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# Effect of Guided Inquiry on the Development of Critical Thinking in Science Learning in Junior High School Students: A Review

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**Abstract:** Students in the 21st century are required to develop advanced thinking skills, especially critical thinking skills, which are essential for dealing with technological advances and scientific developments. Results from international studies indicate that Indonesian students, particularly at the junior high school level, still have relatively low critical thinking skills. This study aims to determine the extent to which guided inquiry approaches can strengthen critical thinking skills among junior high school students. The method used in this study was a Systematic Literature Review (SLR) that adopted the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) approach. The articles analyzed are national and international publications from 2015 to 2025 that are relevant to the topics of Guided Inquiry and critical thinking skills. The synthesis results indicate that guided learning models are consistently effective at enhancing critical thinking skills, particularly in analysis, evaluation, and conclusion. This model requires students to be active in scientific investigation, engage in reflective thinking, and connect concepts to real-life contexts. The integration of the STEM approach, digital learning media, and local contexts further strengthens its effectiveness in shaping scientific and collaborative mindsets. The uniqueness of this study is evident in its comprehensive synthesis of the application of guided learning approaches in the 21st-century context, which emphasizes the integration of technology and contextual learning as a strategy for enhancing critical thinking. This study concludes that the Guided Inquiry Learning Model is an adaptive, innovative, and relevant learning model for strengthening critical thinking skills in the modern era, especially at the junior high school level.

**Keywords:** Critical Thinking; Guided Inquiry; Science Learning.

## Introduction

The 21st century has brought significant changes to the world of education, requiring students to possess higher-order thinking skills, particularly critical thinking. Technological advances, the rapid flow of information, and the complexity of global issues necessitate that schools develop a generation capable of analyzing, assessing, and solving problems rationally and creatively [1]. However, international assessments such as PISA and TIMSS clearly show that Indonesian junior high school students still have low critical thinking skills [2] . This low achievement is due to teaching methods that are still teacher-centered and emphasize memorization of concepts rather than student involvement in active and reflective scientific thinking processes [3]. Therefore, a learning model is needed that encourages students to be directly involved in scientific inquiry and reasoning processes.

The low level of critical thinking skills is also closely related to the limited learning experiences that require students to ask questions, formulate hypotheses, and interpret data independently [4]. A number of previous studies have shown that information-oriented learning tends to result in superficial conceptual understanding and does not encourage students' ability to connect concepts with real phenomena [5]. This condition leaves students poorly trained to identify problems, assess the accuracy of information, and construct arguments based on scientific evidence. When science learning does not provide space for exploration and reflection, critical thinking skills develop in a limited and unsustainable manner [6].

The context of national education policy provides an opportunity to address these issues through the implementation of the Merdeka Curriculum, which explicitly places critical thinking as an essential competency in the Pancasila Student Profile [7]. This policy direction requires science learning that facilitates students' active engagement in the inquiry process, from observing phenomena to drawing conclusions based on evidence. Previous research shows that learning approaches aligned with the principles of inquiry can improve the quality of student reasoning and encourage evaluative skills in understanding scientific concepts [8]. Contextual and experience-based learning allows students to construct knowledge through higher-order thinking processes, rather than simply passively receiving information [9].

Critical thinking is a high-level thinking skill in which a person engages their ability to analyze, evaluate, interpret, and draw conclusions based on logical and credible evidence [10]. This ability reflects not only cognitive intelligence but also maturity in thinking when making decisions and solving problems scientifically. In science education, critical thinking skills are essential for students to master concepts, analyze experimental data, and formulate fact-based arguments [11]. Critical thinking skills, which are increasingly being developed, require a learning model that focuses on scientific inquiry and

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interaction rather than simply providing information in a one-way manner.

One learning model that meets these requirements is guided inquiry. This model enables students to be directly involved in the process of formulating problems, collecting data, and interpreting findings with strategic guidance from the teacher [12]. Previous studies have shown that the guidance structure in guided inquiry helps students develop analytical thinking skills without losing direction in the learning process [13]. Systematically designed investigative activities encourage students to test ideas, evaluate empirical evidence, and reflect on their thoughts logically. This type of learning environment has been proven to be more effective in developing critical thinking skills than conventional learning approaches that focus solely on delivering material [14].

Guided inquiry learning is a learning model that has been proven effective in developing critical thinking skills, as it encourages students to explore concepts, evaluate evidence, and draw logical conclusions [15]. This model is based on constructivist theory, which emphasizes that knowledge is constructed through active and exploratory learning experiences. In Guided Inquiry, teachers act as facilitators who provide limited guidance so that students can discover concepts through scientific stages, such as formulating problems, making hypotheses, conducting experiments, analyzing data, and drawing conclusions [16]. Recent research suggests that Guided Inquiry can enhance critical thinking skills, scientific reasoning, and independent learning abilities because this method encourages students to think reflectively and connect concepts to real-world contexts [17].

Various empirical studies have examined the effectiveness of Guided Inquiry in improving students' critical thinking skills in science learning, with generally positive results [18]. Differences in research design, student characteristics, and critical thinking indicators used mean that these findings do not yet provide an integrated picture of the patterns of influence of guided inquiry. This condition indicates that understanding how and to what extent guided inquiry contributes to the development of critical thinking remains partial. The need for a literature review that specifically synthesizes research results at the junior high school level is important to identify the trends, strengths, and limitations of guided inquiry implementation in the context of science learning [19].

The uniqueness of this article lies in its literature review, which focuses on the relationship between guided inquiry learning and the development of critical thinking skills in junior high school students in science. This article not only summarizes previous research results but also groups the findings based on critical thinking indicators, learning characteristics, and implementation contexts. This synthetic approach provides a more comprehensive perspective on the effectiveness of guided inquiry as a 21st-century learning strategy. The results of this study are expected to enrich the theoretical basis and serve as a reference for educators and researchers in designing science learning that strengthens critical thinking skills in a systematic and sustainable manner.

The innovative value of this research lies in the development of a guided inquiry model tailored to the characteristics of 21st-century learning, namely, scientific-inquiry-based learning, technology integration, and a focus on strengthening students' critical thinking skills. This study examined the effectiveness of guided inquiry learning models in enhancing junior high school students' critical thinking skills and contributed to the development of relevant, contextual, and sustainable science learning strategies to address modern educational challenges.

## Research Methods

This article was compiled using the Systematic Literature Review (SLR) method, which was designed in accordance with the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines. This method was used to obtain a systematic and comprehensive overview of previous research findings relevant to the topic of science learning at the junior high school level, particularly those focusing on the application of the Guided Inquiry Model and the improvement of critical thinking skills [20]. Research data were collected using the Publish or Perish 8 (PoP8) application, with Google Scholar as the primary source, utilizing the keywords “Guided Inquiry,” “critical thinking,” and “science learning.” The search results were then exported to a spreadsheet for further analysis against predetermined criteria.

**Table 1.** Selection Criteria.

| Aspect | Inclusion Criteria | Exclusion Criteria |
| --- | --- | --- |
| Document Type | Focus of articles based on empirical research published in national and international scientific journals. | Non-research articles such as opinions, reviews, proceedings, or reports without empirical data. |
| Field of Study | Research focusing on junior high school levels regarding science learning. | Research outside the field of science education or at different levels of education. |
| Learning Model | Articles that discuss or apply the Guided Learning Model. | Articles that do not use or clearly explain the Guided Inquiry model. |
| Skill Focus | Research that examines or measures critical thinking skills. | Research that does not address critical thinking skills. |
| Publication Period | Articles published from 2015 to 2025. | Articles published before 2025. |
| Text Availability | Articles are available in full text and can be accessed online. | The article is not available in full text or only has an abstract. |
| Publication Language | Articles in Indonesian or English. | Articles in languages other than Indonesian and English. |

The stages of SLR implementation include selecting articles using inclusion and exclusion criteria to ensure accuracy, quality, and relevance to the research objective. Articles that meet the inclusion criteria are used as the primary analysis material, while articles that do not meet the criteria are excluded from the study. Each criterion is used to clarify the reasons for accepting or rejecting articles, so that the selection process is objective and focused.

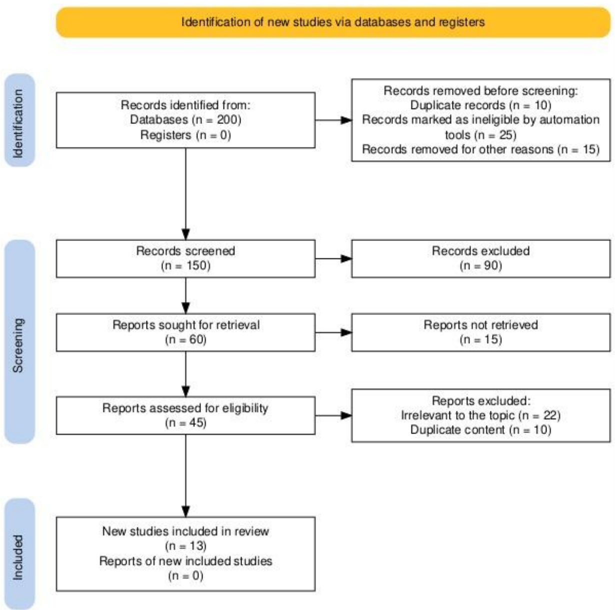


**Figure 1.** Diagram of article search stages based on PRISMA.

Based on the search results and selection process, several articles were identified and then analyzed through four main stages in the PRISMA diagram: identification, screening, eligibility, and inclusion. This process describes the screening flow from article collection and duplication removal to eligibility assessment and the determination of the articles most relevant to the research topic. Of the 200 articles identified in the database, 50 were removed before screening (10 duplicates, 25 automatically deleted, and 15 removed for other reasons), leaving 150 for screening. Of these, 90 articles were excluded, and 60 articles were selected for further review. However, 15 articles were unavailable, leaving 45 to be assessed for suitability. After evaluation, 32 articles were deleted because they were irrelevant to the topic of discussion (22 articles) and contained duplicate content (10 articles). Finally, 13 articles were included in the review, with no additional new articles.

## Results and Discussion

A systematic search on Google Scholar using the Publish or Perish 8 application produced these results. The analysis was conducted on a selection of articles chosen according to predetermined criteria. A total of sixteen articles were selected because they met the inclusion criteria related to Guided Inquiry learning that could improve students' critical thinking skills. The criteria that were the focus of the study are attached in Table 1.

**Table 2.** Result of the articles' analysis based on the context of application.

| Author | Aspect | Analysis Results |
|---|---|---|
| [21] | Conventional | Research on the development of this model indicates that the Guided Learning Model has proven practical and effective in enhancing students' critical thinking skills. |
| [22] | Conventional | Critical thinking skills show that a structured sequence of investigative steps is effective in training students to process data and draw conclusions. |
| [23] | Local Wisdom | Directed learning models have been proven to improve students' critical thinking skills based on local wisdom. Students become more capable of analyzing, providing further explanations, and developing scientific strategies through contextual activities such as the process of making tapai. |
| [24] | STEM | Students' critical thinking skills improved significantly through the application of the Guided Inquiry learning model combined with the STEM approach, as evidenced by this study's results. |

Based on findings from various studies, guided inquiry learning models have been shown to enhance students' critical thinking skills in various learning contexts within junior high schools. Research demonstrates that the Guided Inquiry model is capable of improving critical thinking skills [21]. Furthermore, other researchers emphasize that systematic inquiry steps have a significant effect on training students to process data, draw conclusions, and develop scientific reasoning [22]. Continued by other studies, the application of local wisdom values in Guided Inquiry learning can make he learning process more contextual and meaningful because students are directly involved in activities that are closely tied to their daily lives, such as making tapai, which stimulates their analytical and critical reasoning skills [23]. In line with this, similar research proves that the application of Guided Inquiry with a STEM approach also significantly improves critical thinking skills through science and technology-based scientific activities [24].

Research results show that guided inquiry learning models, whether conventional, locally-based, or integrated with STEM, are consistently effective in fostering critical thinking skills because they involve an active scientific process that requires analysis, reflection, and logical conclusion drawing. This finding is reinforced by theory on critical thinking indicators, such as the ability to analyze, evaluate, and conclude, all of which are honed through inquiry-based learning. Based on conventional context studies, the Guided Inquiry learning model has been shown to be effective in improving junior high school students' critical thinking skills in science learning. Experimental results reinforce these findings, showing that students taught using the Guided Inquiry model achieve significant improvements in critical thinking scores compared to a control group that received conventional instruction [25]. Similar findings have also been reported, namely that there were significant differences in students' critical thinking abilities before and after learning with the Guided Inquiry model [26]. Other studies also confirm that Guided Inquiry serves as a bridge between discovery-based and project-based learning, as students actively construct knowledge through direct experience [27]. Recent empirical evidence consistently shows that the application of Guided Inquiry can train student high-ordr thinking skills in science lessons.

The contextualization of the Guided Inquiry mode across various learning settings also demonstrates its flexibility and effectiveness. Guided research based on local wisdom has been reported to improve students' science literacy and critical thinking skills. Research concludes that the Guided Inquiry model, which integrates local culture, significantly increases science literacy and critical thinking skills among junior high school students [28]. In the local context, two researchers found that the integration of local cultural values can strengthen the meaning of learning and shape scientific attitudes that are relevant to students' social lives [29] and [30]. Similarly, integrating Guided Inquiry with the STEM approach has been shown to strengthen learning outcomes. Researchers report that the use of a STEM-based Guided Inquiry approach can improve students' critical thinking skills compared to conventional expository models [31]. Not only that, the result of the study showed that the combination of science, technology, and engineering in inquiry creates a multidimensional learning experience that stimulates higher-order thinking skills [32]. In general, it can be interpreted that the Guided Inquiry model is contextually adaptive and capable of strengthening the foundations of critical thinking through scientific, contextual, and knowledge-integration-based learning activities.

Results from several studies show that the Guided Inquiry model is effective in improving critical thinking skills among junior high school students, especially when implemented in a conventional setting equipped with innovative learning media (Table 3). The use of Guided Inquiry through Google Classroom facilitates the process of independent critical thinking because students are guided to discover concepts with the guidance of teachers in an interactive digital environment [33]. This finding is in line with other studies, which show that the application of this model through practical activities encourages students to actively analyze, evaluate, and draw conclusions, while increasing their interest and involvement in science learning [34]. Meanwhile, other results emphasizes that exploratory activities based on experiments in Guided Inquiry provide students with space to connect concepts to real phenomena, thereby strengthening their scientific and critical thinking processes [35]. Furthermore, subsequent results confirm that the use of LKPD as a supporting medium makes the inquiry process more focused and systematic, as students are guided to develop logical reasoning, identify evidence, and draw conclusions based on data [36].

**Table 3.** Results of article analysis based on learning support media.

| Author | Aspect | Analysis Results |
|---|---|---|
| [33] | Google Classroom (technology) | The Guided Learning Model (using Google Classroom) develops students' critical thinking skills. Students are encouraged to discover concepts on their own while still receiving guidance from teachers. |
| [34] | Practical Media | The application of guided inquiry, combined with practical media, improves students' critical thinking skills during analysis, recall, and conclusion formulation. |
| [35] | Experimental Exploration Activities | Guided Inquiry-Based science learning can develop critical thinking skills through exploration, discussion, and analysis of experimental results. This model encourages students to actively discover concepts and connect them to real-world phenomena. |
| [36] | Use of LKPD | The use of Guided Inquiry significantly strengthens students' critical thinking skills, particularly in terms of reasoning and problem-solving. Students become more capable of providing logical explanations, identifying evidence, and drawing conclusions systematically with the support of a student worksheet. |

The study's results indicate that, when applied in a conventional context and reinforced by learning support media, including digital, practical, exploratory, or worksheet-based approaches, it effectively develops students' critical thinking skills through active, reflective, and discovery-centered learning activities. This finding is supported by constructivist theory, which holds that guided learning actively builds knowledge through interaction with the environment and meaningful learning experiences. In the modern context, research shows that digital media and interactive LKPD can increase the efficiency of Guided Inquiry by helping students visualize abstract concepts and collaborate online [37]. The findings indicate that using Google Classroom in Guided Inquiry learning contributes to the development of students' critical thinking skills because the learning process remains centred on discovering concepts under the teacher's guidance. These results align with other studies indicating that integrating digital platforms into Guided Inquiry can facilitate higher-order thinking processes, particularly in analysis and evaluation [38].

The practical media used in Guided Learning strengthen students' critical thinking skills, especially in the stages of analysing information and drawing conclusions. These findings are in line with research confirming that practical and easy-to-use learning media can increase the effectiveness of Guided Inquiry [39]. Exploration and experimentation activities in Guided Inquiry play an important role in training students' critical thinking skills through observation, data analysis, and interpretation of results. Other researchers state that experiment-based science learning with a Guided Inquiry approach significantly improves students' critical thinking skills [40]. Furthermore, follow-up results indicate that the use of technology in guided inquiry learning improves independent learning skills, which are the basis for the formation of independent critical thinking [41]. Through media such as Google Classroom, practical activities, and digital LKPD, teachers can create challenging learning experiences while facilitating student self-reflection. These results align with research indicating that Guided Inquiry-based LKPD is effective in fostering students' critical thinking. LKPD functions as a scaffolding that guides the inquiry process without reducing students' independence in thinking [42]. This demonstrates that conventional contexts, reinforced by media innovation, can transform the learning paradigm into one that is more interactive, exploratory, and relevant to the challenges of the 21st century.

Research shows that applying a guided inquiry learning model within a conventional empirical framework (pre-test, post-test, and individual differences) effectively improves junior high school students' critical thinking skills across various science subjects. Research shows that in the Vibration subject, this model can improve critical thinking skills with an N-Gain score of 0.64 (moderate category), because the inquiry process requires students to actively investigate and analyze the observed phenomena independently [43]. In addition, other researchers reported a significant improvement in the subject of Pressure with an N-Gain score of 0.72 (high category), where inference or conclusion became the most developed aspect as a result of student involvement in the scientific thinking process [44].

In line with this, there was an increase in critical thinking skills on the topic of the Human Respiratory System, with an N-Gain of 0.63 and a significance value of 0.000 (<0.05), accompanied by positive student responses to the application of this model, which reached 84% in the "very good" category [45]. Meanwhile, supporting research highlights the aspect of gender differences, where female students show a higher N-Gain (0.68) than male students (0.51), indicating the influence of individual factors on critical thinking achievement [46]. Meanwhile, research using a quasi-experimental approach reinforces empirical evidence that guided inquiry syntax effectively trains students in formulating problems, making hypotheses, and drawing scientific conclusions based on observations and experiments [47].

**Table 4.** Results of conventional empirical analysis of articles.

| Author | Aspect | Analysis Results |
|---|---|---|
| [43] | Pretest - Posttest | The active involvement of students in analysis and investigation is a form of application of the Guided Learning Model, which has proven effective in improving students' critical thinking skills, with an N-Gain score of 0.64, which falls into the moderate category. |
| [44] | Pretest - Posttest | The use of the Guided Inquiry Model on the topic of Pressure significantly improved critical thinking skills, as reflected in an N-Gain value of 0.72. The greatest improvement was in Drawing Conclusions, a crucial stage in the inquiry process. |
| [45] | Pretest - Posttest | The application of the guided inquiry learning model has been proven to significantly improve junior high school students' critical thinking skills in the subject of the human respiratory system, with an average N -Gain of 0.63 (moderate category), a significance value of 0.000 (<0.05), and very positive responses from students, as indicated by an average questionnaire score of 84%, which falls into the "very good" category. |
| [46] | Gender differences | This study demonstrates that guided inquiry learning has a significant positive impact on students' critical thinking skills. The difference in N-Gain scores between female students (0.68) and male students (0.51) indicates that gender influences critical thinking skills. |
| [47] | Semi-Experimen ts | The effective use of guided learning models improves students' critical thinking skills and engagement in the learning process. They can pose problems, develop hypotheses, and draw scientific conclusions based on experimental data. |

Overall, these results reinforce that the guided inquiry model, when applied in a conventional empirical context, whether through pretest-posttest designs or individual-difference studies, can significantly improve students' critical thinking skills, as it involves an active, reflective, and in-depth investigation of scientific phenomena. The findings are similar to those of previous studies, showing that Guided Inquiry learning models are effective in improving learning outcomes and critical thinking skills, as this approach supports the processes of observation, experimentation, and reflection. One study showed that Guided Inquiry-based science learning resulted in moderate to high increases in critical thinking N-Gain, as students were actively involved in analysis, hypothesis testing, and reflection on learning outcomes [48]. These findings prove that the pretest-posttest design is an appropriate approach for measuring the direct impact of Guided Inquiry high-order thinking skills.

The results of this study are in line with findings that report that the Guided Inquiry in junior high school physics and biology significantly improved critical thinking, especially in the indicators of drawing conclusions and evaluating scientific arguments [49]. The study emphasizes that the final stages of Guided Inquiry, namely inference and generalization, are key phases that encourage the improvement of critical thinking, as also reflected in the results of this study. This is in line with research that found that Guided Inquiry effectively improves students' critical thinking skills in various science concepts because this model requires consistency in the scientific process, regardless of the characteristics of the material being studied [50]. Thus, the effectiveness of Guided Inquiry is not only contextual but also structural in building students' scientific thinking processes.

From a methodological perspective, the effectiveness of the pretest–posttest design in revealing improvements in critical thinking is also reinforced by research stating that conventional experimental designs enable the objective and measurable assessment of changes in cognitive abilities [51]. In the context of Guided Inquiry, this design is highly relevant because it can capture changes in critical thinking skills that result from students' active involvement in the scientific investigation process. In addition, researchers found a tendency for gender differences in science learning, where female students are more diligent and systematic in the scientific reasoning process, resulting in higher critical thinking scores [52]. Other results also revealed that the pretest–posttest design is effective for measuring the direct influence of learning models on higher-order thinking skills [53].

These findings are consistent with the result of a meta-analysis stating that Guided Inquiry plays an essential role in developing students' scientific reasoning because it involves a structured scientific thinking process [54]. In addition, other results explain that this model enhances higher-order thinking skills (HOTS) through the stages of observation, data analysis, and drawing conclusions based on empirical evidence. The main characteristic of Guided Inquiry is teaching students to think like scientists, formulating questions, looking for patterns, and testing hypotheses, all of which contribute to improving the critical thinking skills [55]. Thus, in the context of general studies and empirical evidence, the Guided Inquiry-Based Learning Approach has been shown to have a strong theoretical foundation as a scientific inquiry-based learning model that encourages transformation in students' thinking. Theoretically, these findings confirm that the conventional-empirical context provides a strong foundation for the effectiveness of Guided Inquiry in improving critical thinking, as it allows for measurable evaluation of changes in students' cognitive abilities resulting from active engagement in the scientific process.

## Conclusion

From a summary of various studies, it was concluded that the consistent use of the Guided Inquiry learning model was able to improve the critical thinking skills of junior high school students in various learning contexts, including conventional, innovative, media-based, contextual with local wisdom, STEM integration, and empirical approaches, as evidenced by pretest-posttest research. This model guides students to actively conduct scientific investigations through systematic thinking stages, including formulating problems, proposing hypotheses, experimenting, analyzing data, and drawing evidence-based conclusions. This approach directly enhances scientific analysis, evaluation, and reflection skills. The support of digital media, practical activities, and the integration of local and cross-disciplinary contexts further strengthen this model's effectiveness in shaping meaningful, independent learning relevant to real life. Overall, the Guided Inquiry learning model is a flexible and easy-to-implement approach well-suited to the needs of the 21st century because it encourages students to think critically, creatively, and collaboratively, and to communicate through active learning activities based on the scientific discovery process, including observation, experimentation, data analysis, and reflection. This model also allows teachers to act as facilitators, guiding students to learn independently, thereby enabling students' critical thinking skills and holistic competencies to develop significantly across various learning contexts.

### Author’s Contribution

C. S. Hidayat: Proposed the idea, determined the focus of the study, and drafted the main article. S. Wahyuni: Drafted the review methodology section. S. R. D Astuti: Conducted literature analysis and synthesis. S. S. A. Q Barid: Validated the content and performed final editing of the manuscript.

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## References

[1] Y. Fitria, Safnowandi, and S. R. Fajri, “Pengaruh Model Pembelajaran Inkuiri Terbimbing (Guided Inquiry) Berbasis Saintifik terhadap Kemampuan Berpikir Kritis Siswa,” *Biocaster J. Kaji. Biol.*, vol. 2, no. 3, pp. 128–141, 2022, doi: https://doi.org/10.36312/bjkb.v2i3.97.

[2] Afryansyah., Aisyah., K. Harto, Amilda., and K. Hawa, “Refleksi Hasil PISA dan TIMSS di Indonesia: Upaya Peningkatan Kompetensi Literasi Sains Siswa Madrasah melalui AKMI,” *Pendas J. Ilm. Pendidik. Dasar*, vol. 10, no. 02, pp. 391–405, 2025, doi: https://doi.org/10.23969/jp.v10i02.24505.

[3] N. Azzahra, R. Yogica, and R. Fitri, “Menggali Potensi Model Inkuiri Terbimbing dalam Membentuk Kemampuan Berpikir Kritis Peserta

Didik pada Pembelajaran Biologi,” *Papanda J. Math. Sci. Res.*, vol. 3, no. September, pp. 81–89, 2024, doi: https://doi.org/10.56916/pjmsr.v3i2.859.

[4] A. Rahim, “Meningkatkan Keterampilan Berpikir Kritis Melalui Pembelajaran Kritis,” *JSE J. Sains Educ.*, vol. 1, no. 3, pp. 80–87, 2023, doi: https://doi.org/10.59561/jse.v1i3.233.

[5] K. M. Sebe, “Studi Komparatif antara Metode Ceramah dan Demonstrasi dalam Pembelajaran Fiqih di Kelas 11 MA Alkharaat Labuha,” *JIPDAS J. Ilm. Pendidik. Dasar*, vol. 2, no. 3, pp. 157–164, 2024.

[6] T. Kristiana, Afandi, and E. S. Wahyuni, “Konstruksi Perangkat Pembelajaran Menggunakan Model Guided Inquiry Disertai Socioscientific Issues (SSI) terhadap Keterampilan Berpikir Kritis,” *J. Pendidik. Sains dan Mat.*, vol. 10, no. 2, pp. 132–145, 2022.

[7] M. A. Pinasthi, I. P. Sriartha, and I. B. M. Astawa, “Pengaruh Model Process Oriented Guided Inquiry Learning terhadap Keterampilan Berpikir Kritis Siswa dalam Pembelajaran Geografi di SMA Negeri 1 Singaraja,” *J. Educ.*, vol. 06, no. 04, pp. 20599–20611, 2024.

[8] A. Haerullah and M. N. Tamalene, “PBMP untuk Pemberdayaan Keterampilan Berpikir Kritis Siswa Multietnis,” *BIOEDUKASI*, vol. 10, no. 2, pp. 29–34, 2017, doi: http://dx.doi.org/10.20961/bioedukasi-uns.v10i2.12982.

[9] E. N. Harahap, S. Yuniati, A. Kurniati, and D. Rahmi, “Implementasi Guided Inquiry dalam Meningkatkan Penguasaan Konsep Matematika (SMP),” *Pediaqu J. Pendidik. Sos. dan Hum.*, vol. 5, no. 1, pp. 822–832, 2026.

[10] R. H. Ennis, “Critical Thinking Dispositions : Their Nature and Assessability,” *Univ. Illinois, Urbana-Champaign*, vol. 18, no. 2&3, pp. 165–182, 1996, doi: https://doi.org/10.22329/il.v18i2.2378.

[11] I. Azmi, D. S. B. Prasetya, and Sabrun., “Profil Berpikir Kritis Siswa SMP pada Mata Pelajaran IPA,” *J. Classr. Action Res.*, vol. 7, no. 1, pp. 163–175, 2025, doi: https://doi.org/10.29303/jcar.v7i1.10570.

[12] S. Ranti and Y. D. Kurino, “Pengaruh Pembelajaran Inkuiri Terbimbing terhadap Kemampuan Berpikir Kritis IPA Peserta Didik: inquiry learning model, critical thinking, science learning.,” *Papanda J. Math. Sains*, vol. 2, no. 1, pp. 30–39, 2023, doi: https://doi.org/10.56916/pjmsr.v2i1.302.

[13] O. Y. Utami, *The guided inquiry learning model to improve students' critical thinking ability in science lessons in junior high schools*. journal.neolectura.com, 2022. [Online]. Available: https://journal.neolectura.com/index.php/intelektium/article/view/1068

[14] S. Arif and F. N. Asikhin, “Efektivitas Model Pembelajaran Guided Inquiry Berbantuan Metode Pictorial Riddle terhadap Kemampuan Berpikir Kritis Peserta Didik,” *J. Pendidik. MIPA*, vol. 12, no. September, pp. 936–944, 2022, doi: https://doi.org/10.37630/jpm.v12i3.709.

[15] H. Supiyati, Y. Hidayati, I. Rosidi, and A. Y. R. Wulandari, “Analisis Kemampuan Pemecahan Masalah Siswa Menggunakan Model Guided Inquiry dengan Pendekatan Keterampilan Proses Sains pada Materi Pencemaran Lingkungan,” *Nat. Sci. Educ. Res.*, vol. 2, no. 1, pp. 59–67, 2019, doi: https://doi.org/10.21107/nser.v2i1.5566.

[16] F. Irawan and A. Hernita, “Pelatihan Model Pembelajaran Inquiry Terbimbing ( Guided Inquiry ) Terintegrasi Pendekatan Saintifik untuk Guru di SMP YAPIS Merauke,” *AKSELERASI J. Pengabdi. Masy.*, vol. 3, no. 2, pp. 229–236, 2025, doi: https://doi.org/10.70210/ajpm.v3i2.144.

[17] Ernawati., T. M. Sari, and I. N. Haris, “Meningkatkan Kemampuan Berpikir Kritis Peserta Didik Melalui Model Guided Inquiry,” *J. Pendidik. Ilmu Pengetah. Alam*, vol. 06, no. 01, pp. 33–42, 2025, doi: https://doi.org/10.56842/jp-ipa.v6i01.511.

[18] F. D. Devi and E. Hariyono, “Pembelajaran Materi Perubahan Iklim dengan Model Guided Inquiry Menggunakan Pendekatan Socio Scientific Issues (SSI) untuk Meningkatkan Keterampilan Berpikir Kritis Peserta Didik SMA,” *J. Ilmu Pendidik. dan Pembelajaran Pembelajaran*, vol. 03, no. 01, pp. 16–24, 2024, doi: https://doi.org/10.58706/jipp.v3n1.p16-24.

[19] H. Indawati, S. Sarwanto, and S. Sukarmin, “Studi Literatur Pembelajaran Inkuiri Terbimbing Terhadap Kemampuan Berpikir Kritis Ipa Smp,” *INKUIRI J. Pendidik. IPA*, vol. 10, no. 2, p. 98, 2021, doi: 10.20961/inkuiri.v10i2.57269.

[20] S. S. A. Q. Barid, A. S. Gunawan, and S. Nur, “Presepsi dan Tantangan Pembelajaran Koding dalam Mata Pelajaran IPA sebagai Penguatan Keterampilan Abad-21,” *Panthera J. Ilm. Pendidik. Sains dan Terap.*, vol. 5, no. 4, pp. 1141–1152, 2025, doi: https://doi.org/10.36312/panthera.v5i4.678.

[21] I. Kurnia, C. Caswita, and S. Suharsono, “Pengembangan Model Guided Inquiry untuk Meningkatkan Kemampuan Berpikir Kritis Matematis Siswa,” *Al-Ikmal J. Pendidik.*, vol. 1, no. 1, pp. 48–58, 2022, doi: https://doi.org/10.47902/al-ikmal.v1i1.

[22] J. Pane, R. Zai, A. Manalu, and R. Laia, “Pengaruh Pembelajaran Inkuiri Terbimbing terhadap Kemampuan Berpikir Kritis Peserta Didik SMP Negeri 2 Afulu,” *JIIP-Jurnal Ilm.*, 2022, [Online]. Available: http://jiip.stkipyapisdompu.ac.id/jiip/index.php/JIIP/article/view/897

[23] N. Rosyidah and B. Setiawan, “Penerapan Inkuiri Terbimbing Bebasis Kearifan Lokal Sebagai Upaya Peningkatan Keterampilan Berpikir Kritis Siswa,” *BIOCHEPHY J. Sci. Educ.*, vol. 5, no. 1, pp. 595–605, 2025, doi: https://doi.org/10.52562/biochephy.v5i1.1599.

[24] A. F. R. Pratiwi and L. Rosdiana, “Implementasi Inkuiri Terbimbing Melalui Pendekatan STEM untuk Meningkatkan Keterampilan Berpikir Kritis,” *BIOCHEPHY J. Sci. Educ.*, vol. 5, no. 1, pp. 71–77, 2025, doi: https://doi.org/10.52562/biochephy.v5i1.1439.

[25] S. W. R. Nasution, "Penerapan Model Inkuiri Terbimbing (Guided Inquiry) dalam Meningkatkan Kemampuan Berpikir Kritis pada Pembelajaran Fisika," *J. Educ. Dev.*, vol. 3, no. 1, pp. 1–5, 2018, doi: https://doi.org/10.37081/ed.v3i1.85.

[26] E. N. F. Rizky and T. Sritresna, "Peningkatan Kemampuan Berpikir Kritis dan Disposisi Matematis Siswa Antara Guided Inquiry dan Problem Posing," *PLUSMINUS J. Pendidik. Mat.*, vol. 1, no. 1, pp. 33–46, 2021.

[27] S. W. Dai, N. I. Ischak, H. Iyabu, and L. A. R. Laliyo, "Pengaruh Pembelajaran Guided Inquiry Berbasis Proyek pada Materi Makromolekul untuk Meningkatkan Kemampuan Berpikir Kritis Siswa," *Exp. J. Sci. Educ.*, vol. 2, no. 1, pp. 24–31, 2022, doi: https://doi.org/10.18860/experiment.v2i2.23034.

[28] A. Ramdani and A. Syukur, "Meningkatkan Keterampilan Proses Sains Siswa : Studi Pembelajaran Menggunakan Bahan Ajar IPA Inkuiri Terintegarasi Kearifan Lokal," *J. Classr. Action Res.*, vol. 6, no. 1, pp. 84–90, 2025, doi: https://doi.org/10.29303/jcar.v6i1.7404.

[29] Suryani, T. E. Raharjo, and S. Andari, "Kearifan Lokal dalam Pelayanan Kesejahteraan Sosial Saat Kebencanaan : Refleksi Pengalaman Masyarakat Saat Terjadi COVID-19," *J. Penelit. dan Pengemb. Kesejaht. Sos.*, vol. 12, no. 3, pp. 113–130, 2023, doi: https://doi.org/10.33007/ska.v12i3.3347.

[30] D. A. Marhayani, D. Kariadi, R. Setyowati, I. Sains, D. Bisnis, and I. Singkawang, "Developing The E-Module of The Cidayu (Chinese, Dayak, and Malay) Community's Local Wisdom Using Fliphtml5 Software," *J. kependidikan J. Has. Penelit. dan Kaji. Kepustakaan di Bid. Pendidikan, Pengajaran dan Pembelajaran*, vol. 11, no. 1, pp. 316–326, 2025, doi: https://doi.org/10.33394/jk.v11i1.13415.

[31] D. G. Islamyah, P. Yasa, and D. O. Rachmawati, "Penerapan Model Pembelajaran Inkuiri Terbimbing Berbasis STEM Guna Meningkatkan Kemampuan Berpikir Kritis Siswa Kelas X MIPA 4 SMAN Tahun Ajaran 2018/2019," *J. Pendidik. Fis. Undiksha*, vol. 8, no. 2, pp. 86–94, 2018.

[32] Fitriansyah, I. K. Werdhiana, and S. Saehana, "Pengaruh Pendekatan STEM dalam Model Inkuiri Terbimbing Terhadap Sikap Ilmiah dan Kerja Ilmiah Materi IPA," *J. Ilm. Pendidik. Fis.*, vol. 5, no. 2, pp. 228–241, 2021, doi: https://doi.org/10.20527/jipf.v5i2.3598.

[33] W. Utari, V. Hikmawati, and W. Wahyudi, "Pembelajaran Guided inquiry Berbasis Google Classroom Terhadap Berpikir Kritis Siswa," *Mirabilis J. Biol. Educ.*, vol. 1, no. 1, pp. 11–28, 2022, doi: https://doi.org/10.56916/jm.v1i1.44.

[34] J. K. Putri, C. W. Gunawan, and Y. Wiyatmo, "Implementation of guided inquiry to increase students' interest in learning physics and critical thinking skills," *J. Pendidik. Fis.*, vol. 10, no. 2, pp. 257–263, 2024, doi: https://doi.org/10.29303/jpft.v10i2.7091.

[35] N. F. Amalia, I. B. Minarti, and B. Budiastuti, "Profil Keterampilan Berpikir Kritis Peserta Didik SMP dalam Pembelajaran IPA Materi Sistem Peredaran Darah," *J. Penelit. dalam Bid. Pendidik. dan Pengajaran*, vol. 17, no. 1, pp. 152–160, 2023, doi: https://doi.org/10.26877/mpp.v17i1.15388.

[36] U. Salamah and A. N. M. Fauziah, "Inkuiri Terbimbing Untuk Meningkatkan Keterampilan Berpikir Kritis Peserta Didik SMP Pada Materi IPA: Implementation of Guided Inquiry to Enhance Junior …," *Edu-Sains J. Pendidik. Mat. dan Ilmu Pengetah. Alam*, vol. 14, no. 1, pp. 36–47, 2025, doi: https://doi.org/10.22437/jmpmipa.v14i1.40217.

[37] Sofiah, A. Fikriyah, B. Tamam, D. B. R. Astrid, and M. C. Stutarja, "Pengembangan E-LKPD Berbasis Guided Inquiry pada Materi Sistem Ekskresi Manusia," *J. Nat. Sci. Educ. Res.*, vol. 6, no. 3, pp. 115–126, 2023, doi: https://doi.org/10.21107/nser.v6i3.22054.

[38] Wulandari, S. Mursali, and I. N. Dewi, "Pengaruh Model Pembelajaran Guided Inquiry Berbantuan Virtual Laboratory terhadap Keterampilan Berpikir Kritis Peserta Didik," *Biocaster J. Kaji. Biol.*, vol. 5, no. 3, pp. 202–216, 2025, doi: https://doi.org/10.36312/biocaster.v5i3.441.

[39] A. Rahmawati, "Implementasi Inkuiri Terbimbing Berbantuan Live Worksheet untuk Meningkatkan Keterampilan Proses Sains SMP pada Materi Getaran dan Gelombang," *Sci. J. Inov. Pendidik. Mat. dan IPA*, vol. 5, no. 2, pp. 837–845, 2025, doi: https://doi.org/10.51878/science.v5i2.5713.

[40] A. Febri, Sarwanto, and D. Harjunowibowo, "Guided Inquiry Lab : Its Effect to Improve S tudent ' s Critical Thinking on Mechanics," *J. Ilm. Pendidik. Fis. Al-BiRuNi*, vol. 9, no. 1, pp. 87–97, 2020, doi: 10.24042/jipfalbiruni.v9i1.4630.

[41] M. F. Nurrahmatullah, I. Waspada, and H. Mulyani, "The Mediating Role of Self-Efficacy on the Effect of Peer Group on Self-Regulated Learning," *J. Pendidik. Ilu Sos.*, vol. 34, no. 87, pp. 206–221, 2024, doi: https://doi.org/10.23917/jpis.v34i2.5152.

[42] R. M. Devi, A. S. Budiarso, and S. Wahyuni, "Pengembangan E-LKPD Berbasis Inkuiri Terbimbing untuk Meningkatkan Keterampilan Berpikir Kritis Siswa SMP," *J. Eduscience*, vol. 9, no. 2, pp. 405–417, 2022, doi: https://doi.org/10.36987/jes.v9i2.2810.

[43] W. Mardhatillah and T. Nurita, "Implementasi Model Pembelajaran Inkuiri Terbimbing terhadap Keterampilan Berpikir Kritis Siswa SMP," *BIOCHEPHY J. Sci. Educ.*, vol. 4, no. 2, pp. 777–780, 2024, doi: https://doi.org/10.52562/biochephy.v4i2.1279.

[44] S. D. Anggraini and A. R. Purnomo, "Peningkatan Keterampilan Berpikir Kritis Siswa Menggunakan Model Guided Inquiry pada Materi Tekanan," *BIOCHEPHY J. Sci. Educ.*, vol. 4, no. 1, pp. 508–516, 2024, doi: https://doi.org/10.52562/biochephy.v4i1.1203.

[45] Z. C. Alfany and A. R. Purnomo, "Penerapan model pembelajaran inkuiri terbimbing untuk meningkatkan kemampuan berpikir kritis peserta didik pada materi sistem pernapasan manusia," *PENSA E-Jurnal Pendidik. Sains*, vol. 11, no. 3, pp. 250–255, 2023, doi:

https://doi.org/10.26740/pensa.v11i3.55745.
[46] L. N. Azizah and L. Rosdiana, "Penerapan model pembelajaran inkuiri terbimbing untuk meningkatkan keterampilan berpikir kritis siswa ditinjau dari gender pada materi pencemaran lingkungan," *Pensa E-Jurnal Pendidik. Sains*, vol. 10, no. 1, pp. 161–166, 2022, doi: https://doi.org/10.26740/pensa.v10i1.43045.
[47] L. S. Amijaya, A. Ramdani, and I. W. Merta, "Pengaruh model pembelajaran inkuiri terbimbing terhadap hasil belajar dan kemampuan berpikir kritis peserta didik kelas X pada pokok bahasan keanekaragaman hayati dan klasifikasi mahluk hidup," *Indones. J. STEM Educ.*, vol. 13, no. 2, pp. 94–99, 2019, doi: https://doi.org/10.29303/jpm.v13i2.468.
[48] R. Rahmawati, A. Doyan, A. Busyairi, and Gunawan, "The Influence of the Guided Inquiry Learning Model on Learning Outcomes of Student Elasticity Material," *J. Penelit. Pendidik. IPA*, vol. 9, no. 1, pp. 1–8, 2023.
[49] A. C. Fatikhin, M. Budiyanto, and A. Qosyim, "Enhancing Critical Thinking Skills in Junior High School Students through the RADEC Learning Model on Vibration Material," *J. Pijar MIPA*, vol. 19, no. 4, pp. 586–593, 2024, doi: https://doi.org/10.29303/jpm.v19i4.6908.
[50] A. Rahayu and R. S. Sari, "Guided Inquiry-Based Basic Chemistry Practicum Guidelines and Its Impact on Students' Science Process Skills and Critical Thinking Skills," *J. Pendidik. Kim. Indones.*, vol. 7, no. 1, pp. 1–9, 2023, doi: https://doi.org/10.23887/jpki.v7i1.46212.
[51] A. A. Nugroho, Sajidan, Suranto, and M. Masykuri, "The Effect of Socio-Scientific Inquiry Based Learning on Students' Problem Solving Skills," *J. Balt. Sci. Educ.*, vol. 24, no. 1, pp. 149–168, 2025.
[52] S. R. Zahara, F. W. Ginting, and N. Novita, "Perbandingan Keterampilan Proses Sains Siswa Berdasarkan Gender Melalui Model Pembelajaran Inkuiri Terbimbing," *GRAVITASI J. Pendidik. Fis. dan Sains*, vol. 06, no. 02, pp. 32–41, 2023.
[53] R. S. Oktavia, Y. S. Rahayu, and Yuliani., "Implementation of Guided Inquiry-Based Learning Model To Improve Students' Creativity Thinking Skill," *JPPS (Jurnal Penelit. Pendidik. Sains)*, vol. 9, no. 1, pp. 1756–1762, 2019, doi: https://doi.org/10.26740/jpps.v9n1.p1756-1762.
[54] P. D. Sundari, E. Rimadani, P. Fisika, J. Fisika, and U. Negeri, "Peningkatan Penalaran Ilmiah Siswa melalui Pembelajaran Guided Inquiry Berstrategi Scaffolding pada Materi Suhu dan Kalor," *JEP (Jurnal Eksakta Pendidikan)*, vol. 4, no. 1, pp. 34–41, 2020, doi: https://doi.org/10.24036/jep.v1i2.50.
[55] M. F. Simanjuntak and N. Sudibjo, "Meningkatkan Keterampilan Berpikir Kritis dan Kemampuan Memecahkan Masalah Siswa Melalui Pembelajaran Berbasis Masalah," *JOHME J. Holist. Math. Educ.*, vol. 2, no. 2, pp. 108–118, 2019.