Auditory Intellectually Repetition (AIR) Learning Model as an Effort to Improve Students' Critical Thinking Skills in Physics Learning

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Abstract. This study aims to provide students with an understanding of the implementation of the Auditory Intellectually Repetition (AIR) learning model as an effort to improve students' critical thinking skills in physics learning. Critical thinking skills are important components that students must have to explore complex physics concepts. Using the literature review method, this study analyzes various studies and literature related to the effectiveness of the AIR model in improving students' critical thinking skills. The AIR model, which combines aspects of auditory, intellectual, and repetition, functions to help students understand concepts more deeply through a structured process. This model provides students not only to receive information, but also to analyze, evaluate, and integrate new knowledge, so that they are able to make them more critical in understanding and solving physics problems. Understanding the implementation of this AIR model is expected to help students, especially prospective educators, in developing physics learning strategies that can improve students' critical thinking skills effectively.

Keywords: Auditory Intellectually Repetition (AIR), Critical Thinking Skills, Physics Learning.

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INTRODUCTION

Education plays an important role in shaping the character and competence of the young generation, who are competitive in the global era. The main goal of education is to develop individual potential so that they can think critically, creatively, and adaptively in facing various challenges. Education is a conscious effort made by educators in organizing self-development activities for students to become complete human beings in accordance with predetermined goals (Mutoip, 2018 in Alfaringga and Frima, 2023). Effective education must include in-depth learning, which not only emphasizes the absorption of material, but also the ability to think critically to understand and process information independently.

In the era of globalization and increasingly rapid technological developments, the challenges in the world of education are also increasingly complex. Technological developments have a positive impact, such as the many conveniences that are obtained. Information technology can provide insight and knowledge about various things, make it easy to manage human activities, become a means of entertainment, and fill free time, increase creativity, and facilitate communication (Jumini et al., 2024). Teachers are required to be able to create learning that not

only prioritizes cognitive aspects, but is also able to develop critical thinking skills, communication skills, and students' collaboration skills. Simanjuntak (2019) emphasized that teachers are required not only to be able to change the way their students think in facing all the obstacles they experience, but also to have a heroic role that is not easily replaced; how important the role of teachers is for the future of their students. Effective learning is learning that can accommodate various student learning styles and is able to bridge individual differences in understanding the subject matter.

Improving students' critical thinking skills in physics learning is an important concern in the world of education, especially in preparing them to face the challenges of the 21st century. Science learning, whatever the approach, cannot be separated from the spirit of science learning itself, namely, scientific products, processes, and attitudes (Jumini et al., 2024). According to Mardhiyah (2021), 21st-century learning applies creativity, critical thinking, collaboration, problem solving, communication skills, social skills, and character skills. Critical thinking skills are essential skills that enable students to analyze, evaluate, and make decisions logically based on the information obtained. Critical thinking skills can also be interpreted as an individual's ability to translate their own thinking patterns from the responses they receive (Ajwar et al., 2015 in Kurniawan et al., 2021). Critical thinking skills need to be developed in order to solve problems and draw conclusions from various possibilities effectively (Syafitri et al., 2021). In this context, an effective and appropriate learning model is key to building students' critical thinking skills. One of the learning models that has been proposed to improve this skill is Auditory Intellectually Repetition (AIR).

The AIR learning model focuses on an auditory-based approach that involves intellectual repetition and stimulates student engagement in the learning process. This model is designed to strengthen conceptual understanding and improve students' long-term memory with repetition techniques that combine auditory and intellectual aspects. This is believed to help students understand physics concepts that are often abstract and complex. Amin (2020) said that the learning model that involves student activity is the Auditory Intellectually Repetition (AIR) learning model. The AIR learning model is an effective learning model by considering three things, namely Auditory, Intellectually, and Repetition, which require students to be more active, while the teacher who teaches acts as a student facilitator in learning (Sumiati et al., 2019). This model also allows students to practice critical thinking skills in a more structured and directed way.

However, despite many studies on the effectiveness of AIR, the implementation of this model is still less than optimal in some schools, especially in Indonesia. Factors such as limited facilities, minimal training for teachers, and a lack of understanding of the AIR method are obstacles to wider implementation. The importance of providing training to teachers on the application of AIR in physics learning is a step that needs to be considered to overcome this obstacle. In essence, physics itself demands more understanding than memorization (Solecha, et al., 2023). Mastery of Physics subjects makes it easier for students to analyze processes related to the basic performance of equipment and tools that are used to support the formation of skills program competencies (Jumini et al., 2016). The learning process always follows curriculum development and development over time, which is carried out using scientific methods in gaining knowledge from existing developments (Jumini et al., 2022). Through proper training, teachers can understand how to integrate AIR effectively in the classroom and design learning activities that support students' critical thinking skills.

In an effort to better understand the contribution of AIR in physics learning, further research is needed that focuses on the relationship between this model and the improvement of students' critical thinking skills. Existing literature shows that the success of AIR implementation is influenced by several factors, including the interaction between teachers and students, as well as the teaching strategies used. It will be difficult for students to learn the material if students find the teacher's explanation boring, so students do not pay attention (Astatik, A., Jumini, S., & Fuadi, S.I., 2024). So that students obtain the desired learning outcomes in accordance with learning outcomes, teachers must design efficient strategies (Jumini et al., 2022). Therefore, an in-depth understanding of how to effectively implement AIR can provide useful insights for educators in developing learning strategies that support the development of critical thinking skills.

Through this article, researchers use a literature review to provide an overview of the Auditory Intellectually Repetition (AIR) learning model as an effort to improve students' critical thinking skills in physics learning. The findings in this article can be the basis for developing more effective teaching methods. This article is expected to provide valuable insights for educators and policymakers in improving the quality of physics education in Indonesia.

METHODS

This study uses a qualitative approach. Qualitative research emphasizes the use of the researcher as an instrument. Qualitative research uses a natural setting as a direct source of data, and the researcher himself is a key instrument (Romlah, 2021). In practice, researchers review various documents. Qualitative research focuses on the meaning, social construction, and complexity of the phenomena studied (Creswell, 2014 in Jailani, 2023).

The type of research used is a literature review. A literature review is defined as a summary and theory obtained through relevant reading. A literature review also serves as a background for preparing actual data collection in experimental research (Ridwan et al., 2021). Researchers use literature reviews to understand and get an overview of the topic being studied. In agreement with this, Cahyono et al (2019) said that a literature review provides an overview of the development of a particular topic.

Data collection techniques in the study were carried out by reading and reviewing various journals, articles, and various other published manuscripts related to the Auditory Intellectually Repetition (AIR) learning model. The selected articles were articles that met the inclusion criteria: a maximum journal publication period of 10 years (2014-2024). The research subjects in the selected articles were students. Searching for research articles published on the internet through open-access channels such as Google Scholar.

Data analysis is carried out descriptively which is used to describe or interpret data by presenting an easy-to-understand summary. Martias (2021) said that descriptive analysis can be the first step before carrying out other analyzes because descriptive analysis can help researchers identify data. This is because descriptive analysis will be very helpful in organizing, compiling, and presenting in a form that is easy to understand (Maswar, 2017). With descriptive analysis, researchers get a comprehensive picture of the topic being studied without making too deep interpretations. In addition, descriptive analysis helps researchers clarify the context of the topic being developed, map the development of theories, and describe the important contributions of the topic being analyzed, namely the Auditory Intellectually Repetition (AIR) learning model.

RESULT AND DISCUSSION

Auditory Intellectually Repetition (AIR) Learning Model

The AIR learning model is learning by involving auditory (learning must be done by listening, paying attention, communicating, presenting, conveying arguments, and responding), intellectually (learning by using thinking skills), and repetition (learning must be repeated, either in the form of giving assignments, practice questions and/or quizzes (Ekasari & Trisnawati, 2021). The learning model that involves student activity is the Auditory Intellectually Repetition (AIR) learning model (Amin, 2020). Students are more required to be more active in the teaching and learning process. Meanwhile, the teacher is a facilitator whose job is to direct and guide students during the teaching and learning process. The syntax of the AIR learning model can be done by forming groups, dividing the material per group, followed by presentations and discussions, solving problems through discussions, and repeating the material, such as giving assignments by the teacher.

The advantages of learning using the AIR model can result in students having deeper abilities in understanding, creativity, and activeness in learning, problem-solving abilities, and strong memory. One of the disadvantages of this learning model is that teachers must provide

meaningful and easily understood problems for students, so that at this stage, students should have strong motivation so that they do not feel bored in learning (Sumiati et al., 2019). The AIR model helps students internalize concepts by listening repeatedly and processing information through deep thinking. This repetition process allows students to understand the material gradually, correct misunderstandings, and increase long-term information retention.

Critical Thinking Skills

The critical thinking process is a cognitive process, in learning, it begins with identifying problems, analyzing, and then evaluating learning (Astuti et al., 2018). High-level thinking skills are thinking skills that not only require the ability to remember, but also require other higher abilities, such as creative and critical thinking skills (Stiyamulyani, P., & Jumini, S., 2018). In general, the questions presented in PISA require students to think at a high level (HOTS), and creativity is very necessary so that students can solve the questions well (Jumini et al., 2019). In the learning process, critical thinking encourages students to explore knowledge in depth. By thinking critically, students learn to formulate the right questions, see a problem from various perspectives, and develop creative solutions. Costa states that thinking consists of the following activities or processes: (1) determining the law of cause and effect, (2) giving meaning to something new, (3) detecting regularities between phenomena, (4) determining shared quality (classification), and (5) finding the characteristics of a phenomenon. (Komalasari, 2015 in Astuti et al., 2018). Critical thinking skills can emerge with habituation. This ability is an important skill in deep and continuous learning.

From the various explanations above, it can be concluded that critical thinking skills or critical thinking abilities are skills that are directed at receiving, understanding, exploring, finding, and solving problems, concluding, and evaluating material or information so as to be able to make rational decisions.

The implementation of the Auditory Intellectually Repetition (AIR) learning model and the resulting impacts are tabulated in **Table 1**.

Table 1. Auditory Intellectually Repetition (AIR) learning model and the resulting impacts

No	Explanation	Impact	Source
1.	In the control class, no treatment was carried out as in the experimental class, which used the Auditory Intellectually Repetition (AIR) learning strategy, so that students felt bored with the ongoing learning process.	The critical thinking ability of students who received treatment using AIR (Auditory Intellectually Repetition) learning was higher than the average value of the critical thinking ability of students who received treatment using conventional learning.	(Astuti et al., 2018)
2.	There is a difference in critical thinking abilities between students who are given the Auditory Intellectually Repetition (AIR) learning model and students who are given the conventional learning model.	Learning using the Auditory, Intellectualy, Repetition (AIR) learning model can improve students' critical thinking skills.	(Sari et al., 2020)
3.	The AIR (Auditory, Intellectually, and Repetition) learning model is carried out using two cycles, namely cycle I where in this cycle only two indicators exceed the minimum achievement target and five have not met the target, while in Cycle II an increase in critical thinking skills has been achieved in five indicators exceeding the minimum achievement target for each indicator.	Auditory, Intellectually, and Repetition learning models can improve students' critical thinking skills.	(Anindhyta et al., 2019)

4.	Students' activities in deepening the material by playing the *talking stick game*, which is part of the INGAT model innovation, enable students to play an active role in the progress of teaching by answering questions and finding out students' understanding, combined with fun activities.	A significant increase in the tendency is also seen in the learning outcomes of students when participating in learning by applying a combination of the INGAT (Problem Based Learning, AIR (Auditory, Intellectually, Repetition), Talking Stick) models.	(Rosadi, 2023)
5.	The AIR model can help students play an active role in the learning process because students can exchange ideas with other group members and students' thinking skills increase compared to learning using only conventional models, students feel happier and more courageous in expressing their opinions.	The AIR (Auditory, Intellectually, Repetition) learning model, assisted by the quizizz application, can improve student learning outcomes	(Suryanda et al., 2023)
6.	Auditory Intellectually Repetition learning model assisted by cartoon math media applied in learning makes students more interested in learning, so that students find it easier to process information to find solutions to existing problems.	Auditory Intellectual Repetition model in learning can improve problem solving abilities	(Sihsejati & Roestika Rini, 2023)
7.	Through the AIR model, students not only memorize concepts or facts but also understand them, thus giving rise to activities related to the concept, then creating a new, comprehensive understanding of how the concept is learned by students.	There is an increase in students' ability to understand mathematical concepts in each cycle.	(Budianti et al., 2024)
8.	By carrying out activities that have been designed based on the AIR model, students can find information, prove the information obtained by conducting experiments, analyze data, which is then applied in solving physics problems.	The AIR approach in cooperative learning can improve student activity and learning outcomes.	(Fatmawati et al., 2018)
9.	There was a positive increase in students who actively discussed with their deskmates/groups, students who raised their hands to read the results of their discussions in front of the class, and students who responded to the presentation results from other groups, as well as students who were able to draw correct conclusions increasing.	Auditory Intellectually Repetition (AIR) learning can improve science learning outcomes	(Resyani, 2021)
10.	In the learning process, students should be taught with more varied learning models so that students are able to understand physics material effectively and efficiently.	The AIR learning model can be categorized as successful and increases students' interest in learning.	(Siregar et al., 2022)
11.	The average value obtained after applying the Auditory Intellectually Repetition learning model was 12, and before applying the Auditory Intellectually Repetition learning model, the average value was 7.5.	The improvement in critical mathematical thinking skills of students who received the Auditory Intellectually Repetition learning model was better than students who	(Amin et al., 2021)

No.			
		received scientific approach learning.	
12.	The AIR model provides students with the opportunity to explore their own knowledge, provides students with the opportunity to argue, so that students are motivated to learn.	There is an increase in creative thinking skills, student activity, and response after implementing Auditory Intellectually Repetition learning.	(Nasiruddin et al., 2022)
13.	The Auditory Intellectually Repetition learning model can be an alternative for teachers to train students' problem-solving abilities.	Students' problem-solving ability by applying the Auditory Intellectually Repetition learning model is included in the good criteria.	(Luthfiah et al., 2023)
14.	The learning is said to increase with the number of students actively participating in teaching and learning activities.	The application of the AIR (auditory, intellectually, repetition) collaborative Active Debate learning model increases student activity.	(Wargani, 2021)
15.	The Auditory, Intellectual, Repetition learning model can be used by teachers to provide more opportunities for comprehensive skills, familiarize students with providing opportunities to answer problems, so that students can be motivated and increase student activity in learning activities.	Auditory, Intellectual, Repetition (AIR) learning model can improve accuracy and add to students' understanding in discussion activities in problem solving.	(Zulherman et al., 2020)
16.	Auditory, Intellectually, and Repetition (AIR) learning model using arisan card learning media has been proven to be able to make students more active, while the teacher who teaches acts as a student facilitator in the learning process, so that students' opportunities to work together with their group friends will be greater.	Auditory Intellectualy Repitition learning model using arisan card media can improve student learning outcomes.	(Sumiati et al., 2019)
17.	The AIR learning model makes students more actively participate in learning and often express their ideas, and have more opportunities to utilize knowledge and skills comprehensively.	Students get better learning outcomes if they are given the Auditory Intellectually Repetition (AIR) learning model compared to the conventional approach.	(Ramadan, 2023)

The application of the AIR learning model has various impacts, ranging from increasing learning motivation, understanding concepts, increasing creative thinking skills, problem solving, to improving student learning outcomes. Adiani's opinion (2020), the Auditory, Intellectuality, Repetition (AIR) learning model, has three main aspects: the ability to absorb and receive information well (Auditory), the ability to think logically and systematically (Intellectuality), the ability in terms of repetition by giving assignments and by expanding understanding of the material by the teacher (Repetition). The results of this study are in line with previous studies that the AIR learning model is better at improving numerical skills (Arifin, 2020 in Nasiruddin et al., 2022).

This research can help teachers determine the right learning model in physics learning so that it can develop students' critical thinking skills. Critical thinking skills are very much needed by students to develop a deeper understanding of the various concepts and information obtained. Critical thinking helps analyze every aspect of a problem in detail, identify patterns or relationships, and formulate relevant and effective solutions. In addition, this ability helps students to evaluate information carefully, consider the source and quality of the data, so that they can make the right decisions based on strong reasons. In a world filled with information from various sources, critical

thinking is the key for students to sort out which information is valid and useful, so that they can become independent, responsible individuals, and ready to face the era of globalization, which is influenced by various very tight competitions.

CONCLUSION

The AIR learning model encourages students to not only listen to information, but also to reflect and repeat concepts intellectually, so that students are trained to think critically and solve problems more analytically. Several studies have shown that AIR is effective in various subjects, including science and physics, because it encourages students to engage in a continuous and interactive learning process. With intellectual repetition, students are better prepared to face complex problems, develop strong conceptual understanding, and apply the knowledge they have learned in a broader context. The AIR model is a useful learning strategy to improve the quality of students' understanding and critical thinking skills *in* various learning contexts. As a result, repetition in AIR strengthens the memory of the information presented, so that students are better prepared to absorb and remember important information in the long term. In addition, this model increases student engagement and participation, because they are encouraged to be active in learning and contribute to deeper discussions.

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