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Improving critical thinking ability using teaching game for understanding

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Abstract:

This study aims to determine the learning outcomes of junior high school students using TGfU learning model. The method used in this study was experimental research using a one group pretest-posttest design with 32 7th grade students (M: 15; F: 17). The learning process was evaluated using the Formative Evaluation Class (FCE) and critical thinking skills were measured using the critical thinking test instrument. The calculation results show that there is a significant difference in critical thinking skills before and after the application of the TGfU learning model [$t = 9.815$; $p = 0.000$ (<0.05)], with an increase of 16.14%. The students experienced an increase after the application of TGfU learning model, and there is a significant difference in critical thinking skills before and after the application of TGfU. TGfU were able to create a learning environment that includes systematic observation and critical thinking and will potentially help students to better understand and fully integrate their knowledge of different games and sports.

Key words: physical education, TGfU, Learning model

Introduction

Students have a variety of ways of learning according to the development and learning background of students, for this reason a learning model is needed according to the situation and conditions. This is supported by Silverman (2011) who stated that the teacher's design in the learning process is important for students to be able to master higher movements or skills and require a different amount of time and practice. Silverman & Mercier (2015) clarified that physical education (PE) teachers play an important role in designing instructions for the physical development and motor skills of students (Mesias, 2022). Regarding teacher competence and the PE learning process in providing material, it is necessary to choose the right learning model so that educational goals can be achieved. In addition, applying the right PE learning model will be able to attract students' attention in the learning process (Stănescu, 2013). Conceptually, PE's mission is comprehensive education, so that it is seen as not only related to efforts to develop physical abilities alone, but is broader than that, which includes intellectual, mental, social, and emotional dimensions. Rink & Hall (2008) stated that; (1) the learning experience must have the potential to improve students' motor skills; (2) the learning experience must provide maximum activity or time to practice to all students according to the level of ability of students; (3) the learning experience must be appropriate for the level of experience of all students; and (4) learning experiences must have the potential to integrate educational goals (skills, attitudes, and knowledge). Meanwhile, Lynch & Soukup (2016) added that PE is a key area of learning in the curriculum that focuses explicitly on developing movement skills and understanding knowledge, skills through physical activity with competence and confidence to encourage students' sustainable lives and in turn also cause health as the result.

A good learning model is a model that can link learning theory and learning to processes that are more specific to the material that will be given by the teacher to students (Raiola, 2017). Lots of new, interesting, and effective learning models have been developed and used by teachers, including direct instruction, personalized systems for instructional, cooperative learning, sport education, peer teaching, inquiry models, and tactical games (Kirk et al., 2006; Metzler, 2017). The drawback of the scientific learning model in its application in the learning process is that it still requires a deeper understanding of the teacher and the teacher's creativity so that the learning process goes well (Culajara, 2022). The understanding process of the students takes quite a long time because they need experiments before drawing conclusions (Bayu et al., 2013). The inquiry/discovery learning model demands a high understanding of students from the beginning of learning, because when their understanding is lacking it can make students frustrated or misunderstood (Pill & SueSee, 2017). The problem-based learning model requires a teacher's understanding of the problems posed to students and the assessment system is too many and complicated, so it takes quite a long time (Viscione et al., 2019). The project-based learning model requires students to work in teams and this also creates different tasks for each group so that it can cause students to worry about not being able to understand the topic or having difficulties when gathering

information (Snyder & Snyder, 2008). The application of the cooperative learning model still follows the situations and conditions of students, so it tends to be conventional (Kristiawan, 2013). The TGfU (Teaching Game for Understanding) learning model still uses a teacher-centered approach in teaching games (Hortigüela Alcalá & Hernando Garijo, 2017; Memmert et al., 2015).

The advantages of the scientific learning model are that students can develop an understanding of science by connecting knowledge and reasoning so that they can improve thinking skills (Thitima & Sumalee, 2012, p.372). This inquiry/discovery learning model allows students to find in-depth understanding or discover new things through various observations and experiments. This problem-based learning model can form independency, the ability to cooperate, to interact, and to solve problems through group work. The project learning model can increase learning motivation, problem solving. Learners are much more active and provide learning experiences in seeking information and demonstrating that their knowledge can then be implied in the real world. The TGfU learning model provides a framework through play so that in the learning process it is fun, improves physical condition, movement control, mental as well as personal and social life (Arias-Estero et al., 2020; Hortigüela Alcalá & Hernando Garijo, 2017; Moen & Standal, 2016; Viscione et al., 2019). This sport education model can form competent, understanding, and enthusiastic athletes (Arias-Estero et al., 2020; Burgueño & Medina-casaubón, 2020, 2020; Dyson et al., 2004). The main problems of this study can be described: 1) seeing the learning outcomes of junior high school students in Palembang is concerning because in general learning is done in schools using demonstration methods and hands-on practice, 2) conventional learning pays less attention to individual differences but this learning is dominantly used by teachers in schools, 3) learning tends to provide information to students, so students are less equipped with independence, solving problems, and information obtained by students is recorded in the form of knowledge, rarely in the form of tools for further exploration and learning.

Materials and methods

The method used in this study was experimental research using a one group pretest-posttest design with 32 7th grade students at Palembang State 1st Junior High School (M: 15; F: 17). The learning process was evaluated using the Formative Evaluation Class (FCE) (Suroto & Takahashi, 2005) and critical thinking skills were measured using the critical thinking test instrument developed by (Bayu et al., 2013). The data during the pretest and posttest will then be entered in the Microsoft Excel program to make data recording easier. Meanwhile, to simplify the calculation of research data, the IBM SPSS Statistics 25 was used.

Results

The summary of descriptive statistics from the results of students' critical thinking skills before and after the application of the TGfU learning model is presented in table 3. The data shows that there was an increase in students' critical thinking skills between pretest and posttest.

Table 1. Pretest and Posttest Results of Critical Thinking Skills

	<i>N</i>	<i>Mean</i>	<i>Std. Deviation</i>
<i>Pretest</i>	32	28.93	4.31
<i>Posttest</i>	32	33.6	4.34

In table 2, statistical differences for the pretest and posttest data were analyzed using paired samples t-test for the total score of students' critical thinking skills. The calculation results show that there is a significant difference in critical thinking skills before and after the application of the TGfU learning model [$t = 9.815$; $p = 0.000$ (<0.05)], with an increase of 16.14%.

Table 2. Paired Sample t-test

<i>Pre-Post</i>	<i>T</i>	<i>p-value</i>	Increased
Experiment	9.815	0.000	16.14%

Learning effectiveness was assessed during the learning process, in addition to content validity which is carried out before the learning process. The assessment was carried out in the form of FCE questionnaire which was filled by students shortly after the lesson. In general, according to the opinion of students in the first stage test, the effectiveness of the learning model was good.

Table 2. FCE Results

Components	1st Meeting	2nd Meeting	3rd Meeting	4th Meeting
Result	2,742	2,742	2,783	2,8
Will	2,95	2,95	2,95	2,95
Method	1,988	2,088	2,1	2,325
Teamwork	2,975	2,975	3	3
Average	2,66	2,69	2,71	2,77
Criteria	Good	Good	Good	Very Good

Discussion

The educational process determines learning outcomes; therefore, the educational process must be designed to be able to develop the learning outcomes required by students. The desired learning outcomes are learning outcomes that have long-term dimensions that can equip students for life and lifelong learning, namely

thinking skills, life skills, and psychomotor skills. It cannot be denied that the learning process is a very complex activity. However, this can be overcome in the form of a learning model. Azhar et al. (2020) explains that the practical use of a model is so that teachers can know the important elements in the learning process and can then control and predict changes that occur, especially in the behavior (learning outcomes) of their students.

What we need is an alternative that accommodates different learning abilities and focuses on the cognitive and social dimensions of play in addition to the physical dimension. Using a learning model based on a game conceptual perspective can provide this alternative (Pranata & Kurniawan, 2022). Instead of focusing the educational process around how to do it (practiced techniques), we can teach the whys (general concepts) and what ifs (skills and strategies for playing better). This paradigm shift makes us change the focus of teaching from justifying what is wrong in students' actions to encouraging students to respond with creativity resulting from the decisions they make.

TGfU was first developed by Bunker and Thorpe 1982 at Loughborough University in England, this model seeks to give students to enjoy their participation and feel motivated to play (doing motion tasks) and assessing the benefits of these motion tasks (Griffin et al., 2005). TGfU covers all aspects of learning theory to create interconnected situations, the focus is not only on psychomotor aspects, but also cognitive and social aspects of the movement tasks given by the teacher. Through TGfU students are also expected to make decisions and solve problems (cognitive learning theory) through actual situations (Kirk & MacPhail, 2002). The emergence of the TGfU was a reaction to concerns that children were in school with: (1) paying little attention to appearance, (2) gaining very little knowledge about the game, (3) partially achieving endurance, (4) relying too much on coaches and teachers, and (5) lack of development in understanding (because they only role as spectators) and administrative knowledge (Holt et al., 2002).

(Light, 2002) underlined that the effectiveness of TGfU is for cognitive learning. Higher order thinking occurs from questioning and discussion about tactics and strategies and "through the intelligent movements of the body during games". Cognitive development through decision making and tactical exploration can be combined with skill development by modifying play to provide meaningful atmosphere. Bayu et al. (2022) argues that it is difficult for PE teachers to demonstrate cognitive abilities on movement tasks. TGfU is a suitable learning model to implement this.

The key aspect of this model lies in the design of well-structured (conditioned) motion assignments in which students need to make decisions to gain their understanding of movement tasks. TGfU is a step-by-step procedural model for teachers so that students can become skilled. The steps are as follows:

Step 1 - game. Games are introduced and should be modified to suit more advanced forms of play and meet the developmental level of students.

Step 2 - game appreciation. Students are expected to understand the rules (conditions such as limits, scoring, etc.) of the game being played.

Step 3 - consideration of tactics. Students must be aware of game tactics (create or maintain) to help them play with the principles of the game, then increase their tactical considerations.

Step 4 - make the right decision. Learners must focus on the decision-making process in the game. Students are required to do what must be done (tactical considerations), and how to do it (selection of the right response and execution of skills) to help them make the right game decisions.

Step 5 - skill execution. In this step, the focus is on how to execute specific skills and moves. Knowing how to execute the act is different from performing in that the focus is limited to more specific skills and moves.

Step 6 - appearance. Finally, performance is based on certain criteria depending on the objectives of the game, lesson, or unit. In the end, these specific performance criteria lead to competent and proficient students.

TGfU is a learning model that develops ways of thinking to master new things or improve new skills. This new thing can be in the form of new tactics and or techniques. The TGfU carried out in the form of applying game understanding patterns to PE learning tends to be a tactical approach model. The tactical approach in learning is to increase students' awareness of the concept of play through the application of appropriate techniques according to the problem or situation in the actual game. (Mawer, 2012) emphasized that TGfU is suitable for application in PE learning to improve students' critical thinking skills. This is in accordance with the results of this study that show a significant difference in critical thinking skills before and after the application of the TGfU.

Thinking skill is one of the skills that must be possessed by students because of the learning process. Monroe (2007) argues that thinking is a conscious use of the brain to search for causes, consider, argue, estimate, and reflect on a subject. Furthermore Dupri et al. (2020) defines thinking as manipulating or managing and transforming information in memory, which is often done to form concepts, reason and think critically, make decisions, think creatively, and solve problems. This is in accordance with what was conveyed by Mawer (2014) who said that critical thinking is a skilled and active interpretation and evaluation of observation and communication, information, and argumentation. Florea & Hurjui (2015), argue that critical thinking is a way for someone to improve the quality of the results of thinking using systematization techniques for thinking and producing intellectual power in the ideas initiated.

The experience of critical thinking using movement (in PE) is a quick way to stimulate higher order thinking skills for students who are challenged to examine and make solutions to motion problems given by the

teacher (Blitzer, 1995; Cleland & Pearse, 1995; Johnson, 1997; McBride, 1991; Metzler, 2017; Mosston & Ashworth, 1990; Schwager & Labate, 1993). Learning model that focuses on higher order thinking skills can be applied in PE learning through games and sports, movement education, and outside the classroom education.

Conclusions

Overall, it can be concluded that the students experienced an increase after the application of TGfU learning model, and there is a significant difference in critical thinking skills before and after the application of TGfU. If teachers want to change and improve the performance of students, they must be given the opportunity to re-invest the thoughts and realizations they make through observation and critical thinking. Students should be given the opportunity to test the knowledge they have learned (from observation and critical thinking) in game situations. In constructing knowledge and knowing how to do things, students must have the same opportunity to experiment in action to truly integrate what they have learned. Through this process, teachers will create a learning environment that includes systematic observation and critical thinking and will potentially help students to better understand and fully integrate their knowledge of different games and sports. TGfU learning, with its attention to student-centered teaching values and results-based planning, is a learning model that will be able to help teachers, students, parents, and educational implementers in implementing holistic and transformational education for students through physical activity.

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