

## CRITICAL THINKING SKILLS OF GRADE 5 STUDENTS ON SCIENCE LESSONS IN THE INDEPENDENT CURRICULUM

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### Abstract

This research is motivated by the fact that in the 21st century, the learning process is no longer centered on educators (teacher-centered learning) but is centered on students (student-centered learning), learning consists of skills known as "The 4C Skills". Indonesia's low ranking in the PISA results designed by the OECD in 2018, was ranked 71st in the science category. Students' critical thinking abilities are needed in the learning process, especially in science learning in the independent curriculum, but each student has different essential thinking abilities. In the independent curriculum, the learning process is to meet the needs of the students, both in terms of planning learning and conditioning the classroom atmosphere and giving freedom to students to be active in learning. This research aims to determine the critical thinking abilities of grade 5 students in science lessons in the independent curriculum at SDI Al Azhar 27. The research method uses a combination research method with a concurrent triangulation design model. The instruments used in this research were tests, observations, and interviews. The results of the research show that students' critical thinking abilities before using the independent curriculum and students' critical thinking abilities after using the independent curriculum have increased. Quantitative analysis using the Paired Sample T-Test using SPSS 26 for Windows shows that the average value ranges from 85.00 to 90.90. Thus, it can be concluded that there is a significant increase in students' critical thinking abilities.

**Keywords:** *critical thinking; science; independent curriculum.*

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### Abstrak

Penelitian ini dilatarbelakangi oleh abad ke-21 proses pembelajaran sebenarnya bukan lagi berpusat pada pendidik (*teacher centered learning*) melainkan berpusat kepada peserta didik (*student centered learning*), pembelajaran ada keterampilan yang dikenal dengan istilah "*The 4C Skills*". Rendahnya peringkat Indonesia pada hasil PISA yang dirancang oleh OECD pada tahun 2018, berada pada peringkat ke-71 kategori sains. Kemampuan berpikir kritis peserta didik diperlukan dalam proses pembelajaran terutama pada pembelajaran IPA dalam kurikulum merdeka, namun setiap individu pada peserta didik memiliki kemampuan berpikir kritis yang berbeda-beda. Dalam kurikulum merdeka pada proses pembelajaran untuk memenuhi kebutuhan peserta didik tersebut, baik dari segi merencanakan pembelajaran maupun mengkondisikan suasana kelas dan memberikan kebebasan kepada peserta didik untuk aktif dalam pembelajaran. Penelitian ini bertujuan untuk mengetahui kemampuan berpikir kritis siswa kelas 5 pada pelajaran IPA kurikulum merdeka di SDI Al Azhar 27. Metode penelitiannya menggunakan metode penelitian kombinasi dengan model desain *concurrent triangulation*. Instrumen yang digunakan dalam penelitian ini adalah tes, observasi, dan wawancara. Hasil penelitian menunjukkan bahwa kemampuan berpikir kritis siswa sebelum menggunakan kurikulum merdeka dengan kemampuan berpikir kritis siswa setelah menggunakan kurikulum merdeka mengalami peningkatan. Dengan analisis kuantitatif dengan Uji *Paired Sample T-Test* menggunakan SPSS 26 *for windows* menunjukkan bahwa nilai rata-rata berkisar antara 85,00 sehingga 90,90. Dengan demikian, dapat disimpulkan bahwa ada peningkatan yang signifikan pada kemampuan berpikir kritis siswa.

**Kata Kunci:** berpikir kritis; IPA; kurikulum merdeka.

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## **Introduction**

The 21st century is marked by the era of Industrial Revolution 4.0 as the century of openness or globalization, namely that human life experiences fundamental changes that are different from the way of life in the previous century (Yunus & Mitrahadjono, 2020: 135). In the era of Industrial Revolution 4.0, education is one way to complement the phenomenon of digital integration where machines and humans are interconnected to solve problems in the discovery of new theories, as well as to transform information in a practical and digital-based way (Sabaruddin, 2022: 44). Education is becoming increasingly important to ensure students have learning and innovation skills, skills in using technology and information media, and can work and survive using skills for life (Nabilah & Nana, 2020: 3).

The learning system in the 21st century is no longer centered on educators (teacher-centered learning), but rather centered on students (student-centered learning). This aims to provide students with skills in thinking and learning skills in the 21st century, or what is known as "The 4C Skills" formulated by the Framework Partnership of 21 Century Skills, including (1) Communication, (2) Collaboration, (3) Critical Thinking, and (4) Creativity (Mardiyah et al., 2021: 33). Nowadays, one way of learning in the 21st century is learning that applies critical thinking skills, digital literacy knowledge and abilities, information literacy, media literacy and mastering information and communication technology (Sabaruddin, 2022: 46).

Critical thinking ability is the ability to analyze based on logical thinking (Girsang et al., 2022: 173). According to Ennis, critical thinking is thinking that has certain reasons and is reflective with an emphasis on making decisions about what to believe or do. There are several explanations for critical thinking that come from critical activities. According to Ennis, there are 5, namely someone who can think critically and can formulate the main points of the problem, apart from that, critical thinkers can provide the facts needed to solve a problem. Critical thinking is also proven by the ability to choose arguments. Logical, relevant, and accurate, people who think critically can find the best ideas based on different points of view, and finally, someone who can think critically can determine the consequences of a statement taken as a decision (Mulyani, 2022: 101). According to Susanti, in principle, people who can think critically are people who do not simply accept or reject something, they will observe, analyze, and evaluate before determining whether to accept or reject information (Firdausi et al., 2021: 231).

Critical thinking is indeed an important ability for students to have in the learning process, but the reality on the ground is not as expected. According to Narut & Supardi, based on the PISA (Program for International Student Assessment) survey designed by the OECD in 2018, Indonesia is ranked 71st in the science category. The fact that Indonesia's ranking in the PISA survey shows that in the field of science, Indonesian students' skills are still relatively low. This illustrates that the Indonesian education system has not been able to optimize facilities for empowering scientific literacy, which influences students' critical thinking (Solichah & Sari, 2023: 596).

Every individual has different critical thinking abilities. According to Prameswari, good achievement of students' critical thinking in the learning process is influenced by several factors. The factors that influence the ability to think critically are as follows: (1) physical condition, when a person is sick, while he is faced with conditions that require mature thinking to solve a problem, of course, conditions like this affect his mind so that a person cannot concentrate and think quickly, (2) motivation, motivation is the drive that exists within a person to try to grow students' interest in learning, with the growth of students' interest in learning, learning goals can be achieved easily, (3) anxiety, anxiety is a person's emotional state regarding a possibility that can endanger themselves or others, (4) intellectual development, (5) interaction, a conducive learning atmosphere will increase students' enthusiasm in the learning process so that students can concentrate on solving problems (Amalia et al., 2021: 34-35).

At this time, the curriculum used is experiencing a transition from the previous curriculum to an independent curriculum. The Merdeka Curriculum is a curriculum with diverse extracurricular learning where the content is more optimal so that students have enough time to deepen concepts and strengthen competencies. Teachers have the freedom to choose various teaching tools so that learning can be tailored to the learning needs and interests of students (Kemendikbudristek, 2022). The Independent Curriculum gives educators the freedom to create quality learning that suits students' needs and learning environment (Ministry of Education and Culture, 2022). According to Rahayu, the independent curriculum provides freedom for students, to be active in learning, is centered on students, and develops the character that students reflect so that it fits the Pancasila profile (Nadhiroh & Anshori, 2023: 57).

One of the developments in the Merdeka Curriculum that is different from the previous curriculum is combining the subjects of Natural Sciences (IPA) and Social Sciences (IPS) into IPAS (Natural and Social Sciences). The integration of natural sciences and social studies is one learning solution to improve literacy and numeracy competencies. In terms of content, IPAS is very close to nature and human interaction. Science and science learning need to present a context that is relevant to the natural conditions and environment around students (Septiana & Winangun, 2023: 45). In research by Anisa, Triwoelandari & Yono (2022: 227) it is explained that science learning involves student activity, both physical activity and mental activity, and is related to everyday life.

Based on the description above, this research aims to determine the critical thinking abilities of grade 5 students in science lessons in the independent curriculum at SDI Al Azhar 27 Cibinong.

### **Research methods**

This research uses a mixed method type of research. In Sugiyono's book, this mixed method is called the Combination Research Method. Combination Research Method is a research method that combines or combines quantitative methods and qualitative methods to be used together in a research activity so that more comprehensive, valid, reliable, and objective data is obtained (Sugiyono, 2023: 559). Creswell classifies combination methods into two main models, namely the sequential model (sequential combination) and the concurrent model (mixed combination) (Sugiyono, 2023: 562).

In this study, a combined design type of concurrent triangulation (mixed) method was used. The concurrent triangulation model is the use of quantitative and qualitative methods

together, both in data collection and analysis, then comparing the data obtained, and then finding which data can be combined and differentiated (Sugiyono, 2023: 566-567). The use of a combination method with a concurrent triangulation (mixed) model design type is because we want to explain the phenomena in the research comprehensively so that the quantitative research data will be complemented by qualitative explanations.

The steps of concurrent triangulation research The steps of concurrent triangulation research show that research methods can depart from similar qualitative or quantitative problem formulations. Qualitative problem formulations are research questions that require answers with qualitative data, and quantitative problem formulations are research questions that require quantitative data. When researchers use qualitative methods, researchers must strengthen themselves to become human instruments to collect and analyze qualitative data, and when they become quantitative researchers, researchers conduct theoretical studies to formulate hypotheses and research instruments. Research instruments are used to collect quantitative data. The qualitative data that has been collected is analyzed qualitatively, and quantitative data is analyzed with statistics. Both groups of data from the quantitative and qualitative analysis are then analyzed again with meta-analysis (analysis of quantitative and qualitative research data or vice versa) to be grouped, distinguished, and seek the relationship of one data with other data so that whether the two data complement each other, strengthen, expand, deepen or contradict (Sugiyono, 2023: 660).

This research was conducted at SDI Al-Azhar 27 which is located at Jl. Raya Karadenan No.22, Karadenan, Kec. Cibinong, Kab. Bogor, Province. West Java, 16913. As for the time, this research was conducted in March-April 2024, in the second semester (even) of the 2023/2024 school year. In this study, the population was all 5th-grade students at SDI Al Azhar 27 Cibinong as many as 3 study groups totaling 85 students. While in the study using purposive sampling. According to Sugiyono (2022: 218-219) purposive sampling is a data source sampling technique with certain considerations. This particular consideration, for example, the person who is considered to know best about what we expect, or maybe he is the ruler will make it easier for researchers to explore the object under study. In SDI Al Azhar 27 Cibinong, there are 3 study groups in grade 5. So in this study, the sample taken was only one class, namely 5C in class 5 SDI Al Azhar 27 Cibinong which totalled 30 students.

Data collection techniques in this concurrent triangulation combination research method use tests, observations, and interviews. This study used a written description test, which amounted to 15 questions about Ecosystems in science lessons in grade 5. Observations in this study were made in class 5, using researchers observing the learning process, teachers who were teaching, and students who were learning in class. Then the interviews in this study were conducted by researchers with the Deputy Principal, researchers, and the 5th grade teacher.

In this study, there are quantitative research instruments in the form of test questions that are tested for validity and reliability first before going to quantitative data analysis techniques, namely the normality test, homogeneity, and t-test with the Paired Sample T-Test test. Research instruments and qualitative data analysis techniques are in the form of observation, interviews, and documentation.

## **Results and Discussion**

Critical thinking ability is the ability to think that a person does and believes in making decisions, by observing, analyzing, and evaluating to determine the resolution of a problem.

Especially in the current independent curriculum, students' critical thinking skills are expected to improve compared to before. Especially in the current independent curriculum, students' critical thinking skills are expected to improve compared to before. Because the independent curriculum is focused on students who are active in learning (student center learning). In the independent curriculum, there is P5 (project to strengthen the profile of Pancasila students), which supports students to be active and improve their critical thinking skills.

There are several categories of students' critical thinking abilities menurut Yunita (Meryastiti, et al., 2022 : 23-24)

Tabel 1  
Category of Students Critical Thinking Skill

Persentase %	Kriteria
76-100	Tinggi
60-75	Sedang
0-59	Rendah

In the learning process at school, each student has different critical thinking skills. Likewise, in the critical thinking skills of 5th-grade students at SDI Al Azhar 27, each individual has a different level of critical thinking ability. This study was conducted to determine the increase in critical thinking skills of grade 5 Mina students at SDI Al Azhar 27 after using an independent curriculum from the previous curriculum, namely examining science lessons on "Ecosystems and Ecosystem Components", using interactive learning media Canva and word wall, then using the jigsaw cooperative learning model, so that students are enthusiastic about learning.

After conducting research through pretest and posttest tests on students, the researchers conducted a Paired Sample T-Test using the SPSS for Windows version 26 program to determine the critical thinking skills of grade 5 students in science lessons after using the independent curriculum. To conduct the Paired Sample T-test test, the data requirements used must be normally distributed and homogeneous, so the normality and homogeneity tests were carried out.

This normality and homogeneity test is to determine whether the data used is normal and homogeneous or not with a sig level > 0.05. In testing normality and homogeneity using the SPSS for Windows version 26 program. The normality test was carried out using the Shapiro-Wilk normalization test.

H0 = Samples are normally distributed

Ha = Samples are not normally distributed

It can be concluded at the level of significance obtained greater than 0.05 H0 is accepted and if the level of significance is smaller than 0.05 then Ha is accepted and H0 is rejected. The results of this normality test were obtained from the results of the pretest scores of students' critical thinking skills before using the independent curriculum with the posttest of students' critical thinking skills after using the independent curriculum. The data from these scores were then tested for normalization with the SPSS for Windows 26 program, and the following results were obtained:

Table 2  
Shapiro-Wilk Normality Test Results Critical Thinking Ability Test Score

Tests of Normality							
	kelas	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
		c	Df	Sig.	c	Df	Sig.
kemampuan berpikir kritis	pre test	,192	30	,006	,951	30	<b>,183</b>
	post test	,141	30	,130	,952	30	<b>,197</b>

The results of decision data before and after using the independent curriculum are normally distributed, according to the Shapiro-Wilk test, using the Shapiro-Wilk test because this method is more appropriate to use for sample sizes of less than 50. The decision-making criteria have a sig value of 0.183 and 0.197 respectively on the results of pre-test and post-test students' critical thinking abilities. The sig value of both data is greater than 0.05, so it can be concluded that the data from the pretest results on critical thinking skills before using the independent curriculum and the data from the posttest results on critical thinking skills after using the independent curriculum are normally distributed.

Table 3  
Homogeneity Test of Critical Thinking Ability Results

Test of Homogeneity of Variance					
		Levene Statistic	df1	df2	Sig.
kemampuan berpikir kritis	Based on Mean	3,332	1	58	<b>,073</b>
	Based on Median	1,995	1	58	,163
	Based on Median and with adjusted df	1,995	1	47,945	,164
	Based on trimmed mean	3,068	1	58	,085

Based on the homogeneity test results in Table 3, it can be seen that the sig value is 0.073. Because the requirement for a sig homogeneity value is  $> 0.05$ , and the data value above is more than 0.05, it can be concluded that the data is declared homogeneous.

Table 4  
Test Results of Critical Thinking Ability Test Scores

Paired Samples Test									
		Paired Differences				T	Df	Sig. (2-tailed)	
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference					
				Lower	Upper				
Pair 1	preTest - postTest	-5,900	3,986	,728	-7,388	-4,412	-8,108	29	<b>,000</b>

Based on the results of data processing above using the Paired Sample T-Test because there were two groups of data tested but the members of the two groups were the same/used the same class, the test results obtained a sig value of 0.000. The sig value can be obtained. It is 0.000, where this value is smaller than 0.05, so it can be interpreted that  $H_0$  is rejected. According to Ennis, critical thinking is thinking that has certain reasons and is reflective by emphasizing making decisions about what to believe or do, such as explaining simple explanations, building skills, concluding, providing further explanations, and interacting with other people. So it can be concluded that there has been an increase in the critical thinking skills of grade 5 students in the science lessons of the independent curriculum at SDI Al Azhar 27.

Based on the research results presented above, the factors that influence students' critical thinking abilities can be stated that the factors that influence students' critical thinking abilities consist of supporting factors and inhibiting factors. The supporting factors from the research findings are a) Students who are confident and have high curiosity in the learning process. b) Teachers who are creative and optimize the implementation of the independent curriculum. c) School facilities that support the learning process. d) Parents who pay attention to children. These results are Prameswari's opinion, saying that the supporting factors for critical thinking skills are "good school facilities, so the learning process to make students think critically can run well. Student factors, students who are enthusiastic in learning will make it easier for teachers to guide students in critical thinking. And motivation from teachers and parents, motivation is an effort to create encouragement or generate energy for someone to want to do something or show certain behavior that has been planned to achieve the goals that have been set."

The inhibiting factors from the research findings are a) Students who lack self-confidence. b) Teachers who do not understand the independent curriculum so they still use monotonous learning. c) Parents who lack attention/the learning process at home and school is not balanced. This result is by Prameswari's theory which states that the factor inhibiting critical thinking skills is "Students do not dare to express opinions. Lack of exploration, students can think critically to solve an existing problem if students can explore well according to their character to find solutions. Monotonous learning methods, teachers who provide monotonous learning methods tend not to be successful in achieving learning goals, this is because students will feel bored with the same learning atmosphere. And if class management is not good, the class atmosphere must always be maintained so that it is conducive and looks comfortable to support students in the learning process in class."

## Conclusion

Based on the results of research conducted by researchers and based on the analysis of the research results and their discussion regarding the critical thinking abilities of grade 5 students in science lessons in the independent curriculum, it can be concluded that the critical thinking abilities of grade 5 students in science lessons after using the independent curriculum experienced an increase in students' critical thinking abilities. Before using the independent curriculum, namely by obtaining a pretest score of 85.00 and a posttest of 90.90. Then, based on processing the hypothesis test data with the results obtained, a sig value of 0.000, where the sig value of 0.000 is smaller than 0.05, so it can be interpreted that  $H_0$  is rejected, it can be concluded that there is an increase in the critical thinking skills of grade 5 students in the science lessons of the independent curriculum at SDI Azhar 27.

## References

- Amalia, A., Rini, C.P. & Amaliyah, A. (2021). Analisis Kemampuan Berpikir Kritis Siswa Kelas V Dalam Pembelajaran IPA di SDN Karang Tengah 11 Kota Tangerang. *Sibatik Journal : Jurnal Ilmiah Bidang Sosial, Ekonomi, Budaya, Teknologi, dan Pendidikan*, 1 (1) : 33 – 44. <https://publish.ojs-indonesia.com/index.php/SIBATIK/article/view/4/4>.
- Anisa, I.S., Triwoelandari, R. & Yono. (2022). Pengembangan Modul Pembelajaran Ilmu Pengetahuan Alam Berbasis STEM (Science, Technology, Engineering, And Mathematics) untuk Meningkatkan Berpikir Kritis Siswa SD/MI. *Refleksi Edukatika : Jurnal Ilmiah Kependidikan*, 12 (2) : 225 – 233. <https://jurnal.umk.ac.id/index.php/RE/article/view/6840/pdf>.
- Firdausi, B.W., Warsono. & Yermiandhoko. Y. (2021). Peningkatan Kemampuan Berpikir Kritis Pada Siswa Sekolah Dasar. *Jurnal Mudarrisuna : Media Kajian Pendidikan Agama Islam*, 11 (2) : 229-243. <http://dx.doi.org/10.22373/jm.v11i2.8001>.
- Girsang, B. et al. (2022). Analisis Kemampuan Berpikir Kritis Siswa Dengan Model Program For International Student Assesment (PISA) Konten Quantitiy Pada Materi Himpunan Di Kelas VII SMP HKBP Sidorame Medan. *Sepren : Journal of Mathematica Education and Applied* : 172-180. <https://doi.org/10.36655/sepren.v3i2>.
- Kementerian Pendidikan dan Kebudayaan. (2022). Kurikulum Merdeka. <https://kurikulum.kemdikbud.go.id/kurikulum-merdeka/>. (diakses 12 Februari 2024).
- Kementerian Pendidikan Kebudayaan Riset dan Teknologi. (2022). Kurikulum Merdeka. <https://ditpsd.kemdikbud.go.id/hal/kurikulum-merdeka>. (diakses 12 Februari 2024).
- Mardhiyah, R.H. et al. (2021). Pentingnya Keterampilan Belajar di Abad 21 sebagai Tuntutan dalam Pengembangan Sumber Daya Manusia. *Lectura : Jurnal Pendidikan*, 12 (1) : 29 – 40. <https://journal.unilak.ac.id/index.php/lectura/article/view/5813/2659>.
- Mawaddah, R., Triwoelandari, R., & Irfani, F. (2022). Kelayakan LKS Pembelajaran IPA Berbasis STEM untuk Meningkatkan Keterampilan Kolaborasi Siswa SD/MI. *Jurnal Cakrawala Pendas*, 8 (1), 1–14. <https://doi.org/10.31949/jcp.v8i1.1911>.
- Meryastiti, V. et al. (2022). Identifikasi Kemampuan Berpikir Kritis pada Pembelajaran IPS Siswa SMP Negeri 1 Glenmore Kabupaten Banyuwangi. *Saintifika*, 24 (1), 20–29. <http://jurnal.unej.ac.id/index.php/STF>.
- Mulyani, A.Y. (2022). Pengembangan Critical Thinking dalam Peningkatan Mutu Pendidikan di Indonesia. *Diajar : Jurnal Pendidikan dan Pembelajaran*, 1 (1) : 100 - 105. <https://journal.yp3a.org/index.php/diajar/article/view/226>.
- Nabilah, L.N. & Nana. (2020). Pengembangan Keterampilan Abad 21 dalam Pembelajaran Fisika di Sekolah Menengah Atas Menggunakan Model Creative Problem Solving. <https://osf.io/preprints/6vwhd>.
- Nadhiroh, S. & Anshori, I. (2023). Implementasi Kurikulum Merdeka Belajar dalam Pengembangan Kemampuan Berpikir Kritis pada Pembelajaran Pendidikan Agama Islam. *Fitrah : Journal of Islamic Education*, 4 (1) : 56-68. <https://jurnal.staisumatera-medan.ac.id/index.php/fitrah/article/view/292>.
- Sabaruddin. (2022). Pendidikan Indonesia dalam Menghadapi Era 4.0. *Jurnal Pengembangan Fondasi dan Aplikasi*, 10 (1) : 43 – 49. <https://journal.uny.ac.id/index.php/jppfa/article/download/29347/18877>.
- Septiana, A.N. & Winangun, I.M.A. (2023). Analisis Kritis Materi IPS dalam Pembelajaran IPAS Kurikulum Merdeka di Sekolah Dasar. *Widyaguna : Jurnal Ilmiah Pendidikan Guru Sekolah Dasar*, 1 (1) : 43-54. <http://jurnal.stahnmpukuturan.ac.id/index.php/pgsd/index>.



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- Sugiyono. (2023). *Metode Penelitian Kombinasi (Mixed Methods) Dengan 9 Desain*. Bandung : Alfabeta, cv.
- Solichah, P.N., & Sari, D.A.P. (2023). Pembelajaran Learning Cycle 5E untuk Meningkatkan Kemampuan Berpikir Kritis Siswa SMP Kelas VIII. *Jurnal Pendidikan MIPA*, 13 (3) : 596-602. <https://doi.org/10.37630/jpm.v13i3.1117>.
- Yunus, M. & Mitrohardjono, M. (2020). Pengembangan Tehnologi Era Industri 4.0 dalam Pengelolaan Pendidikan Sekolah Dasar Islam Plus Baitul Maal. *Jurnal Tahdzibi : Manajemen Pendidikan Islam*, 3 (2) : 129 – 138. <https://jurnal.umj.ac.id/index.php/Tahdzibi/article/view/8214/4917>.