



Implementing the Guided Inquiry Approach in IPAS Learning at the Elementary Level: A Literature Review (2021–2026)

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ABSTRACT

The Guided Inquiry approach provides students with opportunities to actively engage in the learning process through investigation, data collection, and drawing conclusions. This approach directly fosters critical thinking skills, including interpretation, analysis, evaluation, and inference. This study aims to analyze the effectiveness of the Guided Inquiry model in teaching Natural and Social Sciences (IPAS) at the elementary school level. The research method employed is a Systematic Literature Review (SLR) by analyzing 796 articles from Scopus and Google Scholar databases published between 2021 and 2026. Based on the literature review, the findings indicate that this model significantly improves students' critical thinking skills, conceptual understanding, and learning motivation. The results show that these improvements occur due to the shift in students' roles from passive recipients to active discoverers through systematic learning stages. Furthermore, the integration of digital technologies such as video media, PhET Simulations, and Google Sites enhances learning outcomes by making abstract concepts more concrete. Therefore, the Guided Inquiry approach can serve as a strategic solution in developing science learning aligned with the demands of 21st-century education in elementary schools.

Introduction

Learning in the 21st century requires students to master various competencies needed to face increasingly complex global challenges, including communication, collaboration, creativity, and critical thinking skills. Among these competencies, critical thinking is considered one of the most fundamental because it enables students to analyze information, evaluate evidence, make logical decisions, and solve problems systematically. In the educational context, critical thinking is not only an academic skill but also a life skill that helps students respond wisely to social, scientific, and technological changes. In Indonesia, the implementation of the Merdeka Curriculum further strengthens the urgency of developing critical thinking skills as part of the Pancasila Student Profile, particularly in the dimension of critical reasoning. This curriculum emphasizes student-centered learning

that encourages learners to actively construct knowledge through meaningful learning experiences. Therefore, teachers are expected to design learning environments that support students in exploring problems, asking questions, and reflecting on their learning processes. Previous studies have shown that the development of critical thinking skills from an early age significantly influences students' long-term academic achievement and problem-solving abilities (Ardiawan, 2020).

At the elementary school level, the cultivation of critical thinking skills becomes particularly important because this stage serves as the foundation for students' cognitive development. Elementary school students are in a transitional period where they begin to move from concrete operational thinking toward more logical and analytical reasoning. During this phase, students require learning experiences that stimulate curiosity, encourage questioning, and involve active engagement in the learning process. However, many elementary learning practices still focus heavily on memorization and teacher explanations, limiting students' opportunities to think independently. Such practices may hinder the development of higher-order thinking skills, especially in subjects that require observation, analysis, and reasoning. As a result, there is an increasing demand for learning approaches that actively involve students in constructing their own understanding rather than passively receiving information. This issue has become a major concern in educational research, particularly in science-related learning contexts (Jayakusuma, 2023).

One subject that has strong potential for developing critical thinking skills in elementary schools is Natural and Social Sciences (IPAS). IPAS is an interdisciplinary subject introduced in the Merdeka Curriculum that integrates science and social science concepts to help students understand themselves, society, and their surrounding environment holistically. Through IPAS learning, students are expected not only to master conceptual knowledge but also to develop inquiry skills, environmental awareness, and problem-solving abilities. The nature of IPAS learning is closely related to scientific investigation, observation, experimentation, and evidence-based reasoning. Therefore, IPAS provides an ideal platform for developing critical thinking because students are encouraged to investigate real-world phenomena and connect theoretical concepts with practical situations. In addition, IPAS learning is designed to help students become active learners who can formulate questions, gather information, analyze findings, and communicate conclusions. Nevertheless, the implementation of IPAS learning in many elementary schools remains less optimal because instructional practices are still often dominated by conventional lecture methods (Isro'Hidayatullah & Widhyastuti, 2025).

The limited development of students' critical thinking skills in IPAS learning is also influenced by the instructional approaches used by teachers. Teacher-centered learning tends to position students as passive recipients of information, reducing their opportunities to explore ideas, discuss alternative perspectives, and test hypotheses. In this condition, classroom activities are often limited to reading textbooks, listening to explanations, and completing worksheets without deeper conceptual exploration. Consequently, students may understand concepts superficially but struggle to apply them in solving authentic problems. Previous studies indicate that monotonous instructional strategies negatively affect students' motivation, engagement, and critical thinking development. Moreover, the lack of

varied learning models prevents students from practicing analytical and evaluative thinking in meaningful contexts. This situation demonstrates the importance of adopting more innovative and student-centered instructional approaches in IPAS learning (Mursalim et al., 2026; Ramadhan, 2021).

One instructional approach considered relevant for addressing this challenge is the guided inquiry approach. Guided inquiry emphasizes active student participation in discovering knowledge through systematic investigative processes, including identifying problems, formulating hypotheses, collecting and analyzing data, and drawing conclusions. Unlike open inquiry, guided inquiry provides structured teacher support, making it more suitable for elementary school students who still require scaffolding in conducting investigations. In this approach, teachers function as facilitators who guide students through questioning, providing resources, and ensuring that inquiry activities remain aligned with learning objectives. This model allows students to actively engage in knowledge construction while gradually developing independence in thinking and problem-solving. Furthermore, guided inquiry aligns well with the characteristics of IPAS learning because both emphasize exploration, experimentation, and reflection. Therefore, guided inquiry is widely considered effective for fostering critical thinking skills in elementary education contexts

Several empirical studies have reported the positive impact of implementing guided inquiry in elementary school classrooms. Research findings indicate that guided inquiry can improve students' abilities to interpret information, analyze relationships between concepts, evaluate evidence, and formulate conclusions logically. In addition, students taught through guided inquiry tend to demonstrate higher engagement, stronger curiosity, and better conceptual understanding than those taught through conventional methods. Some studies also reveal that integrating digital learning media within guided inquiry activities can enhance students' understanding of abstract scientific concepts. These findings suggest that guided inquiry is not only effective in improving cognitive outcomes but also supports more meaningful and interactive learning experiences. Despite these promising results, most previous studies have focused primarily on classroom experiments or quasi-experimental designs measuring learning outcomes. Consequently, broader analyses regarding the development and trends of research on guided inquiry in IPAS learning remain limited (Fadilah et al., 2025; Hastuti & Salimi, 2025; Irsan, 2021; Martir et al., 2024; Nasution et al., 2022; Safitri et al., 2024).

Although research on guided inquiry has grown significantly in recent years, there is still limited literature that systematically maps publication trends, dominant research themes, collaboration patterns, and future research opportunities related to guided inquiry in IPAS learning at the elementary school level. Existing studies are largely fragmented and focus more on local implementation rather than providing a comprehensive overview of the field. In this context, bibliometric analysis offers an important method for examining the intellectual structure and evolution of research topics. Bibliometric studies can identify publication growth, influential authors, frequently occurring keywords, citation patterns, and underexplored research areas. Such analysis is valuable for understanding the current state of knowledge and guiding future research directions. Therefore, this study aims to

analyze the development of research on the guided inquiry approach in IPAS learning in elementary schools from 2021 to 2026 using a bibliometric approach.

Research Methods

This study employs a Systematic Literature Review (SLR) approach by referring to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) procedure (Sofiatin, 2020). This approach was chosen to systematically identify, select, and analyze various scientific literatures related to the guided inquiry approach in IPAS learning at the elementary school level within the 2021–2026 period. Through this method, the study not only reviews previous research findings but also maps research trends and developments comprehensively.

The data sources in this study were derived from two major scientific databases, namely Google Scholar and Scopus. The search process was conducted using the keywords “guided inquiry,” “IPAS/science,” and “elementary school,” which were selected to capture relevant studies within the scope of this research. Based on the initial search results, a total of 796 articles were obtained, consisting of 780 articles from Google Scholar and 16 articles from Scopus. Subsequently, an identification process was carried out to ensure that there were no duplicate records (double citations), particularly because some articles may be indexed in both databases. The results showed that 14 pairs of duplicate articles were found, reducing the total dataset to 782 articles. Furthermore, a classification process was conducted to organize the selected articles based on specific criteria, including publication year, database source, research focus, and document type. This classification aims to provide a clearer overview of the characteristics of the collected data and to support the transparency of the selection process. The summary of the sample classification is presented in Table 1.

Table 1 PRISMA Input Summary

Stage	Number
Initial Identification	796
Duplicates Removed	14
After Deduplication	782
Excluded (topic, subject, level)	720
Advanced Screening	62
Inaccessible Articles	44
Final Articles	18

The next stage was screening, which was conducted by reviewing the titles, abstracts, and accessibility of the articles. At this stage, 44 articles were found to be inaccessible in full text and were therefore excluded from the analysis process. After the initial screening process, the number of remaining articles was reduced to 75. This stage is important to ensure that only fully accessible articles are included for in-depth analysis.

Furthermore, the eligibility stage was conducted by applying more specific inclusion and exclusion criteria. Articles that did not focus on the elementary school level were excluded (40 articles), followed by articles that were not relevant to IPAS or science subjects (120 articles). In addition, articles that did not use the guided inquiry approach were also

excluded (560 articles). This process aimed to ensure that the selected literature strictly aligned with the focus of the study.

After going through all stages of selection based on the PRISMA flow (Larasati & Suriadi, 2025), A number of articles that met the inclusion criteria and were deemed eligible for further analysis were obtained. These articles were then analyzed using a qualitative descriptive and bibliometric approach. The analysis was conducted by categorizing the articles based on publication year, research focus, and their contribution to the development of students' critical thinking skills. In addition, bibliometric analysis was used to map research trends, the growth in the number of publications, and the interrelationships among topics within studies on the guided inquiry approach in IPAS learning at the elementary school level. The PRISMA table is presented as follows:

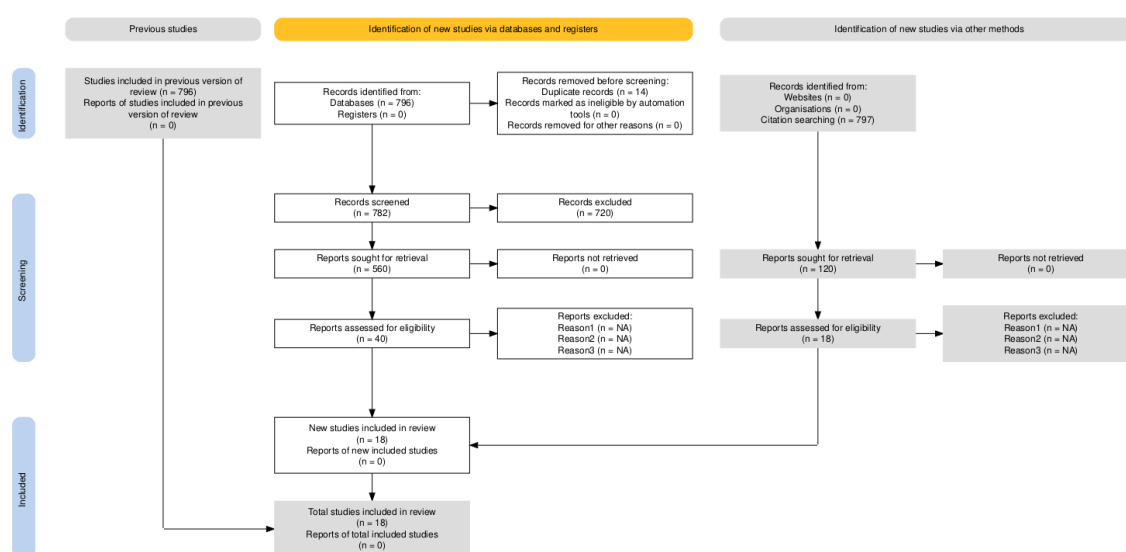


Figure 1. PRISMA Flow Diagram Illustrating the Identification, Screening, Eligibility, and Inclusion of Articles on Guided Inquiry in IPAS Learning (2021–2026)

Findings

Results of Literature Selection Based on PRISMA

Based on the literature selection process using the PRISMA approach, a systematic and transparent overview of the identification, screening, eligibility, and inclusion stages of relevant articles was obtained. In the initial identification stage, a total of 796 articles were retrieved from Google Scholar and Scopus using predefined keywords related to guided inquiry, IPAS/science, and elementary education. This large number of initial records indicates that the topic of inquiry-based learning and science education has received considerable attention in recent years. However, not all identified studies were directly relevant to the specific focus of this research. After the duplicate removal process, 14 overlapping records were excluded, resulting in 782 unique articles. This step is crucial in bibliometric studies to ensure data accuracy and avoid bias caused by repeated indexing across databases. Furthermore, the identification stage also revealed variations in publication types, indexing quality, and accessibility, which required further refinement in the subsequent screening phase. Therefore, the initial dataset served as a broad pool that required systematic filtering to ensure relevance and quality.

During the screening stage, the articles were examined based on title, abstract, and accessibility of full-text documents. A significant number of articles were excluded at this stage due to limited access to full texts, language barriers, or incomplete bibliographic information. This issue is commonly encountered in literature studies relying on open-access platforms, where not all indexed works provide full content availability. In addition, several articles were identified as not meeting basic inclusion criteria, such as focusing on secondary or higher education levels rather than elementary schools. The screening process also filtered out studies that discussed general inquiry learning without specifying the guided inquiry model. As a result, the dataset experienced a substantial reduction, reflecting the importance of rigorous screening procedures in ensuring the validity of the review. This stage plays a critical role in narrowing down the dataset to studies that are both accessible and potentially relevant for deeper analysis. Consequently, only articles that passed the initial relevance and accessibility checks were advanced to the eligibility stage (Aprizanti, 2023)

At the eligibility stage, a more in-depth assessment was conducted by examining the full text of the remaining articles. The selection criteria were strictly aligned with the research focus, namely studies conducted at the elementary school level, involving IPAS or science learning contexts, and explicitly implementing the guided inquiry approach (Aprizanti, 2023). In this phase, many articles were excluded because they did not directly address the integration of guided inquiry within IPAS learning, even though they discussed inquiry-based methods more broadly. Other exclusions included studies that focused solely on learning outcomes without clearly describing the instructional approach used. This indicates that while inquiry-based learning is widely researched, the specificity of guided inquiry within the IPAS context remains relatively underexplored. The rigorous eligibility assessment ensures that only highly relevant and methodologically appropriate studies are included in the final analysis. Ultimately, the remaining articles represent a refined dataset that accurately reflects the research scope of this study. This step strengthens the internal validity of the bibliometric analysis by ensuring consistency between the research objectives and the selected literature.

The final inclusion stage resulted in a limited number of articles that fully met all predefined criteria and were therefore considered suitable for further bibliometric analysis. These selected studies provide a focused representation of research trends related to the guided inquiry approach in IPAS learning at the elementary school level. The relatively small number of included articles, compared to the initial dataset, highlights a significant research gap in this specific area. Although inquiry-based learning has been extensively studied, its application in integrated subjects such as IPAS, particularly within elementary education, has not been widely explored. This finding suggests that there is still substantial room for future research, especially in developing innovative instructional designs that integrate guided inquiry with interdisciplinary learning. Furthermore, future studies could explore the role of digital technology, contextual learning, and local wisdom integration in enhancing the effectiveness of guided inquiry in IPAS learning. Therefore, the results of this PRISMA-based selection process not only map existing research but also provide a strategic direction for future investigations in this field.

Research Trends in the Guided Inquiry Approach (2021–2026)

Based on the bibliometric analysis of the selected articles, it is evident that research on the guided inquiry approach has shown a consistent increase in recent years (Mahmudah et al., 2024). This upward trend reflects the growing academic interest in student-centered learning approaches that are aligned with the demands of 21st-century education. In particular, educational reforms emphasize the importance of developing higher-order thinking skills, especially critical thinking, as a core competency for students. The increasing number of publications also indicates that researchers and educators are actively seeking effective instructional models that can enhance students' engagement and cognitive development. Furthermore, the trend suggests a shift from traditional teacher-centered practices toward more constructivist approaches that prioritize active student participation. This development is also supported by curriculum transformations, such as the implementation of competency-based curricula that encourage inquiry and exploration. Therefore, the rise in guided inquiry research can be seen as a response to both theoretical and practical demands in modern education.

The guided inquiry approach is widely applied in science learning contexts because it provides structured opportunities for students to actively engage in the process of knowledge construction. Unlike conventional learning models, guided inquiry encourages students to explore problems, formulate hypotheses, conduct investigations, and draw conclusions based on empirical evidence. In this process, students are not merely passive recipients of information but become active participants who construct their own understanding through scientific reasoning. The role of the teacher shifts from being the sole source of knowledge to a facilitator who provides guidance and scaffolding throughout the learning process. This approach is particularly relevant in elementary education, where students require structured support while developing independent thinking skills. In the context of IPAS learning, guided inquiry aligns well with the interdisciplinary nature of the subject, which integrates scientific and social perspectives. Therefore, guided inquiry is considered an effective approach for fostering both conceptual understanding and critical thinking skills among elementary school students (Rusmianto et al., 2024).

In line with previous research findings, the implementation of the guided inquiry approach has been shown to significantly improve students' critical thinking skills, including their ability to interpret information, analyze relationships, evaluate evidence, and draw logical conclusions (Waode, 2023). These skills are essential components of higher-order thinking and are crucial for solving real-world problems. The findings also indicate that guided inquiry not only enhances cognitive learning outcomes but also promotes deeper learning and conceptual understanding. Moreover, students who engage in guided inquiry-based learning tend to demonstrate higher levels of curiosity, motivation, and active participation in the classroom. This suggests that the impact of guided inquiry extends beyond academic achievement to include affective and behavioral aspects of learning. The consistency of these findings across multiple studies strengthens the argument that guided inquiry is an effective pedagogical approach in elementary science education. Therefore, current research trends increasingly emphasize the integration of guided inquiry as a means

to develop comprehensive student competencies, particularly in fostering critical and reflective thinking skills.

Effectiveness of the Guided Inquiry Approach in IPAS Learning

The results of the literature analysis indicate that the guided inquiry approach has a positive impact on IPAS learning in elementary schools (Profithasari et al., 2024). The implementation of this approach enables students to construct knowledge independently through systematic learning stages, starting from orientation, problem formulation, hypothesis development, data collection, hypothesis testing, and concluding.

In practice, students who learn using the guided inquiry approach show significant improvement in critical thinking skills compared to those who learn using conventional methods (Widyaningrum et al., 2024). This is evident from the higher increase in pretest to posttest scores in the experimental group compared to the control group (Sari & Ratu, 2021). These findings reinforce that the guided inquiry approach is effective in improving the quality of IPAS learning. Furthermore, this approach also enhances student engagement in the learning process. Students become more active in asking questions, participating in discussions, and exploring learning materials. This is in line with the principles of constructivism, which emphasize that knowledge is built through experience and social interaction (Wulandari et al., 2024).

Integration of Technology in the Guided Inquiry Approach

The findings of the review indicate that the effectiveness of the guided inquiry approach increases when it is combined with technology-based media, such as interactive simulations (Fitriah, 2023). Media like PhET simulations can help concretize abstract concepts in IPAS learning, making them easier for elementary school students to understand.

The use of technology in guided inquiry learning provides a more interactive and engaging learning experience. Students not only conduct direct observations but can also perform virtual experiments that help them understand concepts more deeply. This contributes to the improvement of students' analytical and evaluative abilities in understanding scientific phenomena (Widiya & Radia, 2023). Moreover, the integration of technology supports the development of 21st-century skills, such as digital literacy and critical thinking. Therefore, technology-supported guided inquiry-based IPAS learning can be considered a strategic solution to address the challenges of modern education.

Challenges in Implementation

Despite its many advantages, the implementation of the guided inquiry approach also faces several challenges. One of the main obstacles is students' limited ability in the stages of analysis and evaluation, particularly during data collection and hypothesis testing. Some students still experience difficulties in interpreting data and assessing the validity of the hypotheses they have formulated (Maryamah et al., 2023). In addition, the teacher's role as a facilitator is a crucial factor in the success of the learning process. Teachers are required to provide structured guidance to prevent students from becoming confused during the inquiry process. Without optimal guidance, the inquiry process may become less effective and fail to achieve the intended learning objectives.

Implications and Research Opportunities

Based on the analysis, the guided inquiry approach has significant potential for further development in IPAS learning at the elementary school level (Andriani & Sari, 2024). However, there are still limitations in studies that specifically examine the integration of this approach with various learning media and local contexts. Therefore, future research can focus on developing more innovative guided inquiry learning models, including the integration of digital technology and approaches based on local wisdom. In addition, further studies are needed to examine the long-term effectiveness of this approach in enhancing students' critical thinking skills.

Discussion

The findings of this literature review indicate that the guided inquiry approach is gaining an increasingly important role in IPAS learning at the elementary school level. However, its implementation still faces various limitations, both in terms of the number of relevant studies and its application in practice. First, the results of the selection process using the PRISMA approach reveal that the large number of initial articles is not proportional to the number of truly relevant studies. This suggests that although inquiry-based learning is a popular topic, studies specifically focusing on the implementation of guided inquiry in IPAS learning at the elementary level remain limited. This condition highlights a research gap that needs to be addressed, particularly in developing more contextual and applicable implementations in primary education.

Second, research trends from 2021 to 2026 show a significant increase in the use of the guided inquiry approach. This growth is closely related to the demands of 21st-century education, which emphasize the development of critical thinking, creativity, collaboration, and communication skills. In this regard, the guided inquiry approach aligns well with the student-centered learning paradigm, where students act as active participants in the learning process. This discussion confirms that the shift in educational paradigms has encouraged a transition from conventional teaching methods toward more exploratory and constructivist approaches.

Third, the effectiveness of the guided inquiry approach in enhancing students' critical thinking skills emerges as a consistent finding across various studies. Skills such as interpretation, analysis, evaluation, and inference have been shown to develop through systematic inquiry stages. This supports constructivist theory, which posits that knowledge is actively constructed by learners through experience. Therefore, the guided inquiry approach not only improves cognitive learning outcomes but also fosters higher-order thinking skills (HOTS), which are essential in IPAS learning.

Fourth, the integration of technology within the guided inquiry approach serves as a reinforcing factor in improving learning effectiveness. The use of media such as interactive simulations helps students better understand abstract concepts in a more concrete manner. This finding suggests that the combination of appropriate pedagogical approaches and technological support can create more meaningful learning experiences. Additionally, technology integration contributes to the development of students' digital literacy, a key component of 21st-century competencies.

However, the implementation of the guided inquiry approach is not without challenges. One of the main issues is students' limited ability in analysis and evaluation, particularly during data processing and hypothesis testing stages. This indicates that elementary school students still require intensive scaffolding and guidance from teachers. Therefore, the role of the teacher as a facilitator is crucial in ensuring that the inquiry process remains structured and achieves its intended learning objectives.

Moreover, teachers' readiness to implement this approach is another determining factor for its success. Teachers are expected not only to understand the steps of inquiry but also to design adaptive learning experiences that suit students' characteristics. Without proper planning and support, the guided inquiry approach may not be implemented optimally.

From an implications perspective, this study opens up significant opportunities for future research. The development of guided inquiry learning models integrated with digital technology and local wisdom represents a promising area for further exploration. Additionally, long-term studies are needed to examine the sustained impact of this approach on the development of students' critical thinking skills.

Conclusion

Based on the results of this study using a Systematic Literature Review (SLR) approach with the PRISMA procedure, it can be concluded that the guided inquiry approach plays a significant role in improving the quality of IPAS learning in elementary schools. Although a considerable number of publications were identified, the screening results indicate that studies specifically examining guided inquiry within the context of IPAS at the elementary level are still limited, thereby opening opportunities for more in-depth future research. The analysis shows that the guided inquiry approach is effective in enhancing students' critical thinking skills, including interpretation, analysis, evaluation, and inference. This occurs because the approach positions students as active participants in the learning process through systematic scientific inquiry. These findings are consistent with previous studies, which report significant improvements in learning outcomes and critical thinking skills among students taught using the guided inquiry model compared to conventional methods. In addition, the integration of technology in guided inquiry learning, such as the use of interactive simulation media, has been proven to strengthen students' conceptual understanding, particularly for abstract topics. The use of such media not only increases student engagement but also supports the development of 21st-century skills, including digital literacy and critical thinking. However, the implementation of this approach still faces several challenges, particularly in the stages of analysis and evaluation, which require higher-order thinking skills. Therefore, the role of the teacher as a facilitator is crucial in providing structured guidance to ensure that the inquiry process runs optimally. Based on the findings of this study, several recommendations can be proposed. First, for elementary school teachers, it is recommended to consistently implement the guided inquiry approach in IPAS learning, as it has been proven to improve students' critical thinking skills, conceptual understanding, and learning motivation. Teachers are also encouraged to integrate digital technology-based learning media, such as interactive videos, simulations, and online learning platforms, to optimize the learning process. Second, for curriculum

developers and educational policymakers, the guided inquiry approach can be adopted as one of the recommended learning models in the IPAS curriculum at the elementary level, particularly in supporting the implementation of 21st-century learning that emphasizes Higher Order Thinking Skills (HOTS). Third, for future researchers, it is suggested to conduct empirical studies in real classroom settings using experimental or mixed methods to further examine the effectiveness of the guided inquiry approach in more specific contexts, such as differences in student characteristics, the use of particular media, or integration with other learning models. Additionally, future studies may explore the long-term impact of this approach on students' learning outcomes

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