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Improving Basic Movement Skills of *Pencak Silat* Empty-Hand Moves for Students with Physical Disabilities through Peer Teaching at Elementary School 1 Giritirto Karanggayam

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Abstract: The purpose of this study is to improve basic unarmed pencak silat skills in students with physical disabilities through a peer tutor approach at SD Negeri 1 Giritirto Karanggayam. This study aims to develop an adaptive learning model to increase student participation in physical activities and support an inclusive school environment (Fernández-Batanero et al., 2024). The research subject was a 10-year-old fifth-grade student. The method used was classroom action research (CAR) with two cycles, including planning, action, observation, and reflection stages. The results showed an increase in ability from 53% before the action to 66% in cycle I and 80% in cycle II, exceeding the success criterion of 75%. The peer tutor approach proved effective in improving the striking, kicking, and basic movement coordination skills of students with physical disabilities in pencak silat, as well as fostering self-confidence, motivation, empathy, and social awareness among students and physical education teachers. Further research is recommended to test the effectiveness of this method on other types of disabilities and compare it with other inclusive learning approaches.

Keywords: peer teaching, physical disability, empty-handed moves, pencak silat, elementary school students

Meningkatkan Keterampilan Gerakan Dasar Pencak Silat Gerakan Tangan Kosong bagi Siswa Penyandang Disabilitas Fisik melalui Peer Teaching di SD 1 Giritirto Karanggayam

Abstrak: Tujuan penelitian ini adalah untuk meningkatkan keterampilan dasar pencak silat tanpa senjata pada siswa dengan disabilitas fisik melalui pendekatan tutor sebaya di SD Negeri 1 Giritirto Karanggayam. Penelitian ini bertujuan untuk mengembangkan model pembelajaran adaptif guna meningkatkan partisipasi siswa dalam aktivitas fisik dan mendukung lingkungan sekolah yang inklusif (Fernández-Batanero dkk., 2024). Subjek penelitian adalah seorang siswa kelas lima berusia 10 tahun. Metode yang digunakan adalah penelitian tindakan kelas (PTK) dengan dua siklus, meliputi tahap perencanaan, tindakan, pengamatan, dan refleksi. Hasil menunjukkan peningkatan kemampuan dari 53% sebelum tindakan menjadi 66% pada siklus I dan 80% pada siklus II, melebihi kriteria keberhasilan sebesar 75%. Pendekatan tutor sebaya terbukti efektif dalam meningkatkan keterampilan memukul, menendang, dan koordinasi gerakan dasar siswa dengan disabilitas fisik dalam pencak silat, serta meningkatkan kepercayaan diri, motivasi, empati, dan kesadaran sosial di antara siswa dan guru pendidikan jasmani. Penelitian lebih lanjut disarankan untuk menguji efektivitas metode ini pada jenis disabilitas lain dan membandingkannya dengan pendekatan pembelajaran inklusif lainnya.

Kata kunci: Tutor sebaya, disabilitas fisik, gerakan tanpa senjata, pencak silat, siswa sekolah dasar

INTRODUCTION

The development of motor skills has a significant role in supporting the participation of children with physical disabilities in daily activities. The World Health Organization (WHO) states that access to sports education and motor skills development is a human right for all children, including those with special needs (DiPietro et al., 2020). The importance of programs that focus on motor skills has been emphasized in various studies which shows that physical activity improves the quality of life, mental health, and social ability of children with physical disabilities (Chen et al., 2021).

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However, there are still large gaps in the provision of effective inclusive learning programs in many countries. A study by (Sammon et al., 2021). Highlights that children with disabilities often face discrimination and lack of resources to support integrated movement learning. This shows that innovative approaches, such as peer assessment, are indispensable to creating an inclusive and effective learning environment. Students with special needs are one of the subjects of education with the same rights as children of their age are jointly served in inclusive education. These services include curriculum, environment, and social interaction opportunities (Powell, 2021).

In Indonesia, education for children with physical disabilities has become the focus of the government through various policies, such as Law Number 8 of 2016 concerning Persons with Disabilities. However, implementation in the field still faces various challenges. According to the Ministry of Education and Culture, only about 25% of schools in Indonesia have adequate inclusive facilities (Ministry of Education and Culture, 2023). Local studies also show that children with physical disabilities often experience limitations in the development of motor skills due to a lack of teacher training and adaptive learning methods (Marta Putra, 2019).

Promising approach is the integration of collaborative learning strategies, such as peer teaching, which have proven effective in improving student motivation and learning skills (Kuntjoro et al., 2022). Peer teaching involves peer evaluation that can help create a supportive and inclusive learning environment. However, globally, there is a gap in the implementation of this method, especially in the context of children with physical disabilities. A study by (Ackah-Jnr & Danso, 2019) shows that the biggest obstacles in the implementation of peer teaching are the lack of teacher training and lack of adaptation to the specific needs of students. Similarly, in Indonesia, similar challenges are faced in creating adaptive and sustainable programs.

The context of *pencak silat* learning, bare hand movement skills are one of the important elements that not only develop fine and gross motor skills but also build the confidence of students with physical disabilities. Learning empty-handed moves requires coordination, concentration, and body control that can improve overall physical abilities (Jariono et al., 2023). However, the implementation of this method often faces challenges, such as limited teacher training and adaptation of learning methods to the needs of students with disabilities (Hikmat, 2022).

Elementary School 1 Giritirto Karanggayam faces a similar problem in learning empty-handed skills. Furthermore, there is a gap between the needs of students with physical disabilities and the learning approach that is currently applied. Students need a method that not only provides movement training but also increases their confidence and participation in the school environment (Hartati et al., 2022). Literature analysis shows that peer teaching can be an effective solution to address this gap, but its application requires clear guidance and adaptation to the local context.

Based on the formulation of the existing problem, the trainer does not have data on the level of basic movement skills of pencak silat empty-handed gestures for students with physical disabilities at SD Negeri 1 Giritirto Karanggayam. Research is focused on improving the basic movement skills of *pencak silat* with bare hands of students with physical disabilities through a peer teaching approach at Elementary School 1 Giritirto Karanggayam. The main focus of the research is to develop adaptive learning models to increase student participation in physical activity and support inclusivity in the school environment (Fernández-Batanero et al., 2024).

METHODS

This study analyzes the improvement of basic movement skills of pencak silat empty-handed gestures in students with physical disabilities at SD Negeri 1 Giritirto Karanggayam. This study had been carried out at Elementary School 1 Giritirto, which is in Karanggayam District, Kebumen Regency, Central Java. This location was chosen because this school has facilities that support physical learning activities, including for students with physical disabilities, and has implemented an inclusion program. This study employs a quantitative methodology and classroom action research (PTK) as its research design. Classroom action research according to Arikunto (2010, 58) is a research activity carried out on a number of subjects that are targeted, namely students, with the aim of improving the learning situation in the classroom so that there is an improvement in the quality of learning. Action research in the classroom is done collaboratively. Collaborative research involves both spectators and people who take action, such as researchers or teachers. This study uses the research design of the Action Research model with Kemmis & McTaggart (2005).

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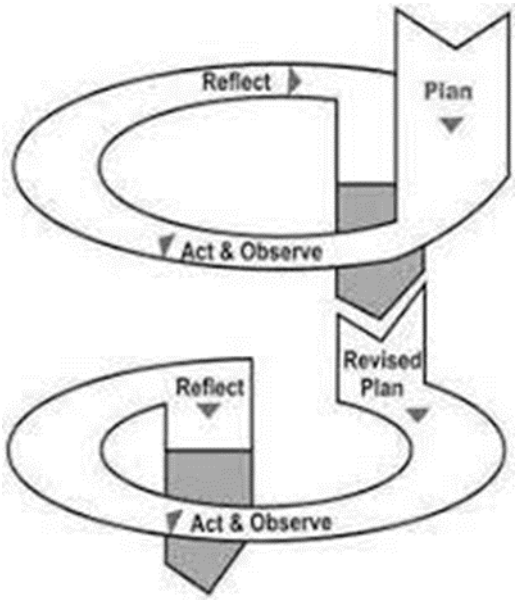

Figure 1. Spiral of Action Research (Kemmis & McTaggart, 2005)

The study was conducted in 2 cycles, with four components in each cycle. Planning, acting, observing, and reflecting are some of these elements. The following are the phases of implementation:

1. Planning stage

   A prepared plan resources, learning scenarios, and the creation of a Learning Implementation Plan (RPP) mark the start of the planning stage. Among the things that are done are:

   a. Create pretest questions based to the material to be taught
   b. Choose on the material and theme
   c. Prepare the media
   d. Establish basic competencies and set indicators based on basic competencies
   e. Create checklist with instructions for monitoring student activity

2. Implementation stage

   Actions are the steps taken to carry out the set strategy. Every cycle, this activity is performed twice. At this point, colleagues who function as observers help the researcher. The learning of the created plan is referred to as the implementation phases. The following is the implementation plan:

   a. The initial activity conditioned students to start learning, open learning by praying and greeting with a warm attitude.
   b. The core activity, teaching the basic movements of bare hands activities includes preparation for hand positions, standing positions, leg positions, and head positions.
   c. The last activity is to go back to the material that has been studied before and check the students' understanding of the learning material.

   Each meeting is implemented into a 60-minute cycle, with the introductory activity taking up 10 minutes, the core activity taking up 40 minutes, and the closing or final activity taking up the remaining 10 minutes. At the conclusion of the lesson, the teacher administered a post-test on the problem. It is hoped that students can improve their basic movement skills with bare hands.

3. Stage Observation

   It was carried out to observe the ability of basic bare hand movement skills of students with physical disabilities through peer teaching. Observations were made using observation instruments. The pre-test is carried out before the student gets the action, and after the student gets the action, the post test is carried out to find out the results of the action that has been given.

4. Reflection phase

   Researchers and colleagues engage in a conversation process named reflection. This is done to evaluate the effectiveness of the activity that has been put into place. The action will be terminated if the outcome is deemed successful. However, the action is carried out in the second cycle if the findings do not meet the desired outcome. At this point, the following actions are taken:

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a. Discussing the results of the implementation of actions carried out on students with physical disabilities. This was obtained from the results of the test of basic bare hand movement skills of students with physical disabilities through peer assessment and observation.
b. Make a plan for the next action, according to the results of the reflection

The subject of the study is the individual who will be the subject of the action. The research subject in this study is students with physical disabilities. The number of subjects in grade 5 is 1 (one) student in one class. The following are the characteristics of these students:

1. The subject is a child with a physical disability on the right leg.
2. The other limbs are normal
3. The subject had low learning outcomes, especially in the ability of *pencak silat* movement skills, bare hand moves in learning.
4. There was 1 male subject (age = 10 years).
5. The subject has not been able to perform the *pencak silat* movement with his bare hands.

The instrument used in this study is a test of learning the basic movements of *pencak silat* bare hands. The instruments to be used will be explained as follows:

Table 1. Grid – Instrument Grid of Empty-handed skills in *pencak silat* learning

No	Assessment Criteria	Dimension Position awareness when performing bare hand movements	Dimension Position awareness when performing bare hand movements	Dimension of Movement Understanding	VALUE
1	Early development	Don't know the position and often be in the wrong place	Slow and stiff movements, often too late to move	Does not understand movements and often performs movements on their own	1
2	Progress	Understand the position but often get confused in moving and turning	Mobility is moderate but the movement is still stiff	Have a basic understanding of punches and kicks but often make mistakes	2
3	Proper	Simply understand the position and be able to be in the right place	Moving well but sometimes inefficient	Simply understand the movements and step appropriately	3
4	Speak	Understand positioning well and always move on time	Smooth and efficient movement	Have a good understanding of punch and kick movements	4
5	Proficient	Very well aware of the position, always in the right and optimal position in punching and kicking	Movements are very agile and efficient	Excellent tactical understanding, and timely	5

The analysis of this validity data uses the Gregory formula. Gregory's formula is a method used to evaluate the validity of content by relying on the judgment of 2 experts. (Gregory, 2015) This approach requires researchers to gather expert opinions on each item in the instrument, especially regarding the relevance of the item to the construction being measured. Using the Gregory formula involves a panel of experts who evaluate the items in the instrument, then the data is analyzed using the Gregory validity matrix. Adaptive *"penjas"* validity experts and special needs child education experts who have more than 10 years of experience in their fields. This assessment is then processed into the Gregory Matrix, which consists of a combination of items deemed relevant or irrelevant by experts, resulting in four categories of assessments. And got a score of 0.8.

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The following are the steps of data analysis in this study adapted from (Sanjaya, 2009):

1. First stage
   Reducing the data emphasis to the issue is the first step. At this point, the researcher uses movement skills (quantitative data) to organize the data. Based on test results (pre- and post-action), quantitative data was acquired. Then, to strengthen it, it is supported by qualitative data obtained based on observation and documentation.
2. Second stage
   In the second step, the implementation takes the form of providing a more relevant description of the data that was collected. This study uses observational data to describe and analyze its data. This observation data is analyzed and described in such a way that the activities of basic movement skills of bare hands can be described through peer assessment in students with physical disabilities. At this stage, the researcher calculated quantitative data in the form of a percentage improvement in the basic movement ability of the bare hand obtained through the pre-action test and the post-action test. The increase in the basic movement of the bare hand is calculated by the following formula: TOTAL SCORE (ADD UP THE SCORE GIVEN).

$$\text{SCORE} = \frac{TOTAL\ SCORE}{15}\ x\ 100$$

3. Third phase
   The third stage is the making of conclusions. This stage is carried out by testing hypotheses based on the results of research and discussion. Decision making of actions taken based on hypotheses refers to success criteria.
4. Success Indicators
   This study was declared to have found the success of the criteria if there was an improvement in basic movement skills of bare hands through peer assessment in students with physical disabilities in grade 5 elementary school. Mastery of the material follows the 70% achievement standard which refers to the national assessment standards of the PJOK curriculum. The PJOK curriculum is designed to form students who are healthy, active and have character through physical sports activities (Ministry of Education and Culture, 2022).

The interpretation of material mastery is divided into 5 categories of achievement of learning outcomes (can be seen in the table):

Table 2. Material Mastery Criteria

Mastery Rate (%)	Category
80 – 100	Excellent
60 – 80	Good
40 – 60	Enough
20 – 40	Low
0 – 20	Very low

RESULTS AND DISCUSSION

Based on the results of the post-action test of the first cycle, the ability of students to perform basic movement skills of bare hands increased compared to the test conducted in the pre-action test. The increase in students' ability to perform basic movement skills of bare hands was shown by an increase in scores from 53% in the pre-action test to 66% in the first cycle and again to 80% in the second cycle test. The results of obtaining student scores in the second cycle have reached the minimum assessment criteria. For more details, the increase in the achievement of the results of the basic movement of the bare hand is presented in the following table:

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Cycle I

Table 1. Improvement of Skills Outcomes in Physical Disability Students Pre-Action I

No	Things that observers should pay attention to	Early development	Progress	Proper	Enough	Proficient	VALUE
1	Position awareness when doing bare hand movements	-	-	√	-	-	3
2	Mobility and movement	-	-	√	-	-	3
3	Movement understanding	-	√		-	-	2
SCORE = $\frac{TOTAL\ SCORE}{15}\ x\ 100$							
SCORE = $\frac{8}{15}\ x\ 100 = 53\%$							

Based on the results of the Pre-Action test cycle I, it can be seen that the score obtained is 53%.

Table 2. Improvement of Skills Outcomes in Physical Disability Students Post-Action I

No	Things that observers should pay attention to	Early development	Progress	Proper	Enough	Proficient	VALUE
1	Position awareness when doing bare hand movements	-	-	√	-	-	3
2	Mobility and movement	-	-	√	-	-	3
3	Movement understanding	-	-		√	-	4
SCORE = $\frac{TOTAL\ SCORE}{15}\ x\ 100$							
SCORE = $\frac{10}{15}\ x\ 100 = 66\%$							

Based on the results of the post-action test of cycle I, it can be seen that the score obtained is 66%. The results of the actions achieved in the second cycle have not been able to reach the minimum assessment criteria of 75%.

After improving the basic movement skills of bare hands in students with physical disabilities in the first cycle, the results of Pre-Action got a score of 53% and post-Action got a score of 66%, which shows that the pre-Action and post-Action scores have not reached the minimum assessment criteria. Because the first cycle of assessment has not reached the minimum assessment criteria of 75%, the improvement of basic bare hand movement skills in students with physical disabilities is continued in the second cycle by providing reinforcement to indicators that have not reached the minimum assessment criteria. The results of achieving basic manual movement skills in Pre – Action I and Post – Action I are presented in the following figure:

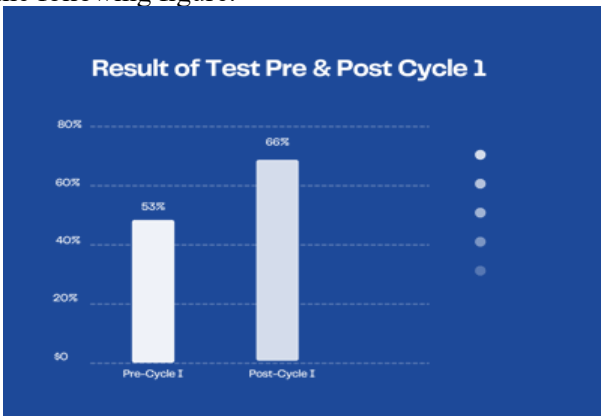

Figure 1. Results of the achievement of basic movement skills of bare hands in Pre-Action and Post-Action in cycle I.

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Cycle II

Table 3. Improvement of Skills Outcomes in Pre-Action II Physical Disability Students

No	Things that observers should pay attention to	Early development	Progress	Proper	Enough	Proficient	VALUE
1	Position awareness when doing bare hand movements	-	-	√	-	-	3
2	Mobility and movement	-	-	√	-	-	3
3	Movement understanding	-	-		√	-	4

$$\text{SCORE} = \frac{TOTAL\ SCORE}{15}\ x\ 100$$

$$\textbf{SCORE} = \frac{\mathbf{10}}{\mathbf{15}}\ \boldsymbol{x}\ \mathbf{100} = \mathbf{66\%}$$

Based on the results of the post-Action test cycle II, it can be seen that the score obtained is 66%.

Table 4. Improving Skills Outcomes in Students with Physical Disabilities Post-Action II

No	Things that observers should pay attention to	Early development	Progress	Proper	Enough	Proficient	VALUE
1	Position awareness when doing bare hand movements	-	-	-	√	-	4
2	Mobility and movement	-	-	-	√	-	4
3	Movement understanding	-	-		√	-	4

$$\text{SCORE} = \frac{TOTAL\ SCORE}{15}\ x\ 100$$

$$\textbf{SCORE} = \frac{\mathbf{12}}{\mathbf{15}}\ \boldsymbol{x}\ \mathbf{100} = \mathbf{80\%}$$

Based on the results of the second cycle of post-Action, it can be seen that the value obtained is 80%. The results of the post-action achieved in the second cycle have reached the minimum assessment criteria of 75%. This means that this cycle can be stopped considering that the target has been achieved. The results of achieving basic movement skills of bare hands in Pre – Action II and Post – Action II are presented in the following figure:

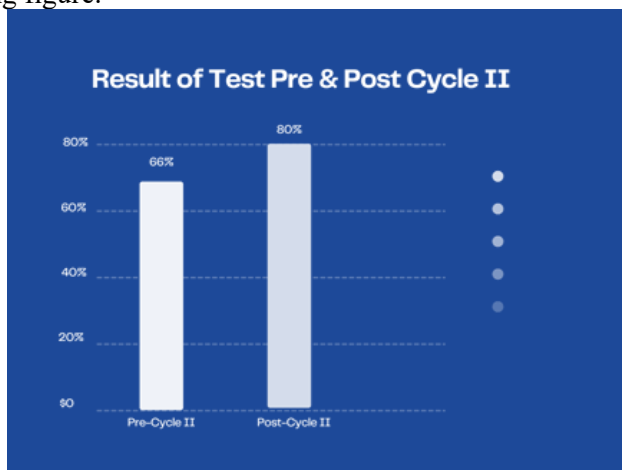

Figure 2. Results of achieving basic bare hand movement skills in Pre-Action and Post-Action in cycle II.

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The results of the above study show that there is an increase in basic movement skills of bare hands in students with physical disabilities. Students showed improvement in punching techniques, kicks and understanding of movement, this study also increased students' confidence and motivation. Thus, the peer teaching method has proven to be effective.

The above reinforces the theory that peer teaching has been proven to be effective in improving the motor skills of students with physical disabilities. This process allows students to provide each other with feedback that helps them understand the strengths and areas that need improvement in basic movement exercises, including the *pencak silat* bare hand moves (Boud et al., 1999). In the context of *pencak silat*, evaluation by peers can create positive interactions that increase students' motivation to practice better (Bertills et al., 2018).

The implementation of peer teaching in *pencak silat* not only improves students' technical skills but also builds confidence. Children with physical disabilities often feel isolated in physical activity, but through peer teaching, they feel more valued and motivated to participate (Ashaver, 2013). This approach allows students with special needs to gain a deeper understanding of movement techniques through constructive feedback (Kuntjoro et al., 2022).

Empty-handed exercises in *pencak silat* require students to master basic movements such as stance positions, punches, and parries. In the context of inclusive education, peer teaching helps students identify weaknesses in their movement techniques through peer observation. Studies show that this method is able to speed up learning because students can instantly see and correct their movement errors (Fitriady et al., 2022).

In addition to improving motor skills, peer teaching also has a positive influence on students' social skills. In *pencak silat* exercises, students learn to cooperate and support each other, so that an inclusive learning environment is formed (L. Li et al., 2022. Through this process, children with physical disabilities gain experiences that strengthen their social relationships with classmates.

However, the success of peer teaching depends on the readiness of teachers and the available facilities. Teachers should ensure that students with physical disabilities receive adequate support during exercises, such as providing appropriate tools or technique adaptations (Ackah-Jnr, F. R., & Danso, J. B. 2019). Intensive mentoring is needed so that students can make optimal use of peer teaching. The application of peer teaching at Elementary School 1 Giritirto Karanggayam has great potential in improving basic bare hand movement skills in students with physical disabilities. By involving students in the evaluation process, schools not only support motor development but also build inclusive and collaborative student character.

The effect of peer teaching on the basic movement skills of bare hands in *Pencak Silat* with physical disabilities, consisting of 3 dimensions. These three dimensions are explained in depth below:

1. Position Awareness when Doing Empty-Hand Movements

   When students do the basic movement skills of bare hands, in cycle I students get decent results enough to understand the position and be able to be in the right place, in cycle I students need to be strengthened in the placement of the right position on the leg stances by their peers exemplifying the right position and strong foot stances, so that in the second cycle to improve the basic movement skills of the bare hand in the right position placement on the foot stance, in the second cycle the students are assessed to be able to place the foot struts in the correct position, namely the knees are slightly bent and facing forward. As a result, the second cycle was stopped.

   Position awareness is an important aspect in mastering basic skills of *pencak silat*, especially for physical disabilities. Peer teaching helps individuals to correct body position errors with direct feedback from fellow exercise participants(Bertills et al., 2018). Through peer evaluation, athletes can understand the correct posture and improve coordination between body parts during bare hand movements (B. Li et al., 2022). It also provides an opportunity for athletes with disabilities to focus more on being aware of limb movements in more detail.

   Additionally, positional awareness involves proprioceptive perception, which allows individuals to know the position of their body without looking (Slemenda et al., 2019). Through peer teaching, athletes with physical disabilities learn from the observations and suggestions of their peers,

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thus reinforcing correct movement patterns (Febrianti, 2019). Accurate feedback from peers will make it easier to identify shortcomings and build a deep understanding of the ideal position.

2. Mobility and Movement

When students do basic movement skills with bare hands, in the first cycle students enter the assessment of being fit to move well but sometimes less efficiently, in the first cycle students need to be improved in making steps to the right side so that they are faster and more efficient. By the way peers exemplify the movement of steps to the right side, so that it is carried out in the second cycle to improve the basic movement skills of the bare hand movement of the step to the right side, in the second cycle the students are assessed to be able to move well to the right side quickly. As the result, the second cycle was stopped.

The mobility dimension includes the athlete's ability to move efficiently in the range of movement of the bare hand. Peer teaching allows for direct observation of movements so that athletes can optimize transitions between movements (Dochy, Segers, & Sluijsmans, 1999). With good mobility, athletes with physical disabilities can maintain smooth movements and improve performance consistency during empty-handed exercises (Hattie & Timperley, 2007).

Mobility is also closely related to the flexibility of the body. In this case, peer teaching plays a role in evaluating the flexibility aspect of movement, so that athletes can improve the ability of muscles and joints to move more freely (Topping & Ehly, 2001). Exercises accompanied by feedback from peers will help athletes achieve optimal mobility that supports basic *pencak silat* skills.

3. Movement Understanding

When students do basic movement skills of bare hands, in cycle I students have a good understanding of punch and kick movements, in cycle I students need to be improved in doing hand and foot movements faster and more efficiently. By the way peers exemplify the movement of hitting and kicking, so that it is continued in the second cycle to improve the basic movement skills of the bare hand and foot movements, in the second cycle the students are assessed to be able to move well with the hand hitting forward and the foot kicking forward. As the result, the second cycle was stopped.

Movement comprehension is the ability to compose and execute the sequence of movements logically and precisely in bare hand movements. Peer teaching assists athletes in analyzing the quality of movement based on the observations and feedback of training partners (Fernández-Batanero et al., 2024). Through reflection and discussion, athletes can build an understanding of how each movement contributes to the overall move (Kuntjoro et al., 2022).

The quality of movement comprehension will be better when athletes are given the opportunity to assess and provide input to their peers. This activity creates a collaborative learning environment, where athletes can correct movement deficiencies based on the feedback received (Norito et al., 2022). Therefore, peer teaching not only improves cognitive understanding but also hones practical skills in the implementation of movements.

From this study, the latest learning method was obtained to improve basic movement skills of bare hands in students with physical disabilities using the peer teaching method. The results of the study show that the peer teaching method is effective in improving the basic movement skills of bare hands in students. This method facilitates active learning, improves movement skills and develops self-awareness. The study has limitations in the limited number of samples, so results may not be generalized to a wider population.

CONCLUSION

This study shows that the peer teaching method is effective in improving the basic movement skills of bare hands of students with physical disabilities. The results of the study showed a significant improvement in the technique of punching, kicking and understanding the movements of students. Peer teaching methods can be included in the physical education curriculum, and there is a need for further research on the influence of peer teaching methods on deaf people. The limitation in this study is the lack of attention from teachers in teaching students with physical disabilities specifically so that these students lack communication with teachers and peers. This research makes a real contribution to the

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adaptive learning model in inclusive physical education and underlines the importance of peer involvement as a support in learning. Further research is recommended to test this method on other types of disabilities as well as compare it with other learning approaches.

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