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## Motivating Active Learning in Physical Education: Critical Thinking

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**Abstract:** Motivation is essential in shaping how much a student is interested in learning and also affects how much students will learn from a learning activity or how much students' ability to capture the information presented by the teacher. Well-motivated students will produce a vibrant learning atmosphere and a better success rate. This research aims to determine whether the motivating active learning in physical education (MALP) model can help kids in elementary school develop their capacity for critical thinking. The design used is experimental. The research subjects were grade 6 elementary school students representing five sub-districts in the Tasikmalaya district. One elementary school was taken from each sub-district through a probability sampling technique using the cluster random sampling approach. The total sample taken was 137 people. The results of the study prove that applying the MALP model can greatly influence improving the critical thinking skills of elementary school students. The result of the study is proven by the significance test using the paired sample t-test; the results obtained from sig. (2-tailed) of  $.001 < .05$ . So applying motivating active learning in the physical education model influences increasing elementary school students' critical thinking skills.

**Keywords:** *Elementary school, HOTS, motivation active learning, physical education.*

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### Introduction

Learning is a process of obtaining new information, or it may modify knowledge, behavior, and skills (Socher et al., 2013). Loyens et al. (2008) explain that some learning is direct, as with physical education (PE). An event causes it, but much skill and knowledge are accumulated from repeated experience. Ideally, learning is a benchmark to create an optimal result. Emphasizing the active participation of students is a definite step for an educator to create ideal learning. *Learning* is a process that does not prioritize the results achieved by students (Djiwandono, 2008). Still, they have gone through a series of techniques to understand the material, analyze, have good motor skills, have perseverance, and have behavior change and, of course, what can be applied to everyday life. Good learning can train and instill a positive attitude in students to create a pleasant and comfortable learning atmosphere. To achieve all the goals, the teacher's role is central to developing learning, especially PE, which can make children more enjoyable, facilitate children's basic movement needs, and be free in learning. This is in line with the assertion made by Muhtar et al. (2019) that teaching skills must be seen from the perspective of fostering reading skills by investigating studies that can enhance students' abilities.

Implementing a pioneer school curriculum in PE, which has been activated earlier to provide a different atmosphere in learning activities, is hoped that there will be a change of view on implementing PE learning in schools. Baeten et al. (2010) explain that the teacher is the spearhead of a change that can change the mindset, and learning strategies that were initially teacher-centered now have to become student-centered. This issue aligns with the Indonesian government's new policy regarding emancipated learning. Lohr et al. (2021) explain that teachers must start everything in learning activities before they teach it to students. That is, there needs to be a more in-depth explanation of the essential competencies and the existing curriculum to create the desired learning. Teachers must prepare

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everything well, from preparing teaching tools and understanding concepts and practices in a structured way of learning. The success of this emancipated learning policy for students will show the soft skills and hard skills of the students. This is in line with what was conveyed by Alsumait and Al-Musawi (2013) that the success of student learning is marked by the birth of students who are productive, creative, innovative, and effective through strengthening integrated attitudes, skills, and knowledge. So that an increase and balance between soft skills and hard skills marks the final result. Afterward, Feraco et al. (2023) explain that freely packaged learning can hone students' soft skills so that they care about the environment, love the environment, are creative, responsible, objective, and work hard. Afterward, Lengkana et al. (2020) explain that learning by developing a learning atmosphere, media, and learning methods can improve the hard skills of students.

Pioneer school has stages of cognitive abilities adapted from Bloom's taxonomy Ulum (2016), starting from the level of higher-order thinking skills or often known as Higher Order Thinking Skills (HOTS), and lower-order thinking skills (LOTS) (Muhtar et al., 2020). Because the demands of pioneer schools must reach the level of creation, students must be continuously trained to produce something new. HOTS is the ability to think critically, logically, reflectively, metacognitively, and creatively, including the ability to think at higher levels (Flowers, 2004; Miri et al., 2007). Students with low-level thinking skills need higher-order thinking exercises to complete the student's learning process. Accordingly, an instrument is needed to support students in getting used to higher-order thinking. The instrument is designed as a test that, in its completion, requires higher-order thinking skills or what we are more familiar with HOTS-based tests. Therefore, the researchers tried to create a more creative learning atmosphere by motivating active physical education (MALP) learning. As designers and facilitators, teachers can take advantage of the sources of students' interest in learning. Teachers can also attract interest by displaying some media that looks foreign and conspicuous so that it can invite their curiosity. Understanding student interests allows teachers to design highly motivating activities for students Bruna (2013) so that in the future, students can motivate themselves well (Lonsdale et al., 2013). Lutes (2018) explains that all activities undertaken contain motivation, whether through challenges or not.

*Motivation* is a condition that can move individuals to achieve a goal and cause a kind of power to emerge so that the individual can act or behave (Mosoi, 2013). Koch et al. (2017) divided it into two types of motivation: autonomous and controlled. For people to be self-motivated, they must feel volition or self-approval for their actions. Autonomous motivation comprises intrinsic motivation and the kind of extrinsic motivation in which people recognize the value of an ideal activity and will integrate it into their sense of self or behavior. In contrast, controlled motivation consists of external regulation, in which a person's behavior depends on reward or punishment, and by factors such as approval motives, shame avoidance, self-esteem, and ego involvement. Therefore, active learning should be packaged so students are more interested and motivated to learn because maintaining and managing motivation is the most challenging part (Negro et al., 2019). Budd et al. (2021) explains that active learning should be fun, enthusiastic, and passionate. Active learning activities must be distinct from the role of a teacher as a facilitator who designs effective and efficient learning strategies so that meaningful learning can achieve learning objectives. Each teacher must comprehend the learning strategies that will be used in order to meet the learning objectives. Instead of relying solely on the lecture method, a teacher must consider the tactics or approaches used in instruction Lonsdale et al. (2013) in order to have an impact on the level of student mastery across the board—cognitively, psychometrically and effectively—as well as student learning achievement, the method chosen must be appropriate, particularly given the circumstances and conditions encountered (Konyushkova et al., 2017). Active learning encourages students to engage in additional learning activities through interactive relationships with the subject matter rather than simply accepting the teachings. By doing this, they actively develop their ability to locate the topic's fundamental idea and create alternate solutions to difficulties, applying what they have just learned to a situation that arises in real life.

The accumulation of these subjects in the Pioneer School curriculum results in students needing more enthusiasm and engagement in learning, especially the learning evaluation model, which is a burden for teachers. This is based on the findings of field observations. Within a month, the discussion of material on one theme must be completed as soon as possible; students become lazy to ask questions because they are tired after doing various practical and theoretical activities in class. This is in line with the statement of Rokhayati et al. (2017) that the phenomenon of not yet optimal educational attainment in the context of physical education learning outcomes, among others, occurs because of the diverse characteristics of students related to their respective developments and the limitations of teacher competence. This affects the level of success of students in learning because learning that does not invite attention and the teacher pays less attention to the success of their learning also affects the mental activity that is less active and boring in class (Mulya et al., 2021). So, a practical learning approach is necessary to facilitate teachers to transfer the knowledge provided. Several types of research reveal that using a learning approach positively impacts the learning process (Vinayakumar et al., 2019).

Teaching physical education students through active learning has a beneficial influence on student motivation, according to earlier research on PE learning utilizing the MALP concept from (Lonsdale et al., 2013). While Negro et al. (2019) found that the most challenging part of educating is maintaining and managing student motivation. Therefore, active learning offerings must be able to facilitate students. George and Supreetha (2021) found that active learning effectively increased students' attention and kept them engaged during the learning session. Then Koch et al. (2017)

found that learning in which there is motivation will make students more enthusiastic and avoid undisciplined behavior. However, several previous studies have yet to be so specific to MALP learning based on HOTS, which is expected that students will be able to think critically about all findings in PE learning activities, especially in junior high school students aged 13 years. Therefore, this research seeks to fill the void by incorporating the HOTS-based MALP concept in PE learning. So, it is required that students not only master their psychomotor skills but also their cognitive and affective skills, which make learning physical education successful.

## Literature Review

### *Motivating Active Learning in Physical Education (MALP)*

Motivation is one of the most critical dynamic aspects. Students often need more achievement because of their lack of ability; however, because of the lack of motivation to learn, students do not try to move their abilities to learn (Solomon & Anderman, 2016). Teachers, as learners, are obliged to motivate students to learn. Student learning achievement depends on how teachers as educators can motivate students in learning so that students try to improve their achievements. *Study saturation* is a problem experienced by many students. The severe consequences of the problem are decreased desire to learn, a heavy sense of laziness, and decreased learning achievement. MALP is a critical method for achieving student performance or achievement (Dadach, 2013). MALP is a strategy that involves more students in the learning process. Through MALP, students can independently access various materials and information discussed and studied in the learning process (Ginting et al., 2021). Therefore, they gain experience that can increase competence and understanding, which in the sequence later the knowledge obtained and constructed based on their respective abilities can be applied in everyday life (Cicuto & Torres, 2016).

Here are the MALP method in fostering active student learning that the researcher applies to students during the learning process, namely (Mikalayeva, 2016; Zahay et al., 2017); a) First, using various teaching and learning methods and activities. Doing the same activities will undoubtedly cause excessive boredom, which can reduce students' enthusiasm for learning. b) Second, consistent in enforcing the rules. c) Third, make the physical environment of our classrooms as nuanced as possible for learning. d) Fourth, make students as active participants. e) Fifth, create a conducive classroom atmosphere because a safe and non-dictating class will generally make students feel supported to try. f) Sixth, rewards to motivate. Small rewards when achieving exemplary achievements may also be effective enough to foster student enthusiasm for learning. g) Seventh, establish good study habits. Give a good and correct new way of learning when the student is studying alone or in groups. h) Eighth, use excellent and appropriate learning media. Learning media is usually used as a tool in the teaching and learning process. Everything around us can stimulate the mind, abilities, learning skills, and attention to encourage learning. The preceding relies on the teacher's role as a facilitator who regulates the circulation and course of the learning process. Teachers must design lessons to encourage active questioning, the development of ideas, and participation in hands-on activities. As stated by Corkin et al. (2017), Active learning can be done by discussing, playing roles, debating, doing case studies, being actively involved in group discussions or making short reports, and so on. Active is physical and includes various aspects, such as mental activity. Even in active learning, being active in the mental aspect is more important than being physically active.

From the explanation above, it can be understood that active learning is learning that makes students the centre. However, with the atmosphere created by the teacher, students are invited to take more roles in learning. So that they can actively ask questions, express opinions, and build ideas. Active learning makes students remember the learning material better. Therefore, this active learning model is an alternative that must be considered if the quality of graduates is to be improved. Using active learning methods either fully or as a complement to traditional learning methods will improve the quality of learning (Tendhar et al., 2019). According to Theobald et al. (2020), Active learning pedagogically is a learning process that does not only listen and take notes. Active learning is a learning process that involves students doing something and thinking about what they will do. Active learning is based on the assumption that learning is an active search for knowledge and that everyone learns differently. Students can engage in interactive relationships with the subject matter through learning activities during active learning, which encourages them to draw conclusions and reflect on their comprehension (Paxman et al., 2011). The active learning process directs students in reading, writing, discussing, or engaging in problem-solving activities. Students are actively involved in analytical thinking, synthesis, and evaluation activities.

### *Higher-Order Thinking Skills (HOTS)*

*Critical thinking ability* is an evaluative thinking ability that shows the human ability to see the gap between reality and truth by referring to ideal things and being able to analyze, evaluate, and make stages of problem-solving. Moreover, apply the materials that have been studied in the form of daily behaviour at school, at home and in social life by applicable norms. Critical thinking is one aspect of higher-order thinking skills (HOTS) developed in constructivist-based learning (Çimer et al., 2003; Florea & Hurjui, 2015). According to Renatovna and Renatovna (2021), focusing on problems, analyzing debates, proposing, challenging, and answering inquiries are only a few components of critical thinking. Other components include communicating with others and judging forecasts. Critical thinking is a central

component of human intelligence and plays a role in achieving learning outcomes (Churchill, 1989; Halpern, 2013). The critical thinking construct, viewed as a serious and reasoned manner of thinking to determine what a person can believe and do, includes CTS as one of its components (Seibert, 2021). Critical thinking skill is the ability to evaluate our opinions on the outcomes of interpretation, analysis, evaluation, inference, and explanation to make conclusions that take concepts, methodologies, criteria, and settings into account (Bellaera et al., 2021). Thus, the ability to think critically is a sign of learning outcomes and offers pupils helpful knowledge and the ability to solve difficulties in daily life.

Physical education teachers must be skilled at spotting opportunities, identifying situations, and applying critical thinking skills. When people think, they develop the ability to think critically while considering alternatives and solutions to their issues. This enables people to make decisions because critical thinking includes making decisions (Turan & Koç, 2018). Critical thinking learning can allow students to be more creative, innovative, and independent in solving problems. So, when in physical education, students can enable students to quickly think of strategic plans or make them create reasonable movement solutions. J. Liu et al. (2018) explain that the development of critical thinking skills can occur because PE can provide complex problems that can challenge students to apply several students' abilities. Such as the ability to analyze and propose arguments, give classification, provide evidence, give reasons, analyze the implications of an opinion, and draw conclusions.

### *Higher Order Thinking Skills as Critical and Creative Thinking*

Critical thinking is an active process where one thinks deeply about things, asks questions, and finds relevant information rather than passively waiting for information. When solving problems, making judgments, assessing assumptions, and performing investigations or doing research based on data and information gathered to produce the required information or findings, critical thinking is a process that uses all of one's knowledge and skills. Here are some essential elements needed in higher-order thinking (Uzunöz & Demirhan, 2017).

*Table 1. Essential Elements of Critical Thinking Skills*

<b>Elements</b>	<b>Definition</b>
Focus	Identify the problem well.
Reason	The reasons given are logical or not to be concluded as determined by the problem.
Conclusion	If the reason developed is correct, the reason must be sufficient to finish the conclusion.
Situation	Comparing with the actual situation
Clarity	There must be clarity of terms and explanations used in the argument so that everything is transparent in concluding.
Summary	Checking on something found, decided, noticed, studied, and concluded.

The majority of us do not inherently possess the ability to think creatively. Specific strategies are required to help us use our brains in various ways. The problem with creative thinking is that, by definition, almost any idea that has not been examined will sound strange, far-fetched, and even insane. However, a good solution might sound weird at first. Unfortunately, that is why it often will not be disclosed, and try to file it. Creative thought can be lateral and unconventional, producing multiple potential answers (Pill & SueSee, 2017). Critical and creative thinking skills are essential in preparing students to become good problem solvers, make mature decisions and conclusions, and be accountable academically.

## **Methodology**

### *Research Design*

*The method used is quantitative research with a one-group pretest-posttest pre-experimental design. Experimental research* is a design that the researcher adopts to facilitate changes or the purpose of this research. This design provides an opportunity for researchers to explore several problems in learning and find solutions as part of the improvement process in learning. Some of the problems that become the central issue in PE learning are the need for more active learning motivation for students. So they need more time to study seriously, and their orientation is still happy to do physical activities according to their wishes and interests. This will undoubtedly hurt students' cognitive, affective and motor skills because students pay less attention to physical education learning. Physical education learning is a place to facilitate students in learning movement experiences, social interactions, and some soft skills. This is a reflection activity for researchers because every PE learning must always provide significant meaning, not only the transfer of knowledge but also the need for measurable achievements to equip students with the competencies they need holistically in the future.

The authors made several research steps to find solutions to existing problems, including conducting initial tests using a Formative Class Evaluation (FCE) questionnaire and HOTS-based practice questions. Then after processing the data from the initial test results, the next step was for the researcher to collaborate through a Focus Group Discussion (FGD)



with teachers, and school principals, which aims to design a HOTS-based MALP program implementation program. After the program was structured, the researcher applied the HOTS-based MALP model to grade 6 elementary school students. The researchers chose this because it relates to mastering students' thinking concepts. The last step taken is the evaluation stage, which is to evaluate to measure the level of success of several actions given.

### *Sample and Data Collection*

Sampling used the probability sampling technique with the Cluster Random Sampling approach. The population in this study were 6th-grade elementary school students representing five districts in Tasikmalaya Regency. Each sub-district is brought to one elementary school. The total number of samples used as samples was 137 students, consisting of 85 boys and 85 girls. Some of the strategic steps developed are active learning steps to foster critical thinking skills in elementary school students that are adapted to the scope of physical education subjects. The lessons provided include game development activity material, gymnastics, learning rhythmic activities, learning sports and games, learning health and fitness, and outdoor education. A more detailed explanation can be seen in table 1 below;

*Table 2. Active Learning Strategies to Cultivate Critical Thinking*

<b>Development Activity Games</b>
<i>Manipulative movements by throwing:</i> Provide opportunities for children to explore throwing movements such as balls above the arm by raising the arm behind the head and lowering the other arm or hand, rotating the hip and shoulder about 90° in the direction where the side is not throwing, weight is transferred to the foot by stepping off the opposite arm to throw, releasing the ball diagonally to the side of the body that is not throwing, and moving forward to maintain balance. Let students experiment with different ways of throwing the ball. Ask students to be creative in finding their style of movement, then ask them to explain how to throw the most accurately from various directions, heights, and others. Other movements can also be given, such as how to find a style for catching, kicking, and hitting the ball.
<i>Spatial awareness and intelligence:</i> Ask the students to explore formations in different groups. The group consists of four or six people. In one group, it is allowed to consist of male and female students, or all are the same sex. Then instruct them to be able to try passing the ball among their groups using different formations, such as straight lines with one player behind the other, triangles, squares, and others. Ask them to analyze and compare the effectiveness of which formations have difficulty levels, from the easiest to the most difficult.
<i>Student-designed learning games:</i> Students are instructed to create their version of the learning game. They start by determining the equipment, the place to play, the number of players, the basic rules, and others. They can also modify games designed by the teacher and ask to develop the principles of modification in the context of the game so that they can be more innovative and creative.
<i>Attacking vs Defending Game:</i> Put students into a small game where they can explore the effectiveness of attacking and defending schemes, such as the ability of the team to pass the ball, score goals, take advantage of opportunities effectively, and the ability to communicate among teams.
<i>Motivational strategies:</i> Express goals, create a positive environment, give appreciation, do group discussions, maximize facilities, motivate teaching by invitation techniques, use Discovery/Inquiry Learning, Problem-based Learning/PBL, Project-based Learning/PJBL, and TGFU learning models.
<i>Aspects observed:</i> Cognitive, Affective, Psychomotor.
<b>Gymnastics activity learning</b>
<i>Picture cards:</i> Give students a floor gymnastics picture card. So they have the basic competence to understand the concept of a combination of static and dynamic dominant basic movement patterns to form basic floor gymnastics skills/techniques (such as handstand, kayak, wheeling, and others). Instruct the students to make concept movements according to the difficulty level, from easy to the most difficult, based on the performance of each group. Ask them to give feedback about some of the difficulties in doing these movements.
<i>Forms of balance movements:</i> First, show how to draw for balance lessons, then ask students to create a structured task by making several balance movements of various shapes with their respective partners. Ask them to develop some form of static and dynamic balance learning according to their tastes.
<i>Designing a systematic movement:</i> Students are instructed to take advantage of some of the facilities and infrastructure available at school. Then, they made several systematic movements, both balance and locomotor movements adapted to the stages of physical education learning, namely warming up, core exercises, and cooling down in their movement activities. Then they have to present some of the steps of the movement with their group friends.

Table 2. Continued

<b>Gymnastics activity learning</b>
<i>Analogy learning strategy:</i> Make presenting learning materials more challenging for students by asking them to imagine what if they were walking across an area or field with sticky soil, slippery ground, or even bumpy and rocky ground. Then invite them to discuss differences as they move between the different ground surfaces. Then invite them to do locomotor and non-locomotor movements by imitating specific animal movements.
<i>Motivational strategies:</i> Express goals, create a positive environment, give appreciation, do group discussions, maximize facilities, motivate teaching by invitation techniques, use Discovery/Inquiry Learning, Problem-based Learning/PBL, Project-based Learning/PJBL, TGFU learning models.
<i>Aspects observed:</i> Cognitive, Affective, Psychomotor.
<b>Rhythmic activity learning</b>
<i>Rhythmic movement learning:</i> Movement learning can collaborate with music. Each genre of music has a tempo and dynamics and even contains elements of emotion that significantly affect the ability of students to learn movement. In this case, instruct students to work in pairs or even groups to listen to various genres of music and ask them to make several variations of movements that can represent the music's tempo and dynamics.
<i>Movement patterns:</i> Movement patterns are arranged according to the student's ability level, adjusted from the easiest to the most difficult. The method is like a training circuit in which several posts are marked with the movement's name. Students must pass through all the posts by performing the required movements. Some materials contain elements of locomotor, non-locomotor and manipulative motion.
<i>The use of teaching aids:</i> Ask students to use some of the teaching aids available at school or even learning media made from used goods available around the school. Students can explore the ability to generate new ideas about how to make a variety of simple teaching aids to be used in physical education learning.
<i>Motivational strategies:</i> Express goals, create a positive environment, give appreciation, do group discussions, maximize facilities, motivate teaching by invitation techniques, use Discovery/Inquiry Learning, Problem-based Learning/PBL, Project-based Learning/PJBL, and TGFU learning models.
<i>Aspects observed:</i> Cognitive, Affective, Psychomotor Sports and game learning.
<b>Sports and game learning</b>
<i>Game Model:</i> Instruct students to make one or two of their group versions of the game by applying the principles of tactics and strategy. Ask students to explore more innovations and solve these tactical aspects in a game.
<i>Attack and Defense Game:</i> Make small groups of several people in each group. Teach them to make gameplay by exploring the effectiveness of defence and attack schemes. The learning pattern can be passing the ball, grabbing the ball, and scoring points using friends and the field. This learning will hone them to have more responsibility, respect, and cooperation among their group friends.
<i>Game Modifications:</i> Instruct students to make some modifications to the game. Both in terms of media and the rules used. This is done so that they can use their environment as learning material.
<i>Mastery of Skills:</i> If students have difficulty in mastering skills, the teacher should provide individual assistance to these students by trying to analyze each movement to identify what weaknesses are experienced by students. So that teachers can provide several alternative ways of learning better.
<i>Motivational strategies:</i> Express goals, create a positive environment, give appreciation, do group discussions, maximize facilities, motivate teaching by invitation techniques, use Discovery/Inquiry Learning, Problem-based Learning/PBL, Project-based Learning/PJBL, and TGFU learning models.
<i>Aspects observed:</i> Cognitive, Affective, Psychomotor.
<b>Health and fitness learning</b>
<i>Student Worksheets: In this case,</i> Instruct students to write a few paragraphs about activities in various weather conditions. Allow them to express their opinion and explain what activities are suitable and how to do them.
<i>Health Learning:</i> After knowing some activities, students will ask to discuss some of the benefits of these activities. Discuss various topics about sports, smoking, school health, and the dangers of drugs. This section aims to educate students on Health to promote Health further. Students must be able to create unique ways to advertise to their classmates.
<i>Fitness Program Design:</i> Students are asked to create a fitness program to achieve complete fitness. Fitness activities should represent the components of fitness, such as endurance, strength, flexibility, and speed. Then they can do periodic physical fitness tests based on some standardized tests. They can see the difference in fitness ability before and after fitness activities.
<i>Motivational strategies:</i> Express goals, create a positive environment, give appreciation, do group discussions, maximize facilities, motivate teaching by invitation techniques, use Discovery/Inquiry Learning, Problem-based Learning/PBL, Project-based Learning/PJBL, and TGFU learning models.
<i>Aspects observed:</i> Cognitive, Affective, Psychomotor.

Table 2. Continued

<b>Outdoor Education</b>
<i>Learning Process Concept:</i> Through a series of activities created to be completed outside of the classroom, outdoor education is an interdisciplinary learning process. This method intentionally considers how natural environments might support the growth of the body and mind. Programs have the power to alter attitudes and behaviour toward nature by raising knowledge of the mutually beneficial relationship with it.
<i>The concept of outdoor activities:</i> This method takes advantage of outdoor living and camping activities, which give students numerous opportunities to learn and develop various fundamental attitudes, abilities, and a love of the natural world and interpersonal interactions. Camping, mountain climbing, exploring, fishing, studying nature, living in the country, living simply, creating crafts, and other hobbies are extracurricular activities.
<i>Environmental concept:</i> The study of ecology, which is the foundation of how living things depend on one another, is called the ecological notion. This program's primary goals are to explain how we fit into the universe and demonstrate how to preserve the quality of the environment for good, both present and future.
<i>Motivational strategies:</i> Express goals, create a positive environment, give appreciation, do group discussions, maximize facilities, motivate teaching by invitation techniques, use Discovery/Inquiry Learning, Problem-based Learning/PBL, Project-based Learning/PJBL, and TGFU learning models.
<i>Aspects observed:</i> Cognitive, Affective, Psychomotor.

The author uses the active learning steps above to guide students' critical thinking skills. This cannot be separated from the role of the pioneer school curriculum that the researcher adopted as the basis for making research programs. As explained in the pioneer school curriculum, the role of the ambitious teacher must be able to provide a conducive and effective learning atmosphere. Thus, students feel comfortable and motivated to improve their performance at school. Besides, it can also encourage students to be more critical and creative and have a high tolerance for differences around them. The research was conducted for three months with a frequency of three meetings for PE learning at schools. This was done to explore how this model works optimally and comprehensively. Students undergo a series of education using the MALP program above, with game patterns in each learning session. The researcher observed and recorded the results of student work in a daily journal at each activity session to see how far the students' learning was progressing.

#### Research Instrument

The instrument that the researcher used consists of two forms; the first is in the form of giving HOTS-based questions. Moreover, the second is a questionnaire using Formative Class Evaluation (FCE) adopted by (Tuasikal et al., 2021). The researcher used the FCE questionnaire sheet to determine the effectiveness of the PE learning process that has been carried out in terms of students' opinions. The FCE questionnaire consists of 9 questions: results, motivation, methods, and cooperation. Based on the FCE questionnaire table, the outcome components are described in questions number, 1,2, and 3, the motivation component is described in questions 4 and 5, the method component is described in questions 6 and 7, and the cooperation component does describe in questions 8 and 9. The FCE questionnaire can be seen in the following table;

Table 3. The FCE Questionnaire Grid

<b>Component</b>	<b>Indicator</b>
Result	Memorable Experience, Skills, and Knowledge
Motivation	Sincerity and Fun
Method	Immediate learning and efforts to get learning goals
Cooperation	Attitude to friends and learning to work together

Meanwhile, HOTS-based questions are creatively arranged according to the situation and conditions in their respective regions. Creativity in selecting phenomena-based stimuli in each school environment is essential. Various phenomena that occur in the school can be appointed as contextual stimuli. Thus, the inspiration chosen in the HOTS questions becomes very interesting because it can be seen and felt directly by students. In addition, the presentation of HOTS questions can increase a sense of belonging and love for the potential in their school so that students feel called to take part in solving various problems. The critical thinking ability measured consists of four indicators at the cognitive level, including knowledge, analysis, evaluation, and creation (Assaly & Smadi, 2015), which are then translated into 15 description questions. Observation sheets, peer surveys, recordings, notes, and reflections are some of the instruments used to evaluate the learning process as it is happening. Students' answers were further categorized into four solutions categories: True, Fairly True, Less True, and False. The following is a grid for HOTS-based questions;

Table 4. HOTS-Based Question Grid

Cognitive Level	Operational Verbs	Characteristics of the Question
Knowledge	Recalling To remember, register, repeat, and imitate.	Measuring factual, conceptual, and procedural abilities.
Analyzing	Specifying aspects/elements To compare, examine, critique, and test.	Using reasoning and logic to make decisions (evaluation) Predict and reflect, and develop new strategies to solve problems.
Evaluating	Making your own decision To evaluate, judge, refute, decide, vote, and support.	Demanding the ability of students to formulate hypotheses, criticize, predict, assess, test, justify or blame.
Creating	Creating your own ideas To construct, design, create, develop, write, and formulate.	Demanding the ability of students to design, build, plan, produce, discover, update, perfect, strengthen, beautify, and compose.

### Data Analysis

The IBM SPSS series 20 program was then used to test the quantitative data collected from the student's first and last test results. The data normality test is used to evaluate the distribution of data in a data set or variable and determine whether the data distribution is typically distributed after testing processes, such as the validity and reliability of the questionnaire used. Paired t-test is the final step in hypothesis testing. This test aims to see if the average of the initial and final tests is different. Researchers can continue to analyze text data subjectively with the help of this analysis (Asmus & Radocy, 2017). Following are the results of data processing from the normality test;

### Data Normality Test

The data obtained must be analyzed with the following testing step, namely the normality test of the data as a determinant for the next testing stage. The normality test score that the researcher took was using Kolmogorov Smirnov because the sample was 137 people. Therefore, it has met the prerequisites regarding sample size in determining the analysis prerequisite score. This statistical data analysis used the SPSS for Windows 20 series application program. The data for the normality test can be seen in table 7 below;

Table 5. Normality Test

Variable Test	Kolmogorov-Smirnov <sup>a</sup>		
	Statistic	df	Asymp.Sig (2-Tailed)
HOTS	.307	137	.148
FCE	.427	137	.112

Based on data from the Kolmogorov-Smirnov test, the asymptotic significance (2-tailed) score is .148 for the HOTS test and .112 for the FCE questionnaire. The prerequisite for the normality test is that the asymptotic significance value must be  $> .05$ , so the calculation results can be declared normally distributed. Therefore, the data meets the requirements for further statistical analysis using parametric tests.

## Findings / Results

### Description of data

After the data is obtained, the first step is to find the average value of the answers to the HOTS-based questions and FCE questionnaires previously given to students to see how far the effectiveness of PE learning has been using the MALP approach to improve students' critical thinking abilities. The results of processing the HOTS-based question-answer analysis and the average score on the questionnaire can be described in the following table;

Table 6. The Results of the Analysis of the Answers to the HOTS questions

Aspect	Category			
	True (%)	Fairly True (%)	Less True (%)	Wrong (%)
Identifying or structuring questions	88,1	11,9		
Analyzing conclusions	47,2	39,2	13,4	
Identifying and resolving irrelevance	36,1	49,9	10,9	3,1
Why	70,6	16,2	13,2	
Reputation	54,3	29,1	16,6	



Table 6. Continued

Aspect	Category			
	True (%)	Fairly True (%)	Less True (%)	Wrong (%)
Short interval between observation and report	44,8	29,8	24,7	0,7
Logic class	7,9	68,9	23,2	
Generalizing	35,1	29,7	34,6	0,6
Consequences of accepting or rejecting the decision	48,7	28,1	23,2	
Definition	24,1	65,5	10,3	
Assessing the truth of assumptions		50,1	46,3	3,6
Making and considering decisions	25,1	39,5	29,8	5,6
Following the troubleshooting steps	97,5	2,5		

Based on the results of the category analysis, students' critical thinking skills in each of the above aspects are very varied. The percentage of correct answers in identifying or compiling questions is 88.1%. This shows that students have an excellent ability to formulate questions. The sentence structure of the inquiries made by students is perfect and by the specified topic. Conversely, the percentage of correct answers to aspects of analyzing conclusions is 47.2%. This shows that students' ability to identify the findings still needs to improve. Students can identify the truth or error of the conclusions presented, but students need help to provide explanations that support these conclusions. In identifying and overcoming irrelevance, the percentage of correct answers is 36.1%. Students can identify errors, but they have yet to be able to explain how to overcome these irrelevances— aspects of why the percentage of correct answers is 70.6%. Students can ask questions as well as provide solutions properly and correctly. Aspects of reputation, the rate of correct answers is 54.3%, students can choose or determine reputable sources and are sufficiently able to provide reasons for selecting reputable sources. As aspects of the short interval between observations and reports, the percentage of correct answers is 44.8%.

Students understand the time interval well. Aspects of the logic class, the percentage of correct answers is 7.9%, and the answer is quite large at 68.9%. Students can deduce but have yet to be able to explain the deductions made. Aspects of generalizing, the percentage of correct answers is 35.1%. Students can generalize data, but it is enough to justify the conclusions. As aspects of the consequences of accepting or rejecting the decision, the percentage of correct answers is 48.7%. Students can provide explanations for making or leaving decisions. As aspects of the definition, the rate of correct answers is 24.1%. Students can earn a purpose, but it still needs to be corrected. Aspects of assumptions, the percentage of responses are correct at 50.1% and less correct answers at 46.3%. In making and considering decisions, the rate of correct answers is 25.1%, and reasonably accurate is 39.5%. This shows that students' critical thinking skills are pretty good. Aspects follow the steps to solve the problem; the percentage of correct answers is 97.5%. So it can be concluded from the results of the analysis of students' answers that have been given HOTS-based questions that the student's critical thinking skills as a whole are excellent, so it is hoped that they can provide solutions to problems both in the context of learning at school and in everyday life.

Table 7. The Results of the Average Value of the FCE questionnaire

Component	Indicator	Average score of Each category				
		Very good	Good	Enough	Less	Very Less
Result	Cognitive	3.00-2.87	2.60-2.36	1.59-1.19	1.21-1.73	1.67-1.00
	Affective	3.00-2.78	2.66-2.30	1.68-1.41	1.40-2.27	1.58-1.00
	Psychomotor	3.00-2.65	2.67-2.21	1.57-1.28	1.18-1.87	1.87-1.00
Motivation	Sincerity	3.00-2.90	2.49-2.30	1.71-1.15	1.65-2.40	2.60-1.00
	Enjoyment	3.00-2.70	2.58-2.29	1.63-1.27	1.60-2.29	1.76-1.00
Method	Reinforcement in learning	3.00-2.68	2.76-2.34	1.11-1.32	1.35-2.31	1.45-1.00
	Efforts to achieve learning objectives	3.00-2.79	2.59-2.43	1.62-1.46	1.12-1.87	1.29-1.00
Cooperation	Attitude to friends	3.00-2.92	2.80-2.67	1.54-1.22	1.28-2.10	1.36-1.00
	Learning to work together	3.00-2.95	2.51-2.44	1.65-1.36	1.29-2.15	1.74-1.00
	<b>Total</b>	<b>3.00-2.88</b>	<b>2.56-2.38</b>	<b>1.59-1.23</b>	<b>1.34-2.08</b>	<b>1.69-1.00</b>

Based on the data from the FCE questionnaire results in table 5 above, it can be explained that the average of students who answered very well was 3.00-2.88, and good answers were 2.56-2.38. This proves that students' perceptions of PE learning using MALP are very good at supporting their activities in learning. Students adapt well to the model applied, so it can be done well in interacting and building a conducive atmosphere. So that the learning objectives set by the teacher can be achieved following what is targeted.

*Results of Hypothesis Testing using T-test*

After obtaining data with normal distribution, the next test step is hypothesis testing. Hypothesis testing was carried out to answer the hypothesis set in the study, namely the effect of MALP on increasing the critical thinking skills of elementary school students. The researcher used the paired sample t-test to test this hypothesis. The results of the paired sample t-test hypothesis test can be seen in table 8 below;

Table 8. Hypothesis t-Test Results

		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	-1,7562	1,347	.250	-1,163	-2,280	-5,416	137	,001

Based on the calculation of the results of the paired sample t-test above, the results obtained from significance (2-tailed) is  $.001 < .05$ . So applying the MALP model affects elementary school students' increasing critical thinking skills. To see comprehensively, the table below presents the magnitude of the effect of the MALP model on improving students' critical thinking skills in physical education learning through a simple linear regression test;

Table 9. Simple Linear Regression Test

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.825 <sup>a</sup>	.701	.872	1.704

Based on the data in the simple linear regression test results table using R Square, a score of 0.701 is obtained. To find out the percentage of the effect, using the formula  $r \text{ square} \times 100$ , it is known that  $0.701 \times 100 = 70.1\%$ ; it can be concluded that the magnitude of the influence of MALP on students' critical thinking skills is 70.1%.

## Discussion

### *Does The Motivating Active Learning in Physical Education Model Affect the Improvement of Students' Critical Thinking Skills Through PE?*

The learning approach uses the motivating active learning model in physical education, which has a significant effect. Because in the MALP model, students are directly involved in doing something and thinking about what they are doing. Students are engaged in the process of collecting information and constructing it so that learning becomes fun. Teachers only need to create appropriate strategies so that students can learn actively and have high motivation to learn (Correani et al., 2020). Motivating is also in the spotlight because students need to be encouraged to make them active in learning. Through the nuances of the learning process by combining teaching-by-invitation motivating techniques, the students seemed more enthusiastic so that the frequency and duration of the movement task learning could be carried out optimally. This is in line with the research of C.-H. Liu et al. (2018), which revealed that in the context of physical education teaching, the motivational strategies given by the teacher significantly affect student activity. In addition, students get experience from the learning environment created by the teacher so that they find and realize that each ball used has its characteristics (Nur et al., 2019). For example, for students whose energy is relatively small, when choosing to use a light ball, the results are more effective in practicing basic passing techniques in basketball games. Furthermore, the students could determine the most effective ball choice when the throwing distance was far enough; they chose a light but accurate ball, such as a tennis ball. This means that indirectly, besides increasing children's motivation, it can also stimulate children's critical thinking in dealing with problems, in this case, the selection of the type of ball (Kurnianto et al., 2020; Sari et al., 2021).

According to Chiva-Bartoll and Fernández-Rio (2022) with the active learning model, students will participate more actively in the lessons. This is because, in this method, the class will be made so that each student is required to understand the material obtained and then transfer it to other students. The teacher is only a director who designs the learning process and ensures a reciprocal interaction between students so that the process of receiving or understanding the subject matter results from active interaction between students (Muhtar et al., 2021). Students can actively participate in the lessons they are learning through active learning. The teacher only acts as a facilitator who ensures the learning process follows the expected plan. In the end, the teacher conducts a question-and-answer session to ensure that the material received is correct and consistent with the proper concept (Kurniasih et al., 2020). Active learning aims to maximize each student's potential for achieving satisfactory learning outcomes tailored to their individual needs. Additionally, active learning aims to maintain students' attention on the learning process (Konyushkova et al., 2017). Active learning sees the learning process as a product of thinking, and thinking is a product

of a learning process (Aggarwal et al., 2014). Because PE learning is packaged more enjoyable and nuanced than other forms of instruction, students tend to be more passionate about participating in class. As a result, when they receive questions or questions based on HOTS, they feel at ease and truly enjoy the PE learning process.

When using the MALP approach, students are encouraged to assume personal responsibility and are given the freedom to choose from various learning activities. Students are prepared to face real environmental problems and can solve them according to the learning experience's solutions. Implementing the MALP model requires all parties to participate in the learning process. Teachers and students are expected to be able to reflect on their experiences and their willingness to share those experiences (Suherman et al., 2019). Active learning strategies that can reflect on students' self are used in their application in the form of student questions (Carr et al., 2015). This strategy is used to learn about students' desires and expectations to maximize their potential and get students' participation through writing.

#### *How Much Influence Does Active Learning Motivation Have on Improving Students' Critical Thinking Skills Through Physical Education?*

The MALP model has a very significant influence in helping students achieve critical thinking skills. Because students learn to be invited to develop critical thinking skills through the MALP model, it can effectively help students form thinking habits helpful in understanding a concept. Students are allowed to carry out problem-analysis activities independently (Hidayat et al., 2022; Lengkana et al., 2019). The active learning model directs each new subject matter to existing knowledge and experiences. Existing knowledge is actively contributed to the new topic matter. Teachers must be able to create learning that trains students' critical thinking skills (Subarna et al., 2021). Selecting a suitable learning model will activate all the students' potential, which in turn can improve their critical thinking skills (Carr et al., 2015). Various learning models applied to the research process include guided inquiry learning models and PBL. After being taught through problem-based learning, students' critical thinking abilities can be steadily improved through the guided inquiry learning paradigm, as can their motivation (PBL). Hartini et al. (2020), Saputra et al. (2019), and Xu (2011) emphasized that critical thinking abilities must be taught to kids since they help them assess their thoughts when making decisions and developing sensible conclusions. Suppose students are allowed to use higher-level thinking at each grade level. In that case, they will become accustomed to distinguishing between truth and lies, appearance and reality, fact and opinion, and knowledge and belief.

Therefore, the construction of student understanding is needed after students carry out learning activities (Lengkana et al., 2020; Mulya et al., 2021). Dialogue with oneself is a reflective process about the topic being studied. Students ask themselves what they think so that they will be able to construct their understanding independently. In addition to having a dialogue with oneself in reflective activities, dialogue is also sought with others. Dialogue with others is not a partial dialogue as in conventional teaching but a more active and dynamic dialogue in small group discussions about the studied topic. Students will carry out learning activities by doing something during the discussion process, such as discussing practicum and criticizing a friend's argument. Then the results of these activities will be compiled into new knowledge of the cognitive structure.

### **Conclusion**

Several previous studies have identified the effect of active learning on student learning outcomes, while the author's research is trying to identify more deeply the influence of active learning given motivation on students' critical thinking skills. It is clear from the calculations and data analysis in this study that using the MALP model impacts primary school children developing critical thinking abilities. The difference in the average score on the initial and final tests indicates this. Therefore, motivation is essential as a psychological basis for students to continue to develop their potential according to their respective characteristics. Active learning can only be realized with a psychological touch and a scientific approach. Thus, in the future, there should be more attention to teachers and policymakers to continue to innovate and develop their competence in physical education.

### **Recommendations**

Other psychological approaches and a comprehensive sample coverage can be recommendations for further research so that this research can be developed in line with the core competency needs of physical education students must have. Student requirements must be considered at the elementary school level and maintained up to senior high school in future studies regarding students' critical thinking skills, motor skills, and affective abilities.

### **Limitations**

Weaknesses in the research include the few subjects used, so the researcher needs to identify more broadly student abilities. The need for critical thinking skills only limits this research. In physical education, cognitive, affective, and psychomotor needs is a priority.

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## Authorship Contribution Statement

Hidayat: Concept and design, Drafting manuscript. Lengkana: Drafting manuscript, data analysis / interpretation. Rohyana: Critical revision of manuscript. Purwanto: Statistical analysis. Razali: Technical or material support. Rosalina: Data analysis / interpretation.

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