

THE EFFECT DISCOVERY LEARNING MODEL STUDENTS SCIENCE LITERACY IN INDONESIA

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Abstract

This study aims to determine the effect of discovery learning model on students' science literacy in Indonesia. This research is a type of meta-analysis research. Data sources came from 10 national and international journals published in 2020-2023. Data search techniques in this study through Google Scholar, ERIC, DOAJ and ProQuest. The data analysis technique calculates the effect size value with the help of the JSAP application. The results of this study concluded that the average effect size value was 0.825 with large criteria. This finding explains that the discovery learning model has a positive effect on students' science literacy. This research provides important information about the application of the discovery learning model in learning

Keywords: Discovery learning; Effect Size; Science Literacy; Meta-analysis

INTRODUCTION

The Science literacy is an ability that students must have in solving a phenomenon in the field of science (Istyadji & Sauqina, 2023). Science literacy is the

main goal in the current independent curriculum (Alatas & Fauziah, 2020). Students who have science literacy find it easier to solve problems that occur in life (Putranta et al., 2021; Suharyat et al., 2023; Suryono et al., 2023; Fayanto, 2023). Furthermore, science literacy is the main benchmark in learning (Anggreni et al., 2020; Tuttle et al., 2023; Birkan, 2021). However, students' science literacy is the main problem that must be solved in the education system in Indonesia.

The results can be seen from the results of PISA 2018 conducted by the OECD stating that encouraging students' science literacy in learning obtained a score of 396 ranked 71 out of 78 participants (Zulkifli et al., 2022; Elfirae et al., 2023; Razak et al., 2021; Oktarina et al., 2021; Nurtamam et al., 2023; Sofianora et al., 2023; Suryono et al., 2023). In addition, in the learning process teachers have limited resources, teaching language and parana facilities that support student literacy (Rahman et al., 2022). In the learning process, the teacher does not direct students to solve a problem and the selection of the model used is not right to make students learn less interested in learning. So, there needs to be a learning model that can encourage students' science literacy.

Discovery learning is one of the learning models that can stimulate students' science literacy skills (Budi et al., 2023; Purwana et al., 2022). Discovery learning is a learning model that encourages students to find their own concepts and materials so that they are easier for students to remember (Winarni et al., 2020; Yolida et al., 2022; Usman et al., 2022). Discovery learning model students learn more actively and independently in learning (Mahlianurrahman et al., 2023; Sugiarti & Husain, 2021). The discovery learning model encourages students to solve problems through knowledge and skills (Laila & Firaina, 2020; Rosdiana et al., 2017).

Discovery learning mode can have a significant influence on students' science literacy skills (Warlinda et al., 2022; Safitri et al., 2021; Maghfiroh et al., 2023; Khasanah & Dwiastuti, 2016). Nilaphruek & Charoenporn's (2023) research on the discovery learning model has a positive influence on students' science literacy skills in carrying out learning activities. However, this research gap is still minimal research on the effect of the overall size of the discovery learning model on student science literacy, so comprehensive research is needed to find out. Based on this, this study aims to determine the influence of the discovery learning model on the science literacy of students in Indonesia.

RESEARCH METHOD

This research is a type of meta-analysis research. Meta-analysis is a type of research that collects and analyzes primary studies that can be analyzed quantitatively (Rahman et al., 2023; Ichsan et al., 2022; Suharyat et al., 2022; Apra et al., 2021; Juandi et al., 2022). This study aims to determine the influence of the discovery learning model on students' science literacy in Indonesia. Data sources come from 10 national and international journals published in 2020-2023. Inclusion criteria in research are data

sourced from SINTA indexed journals, research must be experimental or quasi-experimental, research related to science learning, experimental class research using discovery learning models and conventional control classes, and research having complete data to calculate the effect size value.

The data search technique in this research was via Google Scholar, ERIC, DOAJ and ProQuest. Data analysis calculates the effect value with the help of the JSAP application. The effect size criteria in the research can be seen in Table 1.

Tabel 1. Kriteria Effect Size

Effect Size	Kategori Effect Size
$0.00 \leq ES \leq 0.20$	Low
$0.20 \leq ES \leq 0.50$	Small
$0.50 \leq ES \leq 0.80$	Moderate
$0.80 \leq ES \leq 1.30$	High
$ES \geq 1.30$	Very High

Sumber: (Ridwan et al., 2022;Suharyat, et al., 2023; Tamur et al., 2020)

RESULT AND DISCUSSION

From literature searches through the Google Scholar, ERIC, ScienceDirect, and ProQuest databases regarding the influence of the discovery learning model on students' scientific literacy, 10 articles were obtained that met the inclusion criteria. The effect size value of the article can be seen in Table 2.

Tabel 2. Nilai Effect Size 10 Artikel

No	Penulis	Indeks	Hedge's	Kategori Effect Size
1	Pujiasih et al., (2020)	SINTA	0.56	Moderate
2	Ahfiani & Arif (2023)	SINTA	0.82	High
3	Nur et al., (2020)	SINTA	0.89	High
4	Utami et al., (2020)	SINTA	1.05	High
5	Siregar & Asyhar, (2023)	SINTA	0.74	Moderate
6	Rahman et al., (2022)	SINTA	0.92	High
7	Ariana et al., (2020)	SINTA	0.66	Moderate
8	Hastuti et al., (2023)	SINTA	0.88	High
9	Budi et al., (2023)	SINTA	0.79	Moderate
10	Nursa & Erwisahrani, (2021)	SINTA	0.94	High
Nilai rata-rata effect Size			0.825	High

Based on Table 2, explaining the value of the article effect size ranges from 0.56 to 1.05. The average value of effect size was obtained 82.5 with high categories. These results explain that the discovery learning model has a significant influence on the science literacy ability of students in Indonesia. This research is in line with Erdani et al., (2020) the discovery learning model has a positive influence on students' science literacy skills. This finding is also supported by Aswirna & Ritonga (2020) an effective discovery learning model to improve students' science literacy skills. Discovery learning mode, students learn more actively to conduct experiments in solving a problem (Sawah & Kusaka, 2023; Zahara et al., 2020). The discovery learning model allows students to learn to identify problems, formulate and conclude a problem so as to encourage student literacy (Winarni et al., 2020; Ilhan & Gülersoy, 2019).

Furthermore, the discovery learning model allows students to learn more independently so that students learn to be creative (Koto, 2020). The discovery learning model can stimulate students' curiosity in learning which can help students solve problems related to the field of science. In addition, the discovery learning model can improve students' scientific attitudes in learning so that students more easily understand the subject matter (Permatasari et al., 2018). The discovery model encourages student creativity in learning, so that learning is not centered on the teacher (Wahyuni et al., 2020). In addition, the application of the discovery learning model fosters critical thinking skills that can encourage students' literacy skills in learning.

CONCLUSION

From the research it can be concluded that the average effect size value is 0.825, a large criterion. These findings explain that the discovery learning model has a positive effect on students' scientific literacy. This research provides important information about the application of the discovery learning model in learning. The discovery learning model helps students learn to be more active and independent in finding new ideas. In the discovery learning model, students learn more actively so that learning is not centered on the teacher.

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