

Being A Young Scientist : Does Guided Inquiry Affect Students' Scientific Literacy Skills?

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Abstract:

Guided inquiry learning encourages students to be more active in learning so that students' scientific literacy skills can be developed. Solving problems through investigative activities is one of the elements of contextual learning. Contextual learning by solving everyday problems is one aspect of the description of science literacy competencies. The investigation component in guided inquiry is expected to improve students' science literacy. This study aims to determine the effect of guided inquiry learning model on science literacy skills of 4th grade students of SDN Dukuharum Jombang. The population in this study were all 4th grade students of SDN Dukuharum Jombang in semester 1 of the 2022/2023 academic year, while the samples used were classes 4A and 4B. The experimental class and control class each consisted of 20 students. This research is a quantitative study with a quasi-experimental research method with a research design of nonequivalent pretest posttest pretest- posttest control group design. The results of this study indicate that guided inquiry has a significant effect on science literacy skills.

Keywords: Guided inquiry, Scientific literacy skills

INTRODUCTION

Guided inquiry learning encourages students to be more active in learning so that students' scientific literacy skills can be developed. Guided inquiry learning model will assist students in empowering scientific literacy skills. Scientific literacy has become a term widely used as an important characteristic that must be possessed by every citizen in modern society and includes the goals of science education. This study aimed to determine the effect of the guided inquiry learning model on the scientific literacy skills of Class 4 SDN Dukuharum Jombang. The population in the study were all students of class 4 SDN Dukuharum Jombang second semester 2020/2021, while the

samples used were class 4A and 4B. The experimental class and control class each consisted of 15 students. This research is a quantitative research with quasi-experimental research method with pretest posttest nonequivalent pretest- posttest control group design. The results of this study indicated that guided inquiry has a significant effect on scientific literacy skills. Guided inquiry learning model can be a reference in learning to empower students' scientific literacy skills.

Science literacy has become a widely used term as an important characteristic that must be possessed by every citizen in modern society and is included in the goals of science education. As according to Rahayu (2013), who states that the main goal in science education is the realization of a science literate society. Developed countries continue to strive to improve the science literacy skills of their young generation in the hope that they will be able to compete, especially in the global workforce.

The results of the 2018 PISA survey show that the average science literacy for Indonesia is still in the low category compared to other countries. Where Indonesia is still ranked 73 out of 79 countries with a score of 396 in the field of science literacy. This shows that Indonesian students are still very low in science and technology. In line with this, Rahayuni (2016) also stated that the low science literacy of Indonesian students is caused by many things, including the curriculum, the selection of methods and models in learning by teachers, facilities and infrastructure, learning resources, and so on. One of the factors that is directly related to student learning activities and affects the low literacy of Indonesian students is the selection of methods and models by teachers.

Based on the observations obtained at SDN Dukuharum Jombang, there are several problems found in science learning, especially related to science literacy which is still very low, this is because during the learning process there is no student participation to play an active role in learning, especially developing the science literacy process, then learning is still focused on the teacher (teacher centered) still lacks active student involvement, causing most students to not be able to relate the material to their knowledge and utilize the material in everyday life.

Inquiry is a core part of contextual-based learning activities. The knowledge gained is expected to be not just the result of remembering facts, but the results of their own discoveries. In guided inquiry, the teacher still has a guiding role in learning (Trianto, 2012).

Previous research has shown that there was an effect of guided inquiry on students' creative thinking skills (Neka et al., 2019); (Susanti et al., 2017); (Amaliah et al., 2019). Learning models using guided inquiry can improve creative thinking skills (Putra et al., 2016). In other studies, the use of guided inquiry models greatly influenced students' creative thinking skills in biology lessons than direct learning models or without using guided inquiry models (Neka et al., 2019). In fact, inquiry can improve scientific understanding, be productive in creative thinking, and students become skilled in obtaining and analyzing information (Trianto, 2012). However, similar research during the Covid-19

pandemic has not been disclosed, so this research needs to be carried out in order to see whether guided inquiry gives a positive effect on students' creative thinking skills.

METHODS

This research is a quantitative study with a quasi-experimental research design with a nonequivalent pretest-posttest control group design. This study aimed to determine the effect of the guided inquiry learning model on scientific literacy skills of students at SDN Dukuharum Jombang. This research is a quantitative study with a quasi-experimental research design with a nonequivalent pretest-posttest control group design. This study aimed to determine the effect of the guided inquiry learning model on critical thinking and creative thinking skills of students at SDN Dukuharum Jombang. The population in this study were all students of class 4 at SDN Dukuharum Jombang. The sample used was class 4A SDN Dukuharum Jombang which consisted of 20 students and class 4B which consisted of 20 students. Determination of the sample in this study was done by random sampling technique. The research instrument used is the science literacy assessment rubric.

RESULT

Data on the results of students' critical thinking scores in the experimental class totaled 29 people with the highest score of 30 and the lowest score of 13. From these values, the average value = 23.51, the middle value = 62.9 and the frequency of the Mode group = 23.75 and the value = 3.93 is Standard Deviation. The following is presented in the form of a polygon curve in Figure 1 below.

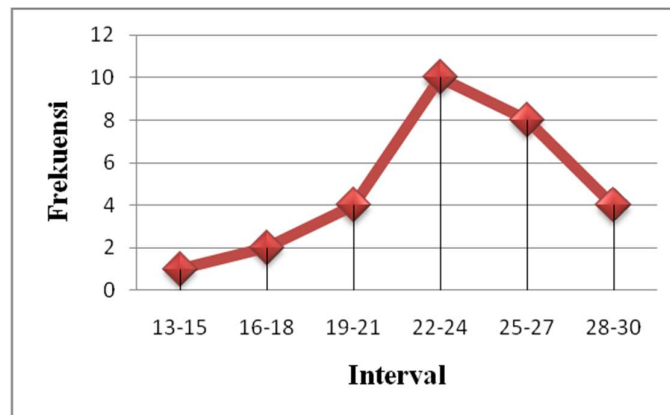


Figure 01: Experimental Group Post-test Result Data

The negative skew curve shown in Figure 01, means that most of the students' science literacy results tend to be high. In contrast to the frequency results of students' science literacy in the control class of 29 people with the highest score of 25 and the lowest score of 8. From the average score obtained, Mean = 15.75, Median = 55.2, Mode = 15.37, Variance = 85.25, and Standard Deviation = 4.30 were obtained = 4.30. The following is presented in the form of a polygon curve in Figure 02 below.

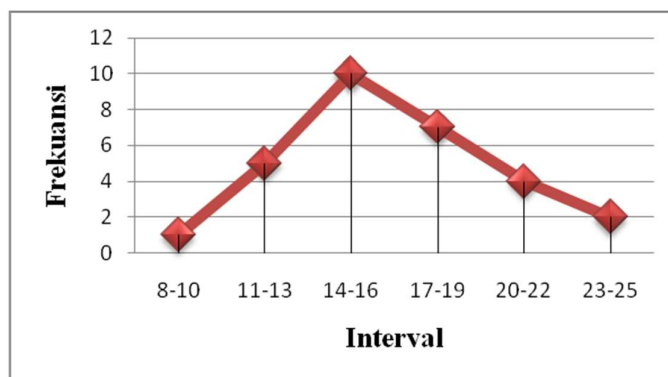


Figure 02: Control Group Student Outcome Data

In the polygon curve of Figure 02, it can be seen that the curve has a positive squint. This means that most students' critical thinking results tend to be moderate. The results of the descriptive statistical analysis were then subjected to hypothesis prerequisite tests. Data distribution normality test and variance homogeneity test. The normality test data for the distribution of science literacy of experimental class students showed the results of Chi-Square (χ^2 count) and table (χ^2 table), namely $1.700 < 3.182$ with a significance level of 5% so that the experimental class post-test results were normally distributed. For the control class, the Chi-Square (χ^2 count) and table (χ^2 tabel) are $1.805 < 3.187$ with a significance level of 5% so that the results of the control class student data are normally distributed. So it is concluded that the post-test data in both classes is proven to come from normally distributed data, so proceed with the homogeneity test.

The variance homogeneity test with two classes shows the value of Fcount (with a significance level of 5%) $< F_{table}$ ($1.07 < 1.88$), so it can be interpreted that the data variance of the two classes is homogeneous. After the prerequisite test, then proceed with hypothesis testing. The results of the t-test analysis with the pooled variance formula obtained tcount of 4.30 Ttable with db = 56 with a significant level of 5% is 2.00. The calculation results show that $t_{count} > t_{table}$ ($4.30 > 2.00$) in this case H_0 is rejected and H_1 is accepted. It is concluded that students taught with guided inquiry learning and students who are not taught with guided inquiry learning have significant differences.

DISCUSSION

The guided inquiry learning model is proven to be able to improve various skills that must be possessed by students. Some research results state that the guided inquiry learning model can complement students' knowledge concepts, with critical and creative thinking skills, communication skills, working in groups, and students' ability in self-evaluation (Gormally et al., 2015). Guided inquiry is a learning model in which the teacher provides instructions to students, so the teacher can encourage students to have experience and conduct experiments that allow students to find principles for themselves (Lovisia, 2018). The guided inquiry model can improve the skills of finding evidence carried out by students with science literacy, and has a positive impact on the initial abilities of seventh

grade students (Ngertini, 2013). The activeness or work process of guided inquiry in following the learning process requires the teacher as a facilitator of students in understanding the material being studied. The purpose of the guided inquiry learning model is to develop students' attitudes and skills to practice solving problems on their own with teacher guidance (Ngalimun, 2018). Solving problems through investigative activities is one of the elements of contextual learning. Contextual learning by solving everyday problems is one aspect of the description of science literacy competencies. The investigation component in guided inquiry is expected to improve students' science literacy.

In the experimental class, science literacy skills showed better results when compared to the control class. The high acquisition of the experimental average score is due to the guided inquiry learning model directing students to various activities including observing, formulating problems and hypotheses, asking questions, planning experiments, using tools and experimental materials and communicating (Fatwa, et al, 2018). Because every syntax in guided inquiry learning is related to science literacy skills.

The guided inquiry learning model can improve students' science literacy skills. In accordance with previous research, guided inquiry-based learning has an effect on increasing students' science literacy (Puspitasari, 2015). In line with this research, research conducted by Dewi & Rochintaniawati (2016), and Kurnia & Fathurohman (2014), which states that science learning conducted through the inquiry process can create a meaningful learning atmosphere and improve science literacy through student curiosity so that it can develop students' cognitive level.

REFERENCE

- Amaliah, A. M., Rahman, A. H., & Ratu, T. (2019). Pengaruh Model Pembelajaran Inkuiri Terbimbing Terhadap Keterampilan Berpikir Kreatif dan Keterampilan Proses Sains Peserta Didik. *QUARK: Jurnal Inovasi Pembelajaran Fisika Dan Teknologi*, 2(1), 5–9. Retrieved from <https://doi.org/10.29303/jpm.v13.i2.468>
- Dewi, P. S., & Rochintaniawati, D. (2016). Kemampuan Proses Sains Siswa Melalui Pendekatan Saintifik dalam Pembelajaran IPA Terpadu pada Tema Global Warming. *Jurnal Pendidikan*, 8 (1), 18-26.
- Fatwa, M. W., Harjono, A., & Jamaluddin. (2018). Pengaruh Model Pembelajaran Inkuiri Terbimbing Terhadap Keterampilan Proses dan Penguasaan Konsep Sains Ditinjau dari Pengetahuan Awal Peserta Didik. *Jurnal Pendidikan Fisika dan Teknologi*, 4(1), 121-130.
- Gormally, C., Brickman, P., Hallar, B., & Armstrong, N. (2015). Effects of Inquiry based Learning on Students' Science Literacy Skills and Confidence. *International Journal for the Scholarship of Teaching and Learning*, 3(2), 32–43. <http://doi.org/https://doi.org/10.20429/ijstol.2009.030216>
- Kurnia, F., Zulherman, & Fathurohman, A. (2014). Analisis Bahan Ajar Fisika SMA Kelas XI di Kecamatan Indralaya Utara Berdasarkan Kategori Literasi Sains. *Jurnal Inovasi*
- Lovisia, E. (2018). Pengaruh Model Pembelajaran Inkuiri Terbimbing Terhadap Hasil Belajar. *SPEJ (Science and Physics Education Journal)*, 2(1), 1–10. Retrieved from <https://doi.org/10.31539/spej.v2i1.333>

- Neka, I. K., Marhaeni, A. A. I. ., & Suastra, I. W. (2019). Pengaruh Model Pembelajaran Inkuiri Terbimbing Berbasis Lingkungan Terhadap Keterampilan Berpikir Kreatif Dan Penguasaan Konsep Ipa Kelas V Sd Gugus Viii Kecamatan Abang. *Jurnal Pendidikan Dasar Ganesha*, 5(1), 124383. Retrieved from <https://media.neliti.com/media/publications/124383-ID-pengaruh-model-pembelajaran-inkuiri-terb.pdf>
- Ngalimun. (2018). *Strategi dan Model Pembelajaran (edisi revisi)*. Yogyakarta: Aswaja Presindo.
- Ngertini, N. (2013). Pengaruh Implementasi Model Pembelajaran Inkuiri Terbimbing terhadap Kemampuan Pemahaman Konsep dan Literasi Sains Siswa Kelas X SMA PGRI 1 Amlapura. *E-Journal Program Studi Administrasi Pendidikan*, 4.
- Putra, R. D., Rinanto, Y., Dwiastuti, S., & Irfa, I. (2016). Peningkatan Kemampuan Berpikir Kreatif Siswa melalui Model Pembelajaran Inkuiri Terbimbing pada Siswa Kelas XI MIA 1 SMA Negeri Colomadu Karanganyar Tahun Pelajaran 2015 / 2016. *Proceeding Biology Education Conference*, 13(1), 330–334.
- Puspitasari, A. D. (2015). Efektifitas Pembelajaran Berbasis Guided Inquiry untuk Meningkatkan Literasi Sains Siswa. *OMEGA Jurnal pendidikan Fisika dan Pendidikan Fisika*, 1(2), 1-5.
- Rahayu, S. (2013). Menuju Masyarakat Berliterasi Sain: Harapan dan Tantangan Kurikulum 2013. *kimia.um.ac.id*.
- Rahayuni, G. (2016). “Hubungan Keterampilan Berpikir Kritis Dan Literasi Sains Pada Pembelajaran Ipa Terpadu Dengan Model PBM Dan STM”. *Jurnal Penelitian dan Pembelajaran IPA*. JPPI, Vol. 2, No. 2. Hal. 131-146 e-ISSN 2477-2038 131.
- Susanti, F. O., Muttaqin, M., & Listiawati, M. (2017). Pengaruh Model Inkuiri Terbimbing Terhadap Kemampuan Berpikir Kreatif Siswa Pada Materi Sistem Ekskresi. *Jurnal BIOEDUIN: Program Studi Pendidikan Biologi*, 7(1), 27. Retrieved from <https://doi.org/10.15575/bioeduin.v7i1.2450>
- Trianto. (2012). *Mendesain model pembelajaran inovatif-progresif*. Kencana Prenada Media Group.