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The Influence of a Learning Model with Scientific Approach on Soccer Skills

ABSTRACT: Physical education teaching and learning should be holistic, accommodating the physical, spiritual, and social aspects. Education through physical activities is expected to provide students with real learning experience. The aim of this research is to analyze the influences of problem-based learning on soccer skills, which are expected to contribute positively to the meeting of the objectives of Curriculum 2013 in Indonesia. The research adopted experimental method with non-equivalent group pre-test post-test design. It was conducted at the SMPN (Public Junior High School) 2 Rangkasbitung, Lebak, Banten, Indonesia, with the sample consisted of 60 students, in which 30 students for the experimental and control groups, respectively. The research was carried out for seven weeks, with each week consisting of two meetings. GPAI (Game Performance Assessment Instrument) was used as the instrument to measure soccer skills. Data were analyzed with t-test, aided by SPSS (Statistical Package for Social Sciences) version 18. The findings of this research are: with problem-based learning model, students' soccer skills increased significantly, as reflected from their post-test scores which were greater than their pre-test scores; with direct instructional model, students' soccer skills increased significantly, as indicated by the increase in their post-test scores compared to their pre-test scores; and problem-based learning model influenced students' soccer skills more significantly than direct instructional model.

KEY WORD: Problem-Based Learning Model; Soccer Skills; Curriculum 2013; Direct Instructional Model; Scientific Approach.

RESUME: "Pengaruh Model Pembelajaran melalui Pendekatan Saintifik terhadap Keterampilan Bermain Sepakbola". Pengajaran dan pembelajaran pendidikan jasmani harus holistik, menampung aspek fisik, spiritual, dan sosial. Pendidikan melalui gerak fisik diharapkan dapat memberikan pengalaman belajar nyata kepada siswa. Tujuan kajian ini adalah untuk menganalisis pengaruh model pembelajaran berbasis masalah terhadap keterampilan bermain sepak bola, yang diharapkan memberikan manfaat positif terhadap pencapaian tujuan Kurikulum 2013 di Indonesia. Metode penelitian yang digunakan untuk mengungkapkan permasalahan tersebut adalah menggunakan metode eksperimen, dengan desain "non-equivalent groups pre-test post-test" atau kelompok tidak setara dengan pra dan pasca tes. Penelitian ini dilaksanakan di SMPN (Sekolah Menengah Pertama Negeri) 2 Rangkasbitung, Lebak, Banten, Indonesia, dengan mengambil sampel pada penelitian ini, yaitu 60 siswa yang terdiri dari 30 siswa pada kelompok eksperimen dan 30 siswa pada kelompok kontrol. Penelitian dilakukan selama 7 minggu, dengan 2 kali pertemuan setiap minggunya. Instrumen yang digunakan adalah GPAI (Game Performance Assessment Instrument atau Instrumen Penilaian Unjuk Permainan) untuk mengukur keterampilan bermain sepak bola. Teknik analisis data menggunakan uji-t, melalui SPSS (Statistical Package for Social Sciences) versi 18. Hasil penelitian menunjukkan bahwa terdapat peningkatan yang signifikan keterampilan bermain sepak bola dari skor pra-tes ke pasca-tes dengan menggunakan model pembelajaran berbasis masalah; terdapat peningkatan yang signifikan keterampilan bermain sepak bola dari skor pra-tes ke pasca-tes dengan menggunakan model pengajaran langsung; serta model pembelajaran berbasis masalah lebih baik bila dibandingkan dengan model pembelajaran langsung terhadap keterampilan bermain sepak bola.

KATA KUNCI: Model Pembelajaran Berbasis Masalah; Keterampilan Bermain Sepakbola; Kurikulum 2013; Model Pembelajaran Langsung; Pendekatan Saintifik.

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INTRODUCTION

There are many factors influencing the skills of playing soccer in the context of physical education, one of which is teacher. Therefore, a teacher should effectively play his or her role in the teaching and learning process. Teaching is the function of a teacher in a teaching and learning process. The term "function" is used to specifically encourage teachers to focus on the objectives of the behaviors they exhibit during teaching rather than on the teaching behaviors themselves (Magill, 2011). According to Darlyl Siedentop (1991), three major functions occupy most of the attention of physical educators as they teach: managing students, directing and instructing students, and monitoring/supervising students (Siedentop, 1991:37).

Another central factor is student. Student engagement in schools should be encouraged by teachers through learning activities, where they can collaborate with teachers, peers, and the environment; thereby creating a learning environment conducive for the acquisition of knowledge, understanding, skills, attitudes, and positive values that can increase students' learning outcomes (Mamun & Saputra, 2000; Trianto, 2007; and Balim, 2009). Student is defined as someone who specifically attends a certain teaching and learning process, either in a formal or non-formal institution, with the aim of creating a human being who is knowledgeable, well-informed, skilled, experienced, and who has good personality, moral, and autonomy (Desmita, 2009:350).

As regards to soccer skills, according to Sucipto *et al.* (2000) and Beltasar Tarigan (2001), as cited also in Nuryadi (2013), soccer tactics include scoring, ball mastery, attacking, creating space, and taking advantage of space in attacking, preventing scoring; defending space, goal, and snatching ball; restarting play; and making a free kick, angle kick, and a throw-in (Sucipto *et al.*, 2000; Tarigan, 2001; and Nuryadi, 2013:27).

To score in the opponent goal is only a temporary objective in the context of physical education, while the real objective is

to educate children in order to be intelligent, honest, skilled, and sociable. Hence, soccer in physical education is a mediator to educate children to develop their cognitive, affective, psychomotor, and social skills (Susan & Copel, 2001; Suherman, 2007; and Samodra, 2015).

In line with the above explanations, Clark Hetherington in 1910, as Father of Modern Physical Education, classified the objectives of physical education into four areas of development, namely: *Organic development*, such as fitness, health, strength, resilience, power, and agility; *Cognitive development*, which focuses on knowledge, such as understanding, freedom, independence, insight, and reality; *Psychomotor development*, namely skills, effective movements, competency, free expression, participation (in sport and gymnastic cultures), and creativity; and *Affective development*, such as character, appreciation, cheerfulness, and excitement (cited in Abduljabar, 2010:vii; and Hagos, 2013).

Physical education teaching and learning should be holistic, accommodating the physical, spiritual, and social aspects. Education through physical activities is expected to provide students with real learning experience. This is in accordance with Adang Suherman (2009)'s argument that the physical education learning experience acquired by students in schools is basically a process of instilling educational values through the physical and sport activities provided by teachers, which eventually will form good habits that will be practiced by students in their social lives for the rest of their lives (Suherman, 2009:3).

Physical education serves a role in developing the teaching and learning of health skills related to fitness, physical competence, and cognition to understand about the physical activities, which can make students gain an active and healthy lifestyle. To get the most benefits of physical education, students should learn physical skills and participate in learning experience with full excitement. This is reciprocal to what is expressed by D.A. Wuest & C.A. Bucher (1995), as follows:

[...] physical education is an educational process that has its aim in the improvement of human performance and enhancement of human development through the medium of physical activities selected to realize this outcome (Wuest & Bucher, 1995:6).

Teachers, as educators, should select teaching and learning strategies that are appropriate to certain situation, condition, and objectives of the teaching and learning, which are naturally different. In terms of the effectiveness of teaching, Adang Suherman (2009) explained that, in general, teaching effectiveness is marked by teachers always being active and students consistently learning actively (Suherman, 2009:55). In this regard, one of the potential integrated learning models is problem-based learning model.

According to Richard I. Arends (2007), PBL (Problem-Based Learning) means presenting students with various authentic and meaningful situations, which can serve as a stepping stone for investigation and inquiry (Arends, 2007:41). Different from other models, whose emphasis is on presenting ideas, in PBL, teachers present problematic situations to students and instruct them to investigate and find the solutions to the problems (*cf* Oon, 2003; Lausamsikan, 2010; Hung, 2011; and Budiana, 2014).

PBL, which references Curriculum 2013 in Indonesia, is one of the approaches regarded to be most suitable to constructivism (Abidin, 2014). This is in line with the explanation of Cindy E. Hmelo-Silver (2004), as follows:

[...] the goals of PBL are to help the students develop flexible knowledge, effective problem solving skills, self-directed learning, effective collaboration skills, and intrinsic motivation (Hmelo-Silver, 2004:235).

In the context of physical education, appropriate selection and use of certain learning models in a teaching and learning with the goal of promoting the mastery of soccer skills is a must for every teacher. Therefore, a more effective and efficient teaching and learning model should be developed in accordance with the demands

and characteristics of students in learning. Such an effective and efficient learning model is important because it relates to the characteristics of levels of movement complexities in soccer games (Gallahue, 1996; and Hubball & Butler, 2006).

In general, it is the case that teachers are the active subjects whose role is to provide information and knowledge, while students only passively receive whatever is fed by the teachers to their mind. As a result, communication only takes place one way, namely from the teacher to students. This phenomenon is attested to by Michael W. Metzler (2000), who observed that version of direct teaching is still used widely by physical educators (Metzler, 2000:162). The teaching approach explained above is called direct teaching. According to E.J. Rink (1993), as follows:

The teacher tells and demonstrates, and students try to do it the way they were told to do it. This type of instruction approaches the learning process rather directly. It is sometimes called direct instruction, and direct instruction can help people to learn motor skills (Rink, 1993:18).

Meanwhile, many researchers have actually showed that student-centered teaching results in better learning outcomes than the teacher-centered one. R. Arjunan & R. Jayachandran (2012), for instance, reported as follows:

For the retention of the acquired psychomotor skill under the guided discovery style, a child-centered teaching approach is superior when compared with command style teaching approach, a teacher-centered teaching approach (Arjunan & Jayachandran, 2012:32).

The implications of their research findings is that physical education teachers should make innovations in selecting the approach, strategies, or even model in teaching fundamental movement skills in soccer games and train the ability of problem-solving to students. In this context, Asep H. Solihin (2014) conducted research on problem-based learning and direct instruction, investigating both models'

influence on basketball skills. His research shows that both PBL (Problem-Based Learning) and direct instructional models significantly influenced the skills of playing basketball (Solihin, 2014).

In the context of the implementation of science-based Curriculum 2013 in Indonesia that calls upon and recommends the implementation of indirect teaching approaches, discovery learning, inquiry learning, and project-based learning, there is an implication that the recommended teaching approach is the one that is student-centered (Huda, 2014).¹ Thus, research testing the effectiveness of indirect teaching approaches is important. In this regard, the present research attempts to test the effectiveness of one of the indirect teaching approaches, namely problem-based learning, in improving the skills of playing soccer.

This research is expected to change the teaching paradigm of physical education teachers, who have previously tended to practice the teacher-centered approach, to employ student-centered approach which will provide comprehensive benefits for students, encompassing their cognitive, psychomotor, affective, and social domains.

Curriculum 2013 expects that teaching be conducted using scientific approach. The use of scientific approach is expected to make teaching and learning able to develop the whole domains of education and meaningful for students. Physical education teaching and learning should not merely focus on one domain, but also other domains (Buschner, 1994; and Santrock, 2011).

Bruce Joyce & Marsha Weil (1996) argued that scientific method can be taught and has positive effects on the acquisition of information, concepts, and attitudes (Joyce & Weil, 1996:42). If teachers do not make innovations in teaching, the process of teaching and learning will be meaningless and not effective in developing the learning domains (Mayer, 2004; and Morgan *et al.*, 2005). Consequently, students' learning

outcomes will not be achieved optimally.

Students' lack of understanding in applying tactics of playing soccer can be solved by appropriate innovations in teaching, which can develop the skills of playing soccer and improve the overall learning outcomes. Hence, the use of scientific learning model is expected to be the supporting factor to develop students' skills in playing soccer.

METHOD

The method used to find the effectiveness of problem-based learning on the skills of playing soccer is the experimental method (Fraenkel & Wallen, 2002; and Sugiyono, 2010). The population in this research consisted of 150 seventh grade students of SMPN (*Sekolah Menengah Pertama Negeri* or State Junior High School) 2 Rangkasbitung, Lebak, Banten, Indonesia. Practically, the reason for selecting this population of 150 seventh graders was due to accessibility.

According to Ali Maksum (2012), accessible population is the population whose limits or numbers of units are recognizable and real. He added that in the process, sample is taken from real population. Therefore, the validity of the inference is only applicable to the real population (Maksum, 2012:257).

SMPN 2 Rangkasbitung was selected as the research population, because this school was one of the schools appointed to implement Curriculum 2013 in the academic year of 2014/2015; hence, it is appropriate for the school to be the population in this research.

The technique of sampling employed was cluster random sampling. Based on sample drawing, two classes were selected. Class VII A, consisting of 30 students, was selected for the experimental group; and class VII B also comprising 30 students for the control group. Hence, in total there were 60 seventh grade students as the sample. The experimental group was treated with Problem-Based Learning, while the control group with direct instructional model (*cf* Baumgartner & Jackson, 1995; Crane, 2009; and Pebriyenni & Nora, 2013).

¹But, concerning on Curriculum 2013 in Indonesia and its problem in implementation, see also <http://edukasi.kompasiana.com/2014/12/05/akhirnya-anis-bawesdan-hentikan-pelaksanaan-kurikulum-2013-708712.html> [accessed in Bandung, Indonesia: August 8, 2016].

Table 1:
Normality Test for PBL Pre-Test and Post-Test Scores of Soccer Skills

<i>One-Sample Kolmogorov-Smirnov Test:</i>		Pre-Test	Post-Test
N		30	30
Normal Parameters ^{a, b}	Mean	7.4187	9.3697
	Std. Deviation	2.69227	2.85824
Most Extreme Differences	Absolute	.142	.124
	Positive	.142	.124
	Negative	-.114	-.092
Kolmogorov-Smirnov Z		.778	.679
Asymp. Sig. (2-tailed)		.581	.746
a. Test distribution is Normal.			
b. Calculated from data.			

Table 2:
Normality Test for Direct Instruction Pre-Test and Post-Test Scores of Soccer Skills

<i>One-Sample Kolmogorov-Smirnov Test:</i>		Pre-Test	Post-Test
N		30	30
Normal Parameters ^{a, b}	Mean	6.6667	7.9273
	Std. Deviation	2.26589	2.61387
Most Extreme Differences	Absolute	.170	.198
	Positive	.170	.198
	Negative	-.120	-.131
Kolmogorov-Smirnov Z		.931	1.086
Asymp. Sig. (2-tailed)		.351	.189
a. Test distribution is Normal.			
b. Calculated from data.			

Design and Procedures. As mentioned above, this research adopted experimental method. More specifically, it used the Non-Equivalent Group Pre-Test and Post-Test design, thereby making this design categorized as a quasi-experimental design according to some researchers (Reinhart & Rallis, 1994; Gribbons & Herman, 1997; Fraenkel & Wallen, 2002; and Sugiyono, 2010).

Instruments. The assessment of students' playing skills truly requires accuracy during the games. Oslin *et al.* (1998) have created an assessment instrument called GPAI (Game Performance Assessment Instrument), which is very appropriate for the purpose of this research (Oslin *et al.*, 1998).

RESULTS AND DISCUSSION

The following steps were taken in processing and analyzing research data:

Prerequisite Test. Based on the results of analysis, it is found that data for PBL (Problem-Based Learning) and Direct Instruction groups are normally distributed and homogeneous. The distribution is displayed in the table 1.

It is found that the significance values for the pretest and posttest data are 0.778 and 0.679, respectively. Because the values are greater than 0.05, it is inferred that pre-test and post-test data are normally distributed. See table 2.

It can be clearly seen that the significance values for pre-test and post-test data are 0.931 and 1.086, respectively. Since the values are greater than 0.05, it can be concluded that the pre-test and post-test data for direct instruction are normally distributed. See table 3.

From the output data, it is clear that the significance value is > 0.05 ($0.292 > 0.05$).

Table 3:
Test of Homogeneity of Variances

Pretest Scores:

Levene Statistic	df1	df2	Sig.
1.131	1	58	.292

Table 4:
Test of Homogeneity of Variances

Post-Test Scores:

Levene Statistic	df1	df2	Sig.
.444	1	58	.508

Table 5:
Manual t-Test

	t	t Critical	Significance (< 0.05)	Note
Paired <i>t</i> -test for PBL sample	17.136	> 2.045	0.000 < 0.05	There is an increase
Paired <i>t</i> -test for Direct Instruction sample	9.865	> 2.045	0.000 < 0.05	There is an increase
Difference test for PBL and Direct Instruction	4.033	> 2.002	0.000 < 0.05	There is a difference

Hence, it can be concluded that the variances for both groups, namely for the pre-tests of problem-based learning and direct instruction, are similar. The variances have met the basic assumption of homogeneity; therefore, the prerequisite for analysis data using parametric statistic is met. See table 4.

As displayed in table 4, the significance value is > 0.05 ($0.508 > 0.05$). So, it can be concluded that the variances for the post-tests of both groups, the problem-based learning and direct instruction, are the same. Similarity in variances means that both groups have fulfilled the basic assumption of homogeneity. As a result, the prerequisite for parametric statistic has been met.

Hypothesis Test. Based on the analysis, the following values are obtained, as shown in table 5.

Based on the table 5, it is found that:

Firstly, $t > t_{\text{critical}}$ ($17.136 > 2.045$) and at the level of significance of < 0.05 ($0.000 < 0.05$), so H_0 is rejected, which means that there was a significant increase in the skills of playing soccer using problem-based learning as shown by an increase in the post-test scores compared to the pre-test scores.

Secondly, $t > t_{\text{critical}}$ ($9.865 > 2.045$) and the

significance value is < 0.05 ($0.000 < 0.05$), so H_0 is rejected. This entails that there was a significant increase in the skills of playing soccer using direct instructional model, as proven by an increase in the post-test scores compared to the pre-test scores.

Thirdly, in the difference test for the experimental and control groups, it is found that $t > t_{\text{critical}}$ ($4.033 > 2.002$) and the significance value < 0.05 ($0.000 < 0.05$), which means H_0 is rejected. Hence, it can be concluded that problem-based learning model has more significant influence on the skills of playing soccer than the direct instructional model.

Discussion. There was a significant increase in students' skills of playing soccer with problem-based learning model as shown by the post-test scores, which were greater than the pre-test scores. The hypothesis test shows that there was an increase in the skills of playing soccer using problem-based learning model, as proven by the post-test scores that were greater than the pre-test scores.

The teaching and learning of physical education in schools is a combination of the cognitive, affective, and psychomotor

functions. According to the contemporary motor skills, especially Scheme Theory by R.A. Schmidt & C.A. Wrisberg (2000), physical education clearly supports the interaction of cognitive and *neoromucular* processes as being necessary for the efficient execution of motor performance (Schmidt & Wrisberg, 2000).

Soccer game is a kind of game with a balance proportion between movement skills and cognitive skills. Soccer requires a greater proportion of cognitive skills because in order to score, one has to make an appropriate decision in passing the ball and playing it, so that eventually she/he can shoot the ball to the goal accurately. The quality of the decision making also depends on the repertoire of experiences, skills, accuracy, and awareness of the situation.

Michael W. Metzler (2000) explains that the games, like learning activities, teach student to recognize when and how to apply tactical knowledge (Metzler, 2000:342). Including in the activities are paying attention to relevant actions (selection attention), anticipating responses by opponents, and choosing appropriate skills.

There was a significant increase in students' skills of playing soccer with direct instructional model as shown by the post-test scores, which were greater than the pre-test scores. According to Roy Killen (2006), as cited also in T. Juliantine, T. Subroto & Y. Yudiana (2013), direct instruction refers to the various expository instructional techniques (direct transfer of knowledge from the teacher to students, such as through lecture, demonstration, and question-answer) that involve the whole class (Killen, 2006; and Juliantine, Subroto & Yudiana, 2013:41).

Thus, it can be concluded that direct instructional model is a teaching and learning model that is teacher-centered, where teacher serves as a source of knowledge and the process of knowledge transfer is done directly through lecture, demonstration, and question-answer session dominated by the teacher. Teachers of direct instructional model are commonly called traditional teachers, because in the context

of physical education in particular, such teachers usually teach in schools in such "traditional" ways (Bicknell-Holmes & Hoffman, 2000).

Problem-based learning model has more significant influence on the skills of playing soccer than direct instructional model. Problem-based learning model provides many benefits to students as explained by J.S. Bruner (1966), and also cited in R.W. Dahar (2011), who argued that discovery learning suits human active search for knowledge and by itself provides better learning outcomes. The attempt of searching for solutions to problems that humans do by themselves and the accompanying knowledge will result in truly meaningful knowledge (Bruner, 1966; and Dahar, 2011:79).

The knowledge obtained through discovery learning has some merits. *First*, the knowledge can last long or memorized for a long time. *Second*, the outcomes of discovery learning have better transfer effects than those of other learning models. *Third*, as a whole, discovery learning increases students' reasoning and the ability to think freely. In this context, J.S. Bruner (1966), and also cited in R.W. Dahar (2011), further asserts that:

If we teach science, for instance, we are not going to create a small life library about science; instead, we want to make our children think systematically for themselves, participate in the process of acquiring knowledge. Knowing is a process, not a product (Bruner, 1966; and Dahar, 2011:83).

CONCLUSION

Based on the results of data processing, analysis, and discussion in the previous sections, the following conclusions are taken:

There was a significant increase in the students' skills of playing soccer as a result of problem-based learning model as shown by an increase in their post-test scores compared to the pre-test scores.

There was a significant increase in students' post-test scores when compared to the pre-test scores for the skills of playing

soccer using direct instructional model.

Problem-based learning model has more significant influence on the skills of playing soccer than the direct instructional model.²

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²Statement: We, hereby, declare that this paper is not product of plagiarism, not to be submitted, reviewed as well as published by other scholarly journals; and if our paper has been received, we will not also withdrawal from the SOSIOHUMANIKA journal.

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Students of Junior High School and Soccer Games in Indonesia
(Source: <http://www.goal.com>, 8/8/2016).

In the context of physical education, appropriate selection and use of certain learning models in a teaching and learning with the goal of promoting the mastery of soccer skills is a must for every teacher. Therefore, a more effective and efficient teaching and learning model should be developed in accordance with the demands and characteristics of students in learning. Such an effective and efficient learning model is important because it relates to the characteristics of levels of movement complexities in soccer games.