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The influence of cooperative learning model, peer teaching and learning motivation on learning outcomes in P.E subject on health topic

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Abstract
This study's main goal is to investigate: (1) The difference in the effect between the cooperative based learning model type jigsaw and peer teaching on its learning result of P.E on the health topic. (2) The gap between the influence of high learning motivation and low learning motivation on its outcome. (3) The interaction pattern amongst the jigsaw type cooperative learning model, peer teaching, and also the learning motivation on the P.E learning result for students' health topic.
This experimental study make use of 2 x 2 factorial design. Students of grade 11 majoring in AKL which is part of State SMK 1 Depok, three classes were listed as its population consisting of 108 total students. Random sampling technique is applied for data collecting. The samples in this study were class XI AKL1 and class XI AKL 3 consisting of 36 students each. The number of samples is 72 students in the motivation test. Two-way ANOVA is utilized for further analyzing the data.
The results showed that: (1) there was a visible difference regarding the effect of the jigsaw cooperative learning model and peer teaching on the learning outcomes of P.E on health topic. A p significance value of 0.005 is obtained. The peer teaching learning model group got higher value (good) compared to that on the jigsaw learning model. (2) A significant difference was recognized in the effect between students who possess high learning motivation and low learning motivation on the learning outcomes of P.E on health topics, this is proved by the significance of p of 0.004. Compared to students who have low learning motivation, Students who possess high learning motivation are higher (good). (3) Significant interaction is recognized between the jigsaw type cooperative learning method and peer teaching with learning motivation in influencing their learning result in P.E subject on health topic with a p significance of 0.000.

Keywords: Jigsaw learning model, peer teaching, learning motivation, P.E learning outcomes on health topic

Introduction
Learning can be seen a process which change personality of an individual and these changes are visible through some indicators such as the improvement of behavior, both qualitatively or quantitatively. For instance, a person improve his/her skills, knowledge, attitudes, habits, understanding, skills, thinking power, and other abilities in certain discipline. So learning activities is a necessity to find experiences as it can improve student behavior.
An educator's understanding of the purpose of learning will influence significantly how the teacher teach. Indirectly speaking, the teacher's quality in teaching affects the learning process carried out. Learning can shape the character of students during their time spent in the class. Whether the effort to achieving educational goals can be successul or failed itr relies heavily on how the learning process run in an effective situation.
The learning system has completely changed as a result of lifestyle habits after the onset of COVID-19. The joint decision of the four ministers on guidelines which regulate education institutions to carry out their learning during the COVID-19 pandemic. The content emphasizes that education units provide limited face-to-face learning service options (PTMT) without neglecting health protocols and permission from parents/guardians, as well as setting minimum distance learning (PJJ).

Physical Education, Sports and Health (P.E) is an aspect of the overall educational process that is concerned with the development and use of voluntary and useful individual motor skills and Is directly related to mental, emotional, and social responses.

P.E itself, as its nature as educational process, utilizes physical activity and health as a medium to produce holistic changes in the overall development of the individual.

Physical education teachers in schools where the pandemic was studied reported implementing hybrid models of instruction that combined in-person meetings with online resources. According to these results, a) most online students don't actively participate in class and just listen, and b) most in-person students don't seem motivated to learn, as shown by the fact that only two students use the Q&A time after the teacher has finished explaining and given some students the chance to ask questions in each lesson, only the inquisitive would have asked When (c) more than half of the class is unable to complete an independent task and (d) the assignment is not collected on time according to the Minimum Completeness Criteria (KKM) set by the teacher, For the previous learning process, only 15 out of 36 students (or 42%) achieved a score above the KKM. e) other issues that may make it difficult for students to internalize the content being delivered by the teacher, such as teachers' insufficient use of visual aids like pictures and videos. Educators must be able to present lessons in a way that piques students' interest while still meeting curricular and pedagogical standards.

Learning motivation is a series of driving forces in a person which boost up learning activity as well as project a clear learning direction, so that the goals desired can be achieved (Sardiman, 2012) [15]. On the other hand, learning goal is change that occur in students regarding their cognitive, affective, and psychomotor ability led by their learning activities (Susanto, 2015) [22]. The learning outcomes of P.E on health topic means the progress of students' cognitive and affective aspects altered by their participation in P.E learning at school.

One indicator of a student's success in the learning session is seen from learning outcomes, a question about whether they pass the minimum criteria. It is important to take this as a consideration to improve learning procedures. If the students do not perform well, it will be a problem that needs to be solved immediately. Student learning outcomes reflect on how the student manage to obtain the ability and quality after the learning process they have gone through (Nurhasanah & Sobandi, 2016) [12].

By developing the learning model, quality of learning and its outcome will automatically be improved. One that teachers can use is to apply a cooperative learning model. It is a learning model that involves group of students in smaller group learning so that students interact with group friends to solve problems, so that with this learning model the teacher can directly emphasize each student to be active in seeking information. In this case it is a problem that has not been understood through group discussions.

According to Eggen & Kauchak (in Juliantine, *et al*., 2013) [5] cooperative learning can be defined as a group of teaching strategies which mainly require student to be active in groups. Meanwhile, according to Riyanto (2010) [13] cooperative learning is a learning model which the main goal is to transfer academic skill and social skill. In addition, according to Sthal (in Juliantine, 2013) [5] the learning process with this cooperative learning model is able to stimulate and arouse the potential of students optimally in a learning atmosphere in small groups consisting of 2 to 6 students. During the group study, an open learning atmosphere will develop in the peer dimension, because at that time there will be a collaborative learning process in personal relationships that develops the need to each other. At that time, students who study in small groups will grow and develop through peer teaching and cooperative learning.

Nazirin (2018) [10] and Mujmal, *et al*. (2013) showed that the Jigsaw cooperative learning model can affect positively regarding student effort to achieve satisfying outcomes when learning in social studies and Civics learning subjects. This then makes the basis for the author to apply it in P.E learning. Student learning outcomes are also influenced by factors from within the students themselves (internal). Thus, the right learning model in learning P.E subjects is by using the Jigsaw type cooperative learning model, students will feel comfortable in the learning process and the student can easily perceive material presented by the teacher.

Student-centered learning is at the heart of the peer teaching paradigm, in which pupils study under the tutelage of classmates of a similar age and level of development/confidence. This is because the kid doesn't feel quite as compelled to adopt the worldview of his classmates (who are, after all, his "teacher"). It's less embarrassing to ask a classmate for help with a new skill. It is intended that children who do not understand would not be shy about communicating their struggles with peers since explanations from their peers are simpler to grasp and there is no hesitation, poor self-esteem, embarrassment, etc.

The peer teaching model is not only useful for students who are reluctant to ask questions or are less active, but also for students who take role as tutors for their friends. One of the signs that someone has mastered a material is that he can teach it back to others. Teaching friends (peer teaching) provides opportunities for students to learn something as well as possible and at the same time become a source of learning for each other (Silberman, 2013) [18]. Students are said to master or understand the lesson if the student is able to teach it to others. In the peer teaching learning model, students are given the opportunity to learn lessons and at the same time can be a source of learning for their friends. Therefore, the learning atmosphere will be livelier and students will be more active because students interact with each other.

Mirzeoğlu (2014) [8] on his study has revealed that the peer teaching learning model that was integrated into volleyball material could improve the cognitive, psychomotor and performance domains of players, but had no effect on the students' affective domain. Looking at the results of this study, the author appeared to review it by conducting a study of the jigsaw. Especially its implementation. Learning model and peer teaching which is associated with P.E learning outcomes for health topic. This study covered cognitive and affective domains in P.E learning.

Considering some issues which appeared in the P.E learning process, necessary steps are a necessity because it has a direct effect on improving the condition. To the author's knowledge, until now no research has been conducted on the application of cooperative learning models, peer teaching and learning motivation to the learning outcomes of P.E on health topic. This is the motivation of the author to conduct a study entitled "The application of cooperative learning models, peer teaching and learning motivation to the learning outcomes of P.E on health topic.".

Research methodology

This is experiment study with a "treatment by level" design with two 2 x 2 categories. Sudjana (2020) [20] states that a factorial experiment is a design that can provide

treatment/manipulation of two or more independent variables at the same time to see the effect of each independent variable, separately and simultaneously on the dependent variable and the effects that occur due to the interaction of several independent variables. Variable.

This study makes use of a quasi-experimental research approach (quasi-experimental). According to Sugiyono (2012) [2], quasi-experiments are employed since the control group cannot fully control external variables that influence the experiment's implementation.

The population of this study consisted of 108 students from three classes in class 11 at SMK N 1 Depok majoring in AKL. In this study, the classes 11AKL1 and 11AKL3 with 36 students each served as examples. According to Siyoto & Sodik (2015) [19], a sample is a subset of the population in terms of size and features, or a subset of population members selected in accordance with specific methods in order to represent the population. The sampling method employs a random sample.) Random sampling methodology is a method of selecting samples or elements at random, where each element or member of the population has an equal chance of being chosen as a sample. (Arikunto, 2010) [1].

This study was conducted in order to provide treatment in a class by comparing two different learning models in P.E to determine its effect on student learning outcomes. Class 11 AKL 3 (experimental class 1) used the jigsaw learning model meanwhile class 11 AKL 1 (experimental class 2) used the peer teaching learning model.

Result and Discussion

This study's data consist of pre- and post-test results on the effects of P.E. learning on health-related topics. The research procedure consisted of three steps. On April 11, 2022, a pretest was administered to collect preliminary data on the evaluation of learning motivation and learning results for PJOK health material. The second part of this study activity is the learning/treatment phase, which lasted from April 13 to June 2, 2022 and consisted of seven learning meetings. While in the third stage, a posttest is administered to collect final data following the treatment. Here are the pre- and post-test results.

Table 1: Pretest and posttest data on health topic's learning outcomes

No	High Learning Motivation Group					
	Jigsaw (A1B1)			Peer Teaching (A2B1)		
	Pretest	Posttest	Difference	Pretest	Posttest	Difference
1	75	70	-5	60	75	15
2	65	70	5	65	70	5
3	75	75	1	60	75	15
4	80	70	-10	65	75	10
5	60	75	15	60	60	1
6	75	80	5	70	75	5
7	60	75	15	55	75	20
8	75	65	-9	65	70	5
9	70	70	0	70	65	-5
10	80	70	-10	65	65	0
11	55	50	-5	65	70	4
12	60	80	20	65	65	0
13	55	75	20	65	65	0
14	45	50	5	55	75	20
15	55	75	20	70	65	-5
16	80	65	-16	70	70	0
17	65	60	-5	75	65	-11
18	55	60	5	70	65	-5
Mean	65,8	68,6	2,9	65,0	69,1	4,1
Percentage			4,38%	Percentage		6,38%
No	**Low Learning Motivation Group**					
	Peer Teaching (A2B2)			Jigsaw (A1B2)		
	Pretest	Posttest	Difference	Pretest	Posttest	Difference
1	50	55	5	60	45	-15
2	60	60	0	70	70	0
3	70	65	-4	70	50	-20
4	65	55	-10	70	65	-6
5	70	70	-1	50	80	31
6	65	65	0	60	55	-5
7	65	60	-5	70	60	-10
8	50	60	10	60	60	0
9	60	70	10	65	60	-5
10	60	75	14	65	55	-10
11	55	70	15	60	50	-10
12	55	60	5	45	50	5
13	55	50	-5	55	60	5
14	55	60	5	50	60	9
15	55	65	10	55	65	10
16	45	50	5	45	65	20
17	60	55	-5	55	60	5
18	50	50	0	20	55	35
Mean	58,0	60,8	2,7	56,9	59,1	2,1
Percentage			4,69%	Percentage		3,75%

The descriptive statistics of the pretest and posttest of health learning outcomes are presented in the following table:

Table 2: Descriptive Statistics Pretest and Posttest Health topic's Learning Outcomes

Descriptive Statistics					
Group	**N**	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Pre_A1B1	18	45.00	80.00	65.8333	10.74436
Post_A1B1	18	50.00	80.00	68.6111	8.87918
Pre_A1B2	18	20.00	70.00	56.9444	12.38344
Post_A1B2	18	45.00	80.00	59.1667	8.26936
Pre_A2B1	18	55.00	75.00	65.0000	5.42326
Post_A2B1	18	60.00	75.00	69.1667	4.92592
Pre_A2B2	18	45.00	70.00	58.0556	7.09989
Post_A2B2	18	50.00	75.00	60.8333	7.52447
Valid N (listwise)	18				

The data on health learning outcomes is presented in the following figure in form of diagram:

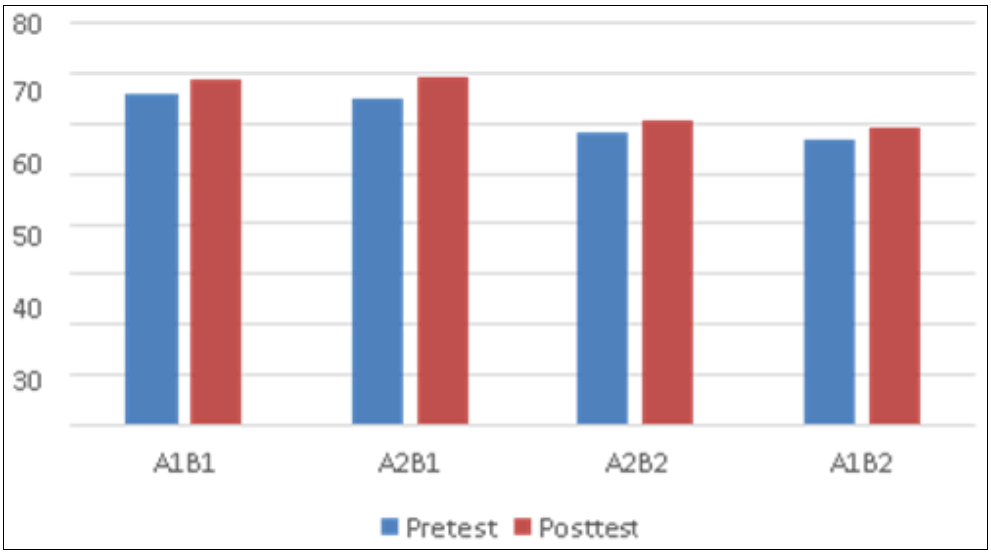

Fig 1: Pretest and Posttest Bar Diagram of Health Topic's Learning Outcomes

Information: Jigsaw learning style is used by students that are very motivated to study.

The A2B1 criteria are met when students use a highly-motivated Peer Teaching learning methodology. When students are unmotivated to study, they employ the Jigsaw strategy A1B2. A2B2: Students use a low-motivation Peer Teaching learning model Average scores for the A1B1 group were 65.8 on the pretest and 68.6 at the posttest, for the A2B1 group they were 65.0 and 69.1, for the A2B2 group they were 58.0 and 60.8, and for the A1B2 group they were 56.9 and 59.0 on the pretest and posttest of health learning outcomes.

In addition, hypothesis testing is performed to determine whether the theory is supported. This hypothesis test begins with the normalcy test, followed by the homogeneity test, and then hypothesis testing or hypothesis proofing. The testing of this hypothesis includes a normalcy test, a homogeneity test, and a test of the hypothesis itself. Herein are presented the results:

Table 3: Normality Test

Group		P value	Significance	Information
Pretest	A1B1	0.078	0,05	Normal data
	A2B1	0.109		Normal data
	A1B2	0.060		Normal data
	A2B2	0.116		Normal data
Posttest	A1B1	0.064		Normal data
	A2B1	0.053		Normal data
	A1B2	0.118		Normal data
	A2B2	0.108		Normal data

Table 4: Summary of Homogeneity Test Results

Levene's Test of Equality of Error Variancesa			
Dependent Variable: Learning Outcome			
F	**df1**	**df2**	**Sig.**
1.040	3	68	.380
Tests the null hypothesis that the error variance of the dependent variable is equal across groups.			
a. Design: Intercept + learning_Model + learning_motivation + learning_model * learning_motivation			

Based on the results of the Levene Test, it produces a significance value of 0.380 0.05. Thus in the data group has a homogeneous variant which is the same in nature

Hypothesis Test Result

Research hypothesis testing was conducted based on the results of data analysis and interpretation of two-way ANOVA analysis. The results of hypothesis testing are

explained as follows.

1. Comparison of the Jigsaw Learning Model and Peer Teaching on the Success of a Health-Related Physical Education Course Hypothesiss

The first hypothesis reads "There is a significant difference in the effect of the Jigsaw learning model and Peer Teaching on the learning outcomes of P.E on health topic". Based on the results of the analysis obtained the data in the following table.

Table 5: ANOVA test results between the Jigsaw learning model and peer teaching on P.E learning outcomes for health topic

Source	Type III Sum of Squares	df	Mean Square	F	Sig
Learning model	20.889	1	20.889	15.390	0.005

According to the results of the ANOVA test presented in the table above, the significance value of p is 0.05 and the F value is 15.390. Because the significant value of p is less than or equal to 0.05, H0 is rejected. Consequently, there is a substantial variation in influence. An average posttest difference of 1.09 indicates that the peer teaching learning model group scored 64.95 points more than the jogsaw learning model group, which scored 63.86 points. This indicates that the research hypothesis that "there is a substantial difference between the effects of peer teaching and jigsaw learning models on the learning outcomes of P.E. health issue" has been confirmed.

Both types of learning models are effective in improving the learning outcomes. Peer teaching is proven to have excellent delivery skills for various levels of education units (Jenkinson, *et al*., 2014) [4]. Professor Ensign at Southern Connecticut State University (in Juliantine *et al*., 2013) [5] said peer teaching can improve overall behavior, attitudes, self-esteem, communication, interpersonal skills with mutual cooperation and positive social behavior such as praise and encouragement. Then there are several principles to consider, namely the length of the semester, the frequency of sessions, the duration of each session, and the experience of the tutor. By keeping the same students in a group for two semesters for a full year the acquisition of knowledge and skills of group development will gradually become easier (Juliantine *et al*., 2013) [5].

Students who become tutors are responsible for delivering learning materials and exercises to their classmates. This is accomplished by enabling students with a high level of comprehension within the group to become tutors for their peers. Friends who do not comprehend the content or exercises offered by the teacher will receive assistance based on the norms unanimously agreed upon in the group, so that a cooperative, not competitive, environment for group learning will be created. According to Sani, the peer tutoring learning model (peer teaching) is a learning approach in which peers with above-average talents serve as tutors for classmates (Sani, 2013) [4].

Liou-Mark, *et al*., (2018) [7] argues that the learning atmosphere in the peer teaching pattern is a stimulus for the development of discussions between tutors and tutees so that both parties can practice critical thinking when facing difficult questions. In addition to improving learning outcomes, the interaction between the tutor and the tutee also has a positive impact on both of them. These positive impacts include increasing self-confidence, increasing problem-solving skills, increasing collaboration between students and improving communication building skills (Scott, *et al*., 2019) [16].

2. The hypothesis of the difference in influence between students who have high learning motivation and low learning motivation on learning outcomes

The second hypothesis which reads "There is a significant difference in influence between students who have high learning motivation and low learning motivation on learning outcomes PJOK health material". The calculation results are presented in the following table.

Table 6: ANOVA Test Results Differences in Students with High and Low Learning Motivation on Learning Outcomes

Source	Type III Sum of Squares	df	Mean Square	F	Sig
Learning Motivation	56.889	1	56.889	24.940	0.004

The significant value of p is 0.004 and the F value is 24,940, as seen in the table above, which presents the results of the ANOVA test. Because p is more than or equal to 0.004 but less than or equal to 0.05, H0 is rejected. On this basis, there is a substantial difference between the effects of high and low learning motivation on the learning outcomes of PJOK health materials for students. The study reveals that students with strong learning motivation score 68.89 points higher (excellent) than students with low learning motivation who score 59.92 points higher (poor), with an average posttest difference of 8. It may be explained that the research hypothesis "There is a considerable difference in influence between students with high and low learning motivation on health-related P.E. topics" has been demonstrated.

Academic achievement in school is significantly impacted by two psychological factors, including interest and motivation to learn (Kpolovie, *et al*., 2014) [6]. Generally, motivation will encourage behavior and influence and change behavior. Therefore, motivation in learning has three functions: First, it encourages behavior or an action. Without motivation, there will be no action like learning. Second, as a director, it means directing actions to achieve the desired goals. Third, as a mover, it means that the size of the motivation will determine the speed of a job.

Motivation is the basis for success in recreational and competitive activities and every athlete's efforts towards success and better performance depend on the value of his motivation (Nezhad & Sani, 2012) [11]. Gill (in Shafizadeh & Gray, 2011) [17] explains motivation in terms of the strength and direction of behavior. The level of effort needed to complete a task is referred to as behavioral intensity, whereas the best way to accomplish a goal in a particular circumstance is behavioral direction. Students who are highly motivated and interested in learning typically perform well in school, have organized study routines, and comprehend each reading well (Black & Allen, 2017) [2]. Possess a high level of self-confidence and learning capacity (Howard, *et al*., 2015) [3].

3. The interaction between the jigsaw type cooperative learning model and peer teaching with learning motivation on the learning outcomes

The third hypothesis which reads "There is a significant interaction between the jigsaw learning model and peer teaching with learning motivation on learning outcomes PJOK health material". The calculation results are presented in the following table.

Table 7: ANOVA Test Results Interaction between Jigsaw Learning Model and Peer Teaching with Learning Motivation on Learning Outcomes

Source	Type III Sum of Squares	df	Mean Square	F	Sig
Learning model * Motivation to learn	111.021	1	111.021	41.097	0.000

The significance value of p is 0.000 and the F value is 41.097 according to the ANOVA test results in the table above. H0 is rejected because the significance value of p is 0.000 0.05. Then, it has been demonstrated that there is a significant interaction between the jigsaw learning model and peer teaching with learning motivation on the learning outcomes of P.E. on health materials. The following is a graph of the interactions between the jigsaw learning model, peer teaching, and the desire to learn physical education on a health-related topic.

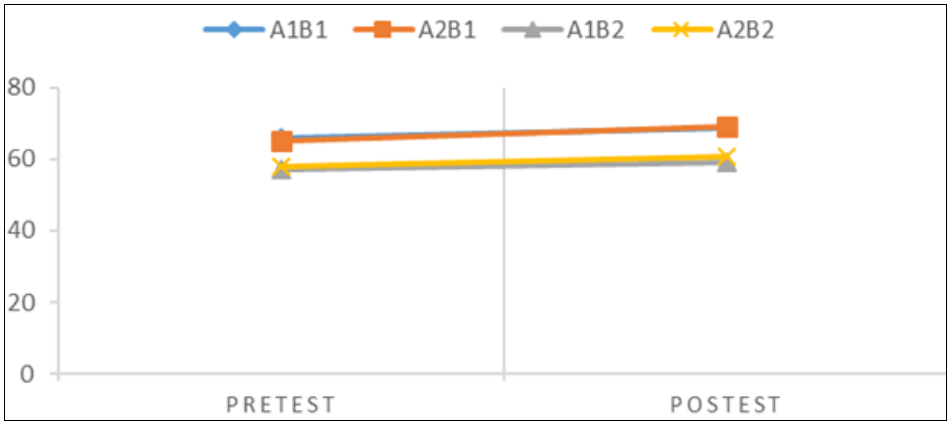

Fig 2: Interaction Results between Jigsaw Learning Model and Peer Teaching with Learning Motivation

It needs to be further tested using the Tukey test to determine whether there is an interaction between the learning models of the jigsaw learning model and peer teaching with learning motivation on the learning outcomes of P.E. on health topic. The table below contains additional test results.

Table 8: Summary of Post Hoc Test Results

Group	Interaction	Mean Difference	Std, Error	Sig,
AlB1	A2B1	-1.888?	030344	0.002
	A1B2	-0.1111	0.50344	0.996
	A2B2	1.555e	0.50344	0.015
A2B1	A1B1	1.8881	0.50344	0.002
	A1B2	2.000Cr	0.50344	0.001
	A2B2	-0.3333	0.50344	0.911
A1B2	A1B1	0.1111	0.50344	0.996
	A2B1	-2.000CT	0.50344	0.001
	A2B2	1.666?	0.50344	0.008
.A2B2	A1B1	-1.555e	0.50344	0.015
	A2B1	0.3333	0.50344	0.911
	A1B2	*-1.666?*	0.50344	0.008

Based on the results of the Tukey test calculation on the asterisk sign (*) it shows that the pairs that have interactions or pairs that are significantly different are: (1) A1B1-A2B1, A1B1-A2B2, (3) A2B1-A1B2, (4) A2B1-A2B2, while the other pairs stated that there was no difference in influence were: (1) A1B1-A1B2, (2) A1B2-A2B2.

The result showed that the peer teaching learning model was a more effective model for students with high learning motivation and the jigsaw cooperative learning model was more effective for students with low learning motivation.

It appears that the primary research factors, which take the form of two factors, exhibit a significant interaction based on the form of interaction. According to the study's findings, the interaction means that the influence of each paired group varies in each cell or group. The following pairs have interactions or partners that are vastly different.

a) With a value of 0.002 to 0.05, the group of students using the peer teaching learning model and having high learning motivation outperforms the group of students using the jigsaw learning model and having high learning motivation.
b) With a value of 0.001 to 0.05, the group of students using the peer teaching learning model and having high learning motivation outperforms the group of students using the jigsaw learning model and having low learning motivation.
c) With a value of 0.015 0.05, the group of students using the jigsaw learning model and having high learning motivation outperforms the group of students using the peer teaching learning model and having low learning motivation.
d) With a value of 0.008 0.05, the group of students using the jigsaw learning model and having low learning motivation performs better than the group of students using the peer teaching learning model and having low learning motivation.

Conclusion

The following conclusions are drawn from the study's findings and the results of the data analysis that was done:

1. The effects of the jigsaw cooperative learning model and peer teaching on the learning outcomes of the P.E. on health topic differ significantly. In terms of learning outcomes for health-related material, the peer teaching learning model group is superior (good) to the jigsaw learning model.
2. Students with high and low levels of learning motivation have a significantly different impact on the learning outcomes of the P.E. on health topic. Students who have high learning motivation for P.E. health topic learning outcomes perform better (better) than students who have low learning motivation.
3. The jigsaw cooperative learning method and peer teaching with learning motivation have a significant impact on the learning outcomes of PE on the topic of health. Couples who interact or have partners who are vastly dissimilar (significantly).

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