KEMAMPUAN *SCIENTIFIC LITERACY* PESERTA DIDIK MELALUI PEMBELAJARAN *DISCOVERY LEARNING* DALAM KONTEKS LINGKUNGAN

SKRIPSI

disusun sebagai salah satu syarat untuk memeroleh gelar Sarjana Pendidikan

Program Studi Pendidikan Biologi

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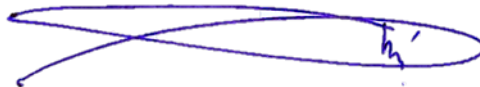
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HALAMAN PERNYATAAN KEASLIAN SKRIPSI

Dengan ini saya menyatakan bahwa skripsi dengan judul "Kemampuan Scientific Literacy Peserta didik Melalui Pembelajaran Discovery Learning dalam Konteks Lingkungan" ini beserta seluruh isinya adalah benar-benar karya saya sendiri. Saya tidak melakukan penjiplakan atau pengutipan dengan cara-cara yang tidak sesuai dengan etika ilmu yang berlaku dalam masyarakat keilmuan. Atas pernyataan ini, saya siap menanggung risiko/sanksi apabila di kemudian hari ditemukan adanya pelanggaran etika keilmuan atau ada klaim dari pihak lain terhadap keaslian karya saya ini.

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ABSTRAK

Penelitian ini bertujuan untuk memperoleh gambaran data kemampuan literasi saintifik peserta didik melalui pembelajaran Inquiry Based Learning (IBL) dengan level *discovery learning* konteks lingkungan pada materi ekosistem. Penelitian dilakukan di SMAN A Bandung pada kelas X semester genap, Tahun Ajaran 2019/2020. Metode penelitian yang digunakan adalah *quasy eksperimental*. Desain penelitian yang digunakan adalah *nonrandomized control group, pretest-posttest design*. Penentuan subjek penelitian dilakukan dengan teknik *purposive sampling*, yang terdiri dari 60 peserta didik. Teknik pengumpulan data menggunakan instrumen tes soal kemampuan literasi sains serta lembar observasi untuk mendeteksi keterlaksanaan tahapan pembelajaran *discovery learning*. Berdasarkan hasil penelitian, terdapat tiga tahapan *discovery learning* yang memiliki presentase keterlaksanaan tahapan pembelajaran kurang dari 100% yaitu tahapan *stimulation, verification* dan *generalization*. Pada kelas kontrol, keterlaksanaan tahapan pembelajaran PBL menunjukkan presentase 100% (sangat baik). Pengolahan data kemampuan literasi sains menunjukkan bahwa H_0 ditolak (terdapat perbedaan yang signifikan antara skor literasi sains pada kelas eksperimen dengan kelas kontrol. Rata-rata *N-gain* pada kelas eksperimen (0,18) lebih tinggi dibandingkan dengan kelas kontrol (0,15). Berdasarkan pengolahan data *N-Gain* pada tes kemampuan literasi sains dapat disimpulkan bahwa *discovery learning* berpengaruh positif terhadap literasi sains peserta didik namun pengaruh tersebut termasuk dalam kriteria yang rendah.
Kata kunci: *discovery learning,* inkuiri, literasi sains.

ABSTRACT

The aims of this research were to obtain an overview of students' scientific literacy abilities through Inquiry Based Learning (IBL) with the level of discovery. The learning focus was related on enviromental context. The study was conducted at SMAN 8 Bandung at the first grade students in the second semester, 2019/2020. The research method was quasy experimental with non-randomized control group, pretest-posttest design was adopted. Data of scienctific literacy was collected by using scientific literacy assessment and observation to detect the implementation of the stages of discovery learning. Data processing of scientific literacy pretest shows that H0 is rejected (there is a significant difference between the score of scientific literacy pretest in the experimental class and the control class). The average N-gain in the experimental class (0.18) is higher than that of the control class (0.15). Based on N-Gain data processing on science literacy ability tests, it can be concluded that discovery learning has a positive effect on students' scientific literacy, but this influence is included in the low criteria.
Keywords: discovery learning, inquiry, scientific literacy.

DAFTAR ISI

DAFTAR PUSTAKA

Al-anwari, A. M. (2014) 'Strategi Pembentukan Karakter Peduli Lingkungan di Sekolah Adiwiyata Mandiri', *Ta'dib*, XIX(02), pp. 227–252.

Anggareni, N. W. *et al.* (2013) 'Kemampuan Berpikir Kritis dan Pemahaman Konsep IPA', *e-Journal Program Pascasarjana Universitas Pendidikan Ganesha*, 3.

Arends, I. Richard. (2008). *Belajara untuk Mengajar. Edisi Ketuhuh/Buku Dua*. Terj. Helly Prajitno Soetjipto. Yogyakarta: Pustaka Belajar.

Arikunto, S. (2005). *Dasar-Dasar Evaluasi Pendidikan*. Jakarta : Bumi Aksara.

Aydelllot, K. (2007) 'Science & Technology Libraries Using the ACRL Information Literacy Competency Standards for Science and Engineering / Technology to Develop a Modular Critical-Thinking- Based Information Literacy Tutorial', *Science & Technology Libraries*, 27(November 2014), pp. 37–41. doi: 10.1300/J122v27n04.

Balim, A. G. (2009) 'The Effects of Discovery Learning on Students ' Success and Inquiry Learning Skills', *Eurasian Journal of Educational Research*, (35), pp. 1–20.

Bybee, R., Mccrae, B. and Laurie, R. (2009) 'PISA 2006 : An Assessment of Scientific Literacy', 46(8), pp. 865–883. doi: 10.1002/tea.20333.

Carlson, J. L. (2008) 'Effect Of Theme-Based , Guided Inquiry Instruction'.

Cazzola, M. and Milano-bicocca, S. (2008) 'Problem-Based Learning and Mathematics : Possible Synergical Actions', 2008.

Creswell, J. W. (1991) *Research Design; Qualitative, Quantitative, adn Mixed Methods Approaches-Third Edition*, *SAGE Publications, Inc*. doi: 10.1163/22118993-90000268.

Fang, Z. and Wei, Y. (2010) 'Improving middle school students' science literacy through reading infusion', *Journal of Educational Research*, 103(4), pp. 262–273. doi: 10.1080/00220670903383051.

Fatmawati, N. I. and Utari, S. (2015) 'Penerapan Levels of Inquiry untuk Meningkatkan Literasi Sains Siswa SMP Tema Limbah dan Upaya Penanggulangannya', *Edusains*, 7(2), pp. 151–159. doi: 10.1017/CBO9781107415324.004.

Gormally, C., Brickman, P. and Hallar, B. (2009) 'Effects of Inquiry-based Learning on Students ' Science Literacy Skills and Confidence', *International Journal for the Scholarship of Teaching and Learning*, 3(2).

Gulo, W. (2002). *Strategi Belajar-Mengajar*. Jakarta: Grasindo.

Hadinugraha, S. (2012). *Literasi Siswa SMA Berdasarkan Kerangka PISA (The Programme for International Student Assessment) pada Konsep Pengetahuan Biologi*. Skripsi Sarjana pada FPMIPA UPI Bandung: tidak diterbitkan.

Hake, R. R. (2002) 'Relationship of Individual Student Normalized Learning Gains in Mechanics with Gender , High-School Physics , and Pretest Scores on Mathematics and Spatial Visualization . * †', pp. 1–14.

Halloun, I. A. (2007) 'Mediated Modeling in Science Education', *Science & Education*, 16(6–7).

Hayat, B. dan Yusuf, S. (2010). *Benchmark Internasional Mutu Pendidikan.* Jakarta: Bumi Aksara.

Hidayat, Y. A., Siahaan, P. and Liliawati, W. (2018) 'Profile of Scientific Literacy Temperature and Heat Matter Competence Student on', *International Conference on Mathematics and Science Education*, 3, pp. 264–268.

Hmelo-silver, C. E. (2004) 'Problem-Based Learning : What and How Do Students Learn ?', *Educational Psychology*, 16(3), pp. 235–266.

Hmelo-silver, C. E. *et al.* (2017) 'Scaffolding and Achievement in Problem-Based and Inquiry Learning : A Response to Kirschner , Sweller , and Scaffolding and Achievement in Problem-Based and Inquiry Learning : A Response to Kirschner , Sweller , and Clark (2006)', 1520(October). doi: 10.1080/00461520701263368.

Holbrook, J. and Rannikmae, M. (2009) 'The Meaning of Scientific Literacy', *International Journal of Environmental & Science Education*, 4(3), pp. 275–288. doi: 10.1097/00006199-195402000-00010.

Hung, W., Jonassen, D. H. and Liu, R. (2008) 'Problem-Based Learning', *journal communications and technology*, (3rd), pp. 486–500.

Joyce, B. R. *et al.* (2000) 'Models of Teaching (7th Edition) Models of Teaching (7th Edition)'.

Juhji (2016) 'Peningkatan Keterampilan Proses Sains Siswa Melalui Pendekatan Inkuiri Terbimbing', *Jurnal Penelitian dan Pembelajaran IPA*, 2(1), pp. 58–70.

Khasanah, N., Dwiastuti, S. and Nurmiyati (2016) 'Pengaruh Model Guided Discovery Learning Terhadap Literasi Sains ditinjau dari Kecerdasan Naturalis The Influence of Guided Discovery Learning Model Toward Scientific Literacy Based on Naturalist Intelligence', *Proceeding Biology Education Conference*, 13(1), pp. 346–351.

Komalasari, K. (2013). *Pembelajaran Kontekstual Konsep dan Aplikasi*. Bdanung: Refika Aditama.

Kundanar. (2007). *Guru Professional Implementasi Kurikulum Tingkat Satuan Pendidikan (KTSP) dan Persiapan Menghadapi Sertifikasi Guru*. Jakarta: raja Grasindo Persada.

Lidinillah, D. A. M. (2013) 'Pembelajaran Berbasis Masalah (problem based learning)'.

Liu, X. (2009) 'Beyond science literacy: Science and the public', *International*

Journal of Environmental and Science Education, 4(3), pp. 301–311.

Lyle, K. S. and Robinson, W. R. (2001) 'Teaching Science Problem Solving : An Overview of Experimental Work', *Journal of Chemical Education*, 78(9).

Maurer, H. and Neuhold, C. (2012) 'Problems Everywhere? Strengths and Challenges of a Problem-Based Learning Approach in European Studies', (February), pp. 17–19.

Millar, R. (2008) 'Taking Scientific Literacy Seriously as A Curriculum Aim', 9(2), pp. 1–18.

Nbina, J. B. (2013) 'The Relative Effectiveness of Guided Discovery and Demonstration Teaching Methods on Achievement of Chemistry Students of Different levels of Scientific Literacy', *Journal of Research in Education and Society*, 4(1), pp. 1–8.

NSTA (2004) 'Scientific Inquiry Introduction', pp. 1–3.

Nurhayati, F., Widodo, J. and Soesilowati, E. (2015) 'Pengembangan LKS Berbasis Problem Based Learning (PBL) Pokok Bahasan Tahap Pencatatan Akuntansi Perusahaan Jasa', *journal of economic education*, 4(1), pp. 14–19.

Odja, A. H. and Payu, C. S. (2014) 'Analisis Kemampuan Awal Literasi Sains Siswa Pada Konsep IPA', (September), pp. 40–47.

OECD. (2006). Assessing Scientific, Reading dan Mathematical Literacy: A framework for PISA 2006. Paris: OECD.

OECD. (2007). PISA 2006. Science Competencies for Tomorrow's World. Volume I: Analysis. Paris: OECD.

OECD. (2009). *PISA 2009 Results*. [Online]. Tersedia : http://www.oecd.org/document/61/0,3746,en_32252351_32235731_465676 13_1_1_1_1,00.html. (03 Juli 2020)

OECD. (2013) 'PISA 2015 Draft Science Framework', pp. 19–48. doi: 10.1787/9789264281820-3-en.

OECD. (2016) 'Programme For International Student Assesment (PISA) Result From PISA 2015', pp. 1–8.

Ogunkola, B. J. (2014) 'Scientific Literacy : Conceptual Overview , Importance and Strategies for Scientific Literacy : Conceptual Overview , Importance and Strategies for Improvement', (May). doi: 10.5901/jesr.2013.v3n1p265.

Pantiwati, Y. (2017) 'Kemampuan Literasi dan Teknik Asesmen Literas', (April), pp. 28–33.

Pester, B. C. and Engeldinger, E. A. (1992) 'Library-Labs-for-Science Literacy Courses', *Journal of College Science Teaching*, 22(1), pp. 52–54.

Reyes, O. and Morell, C. (2017) 'Effective Active Learning Strategy For Multi-Label Learning'.

Roetiyah, N.K. (2008). *Strategi Belajar Mengajar,* Jakarta: Bina Aksara.

Rupilu, N. (2012). *Pengaruh Model Pembelajaran Guided Inquiry terhadap Kemampuan Berfikir Formal dan Sikap Ilmiah Siswa. I.* [Online]. Tersedia: http://pasca.undiksha.ac.id/ejournal/index.php/jurnal_ipa/article/download/486/278. (15 April 2020)

Rusek, M. and Starkova, D. (2014) *Project-Based Education In Science Education*.

Rusilowati, A. *et al.* (2016) 'Developing An Instrument of Scientific Literacy Asessment on The Cycle Theme', *International Journal of Environmental and Science Education*, 11(12), pp. 5718–5727.

Rustaman, N. Y. (2005) 'Perkembangan Penelitian Pembelajaran Berbasis Inkuiri dalam Pendidikan Sains', pp. 22–23.

Rustaman, N. Y. (2011) 'Pendidikan dan Penelitian Sains Dalam Mengembangkan Keterampilan Berpikir Tingkat Tinggi Untuk Pembangunan Karakter', *Seminar Nasional VIII Pendidikan Biologi*, pp. 15–34.

Rustaman, N. Y. (2017) 'Mewujudkan Sistem Pembelajaran Sains / Biologi Berorientasi Pengembangan Literasi Peserta Didik', *Prosiding Seminar Nasional III Tahun 2017*, (April), pp. 1–8.

Sanjaya, W. (2009). *Strategi Pembelajaran Berorientasi Stdanar Proses Pendidikan*. Jakarta: Kencana Pernada Media Group.

Savery, J. R. (2006) 'Overview of Problem-based Learning : Definitions and Distinctions', *Interdisciplinary Journal of Problem-Based Learning*, 1(1).

Shoimin, A. (2016). *Model Pembelajaran Inovatif dalam Kurikulum 2013*. Yogyakarta: Ar-Ruzz Media.

Situmorang, R. P. (2016) 'Integrasi Literasi Sains Peserta Didik Dalam Pembelajaran Sains', *Satya Widya*, 32(1), pp. 49–56.

Sochibin, A., Dwijananti, P. and Marwoto, P. (2009) 'Penerapan model pembelajaran inkuiri terpimpin untuk peningkatan pemahaman dan keterampilan berpikir kritis siswa sd', *Jurnal Pendidikan Fisika Indonesia*, 5, pp. 96–101.

Stone, E. M., Science, B. and Initiative, M. (2014) 'Guiding Students to Develop an Understanding of Scientific Inquiry : A Science Skills Approach to Instruction and Assessment', 13, pp. 90–101. doi: 10.1187/cbe-12-11-0198.

Stewart, A. dan Rivera, Y. (2008). *Inquiry Based Learning.* [Online]. Tersedia:http://www.esf.edu/seminarInquiryBasedLearning.ppt. (05 Juni 2020)

Sudjana. (2005). *Metoda Statistika*. Bandung: Tarsito.

Sulistyorini, Ari. (2009). *Biologi I untuk Sekolah Menengah Atas/Madrasah Aliyah Kelas X*. Jakarta: Balai Pustaka

Sumarno, A. (2011). *Pengertian Hasil Belajar*. [Online]. Tersedia:

http://unesa.ac.id/tag/teori-hasil-belajar-gagne-dan-driscoll-dalam-buku-apa. (21 April 2020)

Susilastri, S. D. and Rustaman, N. Y. (2015) 'Students'environmental Literacy Profile in School-Based Nature and in School that Implement the Adiwiyata Program', *Pendidikan Biologi, Pendidikan Geografi, Pendidikan Sains, PKLH - FKIP UNS*, pp. 2–3.

Suyanti, R. D. (2010). *Strategi Pembelajaran Kimia*. Yogyakarta: Graha Ilmu.

Tang, K. S. (2015) 'Reconceptualising Science Education Practices from New', 26(3), pp. 307–324.

Toharudin, *et al.* (2011). *Membangun Literasi Sains Peserta Didik*. Bandung: Humaniora.

Trowbridge, D. E. and Mcdermott, L. C. (1981) 'Investigation of student understanding of the concept of acceleration in one dimension', 242(May 2013). doi: 10.1119/1.12525.

Utaya, S. and Bachri, S. (2019) 'Ecological Literacy Siswa SMA Adiwiyata dan Non Adiwiyata', *Jurnal Pendidikan*, 4, pp. 499–503.

Wenning, C. J. (2004) 'Levels of inquiry : Hierarchies of pedagogical practices and inquiry processes', pp. 175–176.

Wenning, C. J. (2007) 'Assessing Inquiry Skills as A Component of Scientific Literacy', *Journal of Physics Teacher Education Online*, 4(2), pp. 21–24. doi: 10.1007/s10461-009-9551-0.

Wenning, C. J. (2010) 'Level of Inquiry: Using Inquiry Spectrum Learning Sequences on Teach Science', *Journal of Physics Teacher Eucation Online*, 5(3), pp. 11–20.

Wenning, C. J. (2012) 'The Levels of Inquiry Model of Science Teaching', 6(January).

Wenning, C. J. and Khan, M. A. (2011) 'Levels of Inquiry Model of Science Teaching : Learning sequences to lesson plans', *Journal of Physics Teacher Education Online*, 6(2), pp. 17–20.

Wulandari, N. and Sholihin, H. (2016) 'Analisis Kemampuan Literasi Sains pada Aspek Pengetahuan dan Kompetensi Sains Siswa SMP pada Materi Kalor', *Edusains*, 8(1), pp. 66–73.

Yew, E. H. J., Chng, E. and Schmidt, H. G. (2011) 'Is learning in problem-based learning cumulative ?', (December 2010), pp. 449–464. doi: 10.1007/s10459-010-9267-y.