The Use of Lokal Wisdom-Based Media To Improve Critical Thinking

Dhina Mulatsih[1*], Sri Yamtinah[1], Matsuri[1]

[1] Universitas Sebelas Maret, Surakarta, Indonesia

Abstract: The purpose of this study was to determine the effect of guided inquiry based on local wisdom on students' practical thinking skills in grade IV elementary school. The type of research used is the experiment with the Pretest Posttest Only Group Design. The instruments used are tests and observations and documentation. The results of this study indicate that the model of guided inquiry based on local wisdom is effective for improving critical thinking skills in the theme of sciences class IV elementary school rather than guided inquiry models. This is evidenced by the results of the mean value of guided inquiry models based on local wisdom rather than guided inquiry models (76.55 > 67.94), there is a significant effect of students' critical thinking skills between the model of guided inquiry based on local wisdom and the guided inquiry model. This is evidenced by the results of t count > t table (2.757 > 2.002) and smaller significance value with a significance level of 5% ($p = 0.010 > 0.05$).

Keywords: critical thinking, learning; wisdom based media

Introduction

The development of globalization in various fields requires changes in all aspects of life, including education (Abu Khurma et al., 2023; Daniel, 2020). This was reinforced by Falahudin et al. (2016) who stated that rapidly developing science and technology had an impact on changes in various aspects of human life which could cause problems, especially in the field of education. The desired education at this time requires educators to be more innovative and creative in learning (Agnesiana et al., 2023; Ramalingaiah et al., 2021). The existence of intended innovation includes strategies, techniques, models and media in learning (Lee & Tan, 2020; Musa et al., 2023). Teachers who are innovative and creative in learning are proven to be able to increase student motivation in learning (Paris et al., 2018; Riding & Rayner, 2020; Wichadee, 2014). Innovative teacher learning fosters students' curiosity. Students' curiosity shows that students have taken a higher-level thinking step, namely critical thinking (Suliworo et al., 2020; Wichadee, 2014). Critical thinking in the field of education is used by teachers as the first step to achieving educational success. Students who are accustomed to critical thinking from an early age are expected to be more open and agile in real life. This is based on the fact that those who are used to thinking critically do not easily give up on existing circumstances but rather they will find a way out of every problem they face with the various considerations that have been made (Boonprasom & Sintanakul, 2020; Liu et al., 2022).

This is reinforced by research conducted by Fristadi & Bharata (2015) which states that critical thinking is a level of thinking ability that allows us to analyze and synthesize the information obtained to solve problems within a certain scope. This is in line with research conducted which states that only individuals who have the ability to think critically and creatively will be able to survive productively in the midst of intense competition and increasingly open opportunities and challenges. The high ability of students to think critically has a big influence on their success in learning, especially in their lives in the future (Getachew, 2018; Mathis & Jackson, 2016).

This is reinforced by the opinion stating that elementary school teachers need to equip their students with critical thinking skills because an elementary school student who only studies material without being equipped with this ability will experience difficulties when working. In addition, students who have critical thinking skills in learning are felt to be more active, critical, never give up and have a high curiosity (Seranica et al., 2018; Wahyudin & Putra, 2021). This makes students continuously motivated to learn so that they are successful in the future. In fact, the cultivation of critical thinking in education is difficult because students are not accustomed to critical thinking, teachers teach conventionally, students are rarely given problems in learning that train their thinking, students tend to be passive in learning, students are rarely given experiments to get information that they get themselves. and teachers rarely give questions and answers that involve two-way interaction. This is not much different from this research (Riding & Rayner, 2020).

Based on the results of direct observation on July 26 2017, it was found that students' critical thinking skills were low, seen from their low ability to analyze questions, focus questions, draw conclusions from the data obtained, re-prove the correctness of generalizations and identify assumptions. In addition, the existence of a teacher centered learning approach that is sometimes applied by teachers makes students' critical thinking skills not develop properly and sometimes even decreases. Therefore, teachers are required to be aware of the current educational weaknesses and start to develop and make changes from an early age. As a first step, the teacher can change the approach used, namely teacher centered learning to become student centered learning which prioritizes the process and development and exploration of students through learning. This is because the big challenge for further education is the task of developing and implementing meaningful learning for students for future provision.

Meaningful learning can be obtained if learning involves a real environment, especially a place to live around, because from there students are able to analyze a problem faced by the surrounding environment. This was also done in this study, the researcher applied the student's living environment by using the local wisdom of the student's residence in learning. The existence of local wisdom by looking at the place where students live is expected to be successful in learning later (Fristadi & Bharata, 2015). Based on the description above, it can be formulated that the problems studied in this study to analyze the effectiveness of guided and guided media based on local wisdom on critical thinking skills on sciences class theme IV elementary school.

Method

The research conducted is a quantitative research that is quasi-experimental in nature (Sugiyono, 2017). The research design used was the Pretest Posttest Control Group Design using two classes, namely the experimental class and the control class (Winarni, 2018). The population in this study were 4th grade elementary school students in Karanganyar Regency. The sample for this study included 4th grade students at five SDKs in Jumantono District, Karanganyar Terus Regency, which were selected by purposive sampling. The independent variable in this study is guided by the local wisdom of Kudus while the dependent variable is the ability to think critically. Data collection techniques used in this study were test and non-test techniques. Test techniques are used to measure students' critical thinking skills before and after learning sciences. The non-test technique is used to see the level of students' critical thinking skills during learning. Data analysis in the study used the t test. Prior to data analysis, a normality test was carried out using the Shapiro Wilk test and homogeneity test with the Levene test (Siregar. & Syofian., 2017).

Result and Discussion

The test results of the research instrument test showed that out of 30 questions in the form of a multiple choice test, 20 questions were declared valid and 10 questions were invalid according to the results of calculating the validity of the test using the *Product Moment Correlation formula*. The results of reliability calculations show that the test instrument can be tested. And the next step is to determine the difficulty level of the questions. Researchers tested the validity, reliability, level of difficulty and discriminating power of the questions that would be included in the thesis attachments using the IBM SPSS *Statistics 26 program.* The results of these tests can be seen in table 1.

Based on the calculation results above, the researcher concluded that 20 questions would be tested for the *pretest* and *posttest instruments* based on the results of calculating the validity, reliability, level of difficulty and discriminating power of the questions. Of the 30 multiple choice questions, there are 17 questions with moderate difficulty level and 13 questions with easy difficulty level. Discriminating power is calculated at the last stage, and the results show that there are 11 questions with good criteria and 9 questions with sufficient criteria.

Table 1. Validity and Reliability

No Question	validity	Reliability	Level trouble	Power differentiator
1	Valid	Reliable	Currently	Enough
2	Valid	Reliable	Easy	Good
3	Valid	Reliable	Currently	Good
4	Valid	Reliable	Easy	Good
5	Valid	Reliable	Easy	Enough
6	Valid	Reliable	Currently	Enough
7	Valid	Reliable	Easy	Enough
8	Invalid	Reliable	Currently	Bad
9	Invalid	Reliable	Currently	Bad
10	Valid	Reliable	Currently	Enough
11	Valid	Reliable	Easy	Enough
12	Valid	Reliable	Currently	Good
13	Invalid	Reliable	Currently	Bad
14	Invalid	Reliable	Currently	Bad
15	Invalid	Reliable	Currently	Bad
16	Valid	Reliable	Easy	Enough
17	Invalid	Reliable	Currently	Bad
18	Valid	Reliable	Easy	Good
19	Invalid	Reliable	Currently	Bad
20	Valid	Reliable	Easy	Good
21	Valid	Reliable	Currently	Good
22	Valid	Reliable	Easy	Enough
23	Valid	Reliable	Easy	Good
24	Valid	Reliable	Easy	Good
25	Invalid	Reliable	Currently	Bad
26	Valid	Reliable	Currently	Good
27	Invalid	Reliable	Currently	Bad
28	Valid	Reliable	Easy	Good
29	Invalid	Reliable	Currently	Bad
30	Valid	Reliable	Easy	Enough

Table 2. Normality test

	Kolmogorov-Smirnov [a]			Tests of Normality Shapiro-Wilk		
	Statistics	df	Sig.	Statistics	df	Sig.
Pretest	.157	100	.200	.969	100	.620
Posttest	.190	100	.200	.886	100	.726
				a. Lilliefors Significance Correction		

Based on the Kolmorgrov Smirnov test for the results of the Pretest and Post Test, it was found to be 0.200 > 0.05, so the test was normally distributed. Then a homogeneity test was carried out with the aim of whether the research sample was taken from a homogeneous population or not. Homogeneity test is explained in the table

Table 3. Homogeneity test

Test of Homogeneity of Variances			
Levene Statistics	df1	df2	Sig.
.005	1	98	.944

After the data is declared normal and homogeneous, the data is ready to be hypothesized. Hypothesis test results Paired sample t test is used to test the hypothesis. By using IBM SPSS *software* , *this test is carried out with the condition that H $_0$ is rejected if* t $_{count}$ is less than t $_{table}$, and vice versa *H* α is accepted if if t $_{count}$ bigger than t $_{table}$. A significant level of 0.05 is used in the t $_{table}$, which is obtained from the distribution table t $_{table}$. Table 7 below shows the results of hypothesis testing:

Table 4. Hypothesis Test Results

Statistical Value	*Pretest - Posttest*	Information
Average	-3,214	H_a accepted
Baku Devi	8412	
Number of Samples	28	
t $_{count}$	-2.022	
t $_{table}$	1.703	
Sig.	0.01	

Based on table 2, the tcount is 2.757, while the ttable with df 57 is 2.002 and a significance value is 0.010. Because t count > t table (2.757 > 2.002) and the significance value is less than the 5% significance level (p=0.010 <0.05) it can be stated that there is a significant influence of critical thinking ability between local wisdom-based.

Based on the results of observations, aspects of students' critical thinking skills in the low category are analyzing arguments and defining terms and considering a definition and identifying assumptions. The aspects in the sufficient category include focusing questions, considering whether sources can be trusted or not, deducing and considering observation reports, making and determining the results of considerations and determining an action. The high category is achieved by aspects of asking and answering questions, observing and considering observation reports, inducing and considering observation reports and interacting with others (Fristadi & Bharata, 2015; Purwadhi, 2019).

Local wisdom that is applied in learning aims to make students know local wisdom, besides that students are able to preserve this local wisdom in everyday life. This is reinforced by the theory put forward that local wisdom-based education has objectives including 1) So that students know the local advantages of the area where they live; 2) Understand various aspects related to the local advantages of the area; 3) Students are able to process resources and be involved in other services/activities related to local excellence so that they can earn income and 4) Preserving culture/traditions/resources that are regional excellence and able to compete nationally and globally.

First, mentoring based on local wisdom is able to invite students to think critically about things around their environment. Second, giving examples of daily life material that is adapted to the local environment makes it easier for students to understand it. Third, the existence of local wisdom values that are instilled helps students get used to doing good. This is in line with previous research conducted by Khusniati et al. (2017) that the use of local wisdom-based science learning model through the reconstruction of indigenous science is proved to improve student's conservationist character from low to good visibility. In essence, both stated that learning based on local wisdom was able to improve student character.

Analyzing arguments Students in analyzing arguments experience difficulties both in writing and orally. In writing it can be seen when students work on the form of description questions that prioritize aspects of analysis. Some students are able to do analysis well, but there are some students who have not been able to analyze, as shown by the answers of students who sometimes just answer. This is due to the habits of students who have been given questions in the form of memory so that when given a question in the form of reasoning they experience difficulties. The low students' ability to analyze arguments was also reinforced who stated that students' low thinking skills were caused by a lack of students in analyzing a question or problem. Based on the results of observations, it is easy for students to analyze questions verbally because they receive direct guidance from the teacher.

Defining terms and considering a definition The number of exposure questions that require conclusions in the form of definitions also makes students experience difficulties. This is because students are not confident with their own writing and their abilities. So that students sometimes hesitate in writing a conclusion or idea based on their abilities. Students in defining something in learning are sometimes shy so the teacher must be more intensive in asking and guiding them. The existence of guidance by the teacher in asking questions and others is reinforced who states that in order for teachers to be successful in learning they should guide and provide direction to their students in conducting investigations and thinking.

Identify assumptions Students in identifying assumptions are capable and still need guidance. This is because they sometimes have not been able to attract a topic that is read. So the teacher needs to guide students to be able to identify assumptions. Smart students are able to identify assumptions and are able to show strong reasons (Indawati et al., 2023; Santoso & Hidayat, 2021). This is due to the character of elementary school students who have not been able to process information so they need guidance so they use local wisdom-based guidance. This is reinforced by the theory put forward that learning suitable for elementary students is guided learning because elementary students have no experience with learning (Amita & Prasasti, 2017; Fristadi & Bharata, 2015).

Conclusion

Based on the results of the study, it can be concluded that there are significant differences based on effective local wisdom to improve the critical thinking skills. The second conclusion is that there is a significant influence on students' critical thinking skills between local wisdom-based guidance and guided inquiry models. Teachers should increase the number of students in giving questions in the form of reasoning, teachers are expected to always guide students in improving critical thinking skills and further research needs to be carried out to improve aspects of critical thinking so that they can improve properly.

References

Abu Khurma, O., Al Darayseh, A., & Alramamneh, Y. (2023). A Framework for Incorporating the "Learning How to Learn" Approach in Teaching STEM Education. *Education Sciences*, *13*(1). https://doi.org/10.3390/educsci13010001

Agnesiana, B., Mahendika, D., Rumfot, S., & Sukmawati, E. (2023). The Analysis of Teacher Efforts to Developing Students Interpersonal and Intrapersonal Intelligence in Learning Activities. *Journal on Education*, *5*(4), 11661–11666. Retrieved from https://www.jonedu.org/index.php/joe/article/

view/2119

Amita, P., & Prasasti, T. (2017). Empowering Science Process Skill and Critical Thinking Through Guided Inquiry in Science Learning. In *Proceedings International Seminar Of Primary Education*, *1*. Retrieved from http://prosiding.unipma.ac.id/index.php/ISPE/article/view/122

Boonprasom, C., & Sintanakul, K. (2020). The Development of Collaborative Learning Management System Using Problem-Based on Cloud Learning to Enhance Critical Thinking. *7th International Conference on Technical Education: The Challenge of Disruptive Innovation in Engineering and Technical Education*, 13-18. https://doi.org/10.1109/ICTechEd749582.2020.9101249

Daniel, S. J. (2020). Education and the COVID-19 pandemic. *Prospects*, *49*(1–2). https://doi.org/10.1007/s11125-020-09464-3

Falahudin, I., Wigati, I., & Astuti, A. P. (2016). Pengaruh Model Pembelajaran Inkuiri Terbimbing Terhadap Kemampuan Berpikir Kritis Siswa Pada Pembelajaran Materi Pengelolaan Lingkungan Di Smp Negeri 2 Tanjung Lago, Kabupaten Banyuasin. *Bioilmi: Jurnal Pendidikan*, *2*(2). https://doi.org/10.19109/bioilmi.v2i2.1133

Fristadi, R., & Bharata, H. (2015). Meningkatkan Kemampuan Berpikir Kritis Siswa Dengan Problem Based Learning. *Seminar Nasional Matematika dan Pendidikan Matematika UNY 2015*, 597–602.

Getachew, B. (2018). Factors Affecting Student's Academic Performance in Ahuntegen General Secondary School, North Wollo Zone, Ethiopia. *Journal of Education and Learning (EduLearn)*, *12*(2), 198–206. https://doi.org/10.11591/edulearn.v12i2.8404

Indawati, H., Sarwanto, S., & Sukarmin, S. (2023). Effect of Guided Inquiry Models and Open Inquiry of Wave and Sound Vibration Materials on Critical Thinking Ability in terms of Science Process Skills. *Jurnal Penelitian Pendidikan IPA*, *9*(1). https://doi.org/10.29303/jppipa.v9i1.1994

Khusniati, M. (2017). *Model pembelajaran IPA berbasis kearifan lokal melalui rekonstruksi indigenous science untuk meningkatkan karakter percakapan siswa*. Universitas Islam Negeri Sultan Syarif Kasim Riau.

Lee, L. H. J., & Tan, S. C. (2020). Teacher learning in Lesson Study: Affordances, disturbances, contradictions, and implications. *Teaching and Teacher Education*, *89*. https://doi.org/10.1016/j.tate.2019.102986

Liu, J., Sun, M., Dong, Y., Xu, F., Sun, X., & Zhou, Y. (2022). The Mediating Effect of Creativity on the Relationship Between Mathematic Achievement and Programming Self-Efficacy. *Frontiers in Psychology*, *12*. https://doi.org/10.3389/fpsyg.2021.772093

Mathis, R. L., & Jackson, J. H. (2016). Human Resource Management : Personnel Human Resource Management. In *Harvard Business Review* (Vol. 13, Nomor January 2019).

Musa, M., Arifin, A., Sukmawati, E., Zulkifli, Z., & Mahendika, D. (2023). The Relationship between Students' Spiritual and Emotional Intelligence with Subjects Learning Outcomes. *Journal on Education, 5*(4), 11729-11733. https://doi.org/10.31004/joe.v5i4.2128

Paris, S. G., Olson, G. M., & Stevenson, H. W. (2018). *Motivation and Achievement*. In Learning and Motivation in the Classroom. https://doi.org/10.4324/9781315188522-7

Purwadhi, P. (2019). Pengembangan Kurikulum dalam Pembelajaran Abad XXI. *MIMBAR PENDIDIKAN*, *4*(2). https://doi.org/10.17509/mimbardik.v4i2.22201

Ramalingaiah, A., Hussaini, S., & Chaudhari, S. (2021). Twitter bot detection using supervised machine learning. *Journal of Physics: Conference Series*, *1950*(1). https://doi.org/10.1088/1742-6596/1950/1/012006

Riding, R., & Rayner, S. (2020). Cognitive style and learning. In *Cognitive Styles and Learning Strategies*. https://doi.org/10.4324/9781315068015-13

Santoso, & Hidayat, T. (2021). Critical Thinking Ability With Guided Inquiry Model on Science Learning. *Proceedings of the International Conference on Educational Sciences and Teacher Profession (ICETeP 2020)*, *532*. https://doi.org/10.2991/assehr.k.210227.074

Seranica, C., Purwoko, A. A., & Hakim, A. (2018). Influence of Guided Inquiry Learning Model to Critical Thinking Skills. *Journal of Research & Method in Education*, *8*(1). Retrieved from https://www.iosrjournals.org/iosr-jrme/papers/Vol-8%20Issue-1/Version-2/E0801022831.pdf

Siregar., & Syofian. (2017). Metode penelitian kuantitatif dilengkapi dengan perbandingan perhitungan manual dan SPSS. *Kencana*, *7*(6), 2016. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/26849997%0Ahttp://doi.wiley.com/10.1111/jne.12374

Sugiyono. (2017). *Metode Penelitian Kuantitatif, Kualitatif dan R&D*. Alfabeta. Bandung.

Sulisworo, D., Ummah, R., Nursolikh, M., & Rahardjo, W. (2020). The analysis of the critical thinking skills between blended learning implementation: Google Classroom and Schoology. *Universal Journal of*

Educational Research, *8*(3 B). https://doi.org/10.13189/ujer.2020.081504

Wahyudin, A., & Putra, N. M. D. (2021). The Improvement of Mastering Science Concept and Critical Thinking Skill Through Guided Inquiry Learning. *Educational Management*, *10*(1).

Wichadee, S. (2014). Students' learning behavior, motivation and critical thinking in learning management systems. *Journal of Educators Online*, *11*(3). https://doi.org/10.9743/JEO.2014.3.3

Winarni, E. W. (2018). Teori dan Praktik Penelitian Kuantitatif, Kualitatif, Penelitian Tindakan Kelas (PTK), Research and Development (R & D). In *Bumi Aksara*.