Improving Volleyball Lower Passing Skills Through Project-Based Learning Model

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Abstract

Study purpose. The purpose of this study was to improve lower passing skills by using the Project Based Learning (PjBL) learning model.

Materials and Methods. The Kurt Lewin model research design is a research design consisting of four stages, namely, planning, implementation, observation, and reflection. The research subjects were class X students of SMKN 1 Pandih Batu, totaling 15 people. The object of research was the improvement of volleyball lower passing skills by using the Project Based Learning (PjBL) learning model. The instrument used in this research was the lower passing skill performance test instrument. The data analysis used was quantitative and qualitative descriptive analysis.

Results. Based on data analysis, the results of learning volleyball lower passing showed an increase in volleyball lower passing skills. This is indicated that in cycle I only 9 people or 60% of students who were complete and 6 people or 40% of students who were not complete, then in cycle II there was an increase, namely from 15 students who completed 11 people or 73% of students who were complete and 4 people or 27% of students who were not complete.

Conclusion. The learning outcomes of volleyball lower passing skills have seen an increase from cycle I and cycle II using the volleyball lower passing learning model has increased overall.

Keywords: Project Based Learning, Under Passing, Volleyball

Introduction

Education is a series of continuous processes to gain essential knowledge and skills in the lives of learners inside and outside school and runs for life that can bring change and progress to the nation and homeland. Education is not only obtained at school but can be obtained in the family and community environment. The purpose of education, in general, is stated in

conveying that learning in the 21st century is an emphasis on the ability of students to explore information from various sources, describe problems, think critically and cooperatively, and collaborate in solving life problems (Pebriyandi, Warni, & Mashud, 2021). One of the important pillars of national education is Physical Education, Sports, and Health (PJOK). In accordance with (The regulation of the Minister of National Education of the Republic of Indonesia, 2006) which states that physical education, sports, and health (PJOK) are an integral part of overall education, aims to develop aspects of physical fitness, movement skills, critical thinking skills, social skills, reasoning, emotional stability, moral action, aspects of a healthy lifestyle and introduction to a clean environment through selected physical, sports and health activities that are planned systematically in order to achieve national education goals.

Physical education, sports, and health (PJOK) is an educational process that utilizes physical activity to produce holistic changes in individual quality, both in terms of physical, mental, and emotional (Mashud, 2015). PJOK is learning that is more than just teaching knowledge from a teacher to students, more than that, in the learning process it is hoped that an educator can optimize the potential that exists in students (Jumadi, Laksana, & Prananta, 2021). In physical education, learning motion plays a role in developing body movement skills and mastering movement patterns in sports skills (Udi, 2012). Physical education is part of the educational process, where the main goal of physical education is to develop aspects of physical fitness, movement skills, and critical thinking (Parwata, 2021).

PJOK learning contains many elements of sports games in its learning, sports games that are often taught are soccer, badminton, basketball, and volleyball. Volleyball games have the characteristics of typical cooperation in volleying the ball so as not to fall, moving speed, and high jumps to cross the ball over the net (smash and block) (jurahman & Wardani, 2018). According to (La Kamadi, 2020) Volleyball games consist of various basic techniques. The basic techniques of playing volleyball consist of serving, passing which is divided into lower passing and upper passing, hitting (smash), and blocking (Ferawati, Mashud, & Warni, 2021). The basic technique that is very important to master is the basic technique of lower passing because lower passing is very useful for starting defense and attack strategies in the game (Karim, Ginanjar, & Sugiyanto, 2017). The stages in performing the lower pass are (Wibowo, 2016) the initial attitude of taking a normal position, namely a standing position with the position of one leg in front of the other leg. The knees are bent, and the body leans slightly forward with the hands ready to be in front of the body. When the hand is put on the ball immediately the arm and hand are lowered and the arm and hand are stretched forward straight down. Elbows should not be bent, both arms that are on the board are always straight. 2) Attitude at the time of impact At the time of contact with the ball, the attitude of the body must be in a state of readiness for the ball. After the ball is at the right distance then immediately swing the arm that is already straight towards the ball, try to hit the ball right at the proximal of the wrist so that the ball bounces high with a bounce angle of 90% so that the ball will be easily received by his teammates. 3) The final attitude after the ball is successfully passed down then, immediately followed by taking a ready attitude to return to a normal position with the aim of being able to move faster to adjust to the situation.

The learning process of a student must have the ability to think critically in order to identify and solve problems that occur in the learning process hopefully can become a culture for children in solving social problems in society and solving these problems that will occur when they are in the world of work later (Dupri, Nazirun, & SM, 2019). In addition, the learning model used by PJOK teachers is less varied and does not involve students in the learning process (Suwardika, Adi, & Suwiwa, 2022). The learning model provided by the teacher to students is considered not effective enough because the teacher plays a full role in learning. So that students can only follow what the teacher tells them, without previously finding out the learning problems that will take place, and finally students do not get optimal results. One of

the tools to help teachers in the learning process is to use the right learning model. To overcome various problems in the implementation of learning, of course, learning models are needed that are considered capable of overcoming the difficulties of teachers in carrying out their teaching duties and also the difficulties of students in learning (Karim et al., 2017).

One of the learning models that can be used in the PJOK learning process is the Project Based Learning model. Project Based Learning is a learning strategy that involves students in complex activities. It usually requires a number of stages and a duration longer than several class periods and up to a full semester. Projects focus on product creation or performance and generally require learners to select and organize their activities, conduct research, and analyze information (Orey, 2010). The advantages of the Project Based Learning model are (a) fostering active student participation during the learning process, (b) developing mastery of the material and student creativity in solving problems, (c) increasing students' willingness to carry out the creative action plans they have made in groups, (d) train students to work together in work groups (Wulandari, Suardana, & Devi, 2019).

The PjBL learning model can be used to apply the knowledge that has been owned and train various thinking skills, attitudes, and skills concretely (Shima, Nurika, & Firya, 2021). The results of research (Sumarni, Wardani, Sudarmin, & Gupitasari, 2016), (Wijanarko, Supardi, & Marwoto, 2017) and (Ardinnata, Mashud, & Warni, 2023) show that the application of PjBL can improve students' psychomotor and concept understanding. Mashud in his book "Project-Based Classroom Action Research on Physical Education Learning (PTK) and PE Learning (PTO)" explains that project-based learning is learning that involves the activeness of students in solving problems, carried out in groups / independently through scientific stages with certain time limits which are poured into a product and then presented to others (Mashud, 2021a).

The volleyball game is a big ball game that is complex and not easy to do for everyone because volleyball games require coordination of all limbs. Volleyball games have several basic techniques including Serving, Passing, smash and blocking (Akmal Muhammad Al-ghifarie, 2022). In learning volleyball, it is possible to use the Project Based Learning model, because the Project Based Learning model can improve psychomotor skills and understanding of concepts and train various thinking skills, and attitudes where learning involves student activeness in solving problems. Teachers must adopt new classroom management skills and learn how best to support their students in learning, using technology where necessary and they must believe that their students are fully capable of learning through this approach (Condliffe et al., 2017). The Project Based Learning Learning phases as outlined in the book Project Based Learning Classroom Action Research in Physical Education (PTK) and Sports (PTO) written by (Mashud, 2021) consist of: 1. Determining basic questions; 2. Designing product planning; 3. Developing a product manufacturing schedule or project schedule; 4. Monitoring project activeness and development; 5. Testing results; 6. Evaluating the learning experience.

According (Wahyu, 2016) explains some of the advantages of project-based learning, among others, as follows; 1. Project-based learning can increase learners' learning motivation; 2. Project-based learning can improve problem-solving skills, make learners more active, and successfully solve problems related to complex problems; 3. Project-based learning will trigger learners' ability to seek and obtain information to be improved; 4. The importance of group work in projects requires learners to develop and practice communication skills. Cooperative group work, learner evaluation, and online information exchange are collaborative aspects of a project; 5. Project-based learning can provide learners with learning and practice in organizing projects, as well as making allocations of time and other resources such as equipment to complete tasks.

Based on the observations of researchers when teaching volleyball lower passing material at SMKN 1 Pandih Batu in class X, the average student has not mastered volleyball lower

passing skills. Overall, the scores obtained by the skills are below the Minimum Completeness Criteria (KKM) when learning to pass down. So that learning objectives are not achieved. The KKM value for Physical Education Sports and Health Learning at SMKN 1 Pandih Batu is 70. Based on student learning skills regarding volleyball lower passing material. Of the 15 students include 12 male students and 3 female students in the class students (60%) have not been able to perform volleyball passing skills. After looking at the overall learning outcomes of lower passing skills, many class X students have not been able to do lower passing. These results were seen during the learning process and the lower passing skills test conducted. From the results of observations during the process of implementing teaching and learning activities and the results of tests that have been carried out, many students get scores below the predetermined KKM. In an effort to get the learning outcomes of volleyball lower passing skills that reach the specified criteria, the researchers tried to apply the Project Based Learning learning model.

The Project Based Learning model applied to volleyball lower passing learning is an innovative model to improve volleyball lower passing skills. The application of the Project Based Learning model that researchers do is a challenge in itself when implementing volleyball lower passing learning. This is because the application of the Project Based Learning learning model in lower passing skills has not been done much. Based on these objectives, there are advantages to the Project Based Learning learning model (Mashud, 2021), namely increasing students' ability to solve problems, making students more active in solving problems, increasing student cooperation, and gaining new knowledge and skills in learning.

Based on the problems studied and the support of studies from previous relevant research related to the application of the *Project Based Learning learning* model in physical education subjects. Therefore, researchers considered the *Project Based Learning* learning model could provide a real learning experience for students. Stated that project-based learning can improve creative thinking skills by involving students in real or simulated experiences and becoming autonomous and independent learners (Mustika & Ain, 2020). The challenge that researchers felt when implementing the *Project Based Learning* model was in the implementation of each learning phase. This was because the application of the *Project Based Learning* learning model in PJOK learning at school was still new. Thus, the purpose of this study was not only to improve the learning outcomes of class X students' volleyball lower passes but also to cultivate the habit of solving learning problems by using the steps of a learning model whose learning was structured and patterned so that every student who experienced learning difficulties could be detected and for what reason, as well as how the reflection was then used as a solution to learning problems.

Materials and Methods

Study participants.

This research sampling technique used *purposive* sampling which was used in sampling based on consideration of learning materials that were in accordance with the class being taught. This is in accordance with what explains that *purposive* sampling is a sampling technique with certain considerations, the sample in this study was class X students at SMKN 1 Pandih Batu consisting of 15 people consisting of 12 men and 3 women.

Study organization.

The method used in this research was classroom action research. This action research implementation procedure used Kurt Lewin's model which each cycle consists of four main steps, namely planning, action, observation, and reflection (Widana, Suarta, & Citrawan, 2019). This research procedure was carried out in several stages including, 1) Initial observation of learning as initial research data; 2) Making a lesson plan (*planning*); 3) Taking action by carrying out between cycles until learning completeness was obtained; 4) Observation of the

implementation of actions in learning which was carried out 2 times a meeting in each cycle. This research was conducted in May with 4 meetings which counted every 2 meetings as 1 cycle. The place of implementation was SMKN 1 Pandih Batu, Kantan Muara Village, Pandih Batu District, Pulang Pisau Regency, Central Kalimantan Province.

Statistical analysis.
     Data analysis techniques were intended to answer research questions or problems that had been formulated previously.

1. Teacher Activity Analysis
     The data obtained from the teacher activity observation sheet in the learning process was analyzed with the following formula:

$$S = \frac{R}{N} \times 100\ \%$$

S = Percentage value sought
R = Amount score activity Teacher
N = Score maximum activity Teacher

Table 1. Criteria Activity Teacher

Activity (%)	Criteria
86-100	Very Good
76-85	Good
60-75	Fair
55-59	Poor
≤ 54	Very poor

Source : (Hawa, 2022)

2. Student activity analysis
     The data obtained from the student activity observation sheet in the learning process was analyzed with the following formula:

$$AP = \frac{\sum p}{\sum p} \times 100\ \%$$

AP = Percent value sought
$\sum P$ = Number of students engaging in the activity
$\sum p$ = Total number of students

Table 2. Student Activity Criteria

Activity (%)	Criteria
86-100	Very Good
76-85	Good
60-75	Fair
55-59	Poor
≤ 54	Very Poor

Source : (Triana, 2022)

3. Critical Thinking Skills Analysis (Test Questions)

At the end of each cycle, a test was conducted to measure students' critical thinking skills:

$$S = \frac{R}{SM} \times 100\%$$

S = Value sought
R = Score obtained by each student
N = Maximum score

To calculate the class average for each cycle, the following formula was used:

$$X = \sum xi\, N$$

X = Average value (mean)
$\sum xi$ = Sum of all values
N = Number of students

Data on students' thinking skills were calculated based on the minimum completeness criteria (KKM) ≥ 70 using the formula (Hawa, 2022):

$$NP = \frac{R}{SM} \times 100\%$$

NP = Percentage value sought
R = Number of students who scored ≥ 70
SM = Total number of students

Table 3. Critical Thinking Proficiency Criteria

Mastery learning	Criteria
86-100	Very Good
76-85	Good
60-75	Fair
55-59	Poor
≤ 54	Very Poor

Source: (Hawa, 2022)

4. Student Analysis Skills

Student skills were measured using evaluation sheets to obtain data on student learning outcomes and analyzed using the following formula:

$$\text{Skill Score} = \frac{\text{Skills obtained}}{\text{Maximum Score}} \times 100\%$$

Table 4. Student Skills Evaluation Criteria

Description Mark	Criteria
90-100	Very Good (VG)
80-89	Good (G)
70-79	Fair (F)
≤ 70	Less (L)

Results

Preliminary data before the Action Research

Based on the results of initial observations of learning volleyball lower passing skills in class X students, there were 15 students consisting of 12 boys and 3 girls. Initial observation data can be seen in Table 5 below:

Table 5. Volleyball Lower Passing Preliminary Observation Results

Learning Completeness	Number of Students (people) Percentage Success Indicator	Percentage	Success Indicator
Complete	*7*	47%	70%
Not Completed	*8*	53%	
Amount	*15*	100%	

Initial observation data on volleyball underserved learning can also be seen in Figure 1 below:
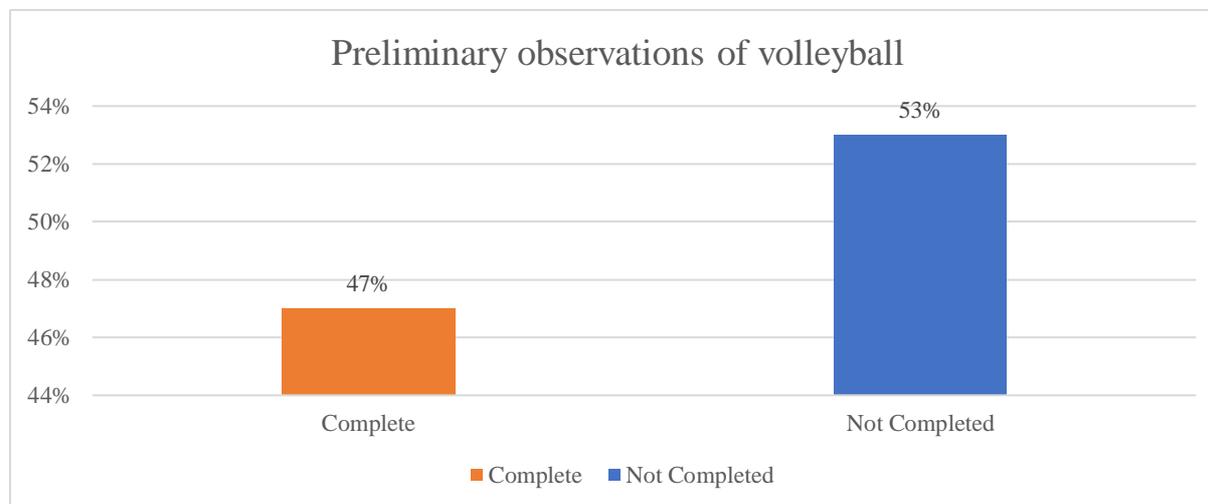

Figure 1. Volleyball Lower Passing Preliminary Observation

Cycle I Data Presentation

In the first cycle, researchers conducted learning in two meetings. In the first meeting, researchers taught by applying the *Project Based Learning model by carrying out the learning stages in accordance with the* phases/syntax of *Project Based Learning*. Where in the initial stage, phase 1) Determining basic questions, students were invited to observe videos of proper lower passing movement material, and then students explored the videos that had been shown through questions and answers based on reference questions with teacher guidance. Phase 2) Designing a product plan. The teacher conveyed the *project* work steps and the *agreement to*

make the project (video) with the students. Phase 3) The teacher developed a product schedule or project schedule. Students observed and discussed with their groups regarding, initial attitude, attitude during implementation, and final attitude based on videos, teaching materials, and other learning resources for one month in 4 meetings in 2 cycles. Phase 4) Students performed the movements one by one and were observed to provide input on how to perform the initial stance, the stance at the time of impact, the final stance, and the mistakes made. phase 5) Testing the results of all students performing the movement task analysing and evaluating the movements at the time of introduction, the stance at the time of impact, and the final stance the teacher monitored and supervised student involvement and measured the achievement of the ball's lower passing skills. phase 6) Evaluating the learning experience of each group of students practicing lower passing skills in the middle of the field.

Furthermore, in the first cycle action at the second meeting, researchers observed learning outcomes by conducting an assessment of the ability to pass under volleyball. The first cycle data presentation is as follows:

Table 6. Results of Volleyball Lower Passing Skills in Cycle I

Learning Completeness	Number of Students (people) Percentage Success Indicator	Percentage	Success Indicator
Complete	9	60%	70%
Not Completed	6	40%	
Amount	15	100%	

Data from cycle I of volleyball underserve learning can also be seen in Figure 2 below:
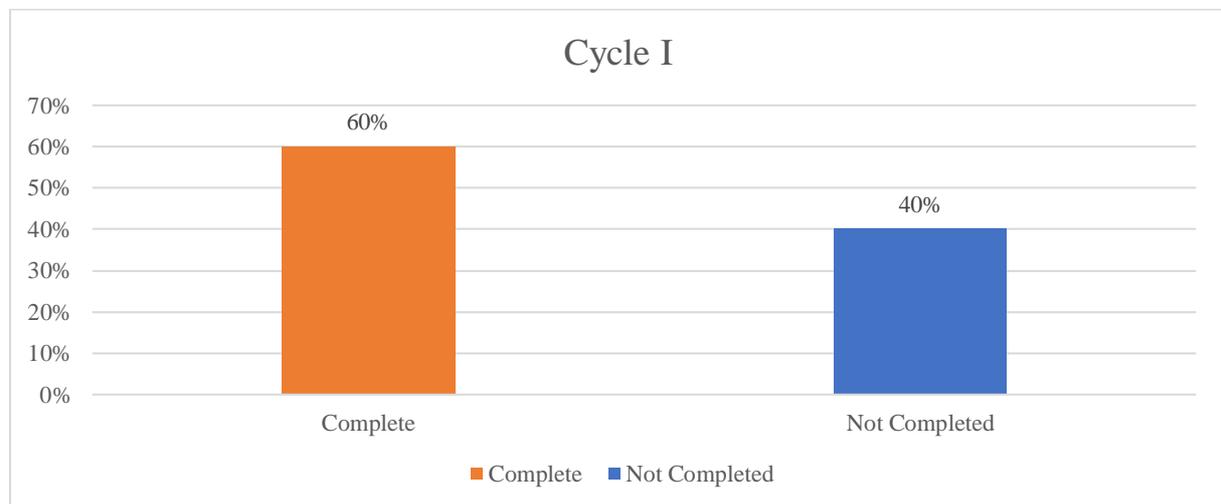

Figure 2. Volleyball Lower Passing Data in Cycle I

Based on the results of observations of skills tests using the volleyball lower passing performance test in class action research, the results were not satisfactory and did not meet the minimum completeness standard that the researchers had set, namely 70%. From the observation data, learning in cycle one in the first and second meetings could also be seen. The results of student observations in cycle one were; 1) It can be seen that some students were not able to apply the stages of the volleyball bottom pass movement. 2) When the material was

delivered and the movement task was demonstrated, there were still a number of students who were not focused and paid little attention. 3) When practicing the movement task, there were still many students who were joking around. Teacher observation results show that the results of observations in cycle I learning were as follows; 1) The phases of learning were not well understood, 2) Class management was not good, and 3) Teachers lacked structure in managing each phase of learning.

Based on the learning outcomes in the first cycle that had not reached the expected minimum completeness and qualitative observation findings. So, researchers provided some notes and evaluations of lesson planning. Further learning improvements are focused on; 1) Better delivery of motion assignment material, 2) Simplification and delivery of more structured motion assignments. 3) The teacher remained focused during the learning process. Based on the evaluation and conclusions above, the **class action research was continued in the second cycle,** by preparing the reflections and learning improvements previously described, and then planning the learning tools in the second cycle.

Cycle II Data Presentation

The second cycle was conducted in two meetings. In the first meeting in the second cycle, researchers conducted a learning process based on improvements from the findings in the first cycle. The second meeting in cycle II was observed for the lower passing skill test. The results of the observation of cycle II researchers are described as follows.

Table 7. Results of Volleyball Lower Passing Skills Cycle II

Learning Completeness	Number of Students (people) Percentage Success Indicator	Percentage	Success Indicator
Complete	*11*	73%	70%
Not Completed	*4*	27%	
Amount	*15*	100%	

Data on the results of cycle II of learning volleyball lower serves can also be seen in Figure 3 below:
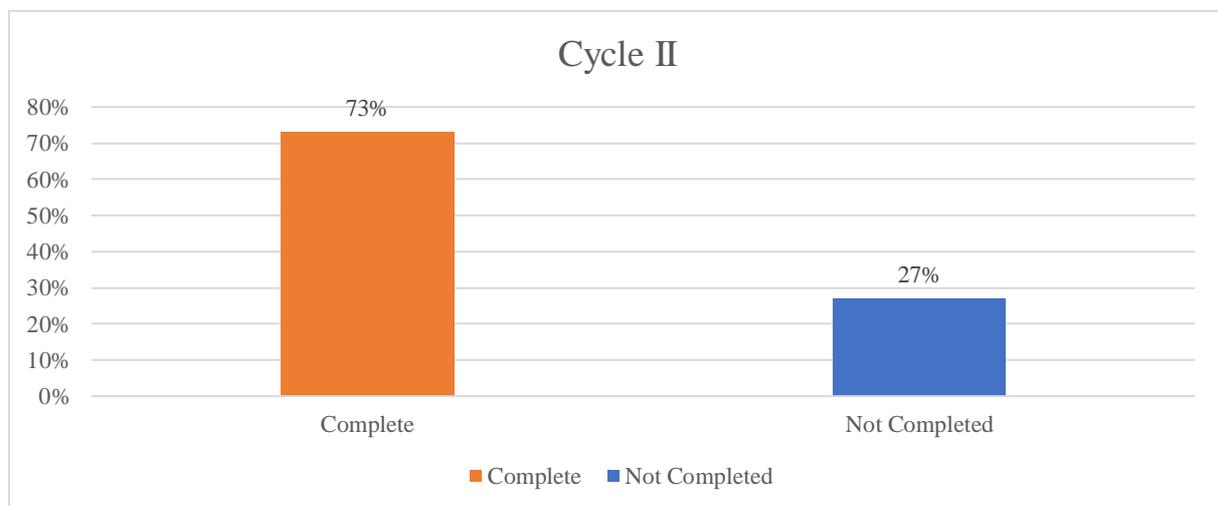

Figure 3. Volleyball Lower Passing Data in Cycle II

The data in the table above shows students' volleyball lower passing skills. The results of observations in cycle II of volleyball lower passing skills using the *Project-Based Learning model*, the researchers explained as follows: 1) Students were able to understand the stages of the motion task. 2) When the material was delivered and the movement tasks were demonstrated, students paid close attention, 3) When carrying out movement tasks according to the sequence of movements, students could do them properly. The results of teacher observations during cycle II learning are; 1) Delivery of material related to motion tasks was clear, 2) Class management was carried out properly, and 3) The teacher implemented learning according to the stages/phases.

It can be seen from the learning outcomes in cycle II that the minimum completeness that the researcher intended to determine had been achieved and based on qualitative observation findings. So, researchers can conclude that learning to pass under volleyball using the *Project Based Learning model* was successfully achieving the specified minimum completeness. This class action research succeeded or did not need to be conducted in the third cycle. In terms of assessment, the value of volleyball lower passing skills can be compared from baseline data, cycle I and cycle II, the comparison of values in the following graph.
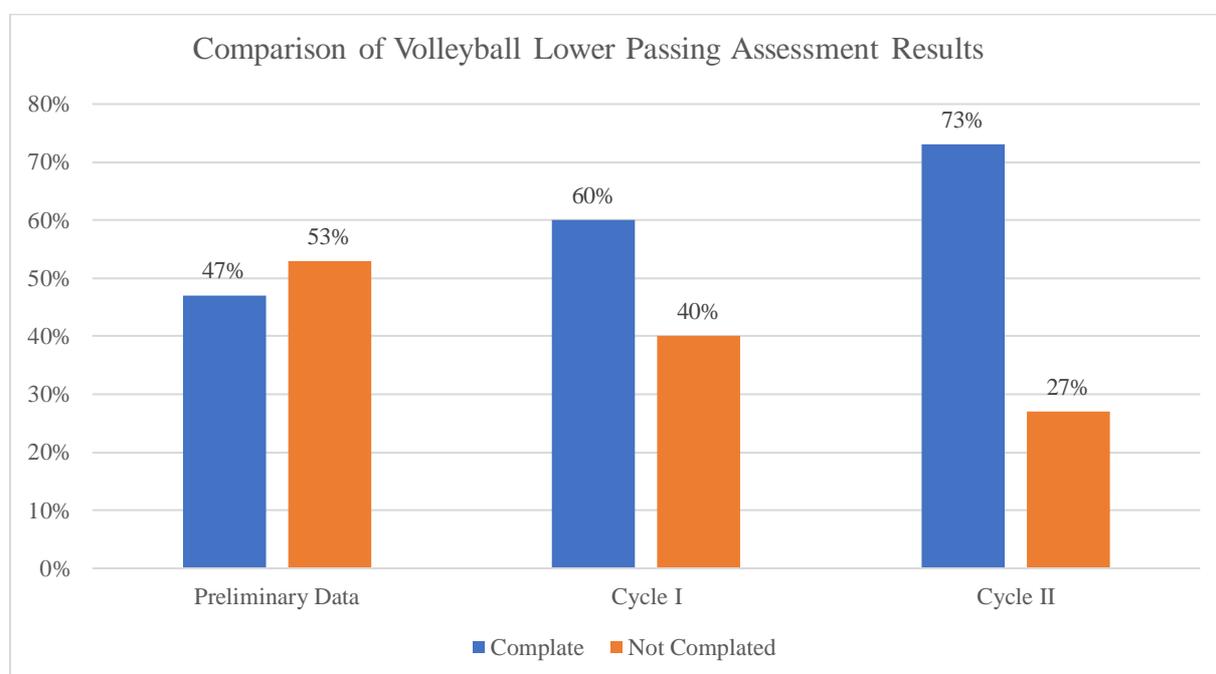

Figure 4. Comparison of Volleyball Lower Passing Assessment Results

Discussion

From the results of the research, the application of the PjBL learning model in two cycles for 4 meetings succeeded in improving the lower passing skills of volleyball in class X. Difficulties and problems that arose during the learning of lower passing before the research action were carried out, had already found a solution. By using an appropriate learning model based on the phases applied realized learning success where the teacher outlined the advantages of being a learning method that improved the learning process and allowed students to be creative, demonstrating learning in their preferred style (Tamim & Grant, 2013).

Based on relevant research (Suwardika et al., 2022) explains that the *Project Based Learning* learning model can improve learning outcomes (PJOK) of big ball game material (basic lower passing techniques). The research had differences in learning materials from what

the researcher conducted, which was this study using learning materials for passing down volleyball games. Other research (Ahwan, Basuki, & Mashud, 2023) conducted explained that the cooperation skills of class X students of SMA Negeri 3 Banjarbaru can be improved through the use of the *Project-Based Learning* (PjBL) learning model through physical activity. Therefore, collaboration is an important aspect of PjBL and teachers must ensure that the process results in a positive and rewarding experience that can improve student learning and performance (Tamim & Grant, 2013). Another study with (Shima et al., 2021) the title "Implementation of PjBL (*Project Based Learning*) Online to Improve Student Learning Outcomes during the Covid-19 Pandemic" This class action research with the PjBL model can be considered successful and effective in applying to online learning and can improve student learning outcomes during the Covid-19 pandemic where learning was carried out online or distance learning (PJJ). This proves that the *Project Based Learning learning* model was also effectively applied even though it was not through direct learning.

Based on the results of the research and the support of relevant research related to the *Project Based Learning learning* model, it described that each stage/syntax needed to be applied according to its stages, this could encourage student activeness and increase student enthusiasm in completing motion tasks. In addition, the experience of successfully operating motion tasks made students eager to try other project-based learning.

The research recommendations are: 1) provide light questions related to learning materials that can be done 2) plan activities and develop project schedules together so that students feel the project must be completed according to mutual agreement 3) always monitor student activeness and guide them when experiencing difficulties.

In its implementation, the researcher intended to convey how difficult it is to deliver learning messages, control the feedback process, and evaluate learning and follow-up learning. Not infrequently there are obstacles to the lack of weather and effective time but it does not reduce the enthusiasm and learning outcomes of students. The researcher would like to convey that as a teacher, you should never stop applying learning models that can improve the ability and learning outcomes of students so as to achieve educational goals.

Conclusions

Based on the discussion in this study, the learning objectives to improve volleyball lower passing skills by applying the *Project-Based Learning model* succeeded in improving volleyball lower passing skills in class X students with II cycles in which each cycle consisted of 2 meetings. The researchers suggest that educators should use the *Project Based Learning* learning model as one of the choices of learning models to improve students' skills in physical education learning.

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Conflict of interest

No conflicts of interest to declare.

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