange to you in the lessons?	30.8%*	27.3%	30.8%	33.3%	n. s.	n. s.
8	Would you rather have PE lessons taught like they were before?	69.2%*	84.6%*	76.9%	46.2%	n. s.	1 st grade*
9	Did you always take part in the games?	82.5%*	100%	61.5%	86.7%*	n. s.	n. s.
10	Do you feel like playing with a ball more often than before?	77.5%*	84.6%*	61.5	85.7*	1 st grade*	n. s.
11	Do you think that our PE lessons were boring?	90.2%*	15.4%*	7.7%*	6.7%*	n. s.	n. s.
12	Do you look forward to getting rid of the student teachers?	12.5%*	15.4%*	15.4%*	7.1%*	n. s.	n. s.

13	Should there be a student teacher in the next grade as well?	87.5%*	100%	92.3% *	71.4%	<i>n. s.</i>	1 st grade*
14	Would you like your teacher to teach you in the same way?	82.5%*	84.6%*	84.6% *	78.6%*	<i>n. s.</i>	<i>n. s.</i>

(i) A normal distribution could be found for 12 items. Only for items 5 and 6 do the data show no normal distribution.

(ii) A great majority of the learners appreciated the approach. Taking items 1, 2, 10 and 14 into consideration, an acceptance of 84.5% could be detected. The boys' acceptance (86.2%) was slightly higher than the girls' acceptance (82.8%). Furthermore, the differences in acceptance with regard to grade are very interesting: basically, 1st grade pupils show the highest acceptance in each item. Statistics show that the results differ significantly from those of grade 2 concerning items 3 ($\chi^2_{(1)} = 7.800$; $p < .05$) and 10 ($\chi^2_{(1)} = 5.769$; $p < .05$) and from grade 4 (items 8: $\chi^2_{(1)} = 4.248$; $p < .05$; 13: $\chi^2_{(1)} = 4.360$; $p < .05$).

(iii) On the one hand, the pupils would not practice TGfU games to the same extent in their free time. Only 61.5% intended to play TGfU games with their friends. On the other hand, this result needs further differentiation, because the pupils of grade 1 greatly appreciated the idea of playing the same games in their free time as well. Analyzing the data aggregated in item 6, there is a significant difference between grade 1 (84.6%) and grade 2 (38.5%; $\chi^2_{(1)} = 5.858$; $p < .05$).

Student teachers' experiences: The student teachers were asked to determine the extent teaching on the basis of the TGfU approach has stressed them. Due to the arranging of the 18 items into stress factors caused by pupils (SF-PU), by the general conditions (SF-CO), and by the content of the lessons (SF-LE) the factor SF-PU is the highest within the aforementioned group of three. However, this trend could not be confirmed statistically, $F(2, 33) = 1.904$, $p = .17$, a fact which also depends on the small group size. Regarding the single items of SF-PU, the most problematic factors for student teachers working with the TGfU were individual disturbing pupils (3.5), general agitation (3.3), noise (3.3), inattentiveness (2.9), and conflicts among the pupils (2.9). A look at the values with reference to grade reveals interesting results, because the higher the grade, the higher the loads of the factors SF-PU, SF-LE, and SF-CO. But only the differences in SF-PU between the 2nd and the 4th grades are significant ($F(2, 33) = 1.904$, $p < .10$). The factor "general agitation" ($U = 3.000$, $z = -1.715$; $p < .10$) in particular was significantly higher in grade 4. Taking gender into consideration, all values are higher for male teachers. However, statistical significance could only be proved for the difference based on BF-CO, $F(1, 11) = 8.565$, $p < .05$, partial $\eta^2 = .46$. For men significant higher values were revealed for the items "position of the lessons in the timetable" ($U = 6.000$, $z = -1.735$; $p < .10$) and "handling of parallel tasks" ($U = 6.500$, $z = -1.631$; $p < .10$).

Viability: Due to the fact that the lessons were taught by specially qualified student teachers, the school teachers were able to observe the lessons from a neutral point of view. By analyzing the data from seven questionnaires, we received the following results:

(i) In summary, the school teachers regard the TGfU approach as being very sensible for pupils attending elementary schools. They emphasized the positive effect of improving the pupils' skillfulness with balls and the chance of improving game ability through non-specific curriculum elements. Their attitude is also substantiated by the fact that in future, all teachers intend to teach their PE lessons according to the principles and ideas of the TGfU.

(ii) The fact that TGfU programmes require a great variety of balls and other materials was supposed to be a problem for schools. However, this apprehension was dispersed because of the school teachers' unanimous opinion that the TGfU can be realized without any problems

under the prevailing conditions. Similar results can be stated when it comes to organization and academic learning time, two other central factors for effective teaching (cf. Parker 1995; Schempp, 1992).

(iii) Usually, teachers expect their pupils to accept and enjoy their lessons and they expect their pupils to make progress rather quickly. In other words, progress and acceptance of the pupils are important elements that teachers demand from teaching models. TGfU programmes fulfill these expectations, a fact which had already been affirmed by the pupils' overwhelming acceptance.

(iv) When asked for the most essential features of the TGfU, the school teachers came up with the following list:

- Cooperation, amusement, motivation, conflict solution, and fairness are the most important objectives that could be realized by means of the TGfU.
- Skills, tactical competence, and rules were judged as less important.

(v) Both school teachers and pupils criticized the high representation of the idea of competitive sport. They would prefer to play without contest more often.

Analysis of game ability: The three groups taught according to the TGfU programme improved their game ability significantly between the first and second measurement points, $F(1, 42) = 7.816, p < .001$, partial $\eta^2 = .16$. No learning progress could be found in the control group. In contrast, a considerable decrease in performance was indicated, $F(1, 11) = 13.366, p > .10$, partial $\eta^2 = .16$. These results are underlined by a significant interaction between group (1st, 2nd, and 4th treatment grades vs. 3rd control grade) and time, $F(1,55) = 19.685; p < 0.001$; partial $\eta^2 = .26$.

An ANOVA of the four grades indicated that there was no significant effect for time ($F(1,53) = .355; p > .10$), no treatment effect, ($F(1,53) = .238; p > 0.10$), but a significant interaction ($F(3,53) = 6.721; p < 0.01$; partial $\eta^2 = .27$, see Figure 2). Significant differences in the baseline performance were ruled out, $F(3,53) = .302; p > .10$. The comparison of the three grades which were trained by the same TGfU programme only revealed significant improvements for the pupils of the 2nd grade, $F(1,13) = 7.379; p < 0.05$; partial $\eta^2 = .36$. The pupils of the other two grades showed improvements in game ability as well. However, these improvements over time could not be confirmed statistically (1st grade: $F(1,13) = 1.053; p > .10$; 4th grade: $F(1,14) = 1.687; p > .10$). These basic results are supported by rather high interaction effects between each of the three groups with control group and time respectively. Again, no significant differences in the baseline performance between each of the three comparisons could be revealed. The important point is that after five weeks of diversification, self-controlled learning, and deliberate play, only the 2nd grade shows relevant improvements in game ability.

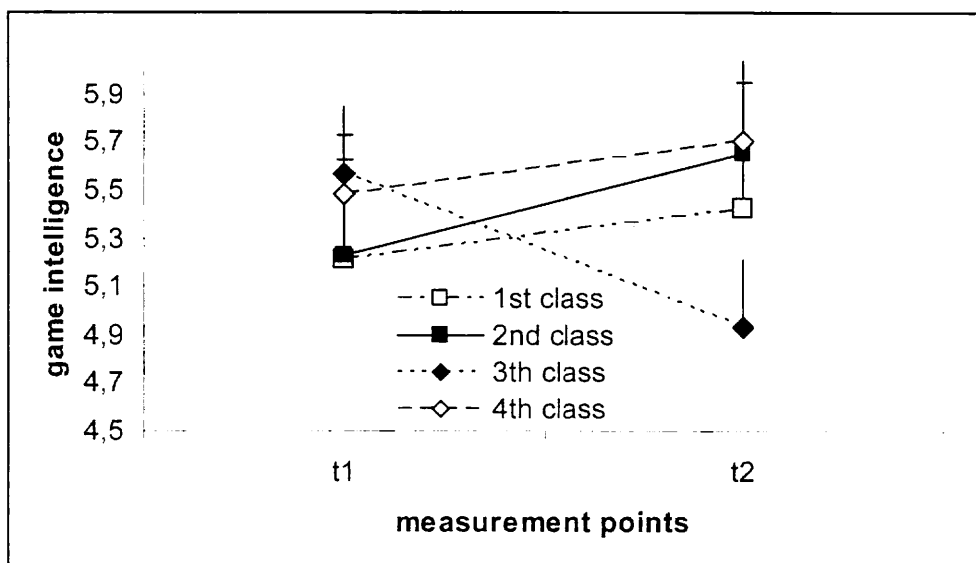


Figure 2: Development of game ability from t1 to t2 according to the three treatment groups and control group

5 Discussion

The purpose of this study was to enrich the debate on the TGfU model by offering some new aspects and therewith a new framework for research and discussion at the elementary level. It could be shown that the TGfU leads to a relatively high acceptance by pupils and teachers in all elementary grades. By summarizing the different results, we are able to say that in general, 1st grade pupils show the highest acceptance, partially even on a significant level between grades 1 and 2 and between grades 1 and 4. This supports the idea that a modified TGfU is an appropriate model for pupils aged 6 and 7. School teachers emphasized the positive effect on skillfulness and game ability by deliberate play. Motivation, conflict solution, and fairness were also realized by means of the TGfU approach. Anyhow, the approach can be improved by implementing games with less competitive targets, which may be more compatible with common pedagogical principles for elementary schools.

A fairly positive outcome can also be attributed to the adding of two new methodological aspects to the established approach of teaching games (see Bunker & Thorpe, 1982; Mitchell, Griffin & Oslin, 1995), namely diversification and self-controlled learning. Diversification seems possible because all required equipment, such as different kind of balls or hockey sticks, is available. Furthermore, it has become evident that TGfU lessons are still exhausting for the teachers. That might be eased by self-controlled playing, although self-controlled learning does not necessarily lead to physical relief for teachers. School headmistresses and headmasters should be aware of the fact that Physical Education lessons are to be planned in accordance with the stress profiles we have discovered (e.g. position of the lessons). Concerning general game ability, the TGfU is a suitable method to improve this factor in all grades. The 2nd grade in particular shows rather high improvements in diversified game ability.

Despite the rather positive outcome the study should also be discussed against the background of potential limitations. *Firstly*, the treatment lasted only 13 lessons. Referring to Rink (1995) the period of treatment should be enlarged. On the other hand it must be said that the principal aim of that study was to investigate on the basis of teaching units which are possible and realistic in elementary schools. Furthermore, the use of longer treatments is not in accordance with the common number of aims and the contents within the scope of the PE curriculum. *Secondly*, the number of classes taking part in studies like this has to be increased. But this would, in turn, create new problems, because different teachers, different schools and different conditions would make things even more complicated when it comes to comparing

results. *Thirdly*, further studies could be carried out to replicate the effectiveness of TGfU concepts with control groups at different kinds of grade levels. In this study this fact is only concerning the results of game ability. However, control groups for pedagogical parameters would have the consequence that either a very complex study would have to be designed or one would have to give up the holistic view which was at the centre of this study.

Summarizing all the aspects it can be said that based on pedagogical results the TGfU approach including two alternative instructional strategies is highly accepted by both learners and teachers at elementary schools. Thus it seems rather obvious that at the beginning of a sports game career, a broad, non-specific and self-controlled teaching approach could be most successful in developing game ability and motivation of pupils.

References

- Allison, S., & Thorpe, R. D. (1997). A comparison of the effectiveness of two approaches to teaching games within physical education: A skills approach versus a games for understanding approach. *British Journal of Physical Education*, 28 (3), 17–21.
- Baker, J., Cote, J., & Abernethy, B. (2003). Sport specific training, deliberate practice and the development of expertise in team ball sports. *Journal of Applied Sport Psychology*, 15, 12–25.
- Bakker, F. C., Whiting, H. A., & Van der Burg, H. (1990). *Sport psychology. Concepts and application*. Lanchester: Butties.
- Boyd, M. P., & Yin, Z. (1996). Cognitive-affective sources of sport enjoyment in adolescent sport participants. *Adolescence*, 31, 383–395.
- Bunker, D., & Thorpe, R. (1982). A model for the teaching of games in secondary schools. *Bulletin of Physical Education*, 18, 5–8.
- Coté, J. (1999). The influence of the family in the development of talent in sports. *The Sport Psychologist*, 13, 395–417.
- Coté, J., Baker, J., & Hay, J. (2002). Pupils's involvement in sport: A developmental perspective. In J. M. Silva & D. Stevens (Eds.), *Psychological foundations of sport* (pp. 484–504). Boston: Merrill.
- Coté, J., Baker, J., & Abernethy, B. (2003). From Play to practice: A developmental framework for the acquisition of expertise in team sports. In J. L. Starkes & K. A. Ericsson (Eds.), *Recent advances in research on sports expertise* (pp. 89–110). Champaign: Human Kinetics.
- Ewing, M. E., & Seefeldt, V. (1990). *American Youth and sport participation: A study of 10.000 pupils and their feelings about sport*. North Palm Beach: Athletic footwear Association.
- French, K. E., Werner, P. H., Rink, J. E., Taylor, K., & Hussey, K. (1996). The effects of a three-week unit of tactical skill instruction on badminton performance of ninth-grade pupils. *Journal of Teaching in Physical Education*, 15, 418–438.
- Gabriel, T., & Maxwell, T. (1995). Direct versus indirect methods of squash instruction. *Research Quarterly for Exercise and Sport*, 66 (Suppl.), A–63.
- Grehaigne, J. F., Godbout, P., & Bouthier, D. (1999). The foundations of tactics and strategy in team sports. *Journal of Teaching in Physical Education*, 18, 159–174.
- Griffey, D., & Housner, L. D. (1991). Differences between experienced and inexperienced teachers' planning decisions, interactions, student engagement, and instructional climate. *Research Quarterly for Exercise and Sport*, 62, 196–204.
- Henschen, K. P. (1998). Athletic staleness and burnout: Diagnosis, prevention, and treatment. In J. M. Williams (Ed.), *Applied sport psychology: Personal growth to peak performance* (3rd Edition), (pp. 398–408). Mountain View: Mayfield.
- Hill, G. M. (1993). Youth sport participation of professional baseball players. *Sociology of Sport Journal*, 10, 107–114.

- Holt, N. L., Streat, W. B., & Bengoechea, E.G. (2002). Expanding the teaching games for understanding model: New avenues for future research and practice. *Journal of Teaching in Physical Education*, 21, 162–176.
- Kimiecsek, J. C., & Harris, A. T. (1996). What is enjoyment? A conceptual/definitional analysis with implications for sport and exercise psychology. *Journal of Sport & Exercise Psychology*, 13, 50–64.
- König, S. (2004). Belastungen für Lehrkräfte im Sportunterricht. Ein Beitrag zur empirisch-analytischen Sportunterrichtsforschung [Stress of Physical Education Teachers. A Contribution to empirical-analytic Research in Physical Education. *Sportwissenschaft* 34, 152–165.
- Kröger, C. & Roth, K. (2005). Ballschule – Ein ABC für Spielanfänger [Ball school – An ABC for beginners of ball games] Schorndorf: Hofmann.
- McPherson, S., & French, K. (1991). Changes in cognitive strategy and motor skill in tennis. *Journal of Sport & Exercise Psychology*, 13, 26–41.
- Memmert, D. (2004). *Kognitionen im Sportspiel (Cognitions in Team Ball Sports)*. Köln: Sport & Buch Strauß.
- Memmert, D. & Roth, K. (2003). Individualtaktische Leistungsdiagnostik im Sportspiel. *Spectrum der Sportwissenschaften*, 15, 44 – 70.
- Memmert, D., & Roth, K. (2007). The Effects of Non-Specific and Specific Concepts on Tactical Creativity in Team Ball Sports. *Journal of Sport Science*, 25, 1165–1175.
- Mitchell, S. A. (2005). Teaching and Learning Games at the Elementary Level. In L. L. Griffin & J. J. Butler (Eds), *Teaching Games for Understanding. Theory, Research, and Practice*. (p. 55 – 70). Champaign: Human Kinetics.
- Mitchell, S. & Clements, L. (2003). Introducing game play in elementary physical education: A net/wall games example. *Teaching Elementary Physical Education*, 14 (1), 12–15.
- Mitchell, S. A., Griffin, L., & Oslin, J. L. (1995). An analysis of two instructional approaches to teaching invasion games. *Research Quarterly for Exercise and Sport*, 66, A–65.
- Neisser, U. (1994). Multiple systems: A new approach to cognitive theory. *European Journal for Cognitive Psychology*, 6, 225–241.
- Nevett, Rovegno, Barbiaz, & McCauley, (2001). Changes in basic tactics and motor skills in an invasion-type game after a 12-lesson unit of instruction. *Journal of Teaching in Physical Education*, 20, 352–369.
- Parker, J. (1995). Secondary teachers' views of effective teaching in physical education. *Journal of Teaching in Physical Education*, 14, 127–139.
- Reber, A. S. (1989). Implicit learning and tactic knowledge. *Journal of Experimental Psychology: General*, 118, 219–235.
- Rink, J. E. (1996). Tactical and skill approaches to teaching sport and games: Introduction. *Journal of Teaching in Physical Education*, 4, 397–398.
- Rink, J. E., French, K. E., & Graham, K. C. (1996). Implications for practice and research. *Journal of Teaching in Physical Education*, 15, 490–502.
- Rink, J. E., French, K., & Werner, P. (1991). *Tactical awareness as the focus for ninth grade badminton*. Paper presented at AIESEP World congress, Atlanta, Georgia.
- Roth, K. (2004). Ballschule Heidelberg. A new answer to traditional questions. Available at <http://www.ballschule.de/publications/paper.html>.
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55, 68–78.
- Scanlan, T. K., & Simons, J. P. (1992). The construct of sport enjoyment. In G. C. Roberts (Ed.), *Motivation in Sport and Exercise* (pp. 199–215). Champaign: Human Kinetics.
- Schempp, P. (1992). Effective teaching in physical education – A research report. *International Journal of Physical Education*, 29 (3), 10–15.

- Schempp, P., & de Marco, G. (1996). Instructional theory in sport pedagogy (1994–1995). *International Journal of Physical Education*, 32, 4–8.
- Silverman, S. (1991). Research on teaching in physical education. *Research Quarterly for Exercise and Sport*, 62, 352–364.
- Silverman, S. & Solmon, M. (1998). The unit of analysis in field research: Issues and approaches to design and data analysis. *Journal of Teaching in Physical Education*, 17, 270–284.
- Strean, W. B., & Holt, N. L. (2000). Players', coaches', and parents' perceptions of fun in youth sport. *Avante*, 6, 84–98.
- Thorpe, R., Bunker, D., & Almond, L. (1996). *Rethinking games teaching*. Loughborough: Department of Physical Education and Sport Science.
- Turner, A. P., & Martinek, T. J. (1992). A comparative analysis of two models for teaching games. *International Journal of Physical Education*, 29, 15–31.
- Vallerand, R. J. (2001). A hierarchical model of intrinsic and extrinsic motivation in sport and exercise. In D. G. Roberts (Eds.), *Advances in motivation in sport and exercise* (pp. 89–110). Champaign: Human Kinetics.
- Wankel, L. M. (1997). „Strawpersons,“ selective reporting, and inconsistent logic: A response to Kimiecik and Harris's analysis of enjoyment. *Journal of Sport Psychology*, 7, 51–64.
- Werner, P., Thorpe, R., & Bunker, D. (1996). Teaching Games for understanding: Evolution of a model. *Journal of Physical Education Recreation and Dance*, 67, 28–33.
- Wiersma, L. D. (2000). Risks and benefits of youth sport specialization: Perspectives and recommendations. *Pediatric Exercise Science*, 12, 13–22.
- Wulf, G., & Toole, T. (1999). Physical assistance devices in complex motor skill learning: Benefits of a self-controlled practice schedule. *Research Quarterly for Exercise and Sport*, 70, 265–272.