Analysis of Implementation of Learning Models through Peer Teaching in the 21st Century on Prospective PE Teachers in Indonesia

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When experts and practitioners try to develop learning models to improve physical activity of students in PJOK (Health, Sport and Physical Education), the Indonesian government through an updated curriculum provides six learning models that are deemed to be in accordance with 21st-century demands. PETE as a place of study for teacher training and teaching needs to test the functioning of the learning models in PJOK learning. This article seeks to describe the results of testing the six learning models through peer-teaching by prospective teacher students in terms of GPA, teaching skills, and the allocation of student time. A total of 149 students were divided into six groups to implement the six learning models recommended by the government, measured by students' motor engaged time (MET), teacher teaching skills (TS), and GPA. ANCOVA is used to find out the variables that can affect MET. The results showed that the MET ranged from 8.3% to 56.7% of the allocation of learning time, with the lowest MET occurring in the project-based learning model and the highest MET in the cooperative learning model. Meanwhile, the TS ranged from 43.2 to 94.6%, with the lowest score occurring in the project-based learning model and the highest score in the inquiry/discovery learning model. ANCOVA points out that learning models and GPA do not affect the MET, that TS affects MET, and that high TS is followed by MET. It is concluded that the government-recommended model could be implemented for PE and to improve the MET, PJOK teachers need to improve and keep TS high.

Keywords: *Peer-teaching, Learning models, TS, GPA, MET.*

Introduction

Understanding the meaning of the learning model in the teaching and learning process means measuring the learning process in accordance with the setting of the learning environment to the activities of the teacher in teaching students. The selection of learning models to be applied in PE learning needs to pay attention to at least two things, specifically the adequacy of the student movement and the construction of positive values in sports (Suroto et al., 2007). Following its characteristics, PE learning actually has a learning model that is commonly used to improve learning outcomes, physical activity, and the formation of positive student attitudes. Learning models commonly used in PJOK learning are Direct Instruction (DI), Personalised Systems for Instruction (PSI), Cooperative Learning (CL), Sport Education (SE), Peer Teaching, Inquiry Teaching, Tactical Games (TG) (Metzler, 2000), and Personal and Social Responsibility Teaching (TPSR) (Metzler, 2011).

In Tennessee, a state in the United States of America, a survey was conducted on teacher knowledge and the use of the learning model in PE teaching (Todd et al., 2016). The results showed that the teachers knew best the Direct Instruction, Personal Teaching and Social Responsibility, and Cooperative Learning models. The learning model that most teachers were not familiar with was the Personalised System of Instruction. The learning model most often used by teachers in teaching PE was DI, and the least used was PSI. The use of the DI model by teachers reached 78% of the amount of time they taught as PE teachers.

The learning models that are commonly used in teaching PJOK have their own specialty in providing positive changes to students as evidenced by research. Sport Education, Tactical Games, and Cooperative Learning are student-centred learning included in the active learning models and are considered as three learning models that have an impact on improving social, physical, and knowledge attitudes (B. Dyson et al., 2004). According to its specificity, the Sport Education Model is proven to have an impact on student motivation which can further increase student participation in learning activities and student decision making a habit in the learning process (Perlman, 2010; Perlman & Karp, 2010; Wallhead & Ntoumanis, 2004). Tactical Games has proven to be effective in increasing tactical awareness (Metzler, 2000) and student participation in practising their skills which can further stimulate them to reach the limits of adequate physical activity recommendations (Song et al., 2010). Cooperative Learning can develop prosocial attitudes in preschool children; social skills in grade 3; motor skills, responsibility, and teamwork in grades 5 and 6; motor skills, accountability, and interpersonal skills in grades 8-11; and developing responsibility and learning skills from others at the college level (B. P. Dyson, 1997). Specifically, to teach students in developing an attitude of responsibility, the TPSR model becomes the most effective learning model used in managing PE classes (Escartí et al., 2010; Walsh, 2007).

However, although the results of the study show that various learning models can have a positive impact on students, teacher quality remains a major factor in determining success in learning (Pembelajaran, 2010). PETE is the main hope for providing great PJOK teachers who are able to follow the development of education and the demands of the national curriculum applied in schools. The most effective way is to place college students in schools to learn to interact with real classes (Barney & Pleban, 2006). They will be able to hone their competencies as teachers in understanding curriculum for schools, planning learning, getting to know the school environment, and interacting with students through collaboration with teachers. This activity is expected to be able to provide new knowledge to college students about the real condition of schools and the problem of curriculum development that applies in schools.

Since 2013, the Indonesian government continues to try to update the education curriculum to be relevant to the demands of the 21st century. At the standard level of the process, in 2013 there was a great deal of talk about active learning processes that required the scientific learning process to include student activities in the form of observing, asking, try, analysing/making conclusions, and communicating (Suroto & Khory, 2015). In 2016, the Indonesian government took the initiative to provide advice to teachers to implement seven learning models, namely: Cooperative (TGT, STAD, and Jigsaw), Problem Based Learning (PBL), Project-Based Learning (PjBL), Scientific, Inquiry/Discovery, Text-Based Instruction, and Eclectic (Ministry of National Education of the Republic of Indonesia, 2016). This suggestion was realised through a guidebook in which the definitions, principles, specificities, syntax, and examples of lesson plans for the application of these models were explained. However, the guidebook provided is still general in nature so that every teacher is required to study the guidebook until they can operationally apply it in the subject matter they teach.

In fact, whichever learning model is applied in PJOK learning, the adequacy of student physical activity becomes the most important issue to consider. The low number of school-age community involvement in physical activity (Setyorini et al., 2017) is sufficient reason for PJOK to be considered a failure in acting as a vehicle for promoting active lifestyles among students (Sallis et al., 1997). Therefore it is not excessive if the amount of allocation of student active moving time in PJOK learning can be used as an indicator of the success of PJOK learning (Suroto, 2017).

Even though the government has gone through a rigorous review process in offering instructional models, empirical evidence has never been found that the reliability of these learning models can make it easy for teachers to be able to make students actively move. For this reason, PETE needs to conduct research to test the reliability of learning models applied in PJOK learning.

Method

Participants

A total of 149 college students (105 male and 44 female) in the third year participated in a peer-teaching program. They were divided into four groups: group 1, n = 32 students (18 male and 14 female); group 2, n = 42 students (32 male and 10 female); group 3, n = 39 students (28 male and 11 female); and group 4, n = 36 students (27 male and 9 female).

Procedure

The six learning models tested in this study were: Cooperative (TGT, STAD, and Jigsaw), Problem Based Learning (PBL), Project-Based Learning (PjBL), Scientific, Inquiry/Discovery, and Eclectic (Text Based Instruction was not tested because this model was clearly dedicated to language learning) (Ministry of National Education of the Republic of Indonesia, 2016). The peer-teaching program was carried out in three stages: (1) building knowledge about active learning; (2) group formation; (3) lesson plan workshop; and (4) implementing peer-teaching.

In phase 1, teacher candidates got an explanation of effective PE learning, starting from the preparation of learning, the implementation of learning, and what to be done after learning. In addition, teacher candidates got an explanation about class management and mastery of teaching skills.

In phase 2, 149 teacher candidates were divided into eight groups, each group consisted of 16-21 members. Each teacher candidate got one learning model and teaching material to be applied in PE learning through peer-teaching. There were four roles that were determined in the division of groups: as teachers, as students, as observers who assess the teaching skills, as observers who assess MET, as a cameraman, and further preparation to become a teacher. The division of tasks is illustrated in the form of a matrix (see Table 1).

Table 1: Task Distribution Matrix in Peer-Teaching Implementation

No.	Prospective PE Code	Peer-1			Peer-2			Peer-3			Peer-4			Peer-5			Peer-6
		S1	S2	S3	S1	S2	S3	S1	S2	S3	S1	S2	S3	S1	S2	S3	S1
1	15-aa-001	M1	S	S	S	S	S	S	S	S	S	S	S	S	Ob2	Cm	PG
2	15-aa-002	P	M2	S	S	S	S	S	S	S	S	S	S	S	S	Ob1	Cm
3	15-aa-003	Cm	P	M3	S	S	S	S	S	S	S	S	S	S	S	Ob2	Ob1

4	15-aa-004	Ob1	Cm	P	M4	S	S	S	S	S	S	S	S	S	S	S	Ob2
5	15-aa-005	Ob2	Ob1	Cm	P	M5	S	S	S	S	S	S	S	S	S	S	S
6	15-aa-006	S	Ob2	Ob1	Cm	P	M6	S	S	S	S	S	S	S	S	S	S
7	15-aa-007	S	S	Ob2	Ob1	Cm	P	M1	S	S	S	S	S	S	S	S	S
8	15-aa-008	S	S	S	Ob2	Ob1	Cm	P	M2	S	S	S	S	S	S	S	S
9	15-aa-009	S	S	S	S	Ob2	Ob1	Cm	P	M3	S	S	S	S	S	S	S
10	15-aa-010	S	S	S	S	S	Ob2	Ob1	Cm	P	M4	S	S	S	S	S	S
11	15-aa-011	S	S	S	S	S	S	Ob2	Ob1	Cm	P	M5	S	S	S	S	S
12	15-aa-012	S	S	S	S	S	S	S	Ob2	Ob1	Cm	P	M6	S	S	S	S
13	15-aa-013	S	S	S	S	S	S	S	S	Ob2	Ob1	Cm	P	M1	S	S	S
14	15-aa-014	S	S	S	S	S	S	S	S	S	Ob2	Ob1	Cm	P	M2	S	S
15	15-aa-015	S	S	S	S	S	S	S	S	S	S	Ob2	Ob1	Cm	P	M3	S
16	15-aa-016	S	S	S	S	S	S	S	S	S	S	S	Ob2	Ob1	Cm	P	M1

M1,2,3, 4,5,6	Students as Teachers taught with models according to the model code (M1 = Cooperative (TGT, STAD, and Jigsaw), M2 = Problem Based Learning (PBL), M3 = Project Based Learning (PjBL), M4 = Scientific, M5 = Inquiry/Discovery, and M6 = Eclectic)
P	Students prepared themselves to become teachers
Cm	Students became learning recorders
Ob1,2	Students acted as observers (Ob1 = assess TS and Ob2 = assess MET)
S	Students as school students
S1,2,3	Peer-teaching sessions at each meeting

In phase 3, teacher candidates were guided to make lesson plans according to the learning model obtained through the draw. Three lecturers guided the teacher candidates in four sessions, and in each session mentoring was conducted to two peer-teaching groups.

In phase 4, the implementation of peer-teaching was carried out by involving two groups at each meeting; three lecturers assisted and assessed the program implementation process. Each meeting consisted of 3 model implementation sessions; each session lasted for 50 minutes (10 minutes for preparation, 30 minutes for application of the model, and 10 minutes for lecturer evaluation). To start the learning process, the lecturer sounded a start sign and at the same time turned on the stopwatch to measure the 30-minute time allocation. When the time was up, the lecturer resounded the signal to announce that the 30 minutes had expired.

Instrument

Measurements made during the peer-teaching process aimed to assess two things: Motor Engaged Time (MET) and Teaching Skills (TS). Both of these measurements were carried out through observation.

The MET was measured using a stopwatch by two people (one student and one lecturer), each observing one male student and the other female student. Each subject of observation made the motion involved in learning and the stopwatch as turned on. Conversely, if the subject did not move or was not involved in the learning process, the stopwatch was stopped. This rule lasted until the learning was completed or a 30 minute time mark for the learning allocation rang. The results of recording time by lecturers and students were averaged to determine the MET in the learning process being assessed.

TS measurement was carried out based on indicators of teacher teaching skills formulated by Suroto and Khory that includes of 12 elements: (1) Preparing Learning; (2) Opening Learning; (3) Managing Learning Time and Arena; (4) Managing Heating and Cooling; (5) Positioning Yourself; (6) Making Orders; (7) Monitoring Orders; (8) Giving Feedback; (9) Recording Student Learning Progress; (10) Asking/Reflecting/Exploring Student Learning Experiences; (11) Closing Learning; and (12) Evaluating Yourself (Suroto & Khory, 2015). Based on student learning needs, four of the 12 teaching skills (TS-7, 9, 10, and 12) were not assessed, although in the peer-teaching process, the four TS were taught.

Data Analysis

Data analysis was performed using three types of statistics: descriptive statistics, ANOVA, and ANCOVA.

Results

The results of the study were explained using descriptive statistics and ANOVA test on the value of teaching skills (TS), motor engaged time (MET), and grade point average (GPA)

which were distinguished based on the learning model recommended by the government. The results of the study can be seen in Table 2.

Table 2: Data on Teaching Skills, Motor Engaged Time, and Grade Point Average in Peer-Teaching Participants

Variables	Teaching Model	N	Mean	Std. Deviation	Mini-mum	Maxi-mum	F	Sig.
Teaching Skills/ TS (%)	Cooperative	32	73.3	9.281	45.9	89.2	0.472	0.796
	PBL	28	71.1	11.318	45.9	91.9		
	PjBL	26	72.7	13.140	43.2	89.2		
	Scientific	20	73.8	12.525	48.6	91.9		
	Inquiry/ Discovery	21	72.9	15.232	43.2	94.6		
	Eclectic	22	76.1	8.869	54.1	89.2		
	Total	149	73.2	11.637	43.2	94.6		
Motor Engaged Time/ MET (%)	Cooperative	32	25.4	9.790	11.7	56.7	0.283	0.922
	PBL	28	26.4	8.186	11.7	41.7		
	PjBL	26	24.3	8.769	8.3	41.7		
	Scientific	20	26.3	9.779	11.7	48.3		
	Inquiry/ Discovery	21	24.0	7.701	15	50		
	Eclectic	22	25.8	9.889	13.3	51.7		
	Total	149	25.4	8.958	8.3	56.7		
Grade Point Average/ GPA	Cooperative	32	3.4	0.119	3.07	3.63	0.099	0.992
	PBL	28	3.4	0.141	3.11	3.72		
	PjBL	26	3.4	0.163	3.07	3.71		
	Scientific	20	3.4	0.180	2.88	3.66		
	Inquiry/ Discovery	21	3.4	0.146	3.06	3.65		
	Eclectic	22	3.4	0.168	3.12	3.68		
	Total	149	3.4	0.149	2.88	3.72		

Note: CooperativeLlearning consists of three types: Team Game Tournament, Student Achievement Division Team, and Jigsaw.

Based on Table 2 above, it can be explained that when applying the government-recommended learning models, the average TS of students when acting as teachers is 73.2%. TS scores were in the range of 43.2% -94.6% or 'enough' to 'very good' categories. ANOVA test shows that there is no difference in the TS scores of students when implementing peer-teaching based on the government's recommended learning model. This means that in terms of TS, peer-teaching groups between learning models are considered equivalent.

The average MET score achieved when implementing the government's recommended learning model is 25.4%. Students' MET scores when acting as school students during peer teaching ranged from 8.3% to 56.7% of the allocation of learning time that had to be used. Based on the maximum score achieved, the learning models that reached the category of 'active dominant' in the learning process were cooperative (56.7%) and eclectic (51.7%). Meanwhile, three other learning models were in the 'passive dominant' category; they were PBL, PjBL, and scientific. One other learning model, namely inquiry/discovery learning, stood at 50%. ANOVA test shows that the MET in the application of the government's recommended learning model was stated the same.

Students average GPA score when starting to take part in a peer-teaching program was 3.4. The range of minimum and maximum GPA for students as 2.88-3.72. ANOVA test shows that there was no difference in students' GPAs when implementing peer-teaching based on the government's recommended learning model. This means that peer-teaching groups between learning models were considered equivalent in terms of the GPA score.

Discussion

Testing of 6 models of government recommended learning was done to determine the suitability of the model applied to PJOK learning. Testing was done by measuring students' level of MET during PJOK learning. The Peer-teaching model was chosen to simultaneously provide knowledge and training to prospective PJOK teachers following the latest curriculum developments in Indonesia. Based on the results of the study, the following aspects were discussed: (1) peer-teaching group equality; (2) the allocation of the student movement in PJOK learning; and (3) the effect of teaching skills on MET.

Peer-Teaching Group Equality

Peer-teaching group was reviewed based on the quality of students in using GPA and the degree of teaching skills they mastered. These two variables need to be taken into account in determining peer-teaching group equality because it is predicted to have a contribution in determining the quality of learning to be implemented.
GPA is proven to be positively correlated with pedagogic and professional competencies. Higher GPA means higher pedagogical and professional competency owned by the students (Suroto et al., 2017). The closest teacher competence to the implementation of the learning process is pedagogical and professional competence, while mastery of teaching skills is teachers' ability to prepare for learning, manage the learning process, and develop themselves through reflection and self-evaluation. Teachers' teaching skills demonstrate their capability in creating quality learning (Şen, 2010).

Based on the results of the study, the peer-teaching groups formed have equality in terms of GPA and teaching skills. This condition is believed to have a positive impact on the peer-teaching process. With an equal group composition, collaboration and interaction between group members are expected to occur well. There are mutual need and complementary knowledge and skills between members of the groups.

Allocation of Student Movement in PJOK Learning

There is no choice for PJOK teachers, whose task is to promote active lifestyles, other than providing learning that is dominated by movement activities throughout the allocation of learning time, although there has never been empirical evidence that PJOK learning is able to provide the needs of the student movement. The SPARK program seeks to prove that PJOK can be managed to meet the needs of students' movements so that it impacts on their physical fitness. The results of the study showed that the implementation of SPARK only had a significant impact on female students on two of the five fitness measurements, namely Mile run and Sits-up (Sallis et al., 1997). That is, a model that is truly dedicated to increasing physical activity is still not enough to comprehensively improve physical fitness for both male and female students.

Based on the results of that study, the program or learning model does not seem important in determining the success of teachers in making high student involvement in physical activity during learning. The implementation of SPARK showed that the involvement of control group students in student activities is only 12% of the time allocation each week, whereas in the experimental group it ranges from 22-27% of the time allocation every week (Sallis et al., 1997). Meanwhile, a review of the results of research by Siedentop, Mand, and Taggert (1986) shows that students only get 21-30% of the time allocation for each learning (Hickson, 2005).

The results showed that the average MET was 25.4%, with a range of 8.3-56.7% of the allocation of learning time. When compared with the results of international research, this number proves that six models of government-recommended learning can be applied in PJOK learning.

The Effect of Teaching Skills on MET

The next discussion is to prove that six learning models, GPA, and teaching skills can affect MET. The results of the covariate analysis showed that all variables had an impact on the MET. However, teaching skills become the variable which had an impact on a student's MET.

Table 3: Effects of Teaching Skills, GPA, and Implementation of six Learning Models Recommended by the Indonesian Government on MET in PE Learning

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	554.387	7	79.20	0.986	0.444
Intercept	47.409	1	47.41	0.590	0.444
Teaching Skills	326.061	1	326.06	4.061	0.046
GPA	0.283	1	0.28	0.004	0.953
Learning Model	123.051	5	24.61	0.307	0.908
Error	11320.945	141	80.29		
Total	107841.680	149			
Corrected Total	11875.331	148			

The table above shows that the quality of the management of the learning process is crucial to consider to ensure student involvement in physical activity. Teachers' teaching skills are believed to provide many learning activities.

Conclusion

Based on the results of this study, it can be concluded that the average value of the MET on the application of six government-recommended learning models is in the range of numbers that are common in international PJOK learning. During the application of 6 government-recommended learning models, the MET ranged from 8.3% - 56.7% of the allocation of learning time, with the lowest MET occurring in the project-based learning model and the highest occurring in the cooperative learning model. Meanwhile, TS ranged from 43.2 to 94.6%, with the lowest occurring in the project-based learning model and the highest in the inquiry/discovery learning model. ANCOVA shows that learning models and GPA are stated not to affect the MET, whereas TS affects the MET, and TS score is followed by MET. For this reason, the six government-recommended learning models can be implemented for PE. To improve the MET, PJOK teachers need to improve and maintain their TS.

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