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Literature Study: The Effect Of Guided Inquiry Learning Models On Physics Learning Outcomes Of Students

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ABSTRACT

This study aims to examine the effect of guided inquiry learning models on students' physics learning outcomes through a literature review. The method used is a literature review by analyzing several journals and proceedings accessed through Google Scholar that are relevant to the topics of guided inquiry and physics learning outcomes. The results of the study show that the application of the guided inquiry learning model can improve students' physics learning outcomes, both in cognitive aspects and other supporting abilities such as learning activities, scientific attitudes, scientific communication, and critical thinking skills. This model provides opportunities for students to be directly involved in a guided investigation process, so that they are more active, focused, and able to build conceptual understanding independently with the guidance of a teacher. In addition, guided inquiry has been proven to be more effective than conventional learning in most studies, although one study showed no significant difference compared to independent inquiry. Overall, the guided inquiry learning model is an effective approach to improving the quality of physics learning.

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Introduction

Education plays an important role in improving the quality of a nation's human resources. Poor quality education can hinder the provision of superior human resources (Yudhistira et al., 2020). The results of the 2022 Programme for International Student Assessment (PISA) show that Indonesian students' achievements are still below the international average, indicating that the Indonesian education system is not yet capable of preparing students to face the challenges of the 21st century (Harto et al., 2025). This condition is reinforced by findings that the literacy competence of Indonesian students is still low and requires improvement in the learning process (Rizkianti et al., 2024).

Physics, as a science subject, has abstract concepts and requires a deep conceptual understanding (Widiawati et al., 2022). Many students have difficulty understanding physics concepts because they require high reasoning skills (Musliman & Kasman, 2022). These difficulties cause physics learning outcomes to be less than optimal (Suindhia, 2023).

Learning outcomes are the main indicator of the success of the learning process (Nabilah & Abadi, 2020). The success of learning can be seen from the scores achieved by students after participating in the learning process (Wibowo et al., 2021). Students' efforts in learning also affect the learning outcomes they achieve (Yandi et al., 2023). In addition, learning outcomes are influenced by internal and external factors that differ for each

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individual (Damayanti, 2022). Good learning outcomes are important to prepare students for future competition (Dakhi, 2020).

Problems in physics learning often occur due to the use of conventional teacher-centered learning models. This type of model makes students passive and less involved in learning activities (Firmansyah & Baharudin, 2022). Monotonous learning causes students to get bored easily and have difficulty understanding the concepts taught (Wahid, 2023). In fact, learning success is greatly influenced by the attitudes, habits, and active involvement of students in the learning process (Susanti et al., 2024). An appropriate learning model is needed as a guide for teachers so that learning objectives can be achieved optimally (Mirdad, 2020). The selection of a learning model must also consider the characteristics of the students, the material, and the readiness of the teacher (Salama, 2022). Therefore, teachers play an important role as facilitators to help students construct understanding through meaningful learning experiences (Triska & Wulandari, 2024).

One learning model that can increase student engagement is the guided inquiry learning model. This model provides opportunities for students to conduct systematic investigations so that they can discover concepts independently with the guidance of teachers (Hulu et al., 2023). In addition, the guided inquiry model encourages group work and helps students develop problem-solving skills (Asni et al., 2020). With these characteristics, this model has the potential to improve concept understanding and physics learning outcomes.

Various studies show that the application of the guided inquiry model can be an effective alternative to overcome low physics learning outcomes. However, the findings from various studies often vary. Therefore, a literature study is needed to review and analyze previous research results regarding the effect of the guided inquiry learning model on students' physics learning outcomes.

Method

This study employed a literature review method by systematically examining a range of scientific articles, reputable journals, and conference proceedings retrieved from Google Scholar. The literature selection process was conducted using specific keywords related to guided inquiry learning models and students' physics learning outcomes. Inclusion criteria were applied to ensure the relevance and quality of the selected studies, such as publication within a certain time frame, focus on physics education, and the use of guided inquiry as an instructional approach.

Each selected article was carefully analyzed to identify the research context, research design, implementation procedures of the guided inquiry learning model, and the reported effects on students' learning outcomes, including conceptual understanding, problem-solving skills, and scientific process skills. The analysis also considered the educational level of participants and learning environments to capture variations in implementation.

The findings from the analyzed studies were then compared and synthesized to identify common patterns, consistencies, and differences in the reported results. This synthesis process aimed to provide a comprehensive understanding of the effectiveness of guided inquiry learning models in improving students' physics learning outcomes. Based on this synthesis, overall conclusions were drawn regarding the potential benefits, limitations, and implications of guided inquiry learning for physics education.

Result and Discussion

Based on the results of a review of various journal articles discussing the application of guided inquiry learning models in physics education and their impact on student learning outcomes, the following findings were summarized:

Table 1. Results of Research Article Analysis

No	Author	Objective	Findings
1	(Wahid, 2023)	To determine the effect of guided inquiry models on physics learning outcomes and compare them with conventional learning.	There was a significant difference in learning outcomes between guided inquiry and conventional learning, but there was no interaction between the learning model and learning interest.
2	(Nurmayani, Doyan & Verawati, 2018)	To determine the effect of guided inquiry learning models on students' physics learning outcomes.	The results showed that the guided inquiry learning model had an effect on students' physics learning

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			outcomes.
3	(Lovisia, 2018)	To determine the significant effect of guided inquiry learning models on students' physics learning outcomes.	The results showed that the guided inquiry learning model had a significant effect on the physics learning outcomes of grade XI students at SMAN 6 Lubuklinggau.
4	(Nurfausiah & Suhardiman, 2016)	To determine the comparison of physics learning outcomes of students taught using guided inquiry and independent inquiry models in grade IX at MTs Madani Alauddin Pao-pao.	The learning outcomes for both models were in the very high category (guided inquiry: average 87.00; independent inquiry: average 83.67), and there was no significant difference in learning outcomes between the two groups. However, students with guided inquiry appeared to be more active and more focused in the learning process.
5	(Hosnah, Sudarti & Subiki, 2017)	To determine the significant effect of guided inquiry models on learning activities and cognitive learning outcomes in high school physics.	There is a significant effect of the guided inquiry model on students' cognitive learning activities and outcomes in physics.
6	(Pramesti, Supeno & Astutik, 2020)	To determine the effect of guided inquiry models on scientific communication skills and physics learning outcomes of tenth grade students at SMAN 1 Gambiran.	The guided inquiry model has been proven to influence students' scientific communication skills and physics learning outcomes.
7	(Dewi, Dantes & Sadia, 2013)	To determine the effect of guided inquiry learning models on students' scientific attitudes and science learning outcomes.	There is a difference in scientific attitudes and science learning outcomes between students who learn using the guided inquiry model and those who learn conventionally. The learning outcomes and scientific attitudes of students using guided inquiry are better than those of conventional learning.
8	(Murni, 2020)	Improving student learning outcomes and critical thinking skills through the application of guided inquiry learning models.	The application of the guided inquiry model has been proven to improve students' physics learning outcomes and critical thinking skills, as seen from the increase in the percentage of learning completeness and critical thinking skills in each action cycle.

Based on the analysis of various research articles, it can be concluded that the guided inquiry learning model consistently demonstrates a positive impact on students' physics learning outcomes. Most of the reviewed studies report significant improvements in cognitive achievement when guided inquiry is implemented compared to conventional, teacher-centered instructional approaches. This indicates that guided inquiry is effective in facilitating students' conceptual understanding by actively engaging them in the learning process rather than positioning them as passive recipients of information.

The effectiveness of guided inquiry can be attributed to its structured inquiry stages, which guide students through problem formulation, hypothesis development, data collection, experimentation, analysis, and conclusion drawing. This structured guidance helps students develop a clearer understanding of abstract physics concepts, which are often considered difficult when taught using traditional lecture-based methods. As reported

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by Wahid (2023) and Lovisia (2018), students taught using guided inquiry achieved significantly higher learning outcomes than those taught conventionally, confirming the model's superiority in improving academic achievement.

In addition to improving cognitive learning outcomes, several studies highlight the broader educational benefits of guided inquiry. Research conducted by Pramesti et al. (2020), Dewi et al. (2013), and Murni (2020) demonstrates that guided inquiry also enhances students' higher-order thinking skills, such as critical thinking, scientific communication, and scientific attitudes. These findings suggest that guided inquiry supports the development of essential 21st-century skills by encouraging students to analyze data, communicate findings, collaborate with peers, and engage in reflective thinking. Consequently, learning becomes more meaningful and aligned with the goals of modern science education.

Furthermore, guided inquiry learning fosters increased student engagement and learning motivation. Hosnah et al. (2017) reported a significant improvement in students' learning activities alongside cognitive outcomes, indicating that guided inquiry creates a more interactive and student-centered classroom environment. Active participation in experiments, discussions, and problem-solving activities allows students to take ownership of their learning, which in turn strengthens conceptual retention and learning satisfaction.

Although most studies indicate positive outcomes, one study by Nurfausiah and Suhardiman (2016) found no significant difference in learning outcomes between guided inquiry and independent inquiry models. However, this study revealed that students in the guided inquiry group were more active and focused during the learning process. This finding suggests that while independent inquiry may yield comparable cognitive results, guided inquiry provides essential scaffolding that supports students—particularly those with lower prior knowledge or limited inquiry experience—by reducing cognitive load and maintaining learning direction.

Overall, the synthesis of these findings suggests that the guided inquiry learning model is a highly effective instructional approach for physics education. It not only improves students' learning outcomes but also promotes active learning, critical thinking, scientific skills, and positive learning attitudes. Therefore, guided inquiry can be considered a viable and recommended alternative for physics teachers aiming to enhance the quality of instruction and learning outcomes in secondary education. Future research may focus on optimizing the level of guidance provided and exploring the long-term impact of guided inquiry across different physics topics and educational levels.

Conclusion

Based on the findings of multiple studies, the guided inquiry learning model has been consistently shown to have a positive effect on students' physics learning outcomes. The majority of the reviewed research indicates that this instructional model not only enhances students' cognitive achievement but also significantly improves learning activities, scientific communication skills, scientific attitudes, and critical thinking abilities. Through structured guidance during the inquiry process, students are actively engaged in observing phenomena, formulating hypotheses, conducting investigations, analyzing data, and drawing conclusions. This active involvement contributes to deeper conceptual understanding and more meaningful learning experiences, positioning guided inquiry as an effective and student-centered approach in physics education.

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