

Implementation of IPAS with an Inquiry Learning Model in Grade 4 Primary School

Aulia Wulandari^{✉1}, Sukarno¹ & Matsuri¹

¹ Primary School Teacher Education Department, Universitas Sebelas Maret, Surakarta, Indonesia

✉ aulia_s032108001@student.uns.ac.id

Abstract. IPAS (*Ilmu Pengetahuan Alam dan Sosial/Natural and Social Sciences*) constitutes essential subjects in the implementation of the Merdeka Curriculum in primary schools. The primary goal of integrating IPAS is to enable students to effectively manage their natural and social environment as a whole. In light of this objective, the researcher recognized the necessity of conducting this research. The research employs a qualitative approach with a case study method conducted at one of the elementary schools in Sukoharjo District, Central Java. The respondents in this research include the school principal, fourth-grade teachers, first-grade teachers, and fourth-grade students. Data collection was carried out through interviews, observation, and documentation, followed by technical triangulation to validate the field findings. Based on the results obtained from the implementation of IPAS learning using the inquiry learning model, it is established that natural and social sciences were taught separately in the first and second semesters. The results of research conducted in the second semester reveal that IPAS learning activities on social science material have been implemented effectively in terms of planning, execution, and evaluation, with a focus on adhering to the syntax of the inquiry learning model. Obstacles to IPAS learning include educators' lack of readiness for curriculum changes, limited training and information regarding the curriculum, a lack of skill in using technology, and classroom conditions that are not conducive. Efforts made include increasing the competence of educators through teacher working group forums, participating in training, and managing classes to ensure conducive learning activities. This research is expected to serve as a valuable reference for studying the implementation of IPAS with the inquiry learning model in the Merdeka Curriculum.

Keywords: Implementation, IPAS, Inquiry Learning Model, Merdeka Curriculum.

1. Introduction

Curriculum changes in the world of education are characterized as a form of improvement and refinement of the existing curriculum (Campbell-Phillips, 2020; Gustiar et al., 2023; Rijal et al., 2023). After the COVID-19 pandemic hit the world, Indonesia also felt its impact. An analysis conducted by the Ministry of Education and Technology revealed that Indonesia experienced learning loss among students, which was marked by a decline and cessation of some learning activities (Imran et al., 2023; Mahajan et al., 2023; Zhuo & Harrigan, 2023).

Learning loss results in changes to the learning and teaching process, affecting both teachers and students. Educational institutions in Indonesia are making various efforts to prevent this situation from having long-term impacts (Kemdikbudristek, 2022a). The adaptation process for using technology and adjusting learning media during the online learning process is carried out quickly. Adaptations and innovations made in classroom management have a significant impact on the learning process (Bertoletti et al., 2023). Therefore, the Indonesian Minister of Education issued emergency learning regulations to reduce the occurrence of learning losses. Moving on to the endemic period, regulations regarding curriculum changes were issued again.

The implementation of the new policy by the Indonesian Ministry of Education is considered an answer to concerns about learning loss. However, educational practitioners have reported experiencing confusion (Tabroni et al., 2022). The curriculum structure has changed due to the

decree of the Minister of Education, Culture, Research, and Technology of the Republic of Indonesia, Number 56/M/2022, regarding guidelines for implementing the curriculum in the context of learning recovery through the implementation of the Merdeka Curriculum. One intriguing aspect is the integration of natural and social science disciplines, which are considered crucial as they are only offered in elementary schools (Asrifan et al., 2023; Kemdikbudristek, 2021, 2022d).

1.1. Problem Statement

Through the results of observations and interviews that have been conducted, data have been obtained regarding the IPAS subject, which is intended to shape students to be capable of managing the natural and social environment as a whole, but its impact is not evident. Furthermore, the teaching materials used consist of books published by the central government. It also does not appear that IPAS learning activities effectively shape students to manage the natural and social environment comprehensively. Based on these teaching materials, it becomes apparent that IPAS learning activities are conducted separately in each semester within one academic year, with natural science taught in semester 1 and social science in semester 2 (Kemdikbudristek, 2022a, 2022b).

There is a disconnect between the learning objectives and learning outcomes set by the Minister of Education. This disparity will undoubtedly affect student learning outcomes (Kemdikbudristek, 2022b). Improvements are needed to align learning outcomes with the learning objectives, a critical consideration as IPAS is essential in primary schools. Therefore, this research is crucial to provide insight into the actual situation in schools.

Incorporating IPAS as a core subject makes teachers key to the success of learning activities. The teacher's ability to plan, deliver material, assess learning outcomes, and manage all students' needs is a pivotal aspect of learning activities (Zainuddin & Hardiansyah, 2023). The significance of using a learning model that can engage students in learning activities is one factor in ensuring that students can acquire their own knowledge. This aligns with the inquiry learning model, which activates students to discover and construct knowledge based on the new information they receive (Borovay et al., 2018).

The primary focus of inquiry learning is students' active involvement in discussions, their ability to formulate explanations, connect explanations with scientific theories, and communicate the results they have obtained (Anggraeni et al., 2023; Miftakhurrohmah et al., 2023). The use of the inquiry learning model has been implemented in many elementary schools. Additionally, this model is in line with the aim of Indonesian education to develop 21st-century competencies. Using this inquiry learning model is challenging because students must collect and analyze information, seek connections, and gradually build patterns while constructing a concept (Bogar, 2019; Harefa, 2023; Vieira et al., 2021).

1.2. Related Research

Several previous studies were compared to identify innovations in the implementation of IPAS learning using the inquiry learning model in elementary schools. The first study addresses teachers' difficulties in understanding the Merdeka Curriculum (Feriyanto et al., 2022). Regarding the implementation of IPAS learning by teachers, it demonstrates strength in terms of planning and execution. Another study reveals that teachers already possess a sufficient understanding of independent learning (Fembriani, 2022). Moreover, a study focuses on the analysis and identification of opportunities for incorporating local content in natural science learning, as well as the issues related to the draft national education system law concerning curriculum and learning (Wahyudi et al., 2022).

Another research effort related to the use of the inquiry learning model is a literature review that analyzed 15 accredited journals. The results of this research indicated that the inquiry learning model is effective in enhancing student learning outcomes (Yofamella & Taufik, 2020). While previous research has explored the variables of the Merdeka Curriculum, IPAS, and the inquiry learning model extensively, there is a notable gap in research specifically addressing IPAS using the inquiry learning model in the context of fourth-grade classrooms. Therefore, the researchers are motivated to investigate this subject further.

1.3. Research Objectives

The research aims to generate new knowledge and outline future possibilities and challenges in enhancing the implementation of IPAS learning through the inquiry learning model in primary schools. The research will address the following questions:

1. How does the IPAS learning process using the inquiry learning model unfold in fourth-grade classrooms?
2. What are the obstacles and efforts in the implementation of IPAS learning using the inquiry learning model in fourth-grade classrooms?

2. Theoretical Framework

The following concepts serve as the theoretical framework for this research related to IPAS and the inquiry learning model:

IPAS learning combines Natural and Social Sciences subjects to encourage students to manage the natural and social environment as a unified entity (Kemdikbudristek, 2022d). The content of IPAS learning closely relates to nature and human social interactions. It's essential to present relevant contexts for science and technology learning that align with students' surroundings and environment (Kemdikbudristek, 2021).

IPAS, which integrates natural and social sciences, empowers students, both individually and in groups, to explore, discover, and comprehend scientific concepts and principles in a holistic, meaningful, and authentic manner. As an approach, science learning aims to provide meaningful experiences tailored to students' developmental stages.

Authentic events and exploratory activities drive science learning in the IPAS approach. This approach aligns with learning theories that reject rote memorization as the foundation of knowledge formation. Prominent figures in this learning theory, such as Piaget and Vygotsky from Gestalt psychology, emphasize the importance of meaningful learning (Frankel & Mountford, 2021).

One of the most important aspects of learning activities is the utilization of learning models. Educators must select a learning approach that best fits their students' characteristics (Markiano Solissa et al., 2023). The Indonesian Ministry of Education provides academic study materials, and the inquiry learning methodology is believed to be conducted concurrently with scientific learning. The inquiry approach is chosen based on the students' cognitive development, as they view things as transitioning from abstract to concrete. Students are encouraged to explore their knowledge by examining phenomena during the learning process (Kemdikbudristek, 2022b, 2022a).

A learning model serves as a conceptual framework that systematically organizes learning experiences to achieve specific learning objectives. The learning model guides the planning and implementation of learning activities (Loyens et al., 2023). Furthermore, the inquiry learning model comprises a series of learning activities that engage students in systematic and logical investigation, allowing them to confidently develop their own hypotheses and discoveries (Lazonder, 2023).

The inquiry learning model has been recommended for decades. Rooted in social constructivist learning theory, which emphasizes social interaction in the learning process (Hart & White, 2022), the inquiry learning model is a strategy akin to that employed by professional scientists for building specific knowledge (Mohajan et al., 2022). This student-centered model aims to develop intellectual abilities as part of the cognitive process. It not only requires students to master the material but also teaches them how to search for and acquire information optimally (Dada et al., 2023). Through observation, interviews, or practice exercises, students become accustomed to the research process. They can then compile the collected data and present their findings to peers (Bacak & Byker, 2021; Dobber et al., 2017; Vieira et al., 2021).

Synthesizing the various definitions, the inquiry learning model emerges as a systematic series of activities designed to enable students to investigate, discover, and derive information independently. Students can then formulate explanations from evidence and connect these with scientific knowledge and theories. Finally, students can communicate and articulate their findings.

3. Method

3.1. Research Design

This qualitative descriptive research aims to understand the real-world conditions in a natural setting. Researchers investigated IPAS learning activities implemented using the inquiry learning model in fourth-grade classrooms and documented their findings in written descriptions. Data were collected, coded, and analyzed to address the research questions, drawing on relevant theories and documents (Creswell, 2018).

3.2. Participant

The research was conducted at an elementary school in Sukoharjo District, Central Java. Data sources included transcripts of interviews with school principals, fourth-grade teachers, and students who possessed knowledge about the independent curriculum, IPAS learning, and inquiry learning models. Respondents consisted of competent government-recognized male and female fourth-grade teachers. Observation transcripts detailing IPAS learning activities using the inquiry learning model supplemented the data collection. Data sources were selected based on their information and competency related to the implementation of IPAS learning using the inquiry learning model. Data collection continued until no new information emerged (Creswell, 2018). Documentation in the form of teaching modules, learning objectives, and other relevant documents supplemented the data.

3.3. Data Collection

Data collection techniques included observation, interviews, and documentation. Structured and semi-structured interviews were used to collect data from interviewees who possessed knowledge about the topics. Observation sheets guided the assessment of IPAS learning implementation using the inquiry learning approach, with generated criteria reviewed by experts. Data validity was ensured through triangulation of sources and methods and member verification to confirm the accuracy of information. Reference materials were also employed to enhance the validity of the findings.

3.4. Data Analysis

Data analysis involved preprocessing raw data for analysis. The collected data was thoroughly reviewed by the researcher, and computer-assisted coding was employed. The coding process consisted of three stages: (1) open coding to identify key themes in the interview transcripts, (2) axial coding to conceptualize and categorize these themes, and (3) selective coding to create a concept map based on the findings. Data analysis results were interpreted by comparing them to relevant literature and theories (Creswell, 2018).

3.5. Validity and Reliability

Checking data from numerous sources in a variety of ways and at a variety of periods is referred to as triangulation in data validity assessment (Sugiyono, 2017). Data validity was ensured through triangulation of sources, data collection methods, and time intervals. The source triangulation involved cross-checking data from multiple sources, while method triangulation verified data from the same source using different methods. Time triangulation accounted for potential reliability changes over time. Member checking was conducted after the analysis of interview transcripts to confirm the accuracy of the obtained data. After data collection, respondents were asked to verify that the information provided was fact-based. Reference materials and theories were used to enhance the validity of the findings.

4. Findings

4.1. The implementation of the IPAS learning process using the inquiry learning model in fourth grade

Planning activities, which involve organizing and preparing requirements before conducting learning activities, are referred to as learning planning. In planning learning activities, it is crucial for educators to understand the objectives of the subjects they are teaching. Interviews were conducted with teachers and school principals to ascertain the objectives of the IPAS subjects in fourth grade and the planning processes involved. The results of the interview with the school principal regarding the objectives of the IPAS subject are as follows:

"In essence, IPAS combines two subjects, natural and social sciences, into one. It is consolidated into a single textbook. According to the guidelines for implementing the independent curriculum, this is essential because it is exclusively offered in elementary schools, right?"

Follow-up interviews were conducted with fourth-grade teachers to corroborate the research data. The findings from the interviews with Teacher AA are as follows:

"... However, if you examine the books or the theory, they do cover material related to nature. Typically, in the first semester, and then in the final semester, it pertains to social sciences but is still connected to the daily lives of children in their environment. So, since this is fourth grade, it must be appropriate for this level, which is fourth grade."

Based on these interviews, it is evident that IPAS combines two subjects into a single textbook. To verify this, the researcher analyzed the teacher's IPAS book and cross-checked the information. The book's table of contents reveals that natural science is taught in the first semester, while social science is taught in the second semester.

Educators engage in planning activities that involve formulating learning outcomes, learning objectives, and a flow of learning objectives, which are then organized into teaching modules. Diagnostic assessments are conducted to determine students' initial abilities. According to the results of interviews with school principals, diagnostic assessments encompass both cognitive and non-cognitive aspects:

"... used to assess students' fundamental abilities and initial conditions... can take the form of cognitive diagnostics (assessing initial abilities) and non-cognitive diagnostics (assessing initial conditions). Cognitive diagnostics involve asking questions and receiving responses related to the learning materials' knowledge. Meanwhile, non-cognitive diagnostics can be carried out by inquiring about students' current emotional states."

Educators create teaching modules while adhering to the structure of the inquiry learning model. Based on the interview results, educators grasp the purpose of the inquiry learning model. The teacher's handbook in the IPAS book explains the inquiry learning model, which is utilized as a cycle during learning activities. The findings from technical triangulation regarding learning planning activities are presented in Table 1.

Table 1. Triangulation Results of IPAS Learning Planning Techniques

Interview	Observation	Documentation
a) IPAS is a combination of two subjects to achieve student competency.	a) Social Science is taught in the second semester	a) Grade-four teacher's handbook of IPAS books
b) The arrangement of learning outcomes, learning objectives, flow of learning objectives is adjusted for each phase.		b) IPAS teaching module document
c) Diagnostic assessments are carried out to map students' abilities.		
d) Teaching modules are adjusted to the needs of educators.		

e) An inquiry learning model that teaches students to search for knowledge independently	
Results of technical triangulation	IPAS planning using the inquiry learning model pays attention to learning outcomes in each phase. Diagnostic assessments are carried out to map students' abilities by paying attention to the syntax of the inquiry learning model.

The IPAS learning activities conducted in fourth grade appeared to be well-executed. Observations were conducted on March 27, 2020, to examine the application of the inquiry learning model, encompassing stages such as orientation, problem formulation, data search and analysis, evaluation, and communication of results, which were conducted as a cyclical process within the learning activities.



Figure 1. Photo of the implementation of IPAS learning activities

Educators adhere to several principles when teaching, namely: 1) educators need to consider the characteristics of students so that meaningful learning occurs; 2) learning activities are designed so that students become lifelong learners; 3) educators must support the development of students as a whole; 4) the material taught is relevant to the students' everyday environment; and 5) the teaching is oriented towards the future. Based on the findings obtained, Table 2 below presents the results of the triangulation of the IPAS learning process using the inquiry learning model.

Table 2. Triangulation of IPAS Learning Process Techniques

Interview	Observation	Documentation
a) Adapted to the level of student achievement and character by following the syntax of the inquiry model	a) Learning activities are conducted according to the schedule.	a) Photo of learning activity implementation during meeting 2
b) The inquiry approach helps students develop knowledge and fosters critical thinking habits.	b) The syntax of the inquiry learning model includes five activities that are systematically carried out.	b) Teacher's guide and student's book on IPAS
c) Learning materials are sourced from the students' immediate environment and must be contextually relevant.	c) Learning resources are gathered from students' personal belongings	c) Teaching module for meeting 2
Results of technical triangulation	The IPAS learning process using the inquiry learning model is validated by the application of syntax and	

teaching materials, aligning with the principles of the learning process.

Learning evaluation and assessment activities are conducted at the end of learning activities. Reflection is an important activity performed at the end of learning. The following is an excerpt from an interview with the school principal regarding reflection activities as part of the learning evaluation.

“In learning, reflection is certainly necessary as a way to evaluate the ongoing learning process. Reflection can involve reviewing the material briefly to gauge the extent to which students have mastered it. It can also take the form of process reflection, where teachers use this reflection to motivate students to become more active, motivated, and focused in their learning.”

Through reflection, educators can assess students' abilities during learning activities. Interviews with fourth-grade teachers were conducted to reinforce the results of previous interviews. Here is an excerpt from the interview:

“Reflection involves asking the children what they have learned, whether there are any areas of confusion or topics they need to revisit. It's about understanding the content of the material, not just repeating what the teacher explained initially. Do the children truly grasp everything? It's all part of the reflection process. We also identify what hasn't been achieved. From this reflection, the teacher may reevaluate which goals haven't been met or which objectives haven't been effectively conveyed or understood by the children. It's the final follow-up.”

Based on the interview findings, reflection activities serve not only to assess students but also to identify unmet learning goals.

4.2. Obstacles and efforts in implementing IPAS learning using the inquiry learning model in fourth grade

Obstacles in learning activities refer to anything that hinders the learning process. In the context of IPAS learning implementation, interviews were conducted with AA respondents to understand the challenges faced by educators.

“Due to rapid changes in the curriculum, the information dissemination process may not have been optimal.”

In addition, interviews with other educators revealed that the classroom conditions were not always conducive, and the new curriculum posed its own challenges.

“At times, the classroom atmosphere is not conducive, especially when some students are overly active, making it challenging for teachers to manage such active students. For me, as IPAS is relatively new, I am still trying to navigate and understand its nuances.”

The results obtained from interviews, observations, and documentation are presented in Table 3, showcasing the findings of technical triangulation regarding the obstacles encountered by educators in IPAS learning.

Table 3. Results of Triangulation Techniques for IPAS Obstacles

Interview	Observation	Documentation
a) Curriculum changes are rapid, and educators do not fully understand the new curriculum.	a) Implementation of IPAS learning activities	a) A photo of the implementation of learning activities.
b) Insufficient ability to use technology		
c) Classroom conditions are not conducive.		
Results of technical triangulation	Lack of preparation, limited understanding of the new curriculum, and technology proficiency challenges.	

Occasionally, classroom conditions are less conducive during activities.

Meanwhile, educators' efforts to overcome obstacles in implementing IPAS learning include participation in various activities aimed at enhancing their competence. These activities take the form of teacher working groups and training programs organized by regional and central government authorities. Table 4 presents the results of triangulating various sources to identify educators' efforts in addressing these challenges.

Table 4. Triangulation Results of Educator Effort by Sources

Interview	Result
DW	a) Participate in teacher working groups and receive training from the government b) Educators must be willing to learn
AA	a) Increased competency for educators b) Seek learning resources through discussions, the internet, and training
HA	a) Capture students' attention and involving them in the class to create a conducive learning environment
P	a) Must continue to learn
Source triangulation results	The educators' willingness to continue learning, both independently and in groups, is one way to overcome obstacles related to new curriculum changes. Their ability to manage the classroom and engage students contributes to creating a conducive learning environment during classes.

5. Discussion

Based on the data obtained from IPAS learning processes in elementary schools and the learning outcomes issued by the Ministry of Education, it is apparent that IPAS is essentially a combination of two subjects (Kemdikbudristek, 2022c, 2022d). Consequently, this approach does not cultivate students capable of managing both the natural and social environments comprehensively. Nonetheless, educators continue to use government-compiled learning outcomes as a reference for determining learning objectives.

Educators must approach planning activities with seriousness, as these plans are closely tied to the execution of classroom learning activities. The goal of these learning activities isn't solely to guide and direct students, but educators must also be adept at adapting materials, utilizing models, methods, and approaches within specified time allocations. Learning planning, involving the systematic documentation of activity steps conducted in accordance with established procedures and guidelines, aligns with Gagne's learning theory. Effective planning contributes to more efficient learning activities (Hatch & Clark, 2021; Iqbal et al., 2021).

The process of implementing IPAS learning using the inquiry learning model has been proven to engage students actively. Active student participation during learning activities indirectly promotes meaningful learning since it employs relevant materials (Kostiainen et al., 2018; Mystakidis et al., 2021; Uiterwijk-Luijk et al., 2019). Educators, acting as facilitators in learning activities, should embrace the student-centered learning approach. Active student participation in learning activities transforms their thinking process from passive learning to independent learning (Dada et al., 2023; Koehler & Meech, 2022). Relevant research on the use of the inquiry learning model highlights that effective implementation is achieved when paying attention to factors such as tailored guidance and material selection (Dmoshinskaia et al., 2021).

One crucial aspect of learning activities is the use of relevant materials and tools. A study found that participants had a better understanding of contextual content (Kousloglou et al., 2023). Additionally, when contextual learning is employed, three factors come into play: feedback, sensory cues, and spontaneous input from students. Appropriate learning activities trigger the

renewal of students' memory, which can be modified at any time (Heald et al., 2023; Markiano Solissa et al., 2023).

The learning evaluation process occurs through reflection at the end of the material, aiming to review the content and assess students' comprehension. Evaluation activities are categorized into three domains based on Bloom's taxonomy. Student learning evaluation results can be obtained through both written and non-written assessments, such as observations (Ningsih & Adnan, 2023).

One obstacle experienced by educators is their lack of preparedness to adapt to changes, especially in the curriculum. Educators who struggle to implement new curriculum policies can negatively impact student learning outcomes (Ke et al., 2023; Lijie, 2023; Ramli et al., 2023). Additionally, educators' limited ability to use technology is another common challenge. Research indicates that in this era of the Fourth Industrial Revolution, educators should be proficient in utilizing technology. Embracing technology can facilitate educators in exploring various materials and tools for instructional purposes, requiring proficiency in educational technology tools and software (Haleem et al., 2022; Ningsih & Adnan, 2023).

To overcome these challenges, educators make efforts to enhance their competencies. Research on self-efficacy suggests that educators should possess the capability to fulfill their primary responsibilities. Educators with higher self-efficacy tend to positively influence their abilities, thinking processes, and motivational performance levels (Bandura, 1977; Bandura & Wessels, 1994). Furthermore, higher self-efficacy levels are associated with increased openness to adopting new teaching methods and models, enabling educators to plan and organize more challenging learning objectives (Hettinger et al., 2021; Lazarides & Warner, 2020; Wulandari et al., 2023).

As facilitators, educators must effectively manage the classroom to create a comfortable and conducive learning environment. Proficient classroom management is a key indicator of achieving learning goals. Therefore, educators should be capable of managing, designing, and organizing engaging learning activities to capture students' attention (Assen & Otting, 2022; Gaspar et al., 2023; Mischenko et al., 2022; Potter, 2021).

The research conducted aims to be a valuable and constructive study on the implementation of IPAS learning using the inquiry learning model in elementary schools. The researchers hope that this study will provide valuable insights for educational practitioners, including teachers, students, and policymakers, as they navigate the recently implemented independent curriculum.

It's important to note that this research is a case study conducted at a single school in Sukoharjo District, Central Java. Consequently, there may be limitations in the data collection process. Additionally, interesting topics unrelated to the research were uncovered during the study, including: 1) the use and readiness of the "Merdeka Belajar" (Freedom to Learn) platform by teachers; 2) the study and implementation of the "Projek Pelajar Pancasila" (Pancasila Student Project) along with the assessment process in primary schools; 3) the effectiveness of training in implementing the Merdeka curriculum for teachers; and 4) the phenomenon of obesity in primary school students.

6. Conclusion

The process of implementing IPAS subjects, aimed at enabling students to manage the natural and social environment as a whole, appears to be inconspicuous. Natural and social sciences learning activities are conducted in different semesters. However, the planning, implementation, and evaluation of IPAS learning activities using the inquiry learning model have been carried out per the guidelines issued by the Indonesian Ministry of Education. The obstacle faced by educators is their lack of preparedness for rapid changes in the curriculum, with minimal information and training provided by the government. The widespread use of

technology still poses challenges for some educators who are not yet proficient in using educational technology. Additionally, non-conducive classroom conditions serve as one of the obstacles to the learning process. To address these obstacles, educators must enhance their competence to effectively conduct IPAS and technology-based learning activities while implementing the independent curriculum. Classroom management is one of the efforts made by educators to effectively coordinate students during learning activities.

Limitation

The limitations of this research are as follows:

1. The research was carried out at the beginning of the independent curriculum, which had just been implemented, resulting in various limitations experienced by educators during the implementation of the independent curriculum.
2. This research was conducted only in the fourth grade of elementary school.

Recommendation

The following recommendations are provided by the authors based on research findings:

1. IPAS, which combines natural and social science subjects with the aim of enabling students to manage the natural and social environment as a whole, has not yet been fully realized. The authors suggest that future research delve deeper into IPAS, considering aspects such as policy, content, and learning outcomes to align it better with the main objectives of IPAS.
2. This research only employed an inquiry-based learning model with reference to the teacher's handbook. It would be beneficial for future research to explore a wider range of learning models.

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Conflict of Interest

The authors' declare that there is no conflict of interest.

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