

## **The Effectiveness of the 7E Learning Cycle Model Aided by Montessori Media on Students' Critical Thinking Ability**

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### **Abstract**

The purpose of this study was to determine the relationship between the Learning Cycle 7E learning model assisted by Montessori media on the critical thinking skills of elementary school students in class IV hearing senses. This research is motivated by the existence of a phenomenon where students have difficulty understanding material about the sense of hearing which is quite complicated because of the many terms used. Science subjects in elementary schools are generally taught by lecture and assignment methods, this will make students feel bored faster in class and unable to absorb the information conveyed correctly. Therefore, research was made to show how effective the Learning Cycle 7E model assisted by Montessori media was on students' critical thinking skills. This research was conducted using a quantitative approach with quasi-experimental methods. The research design developed was a quasi-experimental design model with nonequivalent control group design. The sample used was fourth grade students at SDN Sukarasa. As for the data processing techniques, the authors use descriptive techniques to obtain conclusions from this study. As a result, there is a positive relationship from the Montessori media-assisted LC 7E learning model to students' critical thinking skills. This is also supported by the opinions of experts on how effective learning can be done, one of which is by using a fun learning model so that children's thinking abilities increase.

**Keywords:** Learning Cycle 7E, Montessori, Hearing, Critical Thinking, Elementary Students



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### **INTRODUCTION**

Education and skills are critical to Indonesia's growth prospects. Today, Indonesia has the opportunity to capitalize on the very substantial progress it has made in expanding access to education. Therefore, an important goal of education in Indonesia is to improve learning outcomes and enable students to form core skills and understanding (Sumampouw, 2011). Additional support will be needed to overcome low levels of readiness and motivation of learners. The key to success lies in how the teacher handles the learning process. Science is a field of study that is growing rapidly, in line with advances in technology and information. Because of this urgency, science learning began to be implemented at the basic education level. Through science learning, students can process and develop their abilities in terms of knowledge, skills and scientific attitude (Narut & Supradi, 2019). Science learning is required to provide space for students to develop these abilities, both in the process of solving problems, thinking creatively and also being innovative.

Given the urgency of learning science for the development of students preparing for 21st century skills, appropriate and qualified approaches, models and methods are needed to convey the meaning of science to students. According to Ausubel which is reinforced by Piaget's theory (Mu'min, 2013), learning must be meaningful and learned directly. Given that elementary school students are still at the concrete operational stage where they will more easily remember and understand what they see and feel as real evidence.

The use of conventional methods will make students passive, they will just sit quietly listening to the teacher's explanation without any reciprocal relationship between students and the teacher or vice versa. So that students also seem not enthusiastic in learning. During the lesson, there were some students who paid attention, some chatted, some fell asleep, some seemed to pay attention but when asked they could not answer. Learning with such conditions certainly will not develop students' thinking power, even though if seen from their age level, fourth grade elementary school children can already be required to think at a higher level. This is evidenced by the low learning outcomes of students when tests were carried out on the material of the Sense of Hearing, in which the average scores of most students were still below the KKM. Apart from the unattractive learning methods, the material for the sense of hearing is indeed quite complicated material if it is not accompanied by visualization of pictures or teaching aids.

There is one learning model that can be used as an alternative in solving this problem. This learning model is centered on students and actively involves them to ask questions in the learning process. The model is a type 7E Learning Cycle model. The Type 7E Learning Cycle model contains learning stages in the form of Elicit, Engagement, Exploration, Explanation, Elaboration, Evaluation, and Extend which of the seven stages, students will be directed to develop critical thinking processes and their motivation in learning so that their learning outcomes will increase. This model was chosen not only because it is student centered but also because it has never been applied to learning at SDN 1 Rawa.

In addition to the learning model, the researchers also developed the use of learning media with the Montessori method as a visual aid in learning science on the subject of the sense of hearing. Montessori media is designed according to the development of students, both psychologically and physically so that it will help students understand learning material concretely. Based on the book *The Montessori Method* cited by Damayanti (Damayanti, 2019), montessori is one of the basic curricula that is implemented in the child's environment. Children who participate in this environment have the freedom to explore and choose materials to use in these activities. Montessori teaching aids have four special characters, namely self-taught, self-correction, graded and of course interesting. This teaching aid is designed so that children can learn independently.

Based on the description above, the researcher is interested in conducting an experiment regarding "Effectiveness of the Learning Cycle Type 7E Learning Model Assisted by Montessori Media on Students' Critical Thinking Ability (Experimental Class in Class IV SDN 1 Rawa Kec. Cingambul Kab. Majalengka Material of Hearing)"

## **RESEARCH METHODS**

The research conducted is a quantitative research with quasi-experimental methods. The quasi-experimental method is a research method that does not use random assignment but existing groups. The use of the quasi-experimental method is based on the consideration that in the implementation of this research learning occurs naturally and students do not feel they are being tested, so it is hoped that in such situations they can contribute to the learning process. research validity level. The research design is a quasi experimental design model nonequivalent control two group design. The posttest and pretest questions used were questions about the sense of hearing in the form of 5 essay questions with details of 1 LOTS question and 4 HOTS questions. The following is a picture of a quasi-experimental design model with nonequivalent control group design:

O    XO  
 -----  
 O    O

Information:

X = treatment given (Learning Cycle 7E learning model assisted by Montessori media)

O = pretest and posttest in the control class and experimental class

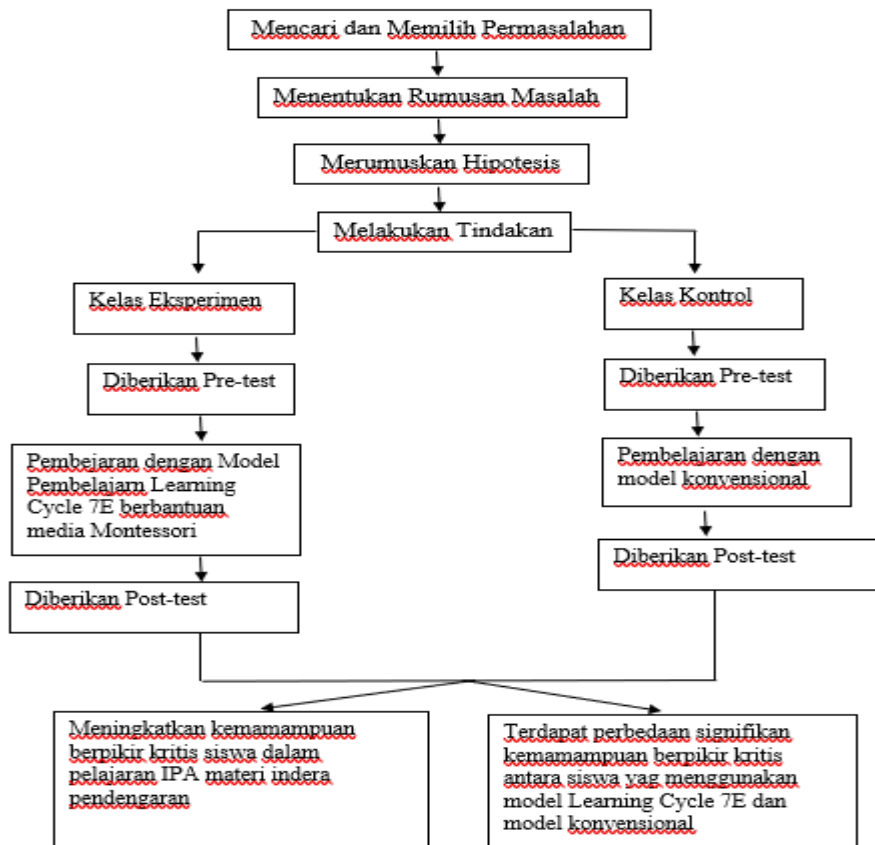
----- = Samples are not randomly selected

The research sample was all fourth grade students at SDN Sukarasa, Cileunyi District, Bandung Regency, consisting of:

**Table 1. Sample**

No	Gender	Number of Class IV Students
1	Man	20
2	Woman	26
Total		46

The sampling technique is non-probability sampling with purposive sampling, where in the purposive sampling technique, the determination of the sample is based on the researcher's considerations about which sample is most appropriate and considered to be representative of a population. The data collection technique used is testing with instruments in the form of test questions. The series of research processes to be carried out are as shown in the following chart:

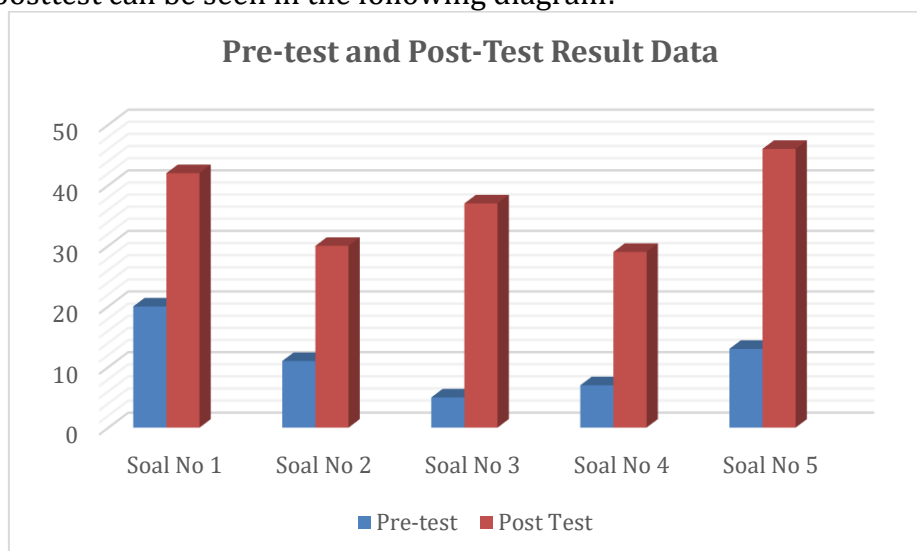


**Figure 1. Thinking Framework Chart**

## RESEARCH RESULTS AND DISCUSSION

From the tests conducted, it was found that the Learning Cycle model assisted by Monetssori media was able to improve students' critical thinking skills. The questions given in this test consist of one LOTS question and 4 HOTS questions. After conducting the pre-test, analyzed from 46 grade IV students, it was found that for number 1 (LOTS) there were 20 students who answered question correctly, 11 students who answered question number 2 correctly, 5 students who answered question number 3 correctly. , 7 students who answered question number 4 correctly, and 13 students who answered question number 5 correctly.

Furthermore, the teacher re-taught the material on the sense of hearing using the Learning Cycle 7E learning model assisted by Montessori media, then after that a pretest was carried out with the same questions. It was found that there were 42 students who answered question number 1 correctly, 30 students who answered question number 2 correctly, 37 students who answered question number 3 correctly, 29 students who answered question number 4 correctly, and 46 students who answered correctly question number 5. Results The pretest and posttest can be seen in the following diagram:



For question no 1, in the pretest results there were 43% of students who answered correctly and after being given treatment then doing a posttest, the results increased by 48% so that students who answered correctly became 91%. Likewise with question number 2 where previously there were 23% of students who answered correctly, after being given treatment it increased by 42% to 65% of students who answered correctly. In question no 3 the increase was quite significant, where previously students who answered correctly were at 10%, after being given treatment it increased by 70% so that it became 80% of students who answered questions correctly. In question no 4 there was an increase of 48% from 15% to 63% of students who answered the questions correctly. In question number 5 the increase was also very significant, where before being given treatment only 28% answered correctly, while after being given treatment it increased by 72% so that the percentage reached 100%, which means that all students answered the questions correctly.

## Discussion

### Science Learning in Elementary Schools

An important aspect that needs to be considered by teachers in carrying out science learning in elementary schools is to involve students actively in learning to develop their

thinking skills (Widiana, 2016). Scientific learning begins with paying attention to students' beliefs/knowledge so that they are relevant to what will be learned. In addition, learning activities are designed through various activities such as real life experiences with nature which can be carried out in the classroom or laboratory with learning aids or directly in the open air (Wahyu et al., 2020). Through real activities with nature, students can develop process skills and scientific attitudes, such as observing, conducting experiments, and drawing conclusions from the results of activities. Science learning activities are also designed wherever possible to provide opportunities for students to ask questions by asking students to do exercises to express themselves in the form of ideas and answers to the problems they face.

### **Characteristics of Grade IV Elementary School Students**

Grade IV students aged 9-10 years. Based on the stages of development proposed by Piaget, fourth grade students are in the concrete operational stage, where children can think logically and flexibly manage the application of concrete objects. Based on the stage of child development at the concrete operational stage (Zuliani et al., 2017). Learning by using concrete media such as serial pictures or other Montessori media and using the 7E Learning Cycle model is very suitable to be applied to fourth graders of elementary school, because it is in accordance with their developmental characteristics.

### **Learning Cycle type 7E**

Learning by applying the 7E learning cycle model requires students to learn meaningful material through work and thinking, so that the knowledge gained is the result of construction from students' direct experience. The 7E Learning Cycle model hopes to create an innovative, constructive and fun learning environment for students (Rosliana, 2019). Thus, students are motivated to be actively involved in participating in the process of learning activities, which in turn can improve student learning outcomes. Learning Cycle 7E (Elicit-Engage-Explore-Explain-Evaluate-Extend) is a learning model that can improve students' understanding of the concepts and principles of science on a topic (Adilah & Budiharti, 2015). The 7E Learning Cycle learning model was developed from the 5E Learning Cycle learning model. Similar to the Learning Cycle 5E learning model, the teacher's role in the Learning Cycle 7E learning model is as a facilitator and motivator of learning. The difference between the Learning Cycle 5E and 7E learning models is that the 7E cycle learning model begins with students' knowledge of a subject by asking questions (elicit) and ends by providing opportunities for students to develop and apply scientific ideas and principles that are applied to everyday life situations. -more complex days.

According to Sadia (2015), there are several benefits of the 7E learning cycle model, namely:

1. Teachers will be able to teach effectively, based on the results of existing knowledge in students (elicit)
2. Students are motivated to remember the topics studied before
3. Engagement activities make students more active and interested
4. Through exploratory activities, students will experience a discovery learning process so that the concepts learned become more meaningful and sustainable.
5. Students' higher order thinking skills (critical thinking and creative thinking) are included in the learning process.
6. Activities at the explanation level train students to develop good scientific communication skills.



7. Through activities in the development stage (comprehensive), so that students' understanding and mastery of concepts becomes very strong.

According to Ngalimun quoted by (Sritresna, 2018), the weaknesses of the 7-cycle learning model are:

1. The effectiveness of learning is low if the teacher does not master the learning steps
2. Requires more planned and organized classroom management,
3. Demand seriousness and creativity of teachers in designing and implementing the learning process,
4. Requires more time and effort in planning and implementing learning.

### **Montessori Learning Media**

Learning media is a useful tool or intermediary to expedite the teaching and learning process to facilitate communication between teachers and students. This is very helpful for teachers in teaching and makes it easier for students to receive and understand lessons. This process requires professional teachers who are able to match teaching media and teaching methods (Hartati et al., 2021). Montessori learning media is designed according to student development, both psychologically and physically, so that it helps students understand the subject matter concretely. Montessori media is one of the media that uses the basic principles of the curriculum applied in the child's environment. Children who participate in this environment have the freedom to explore and choose materials to be used in these activities. Montessori media has four special characters, namely independent learning, self-correction, value and of course interesting (Susiati et al., 2021). These learning resources are designed so that children can learn independently.

### **Supporting Theory**

#### **Learning Theory of Jean Piaget**

In this study, Piaget's theory is used as a supporting theory because the Learning Cycle 7E learning model is also based on constructivism like Piaget's theory. Piaget also introduced student-centred teaching, in which teachers start with students' existing understanding and help them build and develop it (although note this does not preclude teachers from carefully identifying and planning the content to be taught). In addition, when viewed from the stages of child development according to Piaget's theory, grade IV students are included in the concrete operational stage (7-12 years). Students in the concrete operations stage need opportunities for hands-on learning, experimenting and testing objects to build concepts, and then working with verbal propositions. As for the learning activities, the Learning Cycle 7E learning model requires students to construct their own knowledge through several learning steps, namely planning, investigating, explaining, elaborating or assimilating, and evaluating.

#### **Vygotsky's Learning Theory**

Vygotsky's theory shows how learning is built gradually during the early years and with the help of the child's social context. This theory is a criticism of Piaget's theory which states that children's learning is based on self-motivation and interaction with their environment (Hyun et al., 2020). Vygotsky believed that children learn more efficiently in social settings. That is why learning to use social development theory in class, namely in groups, can help students understand ideas more quickly (Verrawati, 2015). Furthermore, social interaction plays an integral role in learning and promotes reciprocal teaching styles. The link between Vygotsky's

learning theory and the Learning Cycle 7E learning model is that both emphasize students to study in groups rather than individually, so that they can exchange knowledge and solve problems.

### **Ausubel Learning Theory**

Ausubel's theory focuses on meaningful learning. According to his theory, to learn meaningfully, individuals must connect new knowledge with relevant concepts they already know (Rasvani & Wulandari, 2021). New knowledge must interact with the student's knowledge structure. Meaningful learning is different from rote learning. Since meaningful learning involves recognizing relationships between concepts, it has the privilege of being transferred to long-term memory. The most important element in meaningful learning is how new information is integrated into old knowledge structures (Adiutami & Sujana, 2022). Thus, the link between Ausubel's theory and the Learning Cycle 7E learning model is in the elaboration phase, where the teacher presents new knowledge that is associated with relevant concepts that already exist in the cognitive structure of students so that learning becomes meaningful.

### **Bruner's Learning Theory**

Bruner's theory states that learning will be effective when faced with new material to follow the development from the enactive stage (students learn from real objects in their environment) to iconic (students learn from visual objects) then symbolic representation (students learn based on abstract knowledge or ideas they already have). ) (Wiradintana, 2018). Bruner's theory also shows that a learner even from a very young age is able to learn any material as long as the instruction is properly arranged and uses assistive media (Sundari & Fauziati, 2021). In this case educators can use learning media that are relevant and able to develop students' interests and learning outcomes. The link between Bruner's theory and the application of the Learning Cycle 7E model is the use of instructional media to increase students' understanding by using visual objects that are attractive and easy to find around students.

### **The Effectiveness of Learning Cycle 7E Models Aided by Montessori Media**

Based on the results of tests conducted on students and theoretical analysis, it was found that the Learning Cycle 7E learning model assisted by Montessori media had a very large influence in improving students' critical thinking skills on auditory material. Students become more active and challenged to be able to solve problems given by the teacher. That way students' activities to think critically are also increasingly honed. Students are given space to think to analyze the parts of the sense of hearing. Next they were given Montessori media in the form of cut images of the parts of the ear, starting from the outer, middle and inner ear. Students are asked to arrange these parts and write down the name and function of each part of the ear. Students are also given problems in the form of how to take care of good ears and they have to find out for themselves. The series of learning carried out in this learning model requires students to be actively involved, but still under the guidance of the teacher. This critical thinking ability will have an impact on daily life, where students will be accustomed to solving problems in everyday life with their thinking skills.

## CONCLUSION

Meaningful learning is not easy to do, this was felt by researchers when observing and interviewing a teacher at an elementary school. According to experience and related sources, the factors that cause less meaningful learning are teachers who do not provide space for students to be actively involved in the learning process. This is because the teacher only uses conventional methods such as lectures in delivering science learning material. In addition, the lack of availability of visual aids is also an obstacle in delivering science lessons. The use of the Learning Cycle 7E learning model can be used as a solution for teachers to develop a more meaningful learning process. Montessori media can also be used as a visual aid that guides students to understand the material provided by the teacher. Students' understanding of the material will also affect their critical thinking skills in solving problems.

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