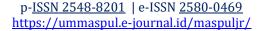# The Effectiveness of a Multiliterate Learning Model to Improve Primary School Students' Critical Thinking Abilities In Science Subjects

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Abstrak

Latar belakang penelitian ini adalah kurang maksimalnya kemampuan berfikir kritis siswa dalam pembelajaran IPA di sekolah dasar. Penelitian ini bertujuan untuk menganalisis peningkatan kemampuan berfikir kritis siswa dan efektivitas pembelajaran setelah menggunakan model pembelajaran multiliterasi. Metode yang di gunakan adalah quasi eksperimen dengan Nonequivalen Control Group Desain. Penelitian ini menggunakan sample sebanyak 36 siswa kelas 5 SDN 254 Griya Bumi Antapani sebagai kelas eksperimen dengan teknik simple random sampling. Data yang dikumpulkan untuk menjawab pertanyaan penelitian adalah berasal dari pre-test dan post-test yang di laksanakan sebanyak masing - masing dua kali pada pertemuan ke 1 dan ke 2 antara kelas kontrol dan kelas eksprerimen. Tes yang di lakukan berupa soal-soal esay yang telah di validasi oleh ahli dan digunakan untuk mengukur hasil belajar peserta didik yang mengarah pada berfikir kritis. Sedangkan Non tes berupa observasi berguna untuk mengamati efektivitas belajar siswa selama proses pembelajaran berlangsung. Untuk perlakuan yang di berikan adalah model pembelajaran multiliterasi kepada kelas eksperimen dengan sintak yang telah di sesuaikan. Sedangkan kelas kontrol menggunakan model konvensional (metode ceramah). Hasil penelitian ini menunjukan bahwa penerapan model pembelajaran multiliterasi pada pelajaran IPA setelah di uji menggunakan uji signifikasi uji t menunjukan adanya perbedaan yang signifikan pada 5 aspek berpikir kritis siswa sekolah dasar yang dibuktikan dengan data kelas kontrol dan eksperimen pada pertemuan 1 mendapatkan skor rata – rata -4,180 dan pada pertemuan 2 mendapatkan skor rata – rata -6,814. Hal ini menunjukan bahwa model pembelajaran multiliterasi efektif dan signifikan dalam meningkatkan kemampuan berfikir kritis siswa dalam mencapai keberhasilan proses pembelajaran dan hasil belajar siswa di sekolah dasar.

Kata Kunci: Model Pembelajaran Multiliterasi, Kemampuan Berpikir Kritis.

Abstract

The background to this research is the lack of maximum critical thinking skills of students in science learning in elementary schools. This research aims to analyze the increase in students' critical thinking skills and learning effectiveness after using the multiliteracy learning model. The method used is quasi-experimental with Nonequivalent Control Group Design. This research used a sample of 36 grade 5 students at SDN 254 Griya Bumi Antapani as an experimental class using a simple random sampling technique. The data collected to answer the research questions came from the pre-test and post-test which were carried out twice each at the 1st and 2nd meetings between the control class and the experimental class. The tests carried out are in the form of essay questions that have been validated by experts and are used to measure student learning outcomes that lead to critical thinking. Meanwhile, non-tests in the form of observations are useful for observing the effectiveness of student learning during the learning process. The treatment given is a multiliteracy learning model for the

experimental class with adjusted syntax. Meanwhile, the control class uses a conventional model (lecture method). The results of this research show that the application of the multiliteracy learning model in science lessons after being tested using the t-test significance test shows that there are significant differences in 5 aspects of critical thinking for elementary school students as evidenced by the data from the control and experimental classes at meeting 1 which received an average score - 4.180 and at meeting 2 they got an average score of -6.814. This shows that the multiliteracy learning model is effective and significant in improving students' critical thinking skills in achieving success in the learning process and student learning outcomes in elementary schools.

Keywords: Multiliteracy Learning Model, Critical Thinking Ability.

Introduction

The problem at the core of this research study is the low understanding of concepts in students' understanding of science subjects in elementary schools. (Anderson and Krathwohl, 2015) say that understanding is a cognitive process that is based on transfer skills which are emphasized in schools and universities. Students are said to understand when they can construct the meaning of messages in learning, whether verbal, written or graphic, presented through teaching books or computer screens. This opinion explains that after going through the learning process students should be able to transfer one concept to another and be able to examine ideas and information critically, if this is not the case it could be an indication that learning is not optimal.

The ability to think critically usually begins with sensitivity to something and is then followed by the ability to evaluate/judge based on the point of view used (Arifudin, 2022). Critical thinking can be applied to various scientific disciplines. Critical thinking is also very necessary in everyday life considering the rapid progress of science and technology (Ulfah, 2022). Therefore, schools as educational institutions are expected to be able to develop students to be able to think critically.

The reality in the field based on observations at SDN 254 Griya Bumi Antapani is that there are several problems that arise in learning which are revealed, namely: The learning implemented is still teacher-centered compared to student activity (teacher centered). It is difficult to arouse students to answer using critical thinking reasoning so that boredom occurs in the learning process and the quality of thinking in the cognitive, affective, and psychomotor domains is weak.

This causes the Minimum Completeness Criteria (KKM) score to not be achieved. Meanwhile, the KKM for science learning is set at 75 and the results are still below the applied value. Apart from that, the use of digital media by teachers and students in the learning process is still far from ideal. This triggers low student motivation to learn so that critical thinking skills are difficult to improve in the learning process.

One of the causes of the low critical thinking skills of elementary school students is teachers' lack of ability to use learning models. According to (Kartika, 2021), a learning model is a pattern that describes a systematic procedure in organizing learning experiences and functions as a guide in planning and implementing learning activities. Various learning models can be used to achieve goals in the learning process. Apart from that, the learning model is one of the factors. determinant of the success of a learning process.

It is felt that the multiliteracy-based learning model can be used as a solution and is able to increase students' effectiveness in responding to the challenges of the 21st century, where students must have high-level thinking skills which include four aspects including: critical thinking, creative thinking, problem solving and decision making. For this reason, a meaningful learning process determines the realization of quality education and learning should be aligned with the progress of the times. The multiliteracy learning model can be used as an option in improving students' critical thinking in

science learning in elementary schools, because the multiliterate learning model is integrative and interdisciplinary in the subjects of science, Indonesian, social studies (Drake, 2007). Therefore, it is necessary to conduct research on the topic "Effectiveness of the Multiliteracy Learning Model to improve Primary School Students' Critical Thinking Ability in Science Subjects".

Methodology

The type of research used in this research is quantitative research with quasi-experimental methods. According to (Arifudin, 2023) research data using a quantitative approach takes the form of numbers and analysis using statistics.

The population in this study were all fifthgrade students at SDN Griya Bumi Antapani, Bandung. The sampling technique chosen by the researcher is a sampling technique using simple random sampling. According to (Arifudin, 2024) this technique is said to be simple because it is taken randomly, without paying attention to strata.

In this research, the instrument used was a test in the form of essay questions. The test instrument is used for pretest and posttest science learning to measure students' critical thinking abilities using a multiliteracy learning model. Apart from that, supporting instruments are also used in the form of observation sheets to evaluate the activities carried out by teachers and students. Observation sheets are used as an effort to collect authentic information about what is done in the learning process in the classroom.

Findings and Discussions

Critical thinking skills in the aspect of providing simple explanations among students taught using the multiliteracy learning model compared to the lecture learning model.

Critical thinking to analyze arguments and generate insight into each meaning and interpretation, to develop cohesive and logical reasoning patterns, understand the

assumptions and biases underlying each position and understand the problem, select information that is important to solve the problem, understand the assumptions assumptions, formulating and selecting relevant hypotheses, as well as drawing valid conclusions and determining the validity of the conclusions. Meanwhile, multiliteracy learning is the skill of using various ways to express and understand ideas and information using conventional text forms as well as innovative text, symbols, and multimedia. In the multiliteracy view, it is hoped that students need to become experts in understanding and using various forms of text, media, and symbol systems, to maximize their learning potential, keep up with technological changes, and actively participate in the global community.

The initial stage of multiliteracy learning in the process involves (Engage) namely the teacher involves students in the learning process by generating schemata or initial knowledge that students already have, then students are invited to connect the topic that will be discussed with the students themselves so that students feel that the topic that will be discussed is important for them to learn, then make important questions that are essential to find answers through the next stage, by providing visual stimulation so that students are motivated to answer various questions from the teacher and can provide simple explanations to the questions asked. This stage can improve critical thinking skills in the aspect of providing simple explanations because this aspect is closely related to students' initial knowledge in studying problematic topics in everyday life. The success of this stage can be seen from student responses, such as students being able to answer actively, providing coherent explanations and showing students' initial knowledge of everyday life.

There is a difference in improvement in the aspect of providing simple explanations between the experimental class which uses the multiliteracy learning model and the control class which uses the lecture learning model which can be seen from the results of

the following hypothesis test analysis. In the experimental class at the 1st meeting, it was found t $_{count}$ of -4.613 and a sig value of 0.000, and at the 2nd meeting t was obtained $_{count}$ of -5.339 and a sig value of 0.000. Meanwhile, in the control class at the 1st meeting, t was obtained $_{count}$ of -4.613 and a sig value of 0.000, and at the 2nd meeting t was obtained $_{count}$ of -5.339 and a sig value of 0.000. It can be concluded that between the two classes there is a significant difference in increasing critical thinking skills in the aspect of providing simple explanations.

Based on the results of this analysis, it can be concluded that the multiliteracy learning model can improve critical thinking skills in the aspect of providing simple explanations in contrast to the control class which uses the lecture learning model. This is in accordance with the results of research conducted by (Dafit, Mustika, and Ain, 2018) which states that multiliteracy learning provides effectiveness in the critical thinking abilities of elementary school students. It is proven that the average critical thinking ability score of students who learn through multiliteracy learning is 17. while the average critical thinking ability score for students who did not use multiliteracy learning was 14.71. Then (Rizkasanti, 2017) said that the aspect provides a simple explanation (elementary clarification) effectively improving students' critical thinking skills. This is seen from the students' ability to provide simple explanations in the form of focusing questions, analyzing arguments, and asking and answering questions regarding classification or challenges to a problem.

The ability to think critically in the aspect of building basic skills among students who are taught using the multiliteracy learning model compared to the lecture learning model

The second stage of multiliteracy learning is the process of responding (respond) namely students individually respond to all learning challenges given by the teacher. Students begin to carry out various investigations, observations or simple

research related to the questions that students have created at this stage. In carrying out this stage, students are divided into 6 small groups, then directed to search for information and identify various changes in the form of objects and explore their skills, distinguishing various types of changes in the form of objects in everyday life. In this activity, students are directed to use library facilities, the school environment, digital media, or other media provided by the teacher to create hypotheses or temporary answers to the questions they created in the previous stage.

This stage can improve critical thinking skills in the aspect of building basic skills because this aspect is closely related to the ability to analyze problems that are not rote or simple and irrational problems, but which are problem solving, whether regarding information, ideas, or assumptions. existing by means of a logical assessment so that conclusions can be drawn correctly and appropriately.

There is a difference in improvement in aspects of building basic skills between the experimental class which uses the multiliteracy learning model and the control class which uses the lecture learning model which can be seen from the results of the following hypothesis test analysis. In the experimental class at the 1st meeting, it was found t $_{count}$ of -3.515 and a sig value of 0.001, and at the 2nd meeting t was obtained $_{count}$ of -9.292 and a sig value of 0.000. Meanwhile, in the control class at the 1st meeting, t was obtained $_{count}$ of -3.515 and a sig value of 0.001, and at the 2nd meeting t was obtained $_{count}$ of -9.292 and a sig value of 0.000. It can be concluded that between the two classes there is a significant difference in increasing critical thinking skills in the aspect of building basic skills.

Based on the results of this analysis, it can be concluded that the multiliteracy learning model can improve critical thinking skills in aspects of building basic skills in contrast to the control class which uses the lecture learning model. This is in line with research conducted by (Wulandary, 2020) that

multiliteracy learning provides students with effectiveness in improving critical thinking skills. Then (Rizkasanti, 2017) said that the aspect of building basic skills (basic support) effectively improves students' critical thinking skills. This is seen from students' ability to consider the credibility of sources, observe, and consider the results of observations of an event.

Critical thinking skills in the aspect of concluding among students who are taught using the multiliteracy learning model compared to with the lecture learning model

The third stage of multiliteracy learning is the elaboration process (elaborate), namely carrying out experiments to practice changing the shape of objects with materials and tools that have been prepared by students. At the first meeting, students practiced changing the state of matter (melting) in the form of ice melting under the influence of the heat of sunlight as well as experimenting with butter melting under the influence of heat, namely the stove fire. Meanwhile, in the second meeting, they practiced changing the state of substances (freezing) in the form of making jelly and palm sugar. The ingredients are melted using hot water and then left to stand until the ingredients freeze. This experiment explores students' creativity in making hypotheses. So, from the elaboration process carried out, students must produce joint ideas and hypotheses that can be used to answer questions that have been asked previously.

This stage can improve critical thinking skills in the concluding aspect because this aspect is closely related to assessing the value, good or bad, whether an idea is correct or not. The ability to analyze problems that are not rote or simple and irrational problems, but which are problem solving, whether regarding information, ideas, or existing assumptions through logical assessments so that you can draw conclusions correctly and appropriately.

There is a difference in improvement in the concluding aspect between the experimental class which uses the multiliteracy learning model and the control class which uses the lecture learning model which can be seen from the results of the following hypothesis test analysis. In the experimental class at the 1st meeting, it was found t_{count} of -4.839 and a sig value of 0.000, and at the 2nd meeting t was obtained $_{count}$ of -6.202 and a sig value of 0.000. Meanwhile, in the control class at the 1st meeting, t was obtained $_{count}$ of -4.839 and a sig value of 0.000, and at the 2nd meeting t was obtained $_{count}$ of -6.202 and a sig value of 0.000. It can be concluded that between the two classes there is a significant difference in increasing critical thinking skills in the concluding aspect.

Based on the results of this analysis, it can be concluded that the multiliteracy learning model can improve critical thinking skills in the concluding aspect which is different from the control class which uses the lecture learning model. This is in line with research conducted by (Widayanti, 2018) which states that students' mathematical literacy skills using the multiliteracy learning model have a significant effect on the average score. N-Gain amounting to 37%, while the rest was influenced by other factors not studied. Then (Rizkasanti, 2017) argues that the aspect of making conclusions (inference) is effective in improving students' critical thinking skills. This can be seen from students' ability to make inductions and consider the results of induction, make deductions, and consider the results of induction, as well as make and consider the results of decisions from discourse or images.

Critical thinking skills in the aspect of providing further explanation among students taught using the multiliteracy learning model compared to the lecture learning model

The fourth stage of multiliteracy learning is reviewing (revisit), namely the draft group report is reviewed for correctness by checking individual data, the validity of the source, and checking the accuracy of the results of the experiments carried out together. Through the experimental results

sheet, students and their groups conclude the weaknesses and strengths of their experimental results so that they can provide a complete explanation.

This stage can improve critical thinking skills in the aspect of providing further explanation because this aspect is closely related to the abilities to understand problems, select information that is important to solve problems, understand assumptions, formulate, and select relevant hypotheses, and draw valid conclusions. as well as analyzing arguments and generating insight into each meaning and interpretation, to develop cohesive and logical patterns of reasoning, understanding the assumptions and biases underlying each position.

There is a difference in improvement in the aspect of providing further explanation between the experimental class which uses the multiliteracy learning model and the control class which uses the lecture learning model which can be seen from the results of the following hypothesis test analysis. In the experimental class at the 1st meeting, it was found t_{count} of -3.873 and a sig value of 0.000, and at the 2nd meeting t was obtained $_{count}$ of -8.135 and a sig value of 0.000. Meanwhile, in the control class at the 1st meeting, t was obtained $_{count}$ of -3.873 and a sig value of 0.000, and at the 2nd meeting t was obtained $_{count}$ of -8.135 and a sig value of 0.000. It can be concluded that between the two classes there is a significant difference in increasing critical thinking skills in the aspect of providing further explanation.

Based on the results of this analysis, it can be concluded that the multiliteracy learning model can improve critical thinking skills in the aspect of providing further explanations, which is different from the control class which uses the lecture learning model. This is in line with research conducted by (Ismail, 2019) that the multiliteracy learning model has an influence on students' critical thinking abilities. It is proven that the average critical thinking ability score for students who learn through the multiliteracy model is 77.28. The average critical thinking ability score for students who learn through

ongoing learning is 66.44. According to (Rizkasanti, 2017), the aspect of making further explanations (advanced clarification) is effective in improving students' critical thinking skills. This is seen from students' ability to identify terms and consider definitions, as well as identify assumptions about a problem.

Critical thinking skills in aspects of strategy and tactics among students taught using the multiliteracy learning model compared to the lecture learning model

The final stage of multiliteracy learning is for students to present the results of the experiment. If the results or content are guaranteed to be accurate, then one of the group representatives is prepared to present the results of the group's work in front of the class where there will be a recorder of the results of the discussion, a reviser of the results, and a team that maintains and is accountable for the content. report. Present via powerpoint presentation that has been prepared by one of the students as minutes in the experimental activity. In the process of making a report, the teacher gives time and allows students to choose strategies and techniques for submitting the report. At this stage, you can improve your critical thinking skills in aspects of strategy and technique because this aspect is related to defining problems, formulating possible alternatives, deciding what to do and reviewing the results of experiments. In the multiliteracy view, it is hoped that students need to become experts in understanding and using various forms of text, media, and symbol systems, to maximize their learning potential, keep up with technological changes, and actively participate in the global community.

There is a difference in improvement in aspects of strategy and technique between the experimental class which uses the multiliteracy learning model and the control class which uses the lecture learning model which can be seen from the results of the following hypothesis test analysis. In the experimental class at the 1st meeting, it was found t_{count} of -4.059 and a sig value of 0.000,

and at the 2nd meeting t was obtained $_{count}$ of -5,100 and a sig value of 0,000. Meanwhile, in the control class at the 1st meeting, t was obtained $_{count}$ of -4.059 and a sig value of 0.000, and at the 2nd meeting t was obtained $_{count}$ of -5,100 and a sig value of 0,000. It can be concluded that between the two classes there is a significant difference in increasing critical thinking skills in the strategic and technical aspects.

Based on the results of this analysis, it can be concluded that the multiliteracy learning model in the experimental class can improve critical thinking skills in aspects of strategy and technique in contrast to the control class which uses the lecture learning model. This conclusion is different from the results of previous research (Abidin, 2014) that literacy acceptance of the multiliteracy model in the learning process can improve students' literacy and reading skills in elementary schools.

Previous research focused on Indonesian language subjects with development of reading comprehension and writing skills. Meanwhile, this research is more about developing multiliteracy in science by discussing the influence of heat on changes in the state of substances. This material is closely related to students' lives, but the learning process is oriented towards improving students' way of thinking by identifying and constructing the science learning process using the application and stages of multiliteracy.

Apart from that, this research is also in line with the research results of (Lestyarini, 2013), that the multiliteracy model can be developed from various competencies, which can improve student learning. It can also be interpreted that multiliteracy learning provides effectiveness for students in improving critical thinking skills. Strategic and tactical aspects (strategies and tactics) are effective in improving students' critical thinking skills. This is seen from students' ability to decide on an action and interact with other people (Rizkasanti, 2017).

Judging from the acquisition of all aspects, the most effective aspect of improvement is the aspect of providing basic explanations (elementary clarification), the aspect of making conclusions (inference), and the aspect of making further explanations (advanced clarification); Meanwhile, what is still lacking in improvement is the aspect of building basic skills (basic support) because the time given to explore the learning text is relatively short.

Conclusion

Based on the problems and objectives of the research and connected with the results of the analysis and discussion, in general the following conclusions can be made: 1) The critical thinking ability of the simple "giving explanation" aspect of students taught using the multiliteracy model is significantly higher than when using lecture learning, 2) The critical thinking ability in the aspect of "building basic skills" in students who are taught using the multiliteracy model is significantly higher than when using lecture learning, 3) The critical thinking ability of the "inferring" aspect of students who are taught using the multiliteracy model is significantly higher than those who use lecture learning, 4) The critical thinking ability in the "further explanation" aspect of students taught using the multiliteracy model is significantly higher than when using lecture learning, 5) The critical thinking ability in the "strategy and tactics" aspect of students taught using the multiliteracy model is significantly higher than when using lecture learning.

Bibliography

[1] Anderson, L.W. dan Krathwohl, D.R. (2015). Kerangka Landasan Untuk Pembelajaran, Pengajaran, dan Asesmen Revisi Taksonomi Pendidikan Bloom. Terjemahan Agung Prihantoro. Yogyakarta: Pustaka Belajar.

[2] Arifudin, O. (2022). *Perkembangan Peserta Didik (Tinjauan Teori-Teori Dan Praktis)*. Bandung: CV Widina Media Utama.

[3] Ulfah, U. (2022). Peran Guru Dalam Upaya Pengembangan Bakat Dan Minat

Peserta Didik. *Jurnal Al-Amar: Ekonomi Syariah, Perbankan Syariah, Agama Islam, Manajemen Dan Pendidikan*, *3*(1), 9–16.

[4] Kartika, I. (2021). upaya meningkatkan mutu pembelajaran pendidikan agama islam dengan model berbasis aktivitas terhadap motivasi belajar SISWA. *Jurnal Al-Amar: Ekonomi Syariah, Perbankan Syariah, Agama Islam, Manajemen Dan Pendidikan*, *2*(1), 36–46.

[5] Abidin, Y. (2014). Perekayasaan Pembelajaran Literasi berbasis konsep multiliterasi, integratif, dan berdiferensial (mid) sekolah dasar (laporan penelitian hibah bersaing). Bandung: Universitas Pendidikan Indonesia.

[6] Arifudin, O. (2023). Pendampingan Meningkatkan Kemampuan Mahasiswa Dalam Submit Jurnal Ilmiah Pada Open Journal System. Jurnal Bakti Tahsinia, 1(1), 50–58.

[7] Arifudin, O. (2024). Utilization of artificial intelligence in scientific writing. *Journal of Technology Global*, *1*(2), 131–140.

[8] Dafit, F., Mustika, D. & Quratul, A.S. (2018). Efektivitas Pembelajaran Multiliterasi TErhadap Kemampuan Berpikir Kritis Siswa Sekolah Dasar Pada Materi Ekosistem. JMIE: Journal of Madrasah Ibtidaiyah Education, Vol. 2, No. 2 , 181-193.

[9] Rizkasanti. (2017). Efektivitas Penerapan Metode Pembelajaran Socratic Circles Terhadap Peningkatan Kemampuan Berpikir Kritis Siswa. Bandung: Tugas Akhir Program Sarjana, Sarjana Universitas Pendidikan Indonesia.

[10] Wulandary, K. (2020). Meningkatkan Kemampuan Berpikir Kritis Siswa Sekolah Dasar Melalui Pembelajaran Multiliterasi. Bandung: Tugas Akhir Program Sarjana, Sarjana Pendidikan Guru Sekolah Dasar Universitas Pendidikan Indonesia.

[11] Widayanti, W. (2018). Penerapan Model Pembelajaran Multiliterasi Untuk Meningkatkan Kemampuan Literasi Matematis Siswa Di SD/MI. Jurnal Keilmuan dan Kependidikan Dasar, Vol. 10, No.2, 117-124.

[12] Ismail dan Iqbal, Y. (2019). Pengaruh Model Multiliterasi Untuk Meningkatkan Kemampuan Membaca Kritis Dan Berpikir Kritis Siswa Sekolah Dasar di Bandung. Bandung: Tugas Akhir Program Megister, Megister Pedagogik Universitas Pendidikan Indonesia.

[13] Lestyarini, B. (2013). Assesment autentik dan relevansinya di era multiliterasi. Diunduh Juni 2023, dari situs Staff Site Universitas Negeri Yogyakarta: http://staff.uny.ac.id/sites/defauilt/files/makalah%20ASSESMEN

[14] Drake, M. S. (2007). Meeting Standard Through Integrated Curriculum . USA: ASCD.