Original Article

e-ISSN: 2721-7175 p-ISSN: 2089-2341

Effect of reciprocal learning in big ball games to improve physical literacy of 12-year-old junior high school students

Tatok Sugiarto[1ABCD], Arief Darmawan[2BCD], Zihan Novita Sari[3CDE], Ahadi Priyohutomo[4ADE], Vania Putri Hariyoko[5BCE]

[1,2,3,5]Univeritas Negeri Malang, Indonesia
[4],Universitas Muhammadiyah Karanganyar, Indonesia

Authors' Contribution: A – Study Design, B – Data Collection, C – Statistical Analysis, D – Manuscript Preparation, E – Funds Collection

Abstract: Physical literacy is the development of various human movements consisting of basic movement skills and basic sports skills, so that these skills provide tools for humans to do physical activities that improve or maintain lifelong health. On average, students after school do not have time to do physical activities, this shows that awareness of physical activity is very low, in addition, in physical education learning there are still students who lack and have not optimized physical activity, so that motivation, understanding, knowledge and movement activities in children decrease. This study aims to determine the effect of reciprocal learning in big ball games in improving physical literacy in 12-year-old children at the junior high school level. The method in this study uses a randomized control group pretest-posttest design experimental study, this experimental study was conducted on a group with a control or comparison group, the research sample consisted of 12-year-old children at the junior high school level, the research instrument used in this study adopted from the measurement of physical literacy from the Canadian Assessment of Physical Literacy (CAPL). The results in the independent t-test output table in the equal variances assumed section are known to have a Sig (2-tailed) of 0.015 <0.05 so that a decision can be taken that in the independent sample t-test it can be concluded that Ho is rejected and Ha is accepted, thus the results of this study conclude that there is a significant difference in the final test results of reciprocal learning in big ball games in improving physical literacy between the intervention group and the control group.

Keywords: Physical Literacy; Reciprocal Learning; Big Ball Games

Corresponding author: Tatok Sugiarto, email; tatok.sugiarto.fik@um.ac.id

Recevied: 2024-10-18; Accepted: 2024-12-30; Published online: 2024-12-31

Effect of reciprocal learning in big ball games to improve physical literacy of 12-year-old junior high school students
Jurnal maenpo: jurnal Pendidikan Jasmani Kesehatan dan Rekreasi
Vol 14, No 2 (2024): Volume 14 Nomor 2 Tahun 2024

INTRODUCTION

Physical education and sports can be the spearhead in changing the character of the Indonesian nation to be stronger. Physical education and sports are expected to have a very large contribution to the development of children, not only intellectual development and psychomotor development through movement, but also to the development of their personality, especially those related to the character of the child (Yuliawan, 2016).

Physical education should be interpreted as a form of education through physical activity in a comprehensive sense, namely humanizing humans as a whole. A process of educating through physical activity media, namely an effort to form physical health that has an impact on spiritual health, mental health, social health, and even spiritual health. Physical activity is used as a tool to achieve educational goals. The learning orientation that needs to be developed is a form of learning and teaching that is meaningful for student education as an effort to deliver students to get the category of physical literacy for the realization of educational ideals, which have an impact on the total health of the whole dimension of students, (Abduljabar, 2014).

Life in the era of society 5.0 can be said that all the desired needs are easy to obtain, without realizing that health at a young age to adulthood has a very low figure and is an important urgency to be improved.

Based on the results of a survey at junior high school 1 Karang Loso, it was found that 12-year-old children in grade VII of junior high school, after school students do not have time to do physical activities, and only a few students still take the time to participate in soccer practice and other sports training. So teachers need to provide various learning models in developing better competencies, physical activity and health, one of which is with an integrated model approach with physical literacy (Irmansyah et al., 2021; Kirk, 2013; Roetert & MacDonald, 2015). There needs to be an understanding of education that provides direction related to this, physical education is one of the subjects that plays a role in facilitating children's health (Whitehead, 2019) and physical activity both at school and in everyday life, physical literacy is one part of the development of physical education that identifies the development of students who are aware of health, physical, knowledge, skills and physical activities, in everyday life (Cairney et al., 2019; Durden-Myers et al., 2018).

Physical literacy is defined as the ability of knowledge, attitude skills, involvement in physical activities and awareness of active and healthy lifestyles, therefore physical education

needs to direct students to understand the meaning and physical activities in everyday life, physical literacy is a learning concept that integrates health that is obtained and applied in the context of movement and physical activity (Edwards et al., 2017).

Physical literacy reflects ongoing changes that integrate physical, psychological, cognitive, and social abilities (Keegan et al., 2019) (Dowens et al., 2013) similar things are explained by (Melby et al., 2022) Physical literacy plays an important role in developing students' affective, physical, and cognitive domains. In addition, physical literacy emphasizes an active and healthy lifestyle by doing various physical activities and improving a person's motor skills (Castelli et al., 2015). Physical literacy has 5 interrelated domains, including physical activity behavior, active attitudes and lifestyles, motivation to exercise, sports knowledge, and motivation (Holler et al., 2019), considering the importance of physical literacy for secondary school students, the teaching methods provided must also be appropriate.

The reciprocal teaching method is one of the physical education learning methods used by Moston. This method teaches about feedback and social relationships with peers, (Simbolon, 2019) Reciprocal learning is a learning model that emphasizes cognitive in students and provides students with the opportunity to learn independently, creatively and actively, in addition reciprocal learning is known as a reverse learning model, where students act as teachers and provide full explanations to friends or other students to provide teaching, so that teachers only act as motivators and facilitators in the learning process, in the learning process students are given the freedom to provide question generating, clarifying, predicting and summarizing. The advantages of reciprocal learning models include, training students' ability to learn independently so that independent learning abilities can be improved, training to explain the material being studied, the orientation of learning is investigation and discovery, developing students' creativity, and fostering talent in speaking. (Amin & Sumendap, 2022).

So that this becomes one of the teaching models that can facilitate students in improving physical literacy in the physical/bodily domain and knowledge and understanding. Based on the description above, the researcher is interested in conducting an experimental study on the application of reciprocal learning in big ball games to improve physical literacy at the age of 12 years in grade VII at junior high school 1 Karangploso, Malang Regency.

MATERIAL AND METHODS

Method in this study used experimental research with a randomized control group pretest-posttest design. Research sample was 16 students of class VII of junior high school 1 Karangploso aged 12 years. This experimental study used a pre-pretest test O1 and a post-posttest test O2 to determine the effectiveness of treatment X on the results of administration before the pretest and after the posttest, the design can be explained as follows:

Table 1. Experimental Method

Variables	Pre test	Treatment	Post Test
Intervention	O1	X	O2
Control	O1	-	O2

Information:

X : Treatment or treatment of research subjects

O1 : Pretest before treatment

O2 : Post-test after treatment

\- : No treatment or care was given to research subjects

The research instrument used in this study adopted the physical literacy measurement from the Canadian Assessment of Physical Literacy-2 (CAPL-2). CAPL-2 has a good, comprehensive, accurate and reliable level of measurement in assessing the level of physical literacy of children aged 8-12 years, CAPL-2 has 4 domains including knowledge, understanding, physical or bodily competence, each explanation in the domain of motor skills and knowledge, as follows:

Table. 2 Instrumen *Canadian Assement of Physical hLiteracy*-2 (CAPL-2)

Motion Components	Indicator	Point
Jumping on 2 feet	Enter and exit the circle in 3 jumps	2
	No excessive jumping and no touching of the circle	
Shifting	Body and legs are aligned sideways when shifting in one direction	3
	Body and legs are aligned sideways when shifting in opposite directions	
	Touch the cone in a low position	
Catch	Catch the ball (don't fall)	1
Throw	Using an overhand throw to hit the target	2
	Pushing the body and rotating the body	
Skipping	Correct jump step pattern	2
	Using arms appropriately (alternating arms and legs, arms swinging for balance	
Jump on 1 leg	Land on one foot in each circle	2
	Jump once in each circle (do not touch the circle)	
Kick	Planned movement before kicking the ball and hitting the target	2
	Long step on the last step, before doing the kick	

Measurement using the CAMSA instrument consists of a movement assessment with indicators of the implementation of movement components with a total score of 0-14 and the fastest time performed by the subject, subjects who performed the CAMSA test for all movement components got the highest score of 14 with a time of <14 seconds, and the lowest score of 1 with a time of >30 seconds, the instrument on the plank test is also the same, the assessment is based on the time performed by the subject, the highest value on the plank point is 10 with a plank time of >110 seconds, while the lowest value in the plank category is 0 with a plank time of <20 seconds.

Table. 3 Instrumen Quisioner Canadian Assement of Physical Literacy-2 (CAPL-2).

Q1	How many minutes each day should you and other children do physical activities that make your heart beat faster and make you breathe faster, like walking fast or running? Count the time you should be active at school and also when you are at home or in your neighbourhood	a) 20 minutes b) 30 minutes c) 60 minutes or 1 hour d) 120 minutes or 2 hour	Correct answer : C 1 : correct answer 0 : incorrect answer
Q2	There are many different kinds of fitness. One type is called endurance fitness or aerobic fitness or cardiorespiratory fitness. Cardiorespiratory fitness means	a) How well muscles can push, pull and stretch b) How well the heart can pump blood and the lungs can supply oxygen c) Have a healthy weight for your height d) Our ability to do the sport we like	Correct answer **:** B 1 **:** correct answer 0 **:** incorrect answer
Q3	Muscular strength or muscular endurance means	a) How well muscles can push, pull and stretch b) How well the heart can pump blood and the lungs can supply oxygen c) Have a healthy weight for your height d) Our ability to do the sport we like	Correct answer **:** A 1 **:** correct answer 0 **:** incorrect answer
Q4	If you wanted to get better at a sport skill, like kicking or catching a ball, what would be the best thing to do?	a) Reading a book about kicking and catching a ball b) Wait till you get older	Correct answer **:** D 1 : correct answer 0 **:** incorrect answer

		c) Try exercising or becoming more active. d) Watch videos, take lessons, or ask a coach to teach you how to kick and catch.	
Q5	Sally tries to be active every day. Running every day is good for her heart and lungs. Sally believes that physical activity is___and also_____for her. At her sports team practices she runs a lot to improve her fitness. Her team also____She does exercises like push-ups and sit-ups that improve her fitness._____When she cools down, she _____to improve her flexibility and slow her heart rate down. After exercising, she checks her heart rate, which is also called _____	Fun Stretching Endurance Pulse Breathing Good Flexibility Strength Poor Exercise	1 Point for each correctly placed word (maksimum of 6) 1st gap: Fun 2nd gap : Good 3rd gap : Endurance 4th gap : Strength 5th gap : Stretches 6th gap : Pulse

The questionnaire instrument in the Canadian Assessment of Physical Literacy (CAPL-2) consists of 5 questions, each of which has an indicator related to knowledge of physical activity, and the questionnaire assessment is based on obtaining correct answers with a total score of 1 for 1 question.

The implementation of the pre-test and post-test in this study was to determine the initial condition of the research subjects, the instrument used in this study used physical literacy CAPL-2 using 2 physical components and knowledge including CAMSA, plank, knowledge and understanding. The implementation of this pre-test was carried out in the first week on Tuesday involving all research subjects, while the implementation of the post-test was carried out in the second week on Friday.

In the implementation stage (treatment), the researcher intervened with the reciprocal learning method in a large ball game, the large ball game that will be used in this study is a basketball game that has been modified in its basic game and movements. The implementation of the treatment focused on the experimental group, with a sample size of 8 7th grade students aged 12 years consisting of boys and girls, the treatment was carried out for 2 weeks with 8 treatments, the first week was carried out on Tuesday, Wednesday, Thursday, Friday and the second week was carried out on Monday, Tuesday, Wednesday and Thursday.

RESULTS

Implementation of pre-test and post-test on the experimental group and control group with physical literacy testing consisting of CAMSA, plank and knowledge test and provision of intervention carried out by researchers in the reciprocal learning model in basketball games for 2 weeks with 8 treatments on junior high school students, then the researcher conducted an independent sample t-test calculation to find out how much the final value was in the intervention group and control group, the results can be explained in the table below:

Table 4. Group Statsctics

Variables	N	Mean	Std. Deviation	Std. Error Mean
Intervention	8	15.75	1.753	.620
Control	8	12.88	2.357	.833

The value shown in the calculation of the independent sample t-test in the category with an average/mean of 15.75 in the intervention group and in the control group got a value of 12.88, thus it can be concluded that there is a difference. To find out whether the difference has significance or not, it will be explained in the table below :

Table 5. Independet Samples Test

Levene's Test for Equality of Variances		t-test for Equality of Means						
F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
1.108	.310	2.769	14	.015	2.875	1.038	.648	5.102

Based on the results shown in table 2, the Sig. Levene's Test for Equality of Variances value is 0.310> 0.05, which means that the data variance between the intervention group and the control group is homogeneous or the same, so that the interpretation of the output table above is guided by the value in the equal variances assumed table. With the explanation in the independent t-test output table in the equal variances assumed section, it is known that Sig (2-tailed) is 0.015 <0.05 so that a decision can be taken that in the independent sample t-test, Ho is rejected and Ha is accepted, thus the results of this study concluded that there was a significant difference in the results of the final test of reciprocal learning in big ball games to improve physical literacy of 12-year-old junior high school students between the intervention group and the control group.

DISCUSSION

This research reinforces the findings of several studies in the last five years, which emphasize the importance of collaborative and interactive learning approaches in the development of physical literacy. For example, research by (Morgan et al., 2013) explained that the use of interactive methods in physical education significantly increased student participation and improved their motor learning outcomes. In the context of large ball games, reciprocal learning allows students to better understand their respective roles in the group, improving collaborative skills that are important in team play.

In addition, this finding is also consistent with research by (Casey & MacPhail, 2018) which shows that the reciprocal learning method improves students' strategic understanding in the context of sports, which ultimately contributes to increased physical literacy. In this study, the higher knowledge test results in the intervention group also reflect that the reciprocal learning model helps students understand the tactical aspects of the basketball game better.

Implications of this study are very important for the development of physical education curriculum in junior high schools. Reciprocal learning can be a more effective alternative method compared to traditional learning methods that tend to be one-way instructional. In the long term, the implementation of this method can not only improve students' physical abilities but also social skills, such as teamwork and communication.

Contribution of this study to the field of study is the implementation of the reciprocal learning model in the context of large ball games, especially basketball. This model has been proven effective in improving learning outcomes as measured by various aspects of physical literacy, including motor skills, physical fitness, and tactical knowledge. This adds to the existing literature by providing empirical evidence regarding the effectiveness of this method in a group of 12-year-old students.

Study also supports the findings of (Hastie & Casey, 2020), which states that interactive learning models, such as reciprocal learning, can increase student engagement in learning and help them develop a deeper understanding of sports game concepts. By giving students an active role in the learning process, this method is able to create a more dynamic and collaborative learning atmosphere.

In the context of basketball, the reciprocal learning model allows students to develop physical skills through direct practice and peer feedback. In addition, this learning also

strengthens students' cognitive aspects by giving them the opportunity to understand and apply game strategies effectively.

These findings have significant policy implications, especially in relation to the design of physical education curriculum in junior high schools. By using the reciprocal learning model, schools can develop more effective programs to improve students' physical literacy. A physical education curriculum based on active participation can help students to be more motivated in participating in physical education lessons, while significantly improving their motor skills.

From a practical perspective, physical education teachers can apply the reciprocal learning model in daily sports activities at school. The use of this method will provide variation in teaching, which can prevent student boredom and increase active participation. In addition, teachers can utilize the reciprocal approach to develop communication and cooperation skills between students, which are important elements in team games such as basketball.

In addition, other factors such as student motivation, support from the learning environment, and previous experience in sports can also affect the results of this study. Therefore, further research is needed to understand in more depth the factors that influence the effectiveness of reciprocal learning in improving students' physical literacy.

Contribution of this study to the field of study is significant, especially in terms of providing empirical evidence on the effectiveness of the reciprocal learning model in the context of basketball games. This study adds to the existing literature by showing that learning methods that focus on student active participation can provide better results than conventional methods in teaching sports.

Overall, this study emphasizes the importance of active learning in physical education and provides a strong foundation for the development of a more inclusive and effective curriculum. By implementing the reciprocal learning model, schools can ensure that students not only improve their physical skills but also gain a better understanding of strategies and tactics in sports, which ultimately improves overall physical literacy. Although the results of this study provide strong evidence for the effectiveness of the reciprocal learning model, it should be noted that there are several limitations that need to be considered. One is the relatively short duration of the intervention, which is two weeks with eight treatments. Long-term research is needed to test whether the benefits obtained from this learning model are long-lasting or only temporary.

Findings of this study are also relevant to the need to improve physical literacy as part of a more comprehensive physical education curriculum. According to (Whitehead., 2019) Physical literacy is an important component in children's development related to physical ability, motivation, and self-confidence in participating in physical activities, significant improvements in the intervention group indicate that reciprocal learning can be one way to achieve these goals.

Conclusion this study confirms that the reciprocal learning model in physical education, especially in basketball, has a significant positive impact on students' physical literacy. With strong statistical evidence, these findings support the implementation of more participatory and collaborative learning methods in physical education in junior high schools.

CONCLUSION

This study supports previous findings that emphasize the importance of interactive and collaborative learning approaches in developing physical literacy, especially in the context of large ball games such as basketball. Reciprocal learning has been shown to be effective not only in improving motor skills, but also in strengthening students' cognitive abilities in understanding game strategies. The implications of these findings are crucial for the development of a more inclusive and participatory physical education curriculum, as well as encouraging the implementation of more dynamic learning methods in junior high schools.

REFERENCES

Abduljabar, B. (2014). Strengthening character education through value-based physical activity mediation. *Jurnal Pendidikan Karakter*, *5*(2).

Amin, & Sumendap, L. Y. S. (2022). *164 Model Pembelajaran Kontemporer*. Pusat Penerbitan LPPM.

Cairney, J., Dudley, D., Kwan, M., Bulten, R., & Kriellaars, D. (2019). Physical Literacy, Physical Activity and Health: Toward an Evidence-Informed Conceptual Model. *Sports Medicine*, *49*(3), 371–383. https://doi.org/10.1007/s40279-019-01063-3

Casey, A., & MacPhail, A. (2018). Adopting a models-based approach to teaching physical education. *Physical Education and Sport Pedagogy*, *23*(3), 294–310.

Castelli, D. M., Barcelona, J. M., & Bryant, L. (2015). Contextualizing physical literacy in the school environment: The challenges. *Journal of Sport and Health Science*, *4*(2), 156–163.

Dowens, T., Dalziell, A., & French, J. (2013). Physical education in Scotland; BMT (Better Movers and Thinkers) and physical literacy. *Journal of Sport Science and Physical Education*, *65*(1), p306--311.

Durden-Myers, E. J., Green, N. R., & Whitehead, M. E. (2018). Implications for promoting physical literacy. *Journal of Teaching in Physical Education*, *37*(3), 262–271.

https://doi.org/10.1123/jtpe.2018-0131

Edwards, L. C., Bryant, A. S., Keegan, R. J., Morgan, K., & Jones, A. M. (2017). Definitions, Foundations and Associations of Physical Literacy: A Systematic Review. *Sports Medicine*, *47*(1), 113–126. https://doi.org/10.1007/s40279-016-0560-7

Hastie, P. A., & Casey, A. (2020). *Models-based Practice in Physical Education*. Routledge.

Holler, P., Jaunig, J., Amort, F.-M., Tuttner, S., Hofer-Fischanger, K., Wallner, D., Simi, H., Müller, A., Van Poppel, M. N. M., & Moser, O. (2019). Holistic physical exercise training improves physical literacy among physically inactive adults: a pilot intervention study. *BMC Public Health*, *19*(1), 1–14.

Irmansyah, J., Susanto, E., Lumintuarso, R., Sugiyanto, F., Syarif, A., & Hermansyah, H. (2021). Physical literacy in the culture of physical education in elementary schools: Indonesian perspectives. *Int J Human Move Sport Sci*, *9*(5), 955–963.

Keegan, R. J., Barnett, L. M., Dudley, D. A., Telford, R. D., Lubans, D. R., Bryant, A. S., Roberts, W. M., Morgan, P. J., Schranz, N. K., Weissensteiner, J. R., & others. (2019). Defining physical literacy for application in Australia: a modified Delphi method. *Journal of Teaching in Physical Education*, *38*(2), 105–118.

Kirk, D. (2013). Educational value and models-based practice in physical education. *Educational Philosophy and Theory*, *45*(9), 973–986.

Melby, P. S., Nielsen, G., Brønd, J. C., Tremblay, M. S., Bentsen, P., & Elsborg, P. (2022). Associations between children's physical literacy and well-being: is physical activity a mediator? *BMC Public Health*, *22*(1), 1–13.

Morgan, P. J., Barnett, L. M., Cliff, D. P., Okely, A. D., Scott, H. A., Cohen, K. E., & Lubans, D. R. (2013). Fundamental movement skill interventions in youth: A systematic review and meta-analysis. *Pediatrics*, *132*(5), e1361--e1383.

Muhsyanur. (2020). *Pemodelan Dalam Pembelajaran : Mendesain Pembelajaran Menjadi Berkarakter dan Berkualitas*.

Roetert, E. P., & MacDonald, L. C. (2015). Unpacking the physical literacy concept for K-12 physical education: What should we expect the learner to master? *Journal of Sport and Health Science*, *4*(2), 108–112.

Simbolon, M. E. (2019). *Tuturan Dalam Pembelajaran Berbicara Dengan Metode Reciprocal Teaching*. Surabaya: Media Sahabat Cendekia.

Whitehead., M. (2019). *Physical Literacy: Throughout the Lifecourse*. Routledge.

Yuliawan, D. (2016). Formation of children's character with a sportsmanship spirit through physical education, sports and health. *Journal Of Sportif*, *2*(1), 101–112.