

Development in Ball Kicking Skill with Problem-Based Learning in Year 4 Physical Education

(Pembangunan Kognitif dalam Kemahiran Sepak Bola melalui Pembelajaran Berasaskan
Masalah dalam Kalangan Murid Tahun Empat Kelas Pendidikan Jasmani)

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Abstract

This action research was conducted to help Year 4 Nilam Class pupils to increase their abilities in applying forces precisely when they kick the ball. Reflections in learning and teaching process of Physical Education has shown that most of the pupils cannot apply forces precisely when they kick the ball result in their failure to send the ball accurately to their friends in the various distance. Therefore, the application of "*Problem-based learning*" during the learning and teaching process of Physical Education was conducted. Study participants consisted of 26 pupils in total, aged 10 years old of Year 4 pupils. The researcher used checklists and written tests to do the quantitative data analysis. Findings have shown that pupils can apply forces precisely on the ball after the teacher used the Problem-based Learning strategy to conduct the practical activities. The creative problem-solving method by pupils in the lesson of Physical Education can help to increase pupils' ability to apply forces precisely when they kick the ball. For further reinforcement, it is suggested to use interactive software as follow-up actions that enhance further learning. This study promotes and encourages pupils to participate in learning problem-solving skills and develop their own constructive understanding and knowledge to meet the current and future needs of individuals in line with the National Education Philosophy of Malaysia.

Keywords: Problem-based Learning (PBL), Physical Education, cognitive, ball kicking skill.

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INTRODUCTION

The National Education Philosophy is an educational guideline that includes important educational issues such as the values, principles, and direction of our country's education. This is evident in the National Education Philosophy, which is enshrined in the Education Act of 1996, Act 550.

“Education in Malaysia is an on-going effort towards further developing the potential of individuals in a holistic and integrated manner, so as to produce individuals who are intellectually, spiritually, emotionally and physically balanced and harmonious, based on a firm belief in and devotion to God. Such an effort is designed to produce Malaysian citizens who are knowledgeable and competent, who possess high moral standards, and who are responsible and capable of achieving high level of personal well-being as well as being able to contribute to the harmony and betterment of the family, the society and the nation at large.”

The National Education Philosophy emphasizes developing the potential of the individual as a whole and integrated it through four potentials, namely physical, emotional, spiritual, and intellectual. To achieve that goal, Physical Education has been formulated as a subject. This is because, Physical Education is a field of knowledge that involves an educational process that emphasizes the development and mastery of meaningful physical movements as well as processes that are closely related to the mental, emotional, and social responses of pupils.

Physical Education is one of the core subjects as provided in the Education Act 1996. Physical Education syllabus is an official document published by the Ministry of Education Malaysia to help teachers plan, implement and evaluate learning and teaching activities.

An effective learning and teaching process in Physical Education is determined by achieving the objectives set in the daily teaching plan. Physical Education Teachers should plan a Physical Education learning and teaching process that has objectives including three domains namely cognitive, affective and psychomotor. The three domains in the subject of Physical Education are interrelated with each other (Mok, 2012).

In the skills module under the basic skills of the attack category game found in the Standard Curriculum and Interpretation Document (KSSR) of Physical Education Year 4, kicking the ball to various distances and directions is one of the skills that need to be mastered (BPK, KPM, 2013). To fully master this skill through the formation of Physical Education objectives, pupils need to master this skill from a cognitive aspect.

According to Nair (2012), critical thinking is an important and vital topic in the modern education era. Education in the 21st century is more challenging and must be able to produce pupils who are creative and innovative, able to solve problems and think critically (Faridah et al., 2016). Hence, Physical Education teachers need to cultivate critical thinking among pupils in the learning and teaching process in Physical Education through the use of appropriate types of approaches, strategies, methods, and teaching techniques. Pupils who have the ability to think critically can achieve the teaching objectives set by the Physical Education teacher. They can also increase the level of knowledge and efficiency of their skills in sports activities.

PROBLEM STATEMENT

Year 4 Nilam pupils are active and enthusiastic. They could follow the Physical Education learning and teaching process that has been planned. They were happy to be able to do physical activities in the school field.

Although they were actively involved and showed high effort in performing the physical activities that have been designed for each Physical Education learning and teaching process, it was found that most of them were not able to master the skills. For example, the skill of kicking the ball to various distances and directions is one of the basic skills in the attack category game. They were not able to send the ball precisely to their friends using the skills they should have mastered. Besides, they also could not answer the questions that focus on the cognitive aspect in the Physical Education textbook given by the Minister of Education. This shows that they could not kick the ball to various distances and directions accurately because they only kicked the ball to their partner without thinking thoroughly.

In the next learning and teaching process, the researcher tried to make modifications to the daily teaching plan by adding one step that is to demonstrate while explaining how to kick the ball to various distances and directions that have to be mastered in that particular learning and teaching process.

At the end of the learning and teaching process, there are still a large number of pupils who were not able to fully master these skills. Although they could kick the ball to their friends, they fail to do it with correct force application precisely. Researchers found that the conventional way of teaching cannot stimulate the minds and thoughts of pupils which caused them unable to focus on important information and skill demonstrations as well as find ways to kick the ball to various distances and directions accurately.

Among the effects, if the learning and teaching process does not stimulate pupils' thinking they are not aware that they do not master the skills perfectly. Eventually failing to achieve the learning outcomes that have been set. Furthermore, if the learning and teaching process in Physical Education does not stimulate pupils' thinking towards a higher level, it will cause them unable to master other skills accurately. They will also think Physical Education is a meaningless subject because the Physical Education activities carried out cannot stimulate pupils' thinking.

Physical Education teachers should take the initiative to overcome this problem so that pupils can understand the application of force when kicking the ball which in turn can help master the skills under the attack category. In the Physical Education learning and teaching process, teachers do not only need to do physical activities, they also need to develop cognitively to analyze and master the skills precisely.

RESEARCH OBJECTIVES

Improving the learning and teaching methods of Physical Education, it is the teachers' role to help pupils to improve force accuracy when kicking the ball using a constructivist approach through the application of "Problem-based learning" in the Physical Education learning and teaching process.

Through this action research, it is hope that

- i. Year 4 Nilam pupils can improve the application of force when kicking the ball in helping to master the skills of kicking the ball to various distances and directions after the application of "Problem-based learning" in the learning and teaching process of Physical Education.
- ii. Improving the pedagogical practice of researchers in teaching basic skills of attack category games from a cognitive aspect among Year 4 Nilam pupils.

The study aims to help pupils of Year 4 Nilam from SK LKTP Chuping, Perlis to increase their force accuracy in ball kicking skills. Hence, participants are limited to the total number of 4 Nilam pupils which is 26 pupils, aged 10 years old. There is a total of 9 male pupils and 17 female pupils. All 4 Nilam pupils were Malay Muslims. This study lasted for a

maximum of 2 learning and teaching lessons in Physical Education. All pupils were required to answer written tests and were observed by the researcher using checklists to evaluate their understanding of force accuracy in ball kicking skills.

LITERATURE REVIEW

Problem-based learning (PBL) was first introduced by Barrows and Tamblyn during the 1980s. Since then, PBL has been used with increased frequency in the Higher Education sector (Edwards & Hammer, 2007). PBL was initially used as a means of ensuring medical pupils can apply knowledge and respond to "real-life" situations, PBL has evolved over the years into one of the popular learning approaches in science and education. PBL requires pupils to solve problems, therefore enhances pupils' learning outcomes by promoting their abilities and skills in applying knowledge, solving problems, practicing higher-order thinking, and self-directing their own learning.

PBL is conceptually based upon the cognitive and constructivist theories. The specific applications in PBL include connecting new information with prior knowledge, elaboration and construction of information learned, and collaborative learning (Zejnilagic-Hajric et al., 2015). Pupils' learning is initiated by a need to solve a problem. In PBL, pupils are no longer receiving the learning content from the teacher in a "textbook" logical sequence.

Historically, a large percentage of the research-based concerning PBL comes from the medical field. Three major reviews of the literature on the effectiveness of PBL instruction for medical pupils are considered seminal and often cited when examining the pros and cons of PBL (Drake & Deborah, 2009). Savery (2006) concluded that results generally support the superiority of the PBL approach over more traditional academic methods due in part to higher levels of pupils' satisfaction with their learning environment. Hmelo-Silver (2004) found that PBL was more nurturing and enjoyable and that PBL pupils performed as well as and sometimes better on clinical examinations and faculty evaluations. Hence, PBL had a positive effect on student skills and a negative effect on knowledge.

Nowadays, problem-based learning has been used as a learning approach because it improves education for all learners. This approach transforms teaching from telling to doing. It also provides opportunities for learners to pursue their own interests and make decisions about how to solve problems which will help them to become technologically literate. The PBL process is illustrated below in Figure 1.

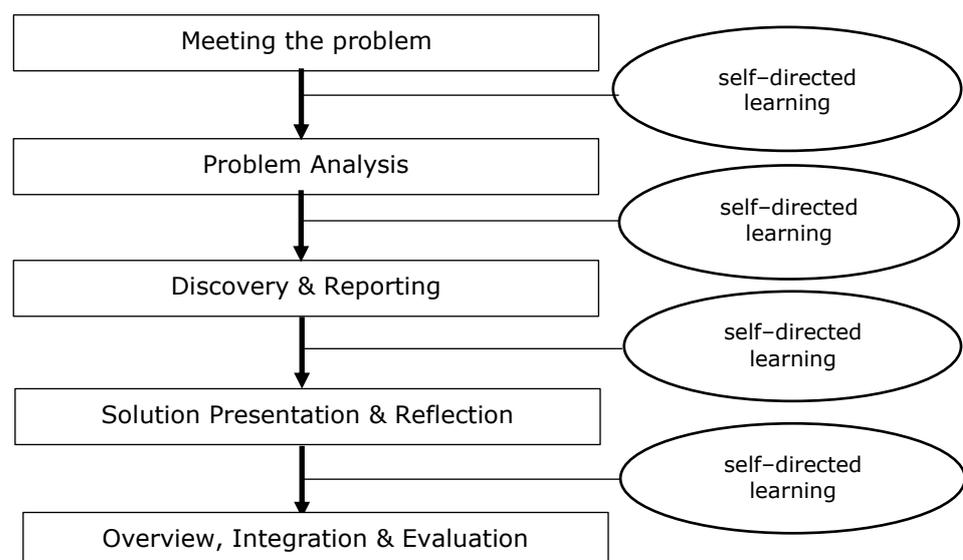


Figure 1. The Problem-based Learning Process

METHODOLOGY

In this action research, the researcher used three data collection methods to collect research data related to the increase of 4 Nilam pupils in the application of force when kicking the ball. Among them are participatory observation, non-participatory observation, and written test on Cognitive Aspects.

Observation

The researcher has used two methods in implementing structured observations, namely participatory observation, and non-participatory observation. The researcher conducted a participatory observation on 4 Nilam pupils. Meanwhile, fellow researchers in the field observed non-participation during the application of "problem-based learning" in the Physical Education learning and teaching process.

Both observations carried out are the type of full observer observation. This means that the observation and data collection is done through the observation checklist provided without the need to create interaction with the study participants and their environment at the peak of the teaching and learning process. A checklist as an instrument is an accurate indication or evidence to measure student improvement explicitly through pupils' behavior Ahmad Hashim (2015).

Researchers have prepared checklist instruments in tabular form. The checklist instrument provided has 7 columns showing the pupils observed in the first column. The second to sixth columns show observed behaviors to assess pupils' improvement explicitly and the seventh column indicates the number of behaviors that have been achieved that can indicate pupils' improvement. The checklist instrument used by the researcher is a checklist form that only requires the researcher to mark (√) for the behavior shown by the pupils during Physical Education learning and teaching process was conducted. Table 1 shows the checklist form used by the researcher in structured observations at the peak before and after the learning and teaching process of applying "problem-based learning" for both types of observations that have been used.

Table 1. Student improvement observation checklist from cognitive aspects

COGNITIVE ASPECTS FOCUSING ON FORCE ACCURACY IN BALL KICKING SKILLS						
Student	Mark (√) for the following behavior					Total
	Ball accurately sent to a friend	Look at the preferred kicking direction	Contact of the ball from behind to send the ball forward	Contact of the ball from side to send the ball sideways	Receive the ball sent accurately	
S1						
S2						
S3						
S4						
...						

To further increase the reliability of the data collected from the checklist form provided, the researcher will also use video recording as an instrument. Video recording material recorded all the actions done during the learning and teaching process in which "problem-based learning" was implemented helps the researcher to review the pupils' improvement in force accuracy in ball kicking skills.

Test on Cognitive Aspects

The researcher used a written test consists of four questions short-structural written in Malay constructed by the researcher according to the Revised Bloom's Taxonomy to determine improvements of 4 Nilam pupils in force accuracy in ball kicking skills. Written test answering sessions that lasted approximately 40 minutes were given to 4 Nilam pupils in their classroom.

Table 2. Items in questionnaires

Question No.	Cognitive aspects tested	Level of mastery in Bloom's Revised Taxonomy
1	Identify the relationship of the point of contact with the direction of movement of the ball	Knowledge
2	Force application while receiving the ball	Understanding
3	Force application when kicking the ball and identify relationship between contact point with the ball and the direction of the ball	Analysis and Applications
4	Force application when kicking the ball and identify relationship between contact point with the ball and the direction of the ball	Analysis and Applications

DATA ANALYZE

Data collected from the participatory observation method and non-participatory observation through the observation checklist are quantitative data. The data will be analyzed through descriptive statistical analysis using frequency. The results of the analysis of observation method before and after the PBL intervention are formulated based on the number and percentage of aspects that need to be observed to ensure increased correct force application while kicking the ball in the form of a table. The data obtained are presented in the form of bar charts.

Lastly, the results of the analysis of the observation method before and after the PBL intervention are combined and formulated in the form of a table showing the data obtained from the total behavior shown by the pupils of 4 Nilam. In addition, it is presented in the form of a bar chart to facilitate understanding of the results of the study.

WRITTEN TEST ANALYSIS

The data collected from the written test instrument is quantitative. The data obtained were analyzed by the researcher through descriptive statistical analysis using frequency to describe the number of questions that can be answered by 4 Nilam pupils more clearly.

The researcher employs the action research method to formulate and categorize the written test responses of four Nilam students into several categories. In the form of a table, the researcher categorizes the answers of 4 Nilam students before and after the action as correct or incorrect based on the question number. Following that, the data is tabulated and analyzed. Finally, the obtained data is presented in the form of a bar chart focusing on the number of students who correctly answer the question.

The results of the analysis of written tests before and after actions which focus on the number of pupils who give the correct answers are combined and presented in the form of bar charts to facilitate understanding of the study results obtained.

FINDINGS

The analysis of the findings of the checklist of participatory observation and non-participatory observation contained in Table 3 and Figure 2 shows the results of the observation analysis before and after the action was carried out by the researcher.

Table 3. Results of observation analysis before and after action

No.	Cognitive aspects focusing on force accuracy in ball kicking skills	Before		After	
		Number of pupils	Percentage %	Number of pupils	Percentage %
1.	Ball accurately sent to a friend.	7	27	24	92
2.	Look at the preferred kicking direction.	19	73	26	100
3.	Contact of the ball from behind to send the ball forward.	10	39	26	100
4.	Contact of the ball from side to send the ball sideways.	10	39	24	92
5.	Receive the ball sent accurately.	7	27	24	92

Before the action is implemented, a total of 7 people with a percentage of 27 percent can demonstrate the behavior of accurately kicking the ball to a friend, whereas after the action is implemented, a total of 24 people with a percentage of 92 percent was recorded. This represents a change of 17 people, resulting in a 65 percent increase.

The second behavior has shown looking at a friend while sending and receiving the ball, which has been recorded by a total of 19 people and carries a percentage of 73 percent before the action is implemented. Following the action, the second behavior recorded a total of 26 people who brought a percentage of 100%. The analysis of the data revealed an increase of 7 people and a 27 percent increase in percentage terms.

Before the action was implemented, contacting the back part of the ball to deliver the ball forward resulted in a total of 10 people carrying a percentage of 39%, while after the action was implemented, a total of 26 people carried a percentage of 100%. There was a 16-person increase, resulting in a 62-percentage-point increase.

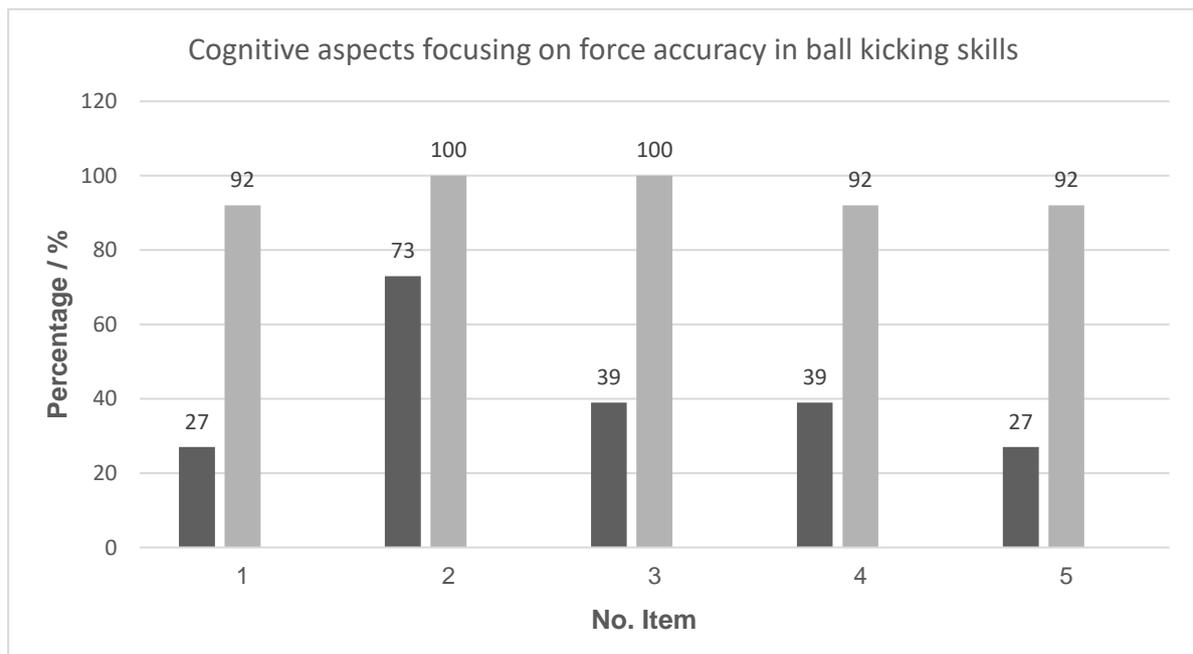


Figure 2. Cognitive aspects focusing on force accuracy in ball kicking skills

Before the action was implemented recorded a total of 10 people carrying a percentage of 39% while after the action is implemented, the behavior of side contact of the ball to pass the ball sideward recorded a total of 24 people carrying a percentage of 92%. This indicates an increase of 14 people leading to a percentage increase of 54%.

Lastly, before the action is implemented, for the behavior of receiving the ball sent accurately recorded a total of 7 people who carry a percentage of 27% while after the action is implemented, recorded a total of 24 people who carry a percentage of 92%. The analysis data showed an increase of 17 people and an increase of 65%.

In conclusion, the results of the observation analysis before and after the action was implemented showed a significant improvement of 4 Nilam pupils from all cognitive aspects for the power application accuracy when kicking the ball.

A written test was conducted on 26 pupils of 4 Nilam before and after the action was carried out by the researcher. A total of 4 questions were constructed based on Bloom's Revised Taxonomy and were given to pupils to answer within 40 minutes.

Table 4. Results of written test analysis before and after action

Question	Before		After	
	Number of pupils	Percentage	Number of pupils	Percentage
1.	24	92	26	100
2.	12	46	24	92
3.	8	31	24	92
4.	10	39	19	73

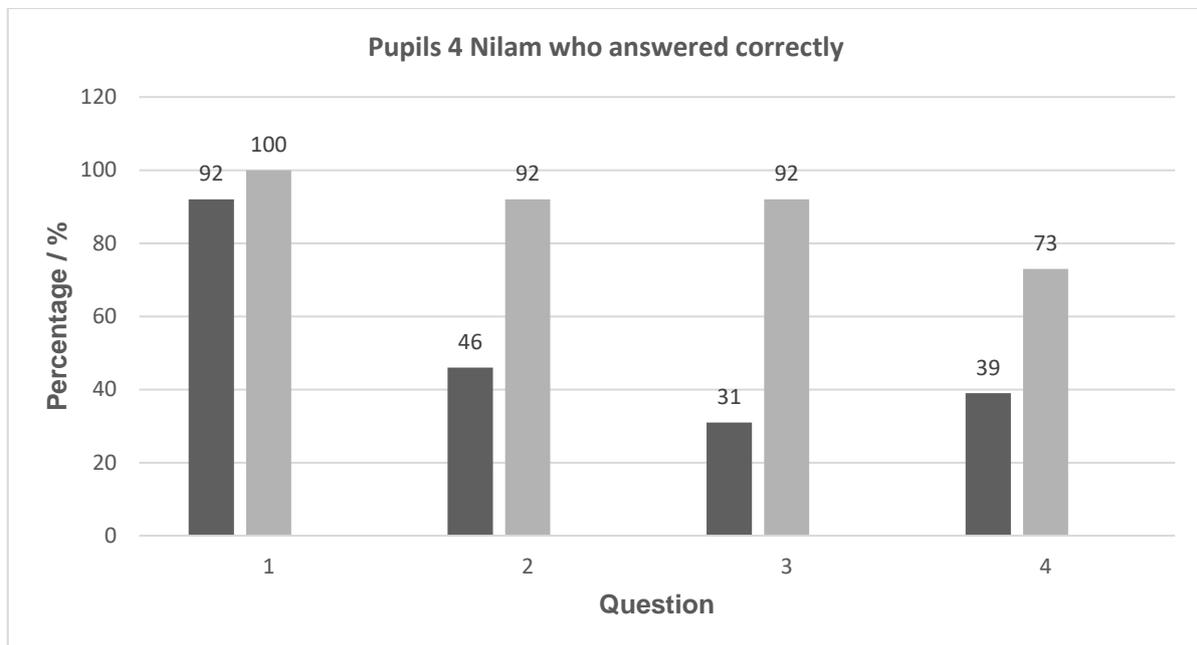


Figure 3. Analysis of written test results before and after the action

The written test findings analysis in Table 4 and Figure 3 shows the results of the written test analysis before and after the action was implemented. Before the action was implemented, a total of 24 people were recorded, indicating 92 percent, while after the action was implemented, the first question recorded a total of 26 people, indicating 100 percent. This represents an increase of two students, increasing by 8%.

The second question was answered by a total of 12 people (46 percent) before the action being implemented. Following the implementation of the action, a total of 24 people (92%) were recorded. This represents an increase of 12 people, resulting in a 46 percent increase.

Before the action was implemented, a total of 8 people answered question 3 with a percentage of 31%, while after the action was implemented, a total of 24 people answered with a percentage of 92%. There was an increase of 16 people, resulting in a 61 percent increase.

Finally, before the action was implemented, there were a total of 10 people who could correctly answer question 4 with a percentage of 39%, and after the action was implemented, there were 19 people with a percentage of 73%. This means that there has been a 9-person increase, resulting in a 34% increase.

In conclusion, there is a significant improvement that shows a positive change before and after the implementation of "Problem-based learning" in the learning and teaching process of Physical Education.

REFLECTIVE DISCUSSION

The problem faced by the researcher in teaching the basic skills in the attack category game with 4 Nilam pupils was the force accuracy in ball kicking skill before the research action is implemented. After the implementation of "Problem-based learning" in the learning and teaching process of Physical Education, there is a significant improvement that shows a positive change in force accuracy when kicking the ball. This can be proven through the results of the analysis of the checklist of observations made before and after the action is implemented. There are positive changes in pupils 4 Nilam's application of force when kicking the ball with their feet, according to the results of the checklist analysis from observations done before and after the learning and teaching sessions that use "Problem-based learning." In the cognitive aspects, more children can display improvements in force accuracy when kicking the ball.

In problem-based learning, pupils are required to work together in a small group to find the knowledge needed to solve the problems they face (Schunk, 2012). In addition, Schwager and Labate (1993) say that the encouragement to think critically can help pupils to understand a learning task better and also help a lesson achieves its objectives. Therefore, the application of problem-based learning is suitable to be implemented to increase pupils in force accuracy in ball kicking skills. The findings of this study have also answered the research question "Can the use of" Problem-based learning" help Year 4 Nilam pupils improve the force accuracy in ball kicking skills, in turn, helps master the basic skills of the attack category game?"

The researchers' pedagogical practices cannot create a learning environment that can stimulate pupils' thinking and awareness of the important force accuracy in ball kicking skills during the Physical Education teaching and learning process, which is one of the next problems faced by researchers in teaching basic skills of attack category games before the research action is implemented. Pupils respond positively to the researcher's pedagogical practice once problem-based learning is integrated into the learning and teaching process of Physical Education. This can be demonstrated using a written test conducted before and after the action is taken. According to the findings of a written test analysis conducted on four Nilam students, they improved their ability to accurately answer questions. The findings of the study have answered the question "Can the use of "Problem-based learning" improve the researcher's pedagogical practice in improving force accuracy in ball kicking skills among Year 4 Nilam pupils?" In conclusion, based on the findings of the study, the researcher can conclude that the application of "Problem-based learning" in the learning and teaching process of Physical Education can help pupils of 4 Nilam to improve the force accuracy in ball kicking skills and improve the researcher's pedagogical practice.

In turn, researchers also found that the selection of learning and teaching strategies as well as the guidance provided in Physical Education learning and teaching process are important to produce a quality learning and teaching process. Although the results of the study based on observation checklist analysis and written test analysis as a whole show a positive change in the number of pupils who show the force accuracy in ball kicking skills explicitly, there are still pupils who cannot master the skills of kicking the ball. Therefore, the follow-up action for the further study is be continued other types of intervention, for example, cooperative learning activity like "Mission File" with interactive application software. Through the interactive application software, an environment where pupils can discuss anytime or anywhere can be created. Teachers can also give proper guidance which helps increase the effectiveness of the activities conducted.

An example of application software that can be used is Google Classroom. This is because pupils have been given exposure to how to use this software in school. Besides, by using this software also pupils will feel more motivated to find excess information and discuss with other pupils in the atmosphere created in this software. At the same time, pupils can also ask the teacher about the problems and questions faced using this application software. The time for the implementation of the research activities can be further extended by the researcher through the proposed method. Lastly, teachers can also design and implement more interesting small games to further enhance pupils' enthusiasm to find more information and improve their weaknesses to win in a designed game.

CONCLUSION

Education in the twenty-first century is more difficult, and it must produce students who are creative and innovative, able to solve problems and think critically. Physical Education (PE) Teachers should design a Physical Education learning and teaching process in which students are motivated as stakeholders when attempting to solve a critical problem. Learning activities should be planned in such a way that they maximize the acquisition of information and routine skills. Therefore, the cognitive domain is essential in the Physical Education learning and teaching process. Without it, pupils are less likely to develop a full understanding of mainly how to apply force accurately when kicking the ball to various distances and directions which will lead to their inability to excel in activities, sports, and games under attack game category in the future.

This action research not only helps to improve the learning and teaching methods used by Physical Education teachers, particularly through the constructivist approach of problem-based learning activities in kicking balls, but it also promotes and encourages pupils to participate in learning problem-solving skills and developing their own constructive understanding and knowledge to meet current and future needs.

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