



## The Influence of the Discovery Learning Model on Students' Concept Understanding and Learning Independence in Science Learning in Elementary Schools

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### Abstrack

Natural Science (IPA) learning in Elementary Schools plays an important role in building the foundation of scientific thinking and students' science process skills. However, conventional and teacher-centered learning practices often hinder students' conceptual understanding and learning independence. This study aims to analyze the influence of the Discovery Learning model on conceptual understanding and learning independence in science learning in Elementary Schools. The method used is a systematic literature review with a qualitative descriptive approach to a number of relevant scientific articles. The results of the study show that Discovery Learning is consistently able to improve conceptual understanding through exploration, observation, and conclusion activities, and encourage learning independence through active student involvement in the learning process. This model also supports the development of critical, creative, collaborative, and communicative (4C) thinking skills. Despite implementation challenges, such as time constraints and teacher readiness, Discovery Learning remains an effective and relevant approach to be applied in science learning in the Merdeka Curriculum era. This study provides theoretical and practical contributions in efforts to improve the quality of active, meaningful, and student-centered science learning.

**Keywords:** Discovery Learning, conceptual understanding, learning independence, science, Elementary School

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## INTRODUCTION

Natural Science (IPA) education at the Elementary School level has a strategic role in forming the foundations of scientific thinking, developing science process skills, and building an understanding of basic concepts that are essential for learning at the next level of education. Through science learning, students are expected to be able to observe, ask, try, reason, and communicate their findings, as mandated in the scientific approach of the Independent Curriculum (Kemendikbudristek, 2022).

However, in practice, science learning in elementary schools is still largely conventional, teacher-centered, and oriented towards memorizing material. This approach does not provide enough space for students to experience an active and meaningful learning process, which often results in poor understanding of concepts, low motivation, and lack of learning independence (Rahmawati & Listiaji, 2020; Fitriani & Susanto, 2021). This condition shows the importance of implementing a learning model that can encourage student activity, provide direct experience, and build knowledge constructively.



One of the relevant learning models to answer these challenges is Discovery Learning. This model emphasizes the active involvement of students in discovering concepts themselves through the process of exploration, observation, experimentation, and inference. In Bruner's view (1961), Discovery Learning allows students to gain knowledge more meaningfully because they experience the learning process directly, not just passively receiving information. Recent studies also support this view. Ningsih, Sutarto, and Wahyuni (2021) show that discovery-based learning can increase cognitive engagement and help students connect abstract concepts with real phenomena that they experience.

In the context of science learning, Discovery Learning is very suitable to be applied because it requires students to conduct simple experiments, observe natural phenomena, and discuss the results of their observations independently or in groups. This process not only deepens conceptual understanding but also fosters scientific skills and critical thinking.

More than just understanding concepts, Discovery Learning also has great potential in developing learning independence. Through this approach, students are trained to design problem-solving steps, search for information independently, and draw conclusions from the data they collect. All of these activities are part of lifelong learning skills that are very much needed in the 21st century (Putra & Iskandar, 2022; Trilling & Fadel, 2009). Amidst rapid changes in technology and information, the ability to learn independently, adaptively, and reflectively is the key to students' success in the future.

A number of empirical studies have shown the effectiveness of the Discovery Learning model in improving students' conceptual understanding and learning independence. Sari and Wahyuni (2023) found that elementary school students who learned using this model obtained higher science concept understanding scores compared to students who followed conventional learning. The same thing was expressed by Hidayati, Zainuddin, and Mahyuni (2021), who stated that Discovery Learning encourages students to be more active and responsible in their learning process, which ultimately increases the level of learning independence.

Based on the explanation above, this literature review aims to identify and analyze the influence of the Discovery Learning model on students' conceptual understanding and learning independence in science learning in elementary schools. This study is expected to provide theoretical contributions to the development of educational science as well as practical contributions in designing learning strategies that are more effective, innovative, and in accordance with the characteristics of 21st century students.

## **RESEARCH METHOD**

This study uses a systematic literature review approach with a qualitative descriptive method that aims to analyze the influence of the Discovery Learning model on students' conceptual understanding and learning independence in Natural Science (IPA) learning in Elementary Schools. The selection of literature review as a research method is based on its ability to present a comprehensive understanding of current research trends, key findings, and theoretical contributions from various relevant studies. In addition, this method also allows researchers to identify research gaps and propose further development directions that are beneficial for educational practice (Snyder, 2019; Yusuf, 2020). The literature search process was carried out through several electronic databases such as Google Scholar, Sinta, DOAJ (Directory of Open Access Journals), and Garuda. To ensure relevant search results, a combination of keywords such as "Discovery

Learning", "conceptual understanding", "learning independence", "IPA", and "Elementary School" were used. Inclusion criteria in article selection include: (1) articles that discuss the application of the Discovery Learning model in science learning at the Elementary School level; (2) articles that examine its impact on students' conceptual understanding and/or learning independence; (3) articles based on empirical research, whether quantitative, qualitative, or mixed; and (4) articles published in accredited journals and written in Indonesian or English. Articles that do not meet these criteria—such as research conducted at secondary or higher education levels, do not include empirical data, or come from non-reputable journals—were not included in this study (Nurfadhilah & Fitriani, 2021).

After the selection process, the selected articles were analyzed using content analysis techniques, a method that allows researchers to systematically and objectively examine written data to identify patterns, categories, and main themes. This technique is considered effective in compiling a synthesis of various written sources to formulate accurate and measurable conclusions (Fitri, Pertiwi, & Sari, 2022; Krippendorff, 2018). The focus of the analysis is directed at the research design used, the implementation strategy of the learning model, and the results related to students' understanding of concepts and learning independence.

After being analyzed, the articles were classified based on the focus of the variables studied and their main findings. This step was taken to identify general patterns and significant differences between studies, as well as to evaluate the consistency of the impact of the implementation of Discovery Learning in the context of science learning. In the final stage, a thematic interpretation was carried out on the synthesis of findings, which were then formulated into a comprehensive conclusion regarding the effectiveness of the Discovery Learning model. It is hoped that the results of this study can provide theoretical contributions to the development of educational science as well as practical recommendations for teachers and researchers in improving the quality of science learning in Elementary Schools through a more active, contextual, and student-centered approach.

## **RESULTS AND DISCUSSION**

The results of a literature review of a number of scientific articles show that the application of the Discovery Learning model consistently has a positive impact on improving students' conceptual understanding in science learning in Elementary Schools. This model encourages active involvement of students in the learning process, allowing them to construct knowledge independently through directed exploratory activities. For example, research by Ningsih, Sutarto, and Wahyuni (2021) shows that the use of Discovery Learning on the material on changes in the state of matter significantly improves students' understanding. Through simple experiments that are designed in a structured manner, students are able to discover and understand scientific concepts directly, which ultimately strengthens their absorption and retention of information on learning materials.

These findings are in line with the results of research by Hidayati et al. (2021), which revealed that the Discovery Learning approach is able to deepen the understanding of scientific concepts because it involves students in observation, discussion, and drawing conclusions collaboratively. This creates a more applicable and reflective learning atmosphere. Sari and Wahyuni (2023) also confirmed that student involvement in the process of discovering concepts through direct experience makes

learning more meaningful. This process not only trains critical thinking skills but also improves analytical and logical thinking skills.

Furthermore, a study by Ramadhanty and Setiyawati (2023) showed that the integration of the surrounding environment as a learning resource in the Discovery Learning model also strengthened the understanding of science concepts in grade IV elementary school students. This contextual approach makes learning more relevant and interesting, because students can relate abstract concepts to real phenomena that they encounter every day. Similar findings were also expressed by Amalia and Rahmat (2020), who noted that student involvement in the exploratory process allows for deeper learning than conventional methods. Other studies by Sudirama, Japa, and Yasa (2021) and Setyaningsih, Dwiyaniti, and Budiarti (2020) also show that this model contributes to significantly improving student learning outcomes. Students' active involvement in a meaningful learning process allows them to build their own understanding of science concepts, as emphasized in Bruner's (1961) constructivism theory, which states that learning will be more effective when students are actively involved in shaping their own knowledge. In this context, Putra and Iskandar (2022) concluded that Discovery Learning creates an interactive and enjoyable learning environment, which contributes greatly to improving students' conceptual understanding.

Not only does it have an impact on cognitive aspects, this study also found that Discovery Learning plays an important role in developing students' learning independence. In a study by Hidayati, Zainuddin, and Mahyuni (2021), students were shown to have improved in managing learning independently, including designing experiments, collecting data, and drawing conclusions based on observation results. A learning environment that provides space for exploration and self-decision making is key to strengthening students' independent attitudes. This is reinforced by the findings of Fithriyah, Wibowo, and Umami (2021), which state that the relationship between Discovery Learning and learning independence simultaneously contributes significantly to improving student learning outcomes. Rahmawati and Listiaji (2020) also emphasized that this model encourages students to be responsible for their learning process, including in terms of time management, choosing learning strategies, and completing assignments. Putra and Iskandar (2022) stated that this approach fosters students' intrinsic motivation and sense of responsibility because they are positioned as active subjects who are in control of their learning. Nurfadhilah and Fitriani (2021) even noted that this model is effective in increasing learning motivation and independence, especially when applied in experimental or project-based learning that gives students the freedom to explore.

However, this study also found a number of challenges in implementing the Discovery Learning model at the Elementary School level. One of the main obstacles is the limited time and ability of teachers to design and facilitate discovery activities that are in accordance with the cognitive development stage of elementary school students (Rahmawati & Listiaji, 2020). Not all students also have sufficient initial readiness to immediately learn independently. Therefore, a well-planned learning strategy and training for teachers are needed to be able to develop learning scenarios that are adaptive and responsive to student needs. Yusuf (2020) emphasized the importance of improving teacher competence in implementing Discovery Learning, especially in terms of adjusting methods to the characteristics and ability levels of students.

Overall, the results of this study indicate that Discovery Learning is an effective learning model in improving students' conceptual understanding and learning independence in science learning in Elementary Schools. This model supports the achievement of 21st century competencies, especially in terms of developing critical, creative, collaborative, and communicative thinking skills (4C). With proper implementation and professional support from teachers, Discovery Learning can be an innovative approach that enriches students' learning experiences and improves the overall quality of science learning.

## CONCLUSION

Based on the results of the literature review, it can be concluded that the Discovery Learning model is effective in improving students' conceptual understanding and learning independence in Natural Science (IPA) learning in Elementary Schools. This model encourages active student involvement through directed exploratory activities, allowing them to build their own understanding of scientific concepts in a meaningful and contextual way. In addition to strengthening cognitive aspects, Discovery Learning also fosters students' independence, responsibility, and intrinsic motivation, which are important parts of 21st century learning skills. However, the implementation of this model is faced with several challenges, such as time constraints and the readiness of teachers and students. Therefore, the success of the implementation of Discovery Learning is highly dependent on careful learning planning and improving the professional competence of teachers. Overall, these findings confirm that Discovery Learning is an innovative approach that is relevant to improving the quality of science learning in elementary schools, while supporting the achievement of the goals of the Independent Curriculum which is oriented towards active and student-centered learning.

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