International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

HOTS and Literacy in Science Learning: A Conceptual Study and Implementive Implications

Sintur Muhammad[1], M. Y. Frida[2], H. O. Abdul[3]

[1]Student, Science education, Gorontalo State University
[2,3]Lecturer, Science education, Gorontalo State University

Abstract

Natural Science (NS) learning in the 21st century requires the development of higher order thinking skills (HOTS) and literacy skills as essential competencies of students. This article aims to examine the conceptual integration of HOTS and literacy in science learning and describe its implications for learning design and assessment. The method used is a literature study by examining various relevant national and international scientific sources. The results of the study show that HOTS, which includes the ability to analyze, evaluate, and create, can be developed effectively through problem-based learning, inquiry, project, and open-ended approaches. On the other hand, science, numeracy, and information literacy literacy play an important role in helping educators understand, interpret, and use science knowledge in real-life contexts. The integration of HOTS and literacy in science learning has implications for the shift in the role of educators as facilitators, the use of contextual activities, and the application of authentic assessments that assess students' thinking processes and products. Thus, science learning that is oriented to HOTS and literacy can form students who are critical, creative, reflective, and able to make decisions based on scientific evidence.

Keywords: HOTS, science literacy, science learning, authentic assessment.

INTRODUCTION

The development of science, technology, and information requires the world of education to no longer focus on mastering facts alone, but on the development of high-level thinking skills and literacy skills. In the context of science learning, students are expected not only to understand scientific concepts, but also to be able to reason, analyze data, evaluate information, and design solutions to real problems in their environment.

HOTS is one of the main focuses in the modern curriculum because it is directly related to 21st century skills, such as critical thinking, creativity, collaboration, and communication. In line with that, literacy—especially science literacy—is the foundation for students to be able to understand and use scientific knowledge responsibly. Therefore, the integration of HOTS and literacy in science learning is an urgent need to improve the quality of the learning process and outcomes. This article discusses the concept of HOTS and literacy in science learning, its implementation strategies, and its implications for learning design and assessment.

OVERVIEW PUSTAKA

1. The concept of Higher Order Thinking Skills (HOTS)

HOTS is a thinking ability that involves a high-level cognitive process, namely analyzing (C4), evaluating (C5), and creating (C6) based on the revised Bloom Taxonomy by Anderson and Krathwohl. This ability demands participants.

Educated to connect various information, assess the validity of data, and produce new ideas or solutions. The characteristics of HOTS include being oriented towards solving real problems, demanding critical and creative reasoning, and encouraging self-reflection. In science learning, HOTS can be developed through inquiry activities, open experiments, scientific discussions, and projects based on the context of daily life.

2. Concepts and Types of Literacy in Literacy Learning

Literation is interpreted as the ability to access, understand, evaluate, and use information effectively. In science learning, literacy includes literacy, numeracy, science literacy, digital literacy, media literacy, and information literacy. Science literacy specifically emphasizes the ability to understand concepts.

scientific processes, and their application in social and environmental contexts. The development of literacy in science learning helps students read and interpret scientific texts, use data and graphs, and communicate the results of thinking logically and systematically.

3. The relationship between HOTS and Literasi

HOTS and literacy has a mutually reinforcing relationship. The development of HOTS requires literacy skills so that students are able to understand information in depth, while meaningful literacy requires the ability to think at a high level so that information can be analyzed and used critically. Therefore, science learning should ideally be designed to integrate these two aspects simultaneously.

RESEARCH METHOD

The article uses a literature study method by analyzing various books, journal articles, and research results relevant to HOTS and literacy in science learning. The analysis was carried out in a descriptive-qualitative manner to synthesize concepts, research findings, and practical implications in learning.

RESULTS AND DISCUSSION

1. HOTS Implementation Strategy in Natural Science (NS) I Learning

The implementation of HOTS can be carried out through inquiry-based learning models, problem-based learning, project-based learning, and open-ended approaches. These models provide space for learners to ask questions, analyze phenomena, evaluate alternative solutions, and create new products or ideas.

2. Literacy Development Strategy in Natural Science (NS) Learning

Literacy development is carried out by integrating scientific text reading, analyzing data, writing reports, and presenting learning results. The use of digital learning resources and contextual phenomena is an effective means to foster science literacy and information literacy.

3. Implications for Learning Assessment

HOTS based assessments and literacy demand the use of authentic assessments, such as projects, case studies, open experiments, portfolios, and reflective journals. Assessments not only assess the final results, but also the thinking process, reasoning skills, and the way students communicate scientific ideas.

CONCLUSION AND SUGGESTION

The science learning oriented to HOTS and literacy is a strategic approach to equip students with critical, creative, and creative thinking skills. reflective. The integration of these two aspects encourages students not only to understand the concept of science, but also to be able to apply it in real life. The main implication is the need for contextual learning design, the use of active learning models, and the application of authentic assessments that assess high-level thinking processes and products.

BIBLIOGRAPHY

1. Anderson, L. W., & Krathwohl, D. R. (2001). A taxonomy for learning, teaching, andassessing. New York: Longman.
2. Biliya, S. (2015). Applying an open-ended approach to improve capabilities critical thinking students. Journal of Mathematics Education, 9(1), 45–56.
3. Facione, P. A. (2013). Critical thinking: What it is and why it counts. Millbrae, CA: Insight Assessment.
4. Fitriani, Y., & Suryani, N. (2020). Strengthening science literacy through problem-based learning. Indonesian Journal of Science Education, 9(2), 187–195.
5. Hake, R. R. (1998). Interactive-engagement versus traditional methods: A six-thousand-student survey of mechanics test data. American Journal of Physics, 66(1), 64–74.
6. Ministry of Education and Culture. (2017). Assessment guide based on high-level thinking skills. Jakarta: Ministry of Education and Culture.
7. Ministry of Education and Culture. (2022). Learning outcomes of science subjects. Jakarta: Ministry of Education, Culture, Research, and Technology.
8. Lahra, A. S., Hasan, M., & Mursal. (2017). Development of creativity and problem-solving through problem-based learning. Journal of Science Education, 5(1),45–53.
9. Norris, S. P., & Phillips, L. M. (2003). How literacy in its fundamental sense is central toscientific literacy. Science Education, 87(2), 224–240.
10. OECD. (2018). PISA 2018 Assessment and Analytical Framework. Paris: OECD Publishing.
11. Sari, R., Wahyuni, S., & Rosmaiyadi. (2016). The effect of an open-ended approach on students' critical thinking skills. Journal of Education, 7(2), 123–131.
12. OECD. (2018). PISA 2018 assessment and analytical framework. Paris: OECD Publishing.
13. OECD. (2019). PISA 2018 results: What students know and can do. Paris: OECD
14. Regulations of the Minister of Education and Culture Number 22 of 2016 concerning Standards for the Process of Primary and Secondary Education.
15. Pratiwi, N., & Fasha, E. F. (2015). Development of HOTS assessment instruments. Journal Education, 16(1), 1–12.
16. Sani, R. A. (2019). HOTS-based learning (Higher Order Thinking Skills). Jakarta: Bumi Aksara.
17. Sari, R., Wahyuni, S., & Rosmaiyadi. (2016). An open-ended approach to improve students' critical thinking skills. Journal of Education, 7(2), 123–131.
18. Setiawan, A., & Susantini, E. (2018). Science literacy in science learning. Journal of Science Education Research, 4(2), 75–83.
19. Sugiyono. (2019). Educational research methods. Bandung: Alfabeta.
20. Trilling, B., & Fadel, C. (2009). 21st century skills: Learning for life in our times. San Francisco: Jossey-Bass.

21. Yuliati, L. (2017). The effectiveness of inquiry-based learning on science literacy. Journal of Indonesian Science Education, 6(2), 233–240.
22. Zohar, A., & Dori, Y. J. (2003). Higher order thinking skills and low-achieving students. Journal of the Learning Sciences, 12(2), 145–181.
23. Zubaidah, S. (2016). 21st century skills: Skills taught through learning. Proceedings of the National Seminar on Education, 1(1), 1–17.