International Journal of Learning, Teaching and Educational Research
Vol. 21, No. 11, pp. 334-356, November 2022
https://doi.org/10.26803/ijlter.21.11.19
Received Sep 9, 2022; Revised Nov 26, 2022; Accepted Nov 30, 2022

Levelling System Model: Approach to Physical Literacy

Cucu Hidayat*
Universitas Siliwangi, Tasikmalaya, Indonesia

Anggi Setia Lengkana and Rizal Ahmad Fauzi
Universitas Pendidikan Indonesia, Bandung, Indonesia

Aang Rohyana
Universitas Siliwangi, Tasikmalaya, Indonesia

Mia Rosalina
Universitas 17 Agustus 1945, Cirebon, Indonesia

Dadang Budi Hermawan
Universitas Sebelas April, Sumedang, Indonesia

Didik Purwanto
Universitas Tadulako, Palu, Indonesia

Abstract. Motion learning needs to be interpreted so that motion becomes effective and efficient. Teachers must develop material adapted to a structured curriculum using specific standards in the learning process that students must achieve. The purpose of this research was to analyze the effectiveness of using the Model Levelling System (LS) to increase physical literacy (PL) in the physical education (PE) of elementary school students. This study used an experimental method with a pretest-posttest one-group design. The samples used in this research were 105 people consisting of male and female students, using the cluster random sampling technique. The instruments used were the Canadian Assessment of Physical Literacy, Second Edition (CAPL-2) to measure students' motivation and self-confidence, the Canadian Agility and Movement Skill Assessment (CAMSA) to measure physical competence, the Physical Literacy Knowledge Questionnaire (PLKQ) to measure knowledge and students' understanding, and Pedometer, Google Fit to measure daily behavior. Statistical data analysis was conducted using SPSS for Windows 20 series with the first step testing validity and

* Corresponding author: *Cucu Hidayat, cucuhidayat@unsil.ac.id*

reliability, reducing data using the method of successive interval (MSI), testing data normality using Kolmogorov Smirnov, and testing significance using the paired sample t-test. This study concluded that the LS model has proven to be effective in increasing the PL of elementary school students. This is supported by the results of the t-test obtained by the value of sig. (2-tailed) of 0.000 < 0.05. Therefore, it can be stated that there is a difference in PL scores between the pre-test and post-test in this study. This research can contribute significantly to the world of physical education so that for the perfection of further research, large samples are needed at every level of education.

Keywords: levelling system model; physical literacy; learning approaches; physical education; elementary school

1. Introduction

Physical education is an educational process that involves interaction between students through systematic physical activity toward the formation of a whole person. PE is a foundation needed to nurture children's cognitive, practical, and psychomotor needs, which they will later need in order to grow and develop holistically (Pühse & Gerber, 2005; Weinberg & Gould, 2018). Children are the nation's assets, therefore paying attention to their physical and psychological health is necessary. Healthy child development is essential in realizing a strong Indonesia. It is of concern that nowadays, children tend to lack physical activity, which can cause problems in their bodies. Many public health experts have emphasized the importance of prevention in dealing with these problems through health promotion and increasing the schools' role in developing children's physical activity (Kolbe et al., 2019).

As time goes by, children's need for systematic and programmed physical activity must be a top priority to be implemented in long-term programs because the initial foundation of growth and development is the forerunner of physical activities as well as activities at school. This is done to promote the early prevention of health problems through physical activity in children using the concept of PL. Corbin (2016) explained that PL is a concept of healthy lifestyle habits with four interrelated components: motivation, belief, physical, cognitive (knowledge and understanding), and behavior. Through a play activity approach, PL is expected to influence motor development in school-age children so that it helps enrich body movements. Based on the results of the writers' observations after the Covid-19 pandemic, the condition of children needs to readjust to daily activities at school, such as the frequency of physical activity in the context of physical education, extracurricular activities, and other routine activities. This is necessitated a study applying learning models in an attempt to prevent and treat children's conditions. Schools play a significant role in PL children through PE and sports extracurricular programs, thereby increasing the role of community-based schools that involve the community in promoting physical activity. Caldwell et al. (2020) explained that the involvement of children in school activities should be fun and can improve motor skills. The role of parents and the community is needed in implementing PL.

PL conditions must contain elements involving cognitive, affective, and psychomotor domains (Edwards et al., 2019; Shearer et al., 2018). Therefore, physically literate individuals are people who have good mobility and physical capacity, motivation, self-confidence, a positive attitude, who are always actively physically involved, have convincing knowledge related to physical activity and its benefits, following a routine and being diligent in doing daily activities (Lengkana et al., 2019a; Mulya et al., 2021). Goss et al. (2022) emphasized that PL is aimed at individuals who can continue to develop skills and add a variety of motions, intensity, and duration. There are several components in PL: motivation, skill, confidence, and knowledge (George et al., 2016). Longmuir et al. (2018) explained that knowledge and understanding are included in the cognitive domain aimed at individuals who know and understand a healthy lifestyle and the benefits of physical activity based on science.

The involvement of children in lifelong physical activity is included in the domain of behavior aimed at individuals responsible for healthy lifestyle choices and the challenges of other physical activities as part of life. The primary key to developing PL is through quality learning experiences, and the characteristics of quality PL learning experiences must vary according to competence and context in PE learning (Dudley, 2015). Higgs et al. (2019) explained the characteristics of the development of PL as a) having the opportunity to move in an unstructured and structured environment, b) having the opportunity for all participants to lead, explore and innovate, c) having the availability of equipment appropriate to learning needs, d) facilitating fun and challenging learning activities that lead to success and failure, e) having the opportunity to choose between various activities and environments, and f) a high student participation rate. Therefore, to equip PL so that all competencies needed by children can be adequately fulfilled through PE, a practical learning approach is necessary for children to learn movement. Strengthening PL in elementary school children is expected to provide motivation, confidence, and enthusiasm to continue doing physical activity (Wagner et al., 2013). With children involved in physical activity, the body's immunity system is increased so that they will stay fit and healthy. Therefore, it is clear that at this stage, physical activity is essential to maintain health.

The learning approach involves learning in stages, from the easiest to the most difficult. This is done to provide a meaningful learning experience and to hone skills based on levels of difficulty in learning. The study sough to apply a learning approach using the model levelling system (LS) to equip children with PE at school. LS is a learning model that consists of several components which are interrelated with each other and form a unified whole to achieve a pre-determined goal. Furthermore, LS is a learning process to determine each student's level. Through LS, students learn to recognize and understand their competencies for coping with life's challenges in the future (From, 2017). Competence is a unity of understanding and mastery of knowledge, skills, values, and attitudes as outlined in the pattern of thinking and acting when carrying out activities (Valijonovna et al., 2022). Through LS, learning is packaged systematically to make learning easier for children. Each level of knowledge has been adjusted to the growth and development of school-going children . It stimulates children's motivation to learn (Muhtar et al., 2021). They will voluntarily participate in learning when the

material presented is exciting, easy to do, and challenging (Stephani, 2017). It also promotes students' autonomous learning (Rahman et al., 2021).

The LS model has been adapted to the *Merdeka Belajar* curriculum initiated by the Indonesian government in 2020 with learning nuances of play. *Merdeka belajar* in PE learning, one of which is to allow students to move freely using facilities prepared and deliberately designed by the teacher to shape students' attitudes, knowledge, and skills (Kemendikbud & Tohir, 2020). Saleh (2020) explained that if students were free to carry out various learning activities by themselves it would not seem like learning to them. Instead of controlling activities, the teacher's role is rather that of a monitor, using various appropriate strategies so that the student activities align with the achievement of the laid-down learning objectives.

Learning design is an essential aspect before any teaching or learning takes place (Lengkana et al., 2020). An educator must understand the competencies to be achieved through the curriculum references used in the learning curriculum (Mustafa, 2021). The first step in preparing a learning design is a needs analysis, where an educator needs to consider the environment encountered when teaching later. Lengkana et al. (2019b) and Subarna et al. (2021) explained the factors necessary to design learning as including facilities, environmental conditions, student characteristics, and the material that needs to be taught. Lesson plans need to be designed according to the requirements of *Merdeka belajar*.

Previous studies were limited to only examining the concept of PL in the 2013 Curriculum (K13) (Roetert & MacDonald, 2015), researching the development of sports and physical literacy (Lundvall, 2015), and researching assessment and physical literacy (Young et al., 2021). Looking at several previous studies, the authors have yet to find research on the involvement of learning models in developing children's PL in PE learning. With this in mind, they identified a need to examine the possibility of providing a different movement learning experience for each PE lesson. It was carried out by applying the LS model to develop the physical literacy abilities of elementary school children.

2. Theoretical Framework

2.1. Levelling System

The LS method is the result of previous research by the authors in 2021. The authors' reason for the LS naming is that they wanted a name for this model that was different from others. This learning process is an approach to identifying or knowing the competence level of each student. The students must progress from the most accessible level to the most complex and challenging (Lengkana et al., 2019b, 2020; Muhtar et al., 2019, 2020; Mulya et al., 2021). The students are given several motion experiences based on what they like; however, the teacher has structured these taking into consideration the tools to be used in the following levels. The students will have a different motion learning experience, with varying levels of difficulty; they will learn to solve problems and think of what techniques, tactics, and strategies should be used to complete the motion assignment (Bores-Garcia et al., 2021). LS has several essential components to consider as follows:

a. The stage of grouping students through an ability test into three levels based on the grades achieved by students.

b. The stage of determining the teaching method according to the level of student ability can thus improve student learning outcomes.
c. The evaluation stage consists of three types, namely i) a daily performance test that is carried out after facilitating learning, ii) a periodical test is held at the end of the topic, and iii) a promotion test is conducted at the end of the semester to assess and reposition students' ability levels.

LS has indicators that must be considered in the preparation of long-term children's programs, especially in the context of physical education. They include the following:

a. *Enthusiasm* is students' willingness to pay attention to the learning facilitated by the teacher.
b. *Desire* is the desire or willingness of students to answer questions or training provided by the teachers.
c. *Speed* is a quick effort made by students in assignments and training given by the teacher.
d. *Initiative* is a student's initiative to ask questions if some instructions or discussions need to be understood or explained.
e. *Focus* is the seriousness of students in carrying out assignments and training provided by the teacher.
f. *Evaluation* is the process of studying the results of the learning provided by the teacher by taking notes and practising.

2.2. Physical Literacy

Physical literacy (PL) is a skill that students must possess owing to a shift in PE learning outcomes (Gustian, 2020). According to Tremblay and Lloyd (2010), PL) is interpreted as a foundation in the formation of behavior, awareness, understanding of active lifestyles, pleasure in carrying out activities, and the ability to identify, understand, interpret, and respond effectively to the use of gestures in a wide and varied context. PL is a concept that was intended to equip individuals to have an active lifestyle involving physical activity. PL is an emerging construct in promoting children's health and can affect their lifelong physical activity habits (Tremblay et al., 2018). Through PL, various health problems caused by a lack of physical activity can be overcome. This means that the emergence of the term PL provides new concepts and directions in physical education science.

PL comprises motivation, self-confidence, physical competence, knowledge, understanding, and respecting and taking responsibility for maintaining physical activity goals throughout life (Ennis, 2015). That is, PL includes the domains of motivation, self-confidence, physical competence, knowledge, and understanding. However, of the four aspects, the field of knowledge and experiences is critical. This is because knowledge and experience become the basis for children about what, how, and when to engage in physical activity (Whitehead, 2016).

According to Priadana et al. (2021), the physical activity of children aged 8-12 years must be adjusted to their growth and development to have an optimal impact on their physical and emotional development. This includes basic movement skills, physical fitness, and sports skills. Therefore, the questions used

in the PL knowledge instrument meet these requirements. Based on the explanation above, this knowledge of PL for children as the primary capital is essential to carry out various lifelong physical activities. Given the importance of developing PL for students, it should be the primary focus of teachers who teach physical education, especially in elementary schools in Indonesia. This is because PE in elementary schools has a vital role in student development, namely encouraging students to learn movement to improve movement skills, develop fitness, increase knowledge about motion, and stimulate them to participate actively in physical exercises.

2.3. Component of Physical Literacy

The benefits for children with good PL include having physical and fitness skills, having positive attitudes and emotions that motivate them to be active, having knowledge and understanding of how, why, and when they should engage in physical activity, and acquiring social skills to enable them to socialize actively with others (Higgs et al., 2019). To achieve PL capabilities, the following components must be considered (Edwards et al., 2017):

a. Motivation and Confidence (Affective); Motivation is the driving force to grow and increase enthusiasm in learning activities. Students' motivation influences the development of the process and student learning outcomes. Confidence is one aspect of personality in the form of belief in one's abilities so that they are not influenced by others and can act according to their own will, and be happy, optimistic, tolerant, and responsible. Motivation and self-confidence grow from healthy interaction in the individual's social environment and occur continuously. Motivation and self-confidence do not just appear in a person; there is a specific process in their personality development. Motivation and self-confidence refer to an individual's enthusiasm for comfort and self-confidence in adopting physical activity as an integral part of life.
b. Physical competence (Physical); Physical competence refers to an individual's ability to develop skills, movement patterns, and the capacity to experience various intensities and durations of movement. Increased physical competence enables individuals to participate in multiple physical activities suitable for children.
c. Knowledge and understanding (Cognitive): This is a combination of factors such as experience, values, contextual information, wisdom, and intuition. Knowledge is one of the requirements for individuals to develop an idea or a skill in which they can achieve or something they want to produce. Knowledge and understanding include identifying and expressing essential qualities that affect movement, understanding the health benefits of an active lifestyle, and appreciating appropriate safety features associated with physical activity in various environments.
d. Engagement in physical activities for life (Behavioral); Involvement of a child in lifelong physical activity refers to individuals who take personal responsibility for their PL by choosing freely according to their interests and their need to be active regularly. This should be a priority and a commitment to maintaining involvement in a variety of personally meaningful and challenging activities as an integral part of one's lifestyle.

2.4. Research Objective

The concept above can be a direction of change for teachers in improving the quality of learning and PE learning activities in schools. Based on this, this study's purpose is to increase PL after students have learnt movement education through a levelling system model approach so that the findings of this study can contribute to improving teachers' pedagogical competence to equip students with holistic learning skills.

3. Method

3.1. Design

The authors tried unsuccessfully to find information on how this levelling system is applied in physical education learning to improve the PL of elementary school students. Therefore, the experimental research approach was chosen in this study. The practical method is used in this study with a research design of one-group pre-test post-test design, i.e., empirical research carried out with only one group selected randomly (Fraenkel et al., 2011). The following is a flowchart for research design:

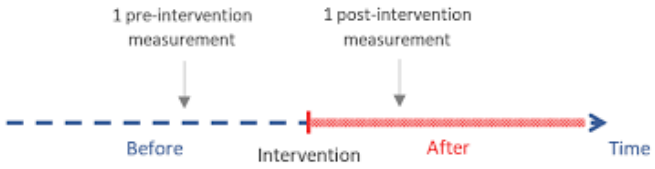

Figure 1: One-group pre-test post-test design

3.2. Research Procedure

In the early stages, a series of tests was conducted at the beginning before the treatment was carried out and at the end after the treatment had been carried out to determine the basic description the level of PL of children before and after being given treatment. Owing to the many components that the researchers had to observe to facilitate the observation process during the research process, a record was kept for each participant to see how their abilities develop from one meeting to the next. The test consists of four components, based on a) children's motivation and self-confidence; b) physical competence; c) knowledge and understanding; and d) involvement in lifelong physical activity. To facilitate class management and research data collection, the sample was divided into three groups, and the test was conducted in three sessions. Questionnaires were distributed to respondents in each session. Respondents were accompanied by researchers and PE teachers from the school to facilitate their understanding in filling out the questionnaire.

Table 1: Stages of levelling system model

No	Indicator	Activity description
1.	**LEVEL 1**	
	Fundamental Motor Skill (FMS):	a) In the first lesson, students are introduced to learning fundamental movements such as running, walking around, imitating various
	Running ABCs (agility, balance, coordination, and speed)	

	Following voice instructions Branchy ball Obstacle ball Walk and hop on Crab walking and horse riding Frog jumping competition Caterpillar walking Body control skills	forms of simple exercises, and developing some of them. b) This learning prioritizes the fulfillment of motion needs as the initial foundation of learning motion before students learn other complex forms of movement. c) Learning the motion of running ABC, following proper instructions, balls with balls, obstacle balls, crab walking competitions, frog jumping, and snail walking are development activities to provide other motion experiences with different nuances. d) The stages of learning are adjusted to the success level of mastery of movement carried out by students. If they do not meet the specified motion criteria, they will not move to material with a high level of complexity. e) Participants prioritize gross motor components such as locomotor, non-locomotor, and manipulative movements at this stage. f) They also learn to control arm and leg position and body control (e.g., balance movement activities, coordination).
2.	**LEVEL 2**	
	Coordination Training: Long shot and combo Crab soccer SOS games Mine circle Throw and catch stars Skills Motor cognitive coordination training (MCCT)	a) Long shot is a direct kick to the target from a distance. A long shot is one of the techniques that every player must master to score and pass the ball to the target. A long shot can also be used when a free kick after a player has committed a foul. Combo soccer steal, or what is called stealing the ball, is one technique that is relied upon by the team when not holding the ball to stop the opponent's movement so that the team can score goals faster. b) Crab football is an activity played by two teams where each team consists of 4-5 people with one goalkeeper. The game aims to kick the ball into the goal to score as many points as possible. Players' hands are placed under or beside their bodies and move sideways using their feet; their movements should be like walking crabs. This game can be played indoors and use a handball the size of a regular soccer ball. Only the goalkeeper can hold the ball. c) In the SOS game, a group of children is divided into red and blue teams. In front of each group are three boxes with five rows behind each row (SOS). Each group must arrange a package their team's colour; it can be horizontal or vertical (it must be a straight line). Each group can make the other group lose by thwarting the opponent team's SOS (entering their team's

		colour into the SOS). The team that can arrange the SOS first wins the game. c) In the SOS game, a group of children is divided into two teams: red and blue. In front of each group are three boxes with five rows behind each row (SOS). Each group must arrange a box with their team's colour; it can be horizontal or vertical (it must be a straight line). Each group can make the other group lose by thwarting the opposing team's SOS (entering their team's color into the SOS). The team that can arrange the SOS first, then that team wins. d) This game uses a circular rope with no end; in this game, there is a tug of war in the form of a circle. The way to do this game is to divide students into three groups, each consisting of 4 students. Each group is given one seat. The circular rope is stored in the middle of the three groups. Each group prepares to hold the rope. When the whistle is blown, the students start running to pick up the rope, then the group that touches their seats is the winner. e) MCCT games prioritize cognitive and coordination aspects in various activities.
3.	**LEVEL 3**	
	Net games; Using tactics (tennis, squash, badminton, table tennis, volleyball, sepak takraw, and a variety of games using the net or walls) Shadow game, no ball Supporting the ball carrier when passing Passing and receiving the ball Using forward target players when shooting and dribbling Application of learning variations, player placement, game patterns, 1vs 1, 1 vs 2, 2 vs 2, 2 vs 3, 3 vs 3, 3 vs. 4, 4 vs. 4, 5 vs. 5 Transitions and shifts Defense mechanism Communication among the players	a) Sending or placing objects against walls or over nets into vacant or poorly guarded areas. For example, a big volleyball game sends it into an empty or open space with various variations of speed and strength. b) Initiating and returning to the original strategic position at the end of each move. Every time you make a move, you immediately analyze the possibilities of what might happen from the action taken; therefore, putting yourself in the correct position is a strategy to win the game. c) The need to play objects in various ways, both speed, rotation, the direction of objects, and strength so that the opponent does not easily read them. In net and wall games, the variety of strokes or placements is decisive in getting the advantage in the game. The more variety players have, the more choices they will have to make or answer the challenges they face while playing. d) The strategy of dividing the area with friends. By dividing the area proportionally according to the abilities possessed by each player, it is easier to control the area or narrow the open area so that all game areas are always in control. The division of this area can also be used to make positions and repositions from areas left by their playmates.

		e) Always communicate with friends during play. Harmonious relationships among team members on the field during the game are beneficial in achieving a goal. f) Communication can be in verbal form or with specific signs, gestures with fingers, thumbs, etc., to perform specific movements, for example, wanting to grab, smash, serve, or block in volleyball, tennis, or table tennis.
4.	**LEVEL 4**	
	Invasion games; Big target, Near-far Small target, Near-far Cross target, tiny target-big target, far-close Games performance (1 vs. 1, 1 vs. 2, 1 vs. 3, 1 vs. 4, 1 vs. 5, 3 vs. 3, 5 vs. 5)	a) Learning begins with students learning the game of accuracy, starting from large targets to smaller sizes. The distance that is played starts from the closest to the farthest point in the corner of the field. The target can be in a straight line with the participant, or it can also be placed across. Therefore, participants have to do some movement development. b) This game is similar to the game of defense and attack; tactics and strategy are essential to score points and win the game. c) When the game starts, participants compete for one vs. 1, starting from determining who is on guard and who is attacking. If the attacker wins a point, the winner has the right to add one player and one ball, so the number of attacking players becomes two players and has two balls. Meanwhile, if the defending team wins the same number, they have the right to have it. The game ends up with five vs. 5, and the number of points is limited to 5 digits.

Based on Table 1 above, the concept of independent learning is that students can choose physical activities that will be carried out according to their hobbies. Thus, the authors determine various activities that, when implementing PE learning, use the LS method, where the material includes basic movement skills activities, physical fitness activities, and sports skills. Students can choose various physical activities the teacher has provided, but they must choose one of the three. In the next meeting, the teacher does the same thing so that, in the end, they have had the experience of movement in various activities.

In the first learning stage, children learn fundamental motor skills (FMS), including various basic activities such as running, jumping, throwing, hopping, and various forms of development movement with and without tools. However, the main focus in the early stages of learning is to prioritize gross motor components such as locomotor, non-locomotor, and manipulative movements. A second learning stage is a movement coordination activity focused on eye-hand coordination, eye-foot coordination, concentration, and understanding concepts. Indirectly in this section, cognitive elements can be adequately trained. The third and fourth stages are a form of sports skill activity. In addition, they learn various forms of development from basic techniques, tactics and strategies that must be

built based on the flow of communication among players. Children will learn how to deal with opponents with an ability level equal to or above their own.

After complete learning, the teacher provides opportunities for children to explain their learning experiences. They are free to choose activities based on their hobbies and interests after seeing the facilities and infrastructure provided by the teacher. The teacher asks various questions related to the children's understanding, level of motivation, and to what extent they master these movement skills. The teacher can evaluate the children's competence and fluency if learning is complex. At the end of the activity, the teacher explains the following lesson plan; the purpose is that the children can learn more about what has been known and what will be studied next.

3.3. Participants

The authors coordinated with physical education teacher organizations and the education department to determine the research sample. Therefore, several schools from 13 elementary schools in the authors' work area were selected. The total population comprised 175 people, thus 60% of the total population was taken as a sample. The number of research subjects was 105, consisting of 67 males and 38 females. Their average age was estimated between 9-12 years. Owing to the authors' limitations, the sampling technique used was random sampling based on area or region (cluster random sampling). This determines the sample based on regional groups of members of the study population. In this technique, research subjects were visited according to where they lived. The purpose, among others, was to research various aspects of a topic in a different site.

3.4. Data Collection

The research data was generated from students' pre-tests and post-tests, which had previously been conducted through coordination with various parties, such as the teacher and the school concerned. The authors held a focus group discussion (FGD) with physical education teachers to determine the data collection schedule. Furthermore, the authors grouped the respondents according to the distance between the schools; then, the authors assembled the respondents in one place, the access to which was affordable to everyone. The initial test and post-test were carried out for three days to avoid overcrowding and to make it easier for the writer to control the respondents.

The instrument used is the Canadian Assessment of Physical Literacy, Second Edition (CAPL-2). CAPL-2 has test components required in PL, such as a) students' motivation and confidence, b) physical competence, c) knowledge and understanding, and d) involvement in physical activity throughout life (Longmuir et al., 2018). The motivation and self-confidence component has several objectives that had to be achieved, such as assessing student preferences, assessing adequacy, assessing expectations for success and feeling satisfied with competency assessment, and determining whether students can complete challenging physical activities optimally (Li et al., 2020). Questionnaire statements represent feelings about how much they enjoy the physical activities carried out at school. The assessment criteria use a Likert scale to facilitate understanding in filling out questionnaires by respondents. For physical competence, the instrument used is the Canadian Agility and Movement Skill Assessment

(CAMSA) (Longmuir et al., 2017). CAMSA has seven movement skills tasks that participants must pass, including a) jumping on two legs through three hoops; b) sliding from side to side at a distance of 3 m; c) catching the ball; d) throwing the ball at the target wall with a distance of 5 m; e) jumping as far as 5 m; f) hopping on one leg in and out of six hoops; and g) kicking a soccer ball between two cones at a distance of 5 m. The last test of physical competence is the shuttle run with a distance of 15 m.

In assessing children's knowledge and understanding of PL using the Physical Literacy Knowledge Questionnaire (PLKQ) instrument, adapted from Longmuir, et al. (2018). This questionnaire contains information about the importance of physical activity, daily physical guidelines for children, recognition of mastery of movement skills, understanding of fitness, daily physical activities, identification of everyday healthy foods, and ways to improve skills and fitness. For measurement of daily behavior, the authors used a pedometer (Belanger et al., 2018) was used, as well as and Google Fit, available on the Google Play Store. Daily behavior, which can be interpreted as daily activities or daily movement behavior, is calculated with a pedometer to count steps taken per day. The daily behavior assessment includes the students' physical activity level, assessed objectively and subjectively. Physical activity was measured directly using a pedometer and indirectly set through the last question on the physical literacy questionnaire, for example, how often the children engage in physical activity that makes their hearts beat faster. The component scores for physical activity behavior were measured by counting the pedometer steps, and the activity self-reports were summed. The physical activity step scores were given a heavier weighting than the weekly physical activity questions because the direct measurement of activity for seven days with a pedometer is more objective than what is measured by the self-report questionnaire. The Google Fit application is one of the health-tracking platforms developed by Google, and serves as a repository of user activity data recorded through the device. The following is a recap of the instruments used in measuring PL:

Table 2: Instrument list of physical literacy

Motivation and Confidence	Canadian Assessment of Physical Literacy-2nd (CAPL-2) Motivation and Confidence Questionnaires
Physical Competence	Canadian Agility and Movement Skill Assessment (CAMSA)
Children's Knowledge and Understanding	Physical Literacy Knowledge Questionnaire (PLKQ)
Daily Behavior	Pedometer, Google Fit

3.5. Data Analysis

Quantitative data obtained from the results of the students' initial and final tests were then analyzed using the IBM SPSS series 20 program. The validity and reliability of the questionnaire used were tested, followed by the data normality test to assess the distribution of data in a group of data or variables and whether the distribution of the data is normally distributed. The last step was to test the hypothesis using the paired t-test. This test aims to determine whether there is a

difference in the mean between the initial and final tests. With this analysis, researchers could continue the process of subjectively interpreting data on text data (Asmus & Radocy, 2017; Mitchell, 2010).

4. Result

4.1. Data Validity and Reliability Test Results

The data were analyzed through questionnaires, daily notes, and the physical competence test. This data confirmed the description and the answers from the participants which were assessed by using SPSS version 20. The result of the internal validity test and reliability showed that the motivation and confidence, knowledge and understanding, and daily behavior can be seen in the following tables (see Tables 3-5):

Table 3: Result of the validity and reliability of motivation and self-confidence questionnaire

Motivation & Confidence	Test (n=105)		Validity Test		Reliability Test					
	Mean (SD)	Item-Total Correlation	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's α	ICC (95% CI)	*p*-Value †	SEM	% SEM	MDC
Point 1	2.21 (0.43)	0.354 **	2.45 (0.52)	.204	0.989	0.934 (0.913–0.935)	0.131	0.10	5.20	0.65
Point 2	2.02 (0.58)	0.562 **	2.66 (0.56)	.303	0.956	0.954 (0.809–0.925)	0.000	0.16	7.56	0.47
Point 3	0.67 (0.89)	0.380	1.31 (0.58)	.265	0.934	0.834 (0.762–0.861)	0.002	0.22	26.74	0.68
Interest	4.34 (0.76)	N/A	5.77 (0.48)	.304	0.945	0.864 (0.718–0.900)	0.802	0.34	6.34	1.28
Point 1	1.47 (0.64)	0.638 **	2.42 (0.38)	.156	0.930	0.876 (0.889–0.917)	0.124	0.11	7.69	0.76
Point 2	1.51 (0.68)	0.344 *	1.67 (0.47)	.313	0.991	0.929 (0.852–0.928)	0.021	0.27	18.07	0.87
Point 3	0.04 (0.47)	0.677**	2.89 (0.77)	.376	0.924	0.930 (0.800–0.947)	0.066	0.23	9.61	0.34
Adequacy	4.12 (1.37)	N/A	5.49 (0.56)	.124	0.956	0.818 (0.789–0.947)	0.007	0.36	6.70	1.93
Point 1	1.42 (0.61)	0.665 **	2.34 (0.47)	.493	0.897	0.898 (0.670–0.820)	0.439	0.19	8.25	0.60
Point 2	3.08 (0.80)	0.223 **	2.45 (0.42)	**.587**	0.819	0.723 (0.546–0.815)	1.000	0.20	9.71	0.88
Point 3	2.44 (0.47)	0.733 **	2.45 (0.39)	.462	0.920	0.809 (0.823–0.938)	0.058	0.18	6.89	0.81
Intrinsic Motivation	6.34 (0.58)	N/A	6.33 (0.59)	.313	0.915	0.810 (0.732–0.863)	0.297	0.39	5.67	1.96
Point 1	1.57 (0.89)	0.786 **	1.09 (0.25)	.231	0.897	0.700 (0.646–0.880)	0.027	0.20	12.41	0.04
Point 2	1.36 (0.56)	0.744 **	1.46 (0.63)	.462	0.912	0.865 (0.854–0.942)	0.000	0.10	10.36	0.93
Point 3	2.28 (0.38)	0.756 **	2.40 (0.39)	**.589**	0.941	0.812 (0.863–0.959)	0.015	0.14	7.77	0.37

Physical activity competence	5.45 (1.69)	N/A	5.70 (1.22)	.340	0.909	0.822 (0.758–0.965)	0.021	0.42	8.60	1.62
Total Score	23.(2.64)	N/A	23.02 (2.48)	.379	0.921	0.829 (0.731–0.950)	0.039	0.92	4.67	2.45

Table 4: Result of the validity and reliability of the knowledge and understanding component questionnaire

Knowledge and Understanding	Test (n=105)		Validity Test		Reliability Test					
	Mean (SD)	Item-Total Correlation	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's α	ICC (95% CI)	*p*-Value †	SEM	% SEM	MDC
Physical activity	2.45 (0.43)	0.354 **	2.53 (0.53)	.135	0.976	0.931 (0.913–0.935)	0.171	0.18	5.70	0.25
(PA) guidelines	2.32 (0.48)	0.757 **	2.27 (0.54)	.462	0.952	0.998 (0.869–0.995)	0.690	0.23	7.86	0.67
Cardiorespiratory	0.56 (0.59)	0.320	1.69 (0.65)	.231	0.907	0.851 (0.702–0.871)	0.172	0.20	26.0`	1.18
Fitness definition	5.59 (0.86)	N/A	5.24 (0.98)	.288	0.918	0.867 (0.748–0.980)	0.542	0.31	6.24	1.58
Muscular endurance	2.77 (0.44)	0.458 **	2.75 (0.45)	.548	0.942	0.876 (0.879–0.907)	0.504	0.19	7.71	0.76
Definition	1.28 (0.68)	0.666 *	1.81 (0.71)	.481	0.961	0.960 (0.852–0.968)	0.141	0.22	18.13	0.87
Improve sport skills	2.69 (0.67)	0.623 **	2.91 (0.60)	.462	0.960	0.977 (0.880–0.937)	0.886	0.28	9.11	0.94
PA comprehension	5.44 (1.17)	N/A	5.28 (0.92)	.306	0.920	0.884 (0.739–0.957)	0.534	0.39	6.67	1.23
Total domain score	2.65 (0.31)	0.721 **	2.38 (0.46)	.135	0.899	0.885 (0.650–0.860)	0.421	0.11	8.28	0.70

Table 5: Results of the validity and reliability test of the daily behavior component questionnaire

PA & Behavior	Test (n=105)		Validity Test		Reliability Test					
	Mean (SD)	Item-Total Correlation	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's α	ICC (95% CI)	*p*-Value †	SEM	% SEM	MDC
Daily Behavior	2.78 (0.83)	0.470 **	2.67 (0.82)	.507	0.981	0.971 (0.920–0.966)	0.122	0.27	4.31	0.15

Based on the data from the validity and reliability test results on the motivation and self-confidence questionnaire, the results of the questions from the motivation and self-confidence questionnaire items, knowledge and understanding of the CAPL-2, and daily behavior were obtained. According to the data seen in Table 5, the data has a good level of consistency; this is according to the questions, variables, the total score of the questionnaire, and the average is in the range (*Cronbach's* from 0.700 to 0.965). The validity test showed that all questions were declared valid, namely < *table* 0.576. Except for the adequacy variable for point 2

with a score of 0.587 > *table*, and the intrinsic motivation variable with a score of 0.589 > *table*, the statement was declared invalid. The question was corrected , then tested again on the respondents, and the results were declared valid.

Furthermore, the authors reduced the data with a successive interval (MSI) transformation method. This method is used to transform ordinal data into interval data. In general, respondents' answers are measured using a Likert scale. Scoring is carried out, giving numerical values of 1, 2, 3, 4, and 5; and each score obtained will have an ordinal measurement level. These numerical values are considered objects and then are placed into intervals through a transformation process. The calculation steps carried out are to determine the frequency of answers from each category (choice answers) based on the frequency of each type, and the proportion is calculated. From the ratios obtained, the cumulative proportions for each category are calculated. Then the Z limit value for each category was determined. Finally, the scale value (average interval) and the score (transformed value) were calculated.

4.2 Data Normality Test

The data obtained must then be analysed with the normality test of the data as a determinant for the next test stage. The normality test score was the one using Kolmogorov Smirnov because the sample was 105 people. Therefore, it already met the prerequisites for the sample size. Analysis of this statistical data used the SPSS for Windows 20 series application program. The data for the normality test can be seen in Table 6:

Table 6: Normality test

Kolmogorov-Smirnov[a]			
Variable Test	Statistic	df	Asymp.Sig (2-Tailed)
Motivation and Confidence	0,421	105	0,201
Physical Competence	0,247	105	0,107
Children's Knowledge and Understanding	0,337	105	0,175
Daily Behaviour	0,502	105	0,085

Based on the test data from Kolmogorov-Smirnov, the asymp.sig (2-tailed) score was 0.201 for the Motivation and Confidence test, 0.107 for the Physical Competence test, 0.175 for the Children's Knowledge and Understanding test, and 0.085 for the Daily Behavior test. The prerequisite for the normality test is that the asymp. sig value must be > 0.05, then the distribution of the data is declared as normal, therefore eligible for further statistical analysis using parametric tests.

4.3. Results of Hypothesis Testing using T-test

The hypothesis used is the null hypothesis, when there is not a significant difference for the experimental group after being given treatment. This null hypothesis addresses research that is expected to produce results. The null hypothesis gives three choices: to accept the consequence statistically, to reject the result negatively, and to reject the outcome positively. After the data has been

declared normal on the results of the normality test above, the next statistical test step is hypothesis testing. Hypothesis testing is carried out to answer the hypothesis set in the study, namely the effect of the levelling system on increasing the physical literacy of elementary school students. The t-test (paired sample t-test) was used to test this hypothesis. The results of the paired sample t-test hypothesis test can be seen in Table 7.

Table 7: Hypothesis Test Results

Paired Sample t-test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	*Upper*			
Pair 1	Pre-test Post-test	-1,8889	1,023	.241	-2,397	-1,380	-7,837	105	,000

Table 7 reveals the results of the t-test (paired sample t-test) using the SPSS series 20 program. In this t-test, the results obtained from sig. (2-tailed) of 0.000 < 0.05. It can therefore be concluded that the application of the LS model influences the PL of elementary school-age children.

5. Discussion

PL is recognized as a basis for lifelong participation and performance excellence in human movement and physical activity. According to Taplin (2019), PL ensures active participation throughout life, motivation, competence, knowledge, and confidence in carrying out sports activities. The basis exists within oneself and is characterized by the emergence of feelings and reactions to meet needs and achieve goals, as well as the readiness within the individual that encourages behavior to do something to that inspires hope (Ennis, 2015). In an activity, motivation is essential; therefore, every individual must have a reason. Inspiration can be encouragement, caused by factors from within and outside the individual to achieve specific goals to fulfill a need. Without any activity people will become passive. Motivational talks encourage people's enthusiasm so that they want to work by using their abilities and expertise optimally to achieve their goals. This stimulus will encourage people to carry out physical activities.

The motivation to exercise provides physiological, psychomotor, and social benefits. Socially, sport can be used as a medium of socialization through interaction and communication with other people or the surrounding environment (Pot et al., 2018). Exercise can reduce dependence on others, help to make many friends, and increase productivity Physiologically, exercise can improve physiological functions such as health, fitness, agility, and strength as well as improving the quality of one's physical condition such as the work of the heart and lungs. Psychologically, exercise can enhance one's mood, reduce the risk of dementia, and prevent depression (Robinson et al., 2018). Undeniably, the motivation instilled from childhood will have a significant impact when entering old age; there are many older people with limitations who are still actively

exercising and participating in competitions. With this high level of motivation and self-confidence, some people are successful even in their old age.

Confidence is a vital aspect of personality for everyone because it is related to belief. Confidence is a person's belief in being able to conquer one's fear of facing various situations. Quennestedt et al. (2021) indicated that self-confidence is people's positive attitude that enables them to develop favorable judgments of themselves and their situations. High levels of self-confidence only refer to several aspects of people's lives where they feel competent and capable and believe that they can because of previous experience, actual potential, achievements, and expectations of themselves (Durden-Myers et al., 2018). Having self-confidence can also affect their physical activity, therefore they expect to be able to carry out their physical activity successfully.

Physical competence refers to an individual's ability to develop skills, and movement patterns and to experience a wide range of intensity and duration of the movement. According to Whitehead (2019), enhanced physical competence allows one to participate in various activities in diverse physical settings. From an early age physical activity is expected to help people maintain their health and fitness in the future, accompanied by their knowledge and understanding of an active and healthy lifestyle.

Knowledge and understanding include the ability to identify and express essential qualities that influence movement, understand the benefits of health and an active lifestyle, and appreciate the safety features appropriate to physical activity in a variety of settings and physical environments (Faigenbaum & Rebullido, 2018; Young et al. al., 2020). Knowledge and understanding are most important in any physical activity. People know and understand their physical activity ability because of prior knowledge and information. Knowledge and understanding gained when young will be helpful when old. Moreover, extensive knowledge will make it easier to get along with various groups. Knowledge about lifestyles that prevent multiple diseases is also important. Adopting a healthy lifestyle can ultimately improve people's quality of life so they can remain active well into old age. The knowledge and understanding one has about the world of sport can also be shared with others by providing coaching and training.

PL exists despite the decrease in active lifestyle habits in the broader community, especially during the transition from the COVID-19 pandemic to the current normal activities. PL is obtained through an educational process that is natural and not forced so that awareness is created to manage and maintain health. The formation of PL is inseparable from the central role of PE. PE orientation is not only about practising physical activity and sports; therefore, students need to be given more information about the importance of physical activity for their future as well (Whitehead, 2013). PE has excellent potential to enhance and promote healthy lifestyles; however, it is not the only priority, as PE serves many other purposes. PE can be integrated in schools with other fields of study because PE is holistic.

The PE learning process must be packaged in a fun learning presentation; this will help children develop their interest in PE learning. When children have developed their interests, it will help them to take on anything in the future. Children must

learn easy things first. It means they gradually get to know something according to their ability and will. Wagner et al. (2013) explained that all education must take place according to the rungs of the ladder; no one should miss a rung, and if it is lost, the children will not be able to move on and continue learning. When children learn gradually, they have a positive attitude to knowledge acquisition (McVee et al., 2019). By studying psychology, we know that when children are happy to learn and know, they will gladly repeat lessons (the law of effect). When they feel excited to repeat the study, they will often do the exercises and have the knowledge that they can (the law of practice). When the children can follow the study, they will be ready to learn independently (the law of readiness) (Gleitman & Gross, 2010; Law, 2013; Olson, 2015).

Therefore, the learning of primary motion material that the author developed through the LS model becomes the starting point for children to start learning motion, as these activities that require the use of smooth muscles and large muscles of the body are simple games, opportunities for trial and error, learning to work together, as well as the chance to use various playing facilities. Learning to work and try together with their friends is an essential ability that children must have because cooperation involves interaction and the ability to get along with other people. Instilling the importance of cooperation in children from an early age provides many benefits for them, especially to improve cognitive, social, and emotional abilities that will be useful right through adulthood (Boyette, 2017; Fang et al., 2022).

Through LS, the enthusiasm of students in paying attention to the learning facilitated by the teacher is immeasurable. This is shown by their being on time, their ability to express opinions, their willingness to answer questions, their ability to do the training provided and practise every movement with enthusiasm. Student competencies develop well when they show seriousness, initiative in learning, as well as speed in carrying out assignments and training provided by the teacher. This model is beneficial for teachers in developing student competencies, especially PL.

Based on the students' daily journal entries, competency achievements, interactions, and habits emerge during research activities. However, overall, it can be seen that the responses elicited by female students were much better than the responses from male students. This is due to the difference in the level of maturity between male and female students. Based on the results of research conducted by Kozieł and Malina (2018), it was found that women's brains reach maturity at the age of 10, while men have to wait until the age of 20 to reach the same level of maturity. Furthermore, Malina et al. (2021) revealed that much activity occurs in the female brain between the ages of 10 to 12 years, while in males, this only occurs between the ages of 15 to 20 years. This causes women to mature faster, both cognitively and emotionally. Therefore, it is essential in implementing the use of learning models to consider these differences. This is taken into consideration so that the PE learning process runs optimally. Through LS, without realizing it, children learn much that is important and that they will need in the future. It is our joint responsibility to make educational programs successful by adapting them to the growth and development levels of children.

6. Conclusion

Based on the results of data processing and in-depth logic analysis in the discussion that is strengthened by experts' opinions, the next step is to provide conclusions as the final statement of the results of this study. The decision proves that applying the LS model has proven to be very effective in helping children improve physical literacy. With the development of physical literacy, it is hoped that the growth and development of children will enable them to overcome problems both in education at school and in everyday life.

Acknowledgement

The authors would like to thank those who have supported this research, especially the Institute for Research and Community Service of the University of Siliwangi, which has financed this research, as well as all parties who were directly involved and participated in this research.

7. References

Asmus, E. P., & Radocy, R. E. (2017). Quantitative analysis. In M.C. Moore (Ed.), *Critical Essays in Music Education* (pp. 129–172). Routledge.

Belanger, K., Barnes, J. D., Longmuir, P. E., Anderson, K. D., Bruner, B., Copeland, J. L., Gregg, M. J., Hall, N., Kolen, A. M., Lane, K. N., & others. (2018). The relationship between physical literacy scores and adherence to Canadian physical activity and sedentary behavior guidelines. *BMC Public Health*, *18*(2), 1–9. https://doi.org/10.1186/s12889-018-5897-4

Bores-Garcia, D., Hortigüela-Alcalá, D., Fernandez-Rio, F. J., González-Calvo, G., & Barba-Martin, R. (2021). Research on cooperative learning in physical education: Systematic review of the last five years. *Research Quarterly for Exercise and Sport*, *92*(1), 146–155. https://doi.org/10.1080/02701367.2020.1719276

Boyette, A. H. (2017). Autonomy, cognitive development, and the socialization of cooperation in foragers. *Hunter Gatherer Research*, *3*(3), 475–501.

Caldwell, H. A. T., Di Cristofaro, N. A., Cairney, J., Bray, S. R., MacDonald, M. J., & Timmons, B. W. (2020). Physical literacy, physical activity, and health indicators in school-age children. *International Journal of Environmental Research and Public Health*, *17*(15), 5367. https://doi.org/10.3390/ijerph17155367

Corbin, C. B. (2016). Implications of physical literacy for research and practice: A commentary. *Research Quarterly for Exercise and Sport*, *87*(1), 14–27. DOI: https://doi.org/10.1080/02701367.2016.1124722

Dudley, D. A. (2015). A conceptual model of observed physical literacy. *The Physical Educator*, *72*(5). https://doi.org/10.18666/TPE-2015-V72-I5-6020

Durden-Myers, E. J., Whitehead, M. E., & Pot, N. (2018). Physical literacy and human flourishing. *Journal of Teaching in Physical Education*, *37*(3), 308–311. https://doi.org/10.1123/jtpe.2018-0132

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. 10.1007/s40279-016-0560-7

Edwards, L. C., Bryant, A. S., Morgan, K., Cooper, S.-M., Jones, A. M., & Keegan, R. J. (2019). A professional development program to enhance primary school teachers' knowledge and operationalization of physical literacy. *Journal of Teaching in Physical Education*, *38*(2), 126–135. https://doi.org/10.1123/jtpe.2018-0275

Ennis, C. D. (2015). Knowledge, transfer, and innovation in physical literacy curricula. *Journal of Sport and Health Science*, *4*(2), 119–124. https://doi.org/10.1016/j.jshs.2015.03.001

Faigenbaum, A. D., & Rebullido, T. R. (2018). Understanding physical literacy in youth. *Strength & Conditioning Journal*, *40*(6), 90–94. https://doi.org/10.1519/SSC.0000000000000417

Fang, G., Chan, P. W. K., & Kalogeropoulos, P. (2022). The effects of school-to-school collaboration on student cognitive skills: Evidence from propensity score analysis. *The Asia-Pacific Education Researcher*, *31*(3), 193–203. https://doi.org/10.1007/s40299-020-00549-3

Fraenkel, J. R., Wallen, N. E., & Hyun, H. H. (2011). *How to design and evaluate research in education*. New York: McGraw-Hill Humanities/Social Sciences/Languages.

From, J. (2017). Pedagogical digital competence--between values, knowledge, and skills. *Higher Education Studies*, *7*(2), 43–50. https://doi.org/10.5539/hes.v7n2p43

George, A. M., Rohr, L. E., & Byrne, J. (2016). Impact of Nintendo Wii games on physical literacy in children: Motor skills, physical fitness, activity behaviors, and knowledge. *Sports*, *4*(1), 3. https://doi.org/10.3390/sports4010003

Gleitman, H., & Gross, J. (2010). *Psychology: Eighth International Student Edition*. WW Norton & Company.

Goss, H. R., Shearer, C., Knowles, Z. R., Boddy, L. M., Durden-Myers, E. J., & Feather, L. (2022). Stakeholder perceptions of physical literacy assessment in primary school children. *Physical Education and Sport Pedagogy*, *27*(5), 515–530. ttps://doi.org/10.1080/17408989.2021.1911979

Gustian, U. (2020). Permainan tradisional: Suatu pendekatan dalam mengembangkan physical literacy siswa sekolah dasar. *Jurnal SPORTIF: Jurnal Penelitian Pembelajaran*, *6*(1), 199–215. https://doi.org/10.29407/js_unpgri.v6i1.14252

Higgs, C., Cairney, J., Jurbala, P., Dudley, D., Way, R., Mitchell, D., Grove, J., Verbeek, M., Carey, A., Ross-Mcmanus, H., Jagger, L., Naylor, P.J. & Laing, T. (2019). Developing physical literacy—Building a new normal for all Canadians. *Sport for Life Society (Canada).* https://sportforlife.ca/wp-content/uploads/2019/09/DPL-2_EN_web_November_2019-1.pdf

Kolbe, L. J. (2019). School health as a strategy to improve both public health and education. *Annual Review of Public Health*, *40*(1), 443–463. https://doi.org/10.1146/annurev-publhealth-040218-043727

Kozieł, S. M., & Malina, R. M. (2018). Modified maturity offset prediction equations: validation in independent longitudinal samples of boys and girls. *Sports Medicine*, *48*(1), 221–236. https://doi.org/10.1007/s40279-017-0750-y

Law, H. (2013). *The psychology of coaching, mentoring, and learning*. John Wiley & Sons.

Lengkana, A. S., Rahman, A. A., Alif, M. N., Mulya, G., Priana, A., & Hermawan, D. B. (2020). Static and dynamic balance learning in primary school students. *International Journal of Human Movement and Sports Sciences*, *8*(6), 469–476. https://doi.org/10.13189/saj.2020.080620

Lengkana, A. S., Tangkudung, J., & Asmawi, A. (2019a). The effect of core stability exercise (CSE) on balance in primary school students. *Journal of Education, Health and Sport*, *9*(4), 160–167.

Lengkana, A. S., Tangkudung, J., & Asmawi, A. (2019b). The effectiveness of thigh lift exercises using rubber on the ability of acceleration on sprint runs. *Journal of Physics: Conference Series*, *1318*(1), 12031. https://doi.org/10.1088/1742-6596/1318/1/012031

Li, M. H., Sum, R. K. W., Tremblay, M., Sit, C. H. P., Ha, A. S. C., & Wong, S. H. S. (2020). Cross-validation of the Canadian assessment of physical literacy second edition (CAPL-2): The case of a Chinese population. *Journal of Sports Sciences*, *38*(24), 2850–2857. https://doi.org/10.1080/02640414.2020.1803016

Longmuir, P. E., Boyer, C., Lloyd, M., Borghese, M. M., Knight, E., Saunders, T. J.,

Boiarskaia, E., Zhu, W., & Tremblay, M. S. (2017). Canadian agility and movement skill assessment (CAMSA): Validity, objectivity, and reliability evidence for children 8--12 years of age. *Journal of Sport and Health Science*, *6*(2), 231–240. https://doi.org/10.1016/j.jshs.2015.11.004

Longmuir, P. E., Gunnell, K. E., Barnes, J. D., Belanger, K., Leduc, G., Woodruff, S. J., & Tremblay, M. S. (2018). Canadian assessment of physical literacy second edition: A streamlined assessment of the capacity for physical activity among children 8 to 12 years of age. *BMC Public Health*, *18*(2), 1–12. https://doi.org/10.1186/s12889-018-5902-y

Longmuir, P. E., Woodruff, S. J., Boyer, C., Lloyd, M., & Tremblay, M. S. (2018). Physical literacy knowledge questionnaire: Feasibility, validity, and reliability for Canadian children aged 8 to 12 years. *BMC Public Health*, *18*(2), 1–11. https://doi.org/10.1186/s12889-018-5890-y

Lundvall, S. (2015). Physical literacy in physical education--A challenge and a possibility. *Journal of Sport and Health Science*, *4*(2), 113–118. https://doi.org/10.1016/j.jshs.2015.02.001

Malina, R. M., Kozieł, S. M., Králik, M., Chrzanowska, M., & Suder, A. (2021). Prediction of maturity offset and age at peak height velocity in a longitudinal series of boys and girls. *American Journal of Human Biology*, *33*(6), e23551. https://doi.org/10.1002/ajhb.23551

McVee, M. B., Ortlieb, E., Reichenberg, J., & Pearson, P. D. (2019). *The gradual release of responsibility in literacy research and practice*. Emerald Publishing. https://doi.org/10.1108/S2048-045820190000010018

Mitchell, K. (2010). Quantitative analysis by the point-centered quarter method. *ArXiv Preprint ArXiv: 1010.3303*. https://doi.org/10.48550/arXiv.1010.3303.

Muhtar, T., Supriyadi, T., & Lengkana, A. S. (2020). *Character development-based physical education learning model in primary school*. *8*(6), 337–354. https://doi.org/10.13189/saj.2020.080605

Muhtar, T., Supriyadi, T., Lengkana, A. S., & Cukarso, S. H. I. (2021). Character education in physical education learning model: A bibliometric study on 2011-2020 Scopus database. *International Journal of Human Movement and Sports Sciences*, *9*(6), 1189–1203. 10.13189/saj.2021.090613

Muhtar, T., Supriyadi, T., Lengkana, A. S., & Hanifah, S. (2019). Religious characters-based physical education learning in elementary school. *International Journal of Learning, Teaching and Educational Research*, *18*(12), 211–239. https://doi.org/10.26803/ijlter.18.12.13

Mulya, G., Lengkana, A. S., & Agustryani, R. (2021). TennBasTech: A scientific approach to teach tennis. *International Journal of Human Movement and Sports Sciences*, *9*(6), 1371-1382. 10.13189/saj.2021.090633

Mustafa, P. S. (2021). Merdeka Belajar dalam Rancangan Pembelajaran Pendidikan Jasmani di Indonesia. *Integrasi Keilmuan Dalam Menyongsong Merdeka Belajar*, *1*, 153–160.

Olson, M. H. (2015). *Introduction to theories of learning*. Routledge. https://doi.org/10.4324/9781315664965

Pot, N., Whitehead, M. E., & Durden-Myers, E. J. (2018). Physical literacy from philosophy to practice. *Journal of Teaching in Physical Education*, *37*(3), 246–251. https://doi.org/10.1123/jtpe.2018-0133

Priadana, B. W., Saifuddin, H., & Prakoso, B. B. (2021). Kelayakan pengukuran aspek pengetahuan pada instrumen physical literacy untuk siswa usia 8-12 tahun. *Multilateral: Jurnal Pendidikan Jasmani Dan Olahraga*, *20*(1), 21–32. http://dx.doi.org/10.20527/multilateral.v20i1.9675

Pühse, U., & Gerber, M. (2005). *International comparison of physical education: Concepts, problems, prospects*. Meyer & Meyer Verlag.

Quennerstedt, M., McCuaig, L., & Mårdh, A. (2021). The fantasmatic logic of physical literacy. *Sport, Education, and Society*, *26*(8), 846–861. https://doi.org/10.1080/13573322.2020.1791065

Rahman, A. A., Angraeni, A., & Fauzi, R. A. (2021). The activation of learners' metacognition to promote learning autonomy of good language learners. *Pegem Journal of Education and Instruction*, *11*(4), 249–253. https://doi.org/10.47750/pegegog.11.04.24

Robinson, D. B., Randall, L., & Barrett, J. (2018). Physical literacy (mis) understandings: What do leading physical education teachers to know about physical literacy? *Journal of Teaching in Physical Education*, *37*(3), 288–298. https://doi.org/10.1123/jtpe.2018-0135

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. https://doi.org/10.1016/j.jshs.2015.03.002

Saleh, M. (2020). Merdeka belajar di tengah pandemi Covid-19. *Prosiding Seminar Nasional Hardiknas*, *1*, 51–56.

Shearer, C., Goss, H. R., Edwards, L. C., Keegan, R. J., Knowles, Z. R., Boddy, L. M., Durden-Myers, E. J., & Feather, L. (2018). How is physical literacy defined? A contemporary update. *Journal of Teaching in Physical Education*, *37*(3), 237–245. https://doi.org/10.1123/jtpe.2018-0136

Stephani, M. R. (2017). Stimulasi Kemampuan Berpikir Kritis Melalui Pembelajaran Berbasis Masalah Pada Pendidikan Jasmani. *Jurnal Pendidikan Jasmani Dan Olahraga*, *2*(1), 16–27. https://doi.org/10.17509/jpjo.v2i1.6397

Subarna, Tangkudung, J., Lengkana, A. S., Rahman, A. A., Asmawi, M., Abdulgani, R., Mulyana, D., & Badaru, B. (2021). The effect of endurance, eye-hand coordination, and confidence to volleyball referee performance in West Java. *International Journal of Human Movement and Sports Sciences*, *9*(3), 436–444. https://doi.org/10.13189/saj.2021.090307.

Taplin, L. (2019). Physical literacy as a journey. In M. Whitehead (Ed.), *Physical literacy across the world* (pp. 239–254). Routledge.

Kemendikbud, & Tohir, M. (2020). *Merdeka Belajar: Kampus Merdeka*. https://doi.org/10.6084/m9.figshare.12645443

Tremblay, M., & Lloyd, M. (2010). Physical literacy measurement: The missing piece. *Physical and Health Education Journal*, *76*(1), 26–30.

Tremblay, M. S., Longmuir, P. E., Barnes, J. D., Belanger, K., Anderson, K. D., Bruner, B., Copeland, J. L., Nyström, C.D., Gregg, M. J., Hall, N., Kolen, A.M., Lane, K.N., Law, B., MacDonald, D.J., Martin, L.J., Saunders, T.J., Sheehan, D., Stone, M.R., & Woordruff, S.J. (2018). Physical literacy levels of Canadian children aged 8--12 years: Descriptive and normative results from the RBC Learn to Play--CAPL project. *BMC Public Health*, *18*(2), 1–14. https://doi.org/10.1186/s12889-018-5891-x

Valijonovna, K. I., & others. (2022). The concept of environmental competence and its structure. *Gospodarka i Innowacje*, *22*, 29–35.

Wagner, K., Dobkins, K., & Barner, D. (2013). Slow mapping: Color word learning as a gradual inductive process. *Cognition*, *127*(3), 307–317. https://doi.org/10.1016/j.cognition.2013.01.010.

Weinberg, R. S., & Gould, D. S. (2018). *Foundations of sport and exercise psychology*. Human Kinetics.

Whitehead, M. (2013). What is physical literacy, and how does it impact physical education? In S. Capel, & M. Whitehead (Eds), *Debates in physical education*, (pp.37–52). Routledge. https://www.physical-literacy.org.uk

Whitehead, M. (Ed.). (2019). Definition of physical literacy: Developments and issues. In *Physical literacy across the world* (pp. 8–18). Routledge.

Young, L., O'Connor, J., & Alfrey, L. (2020). Physical literacy: A concept analysis. *Sport, Education, and Society*, *25*(8), 946–959. https://doi.org/10.1080/13573322.2019.1677586

Young, L., O'Connor, J., Alfrey, L., & Penney, D. (2021). Assessing physical literacy in health and physical education. *Curriculum Studies in Health and Physical Education*, *12*(2), 156–179. https://doi.org/10.1080/25742981.2020.1810582