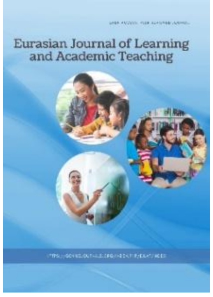

Implementation Of The Inquiry Learning Method In Science Learning At Sd Negeri 2 Maitara Island, Tidore Islands

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ABSTRACT

This study aims to provide an in-depth description of the implementation of the inquiry learning method in Natural and Social Science (IPAS) learning at SD Negeri 2 Pulau Maitara, Tidore Kepulauan City, North Maluku. The background of this research is the low student learning activeness and weak conceptual understanding of IPAS material due to the dominance of conventional teacher-centered learning methods. The study employed a descriptive qualitative approach involving 24 fourth-grade students, one classroom teacher, and the school principal as research subjects. Data collection was carried out through participatory observation over 12 sessions, semi-structured in-depth interviews, and documentation. Data analysis applied the Miles, Huberman, and Saldana (2014) model, covering data condensation, data presentation, and conclusion drawing. Data validity was tested through source triangulation, technique triangulation, and member checking. The results show that inquiry learning was implemented in a structured manner through five stages: orientation, problem formulation, hypothesis formulation, data collection, and conclusion drawing. The utilization of the natural environment of Maitara Island as a contextual learning resource was the key advantage of this implementation. Findings reveal an increase in student activeness from 42.3% to 78.3%, and an increase in the average conceptual understanding score from 62.4 (low category) to 79.8 (high category). Major constraints identified include limited laboratory facilities, unstable internet connectivity, and students' habitually passive learning behavior. This study contributes to the development of a contextual learning model based on local island potential that is adaptive to infrastructural limitations in Indonesia's remote island areas.

Keywords: Inquiry learning, IPAS, elementary school, islands, contextual learning, Tidore

1. Introduction

Education in Indonesia has entered a new chapter with the enactment of the Independent Curriculum which has officially begun to be implemented gradually since 2022. One of the significant changes in this curriculum is the emergence of Natural and Social Sciences (IPAS) subjects as an integration between science and social sciences for elementary school (SD) grades I to VI. This change reflects a more holistic vision of education, where students are not only required to understand natural phenomena scientifically, but also to be able to understand the social and cultural context that surrounds them. According to the Ministry of Education and Culture (2022), IPAS is designed to form a profile of Pancasila students who are able to think critically, creatively, work together, and have character.

The transition from separate science and social studies subjects to an integrated social studies requires a fundamental change in the learning paradigm, both from the teacher and student sides. Teachers can no longer rely on a monodisciplinary approach in teaching, but must be able to design learning that integrates natural and social concepts in a meaningful way. On the other hand, students are expected not only to be passive recipients of information, but also to be active investigators who are able to ask questions, design simple investigations, gather evidence, and draw conclusions based on the data obtained. This role transformation is in line with the demands of 21st century proficiency that places critical thinking, communication, collaboration, and creativity skills as the main competencies that every graduate must possess (Binkley et al., 2012).

However, the reality on the ground shows that this paradigm change has not been fully realized, especially in schools in remote, disadvantaged, and outermost areas (3T). Research by Wahyuni et al. (2023) conducted in a number of elementary schools in North Maluku found that most teachers still use the lecture method and note it as the only learning strategy. This situation results in students tending to be passive, not used to asking questions, and having difficulty applying the concepts learned to real situations. Furthermore, Nurhayati and Wahyudi (2024) emphasized that the success of the implementation of the Independent Curriculum depends heavily on the capacity of teachers to adopt active, innovative, and contextual learning methods.

A similar condition was found at SD Negeri 2 Maitara Island, an elementary school located on Maitara Island, one of the small islands in Tidore Islands City, North Maluku Province. Based on initial observations and preliminary interviews conducted by researchers in February 2024, it was obtained that IPAS learning at the school was still dominated by lecture methods and assignments from textbooks. Teachers have never used the inquiry learning method in a structured manner. Student activity during the learning process is very low; students rarely ask questions, class discussions almost never occur, and students' ability to relate subject matter to phenomena in their surroundings is very limited. School documentation data records that the average daily test score for IPAS grade IV is only 61.5, still below the Learning Goal Achievement Criteria (KKTP) set at 70.

Inquiry learning is one of the most recommended learning methods for science and natural science learning. Philosophically, inquiry learning is rooted in the thought of John Dewey (1938) who stated that true learning occurs through direct experience and authentic problem-solving. This method places students as active investigators who construct their own knowledge through the process of questioning, observing, experimenting, and concluding (Llewellyn, 2014). According to Pedaste et al. (2015), inquiry learning includes a series of structured phases ranging from orientation, conceptualization, investigation, conclusion, to interrelated and mutually supportive discussions.

A number of studies have proven the effectiveness of inquiry learning in improving the quality of science learning in elementary schools. A meta-analysis study by Lazonder and Harmsen (2016) that analyzed 72 experimental and quasi-experimental studies concluded that inquiry learning consistently resulted in higher learning achievement than direct instruction. Minner et al. (2010) in their systematic review of 138 studies found that inquiry-based science learning improved concept understanding and long-term knowledge retention. Furtak et al. (2012) further revealed that inquiry learning accompanied by teacher guidance (guided inquiry) provides the most optimal results for elementary school students.

The novelty or state-of-the-art of this research lies in its specific geographical and cultural context. Most research on inquiry learning is conducted in urban or suburban schools that have adequate access to laboratory facilities, the internet, and digital learning resources. Instead, this research focuses on the implementation of inquiry learning in remote island environments with very limited infrastructure. This study explores how teachers can adapt and implement inquiry learning creatively by utilizing the potential of the marine natural environment and maritime culture of the Tidore Islands as an authentic learning resource that does not require advanced technology. This approach responds to a research gap identified by Fazilla et al. (2023) that inquiry learning research in the context of the Indonesian archipelago is still very limited.

The purpose of this research is to describe in depth the process of implementing the inquiry learning method in science learning in SD Negeri 2 Maitara Island, including its implementation stages, increasing the activeness and understanding of students' concepts, as well as obstacles and solutions found in the field. The urgency of this research lies in the urgent need to improve the quality of science learning in the archipelago so that students in 3T areas get a meaningful learning experience that is on par with students in urban areas. This research is expected to contribute to: (1) the development of knowledge about the adaptation of inquiry learning in remote school environments; (2) the provision of practical models for teachers in the archipelago; and (3) policy recommendations for the Education Office in improving the quality of learning in the 3T area.

2. RESEARCH METHODS

2.1 Research Design and Approach

This study uses a qualitative approach with a descriptive design. The qualitative approach was chosen because the research aims to deeply understand the process, meaning, and experience of the implementation of inquiry learning in the natural context of classroom learning (Creswell & Poth, 2018). Descriptive design is used to accurately and systematically describe the characteristics, stages, and impact of the implementation of the method without manipulating any variables. The research paradigm used is interpretivism, which emphasizes that social reality is constructed by participants through their interactions and experiences (Merriam & Tisdell, 2016).

2.2 Research Time and Location

The research was carried out at SD Negeri 2 Maitara Island, Tidore Islands City, North Maluku Province, during the period from February to April 2024. This school was chosen purposively because it represents the characteristics of remote island schools in the eastern region of Indonesia that face complex geographical and infrastructure challenges in the implementation of the Independent Curriculum. The school is located on Maitara Island which can be reached by motorboat for approximately 15 minutes from Bastiong Port, Tidore City.

2.3 Research Participants

The research participants consisted of three groups selected using purposive sampling techniques. The first group was 24 grade IV students consisting of 13 male students and 11 female students, with an average age of 10 years. The second group was one grade IV teacher who had 12 years of teaching experience and had participated in the Independent Curriculum training in 2023. The third group was a school principal who served for 6 years and had a deep understanding of school conditions and challenges. Of the 24 students, 6 students were selected as key informants for in-depth interviews, taking into account the representation of academic abilities (high, medium, low), gender, and level of activity in learning.

2.4 Data collection techniques

Data were collected through three main techniques that were carried out simultaneously and continuously. First, participatory observation was carried out by researchers during 12 social studies learning meetings (2 x 35 minutes each) using structured observation sheets developed based on the stages of inquiry learning by Pedaste et al. (2015). The researcher acted as an active non-participant observer who recorded teacher and student activities, class interactions, and the use of learning resources in detail in field notes.

Second, semi-structured in-depth interviews were conducted with classroom teachers (3 sessions, 4.5 hours total), principals (1 session, 1 hour), and 6 selected students (30 minutes each). Interview guides were developed to explore the perceptions, experiences, and challenges faced by participants in the inquiry learning implementation process. All interview sessions were recorded with the participant's permission and then transcribed verbatim.

Third, documentation is collected in the form of a Class IV Science Learning Implementation Plan (RPP), photos of learning activities, samples of student work results (worksheets, investigation reports), and daily test score data. This documentation serves as supporting and reinforcing data for observation and interview results.

2.5 Data Analysis and Data Validity

Data analysis was carried out using the interactive model of Miles, Huberman, and Saldana (2014) which consisted of three interacting components. The data condensation stage includes verbatim transcription, open coding, axial coding, and theme categorization. The data presentation stage is carried out in the form of descriptive narratives, tables, and charts that facilitate interpretation. The conclusion drawing stage is carried out iteratively through continuous verification of raw data.

The validity of the data was tested through four strategies. Source triangulation was carried out by comparing data from teachers, students, and principals. Technical triangulation was carried out by comparing data from observations, interviews, and documentation. Member checking was carried out by confirming findings to the main participant (teacher) to ensure the accuracy of interpretation. Observation diligence (prolonged engagement) was carried out through observation for 12 consecutive meetings to ensure that the data obtained was representative and in-depth.

3. RESULTS AND DISCUSSION

3.1 Description of the Context of Science Learning at SD Negeri 2 Maitara Island

Before presenting the results of the implementation of inquiry learning, it is important to understand the initial context of IPAS learning at SD Negeri 2 Maitara Island. The school has 6 study groups with a total of 142 students and 8 educators, including the principal who is also teaching. School facilities are very limited: there is no science laboratory, the library only has about 200 titles of old textbooks, and internet access is only available through one WiFi unit with an unstable signal, especially in the easterly wind season.

Initial observations before the implementation of inquiry learning show a worrying picture. IPAS learning takes place in a linear manner: teachers open the lesson, explain the material from the textbook while writing points on the board, students copy, and then work on practice questions. Teacher-student interaction is very limited and one-way. Of the 24 students observed, on average only 2-3 students dare to ask questions in one meeting. This situation creates a stagnant learning ecosystem and hinders the development of students' high-level thinking skills.

3.2 Preparation for the Implementation of Inquiry Learning

Before the implementation was implemented, researchers and classroom teachers conducted a series of preparations for two weeks. The first preparation was a two-day mini-workshop to introduce the concepts and stages of inquiry learning to teachers. This workshop included the basic theory of inquiry learning, techniques for formulating scientific questions, how to design local environment-based investigative activities, and scaffolding strategies to guide students in the inquiry process.

The second preparation is the development of learning tools that include a Learning Implementation Plan (RPP) based on inquiry learning, Student Worksheets (LKS) designed to guide the inquiry process gradually, and field observation guidelines for activities outside the classroom. All of these learning tools were developed by considering the conditions and potential of the Maitara Island environment, so that they are contextual and relevant to students.

The third preparation is an exploration of the environment around the school to identify potential natural learning resources that can be integrated in IPAS learning. This identification finds several rich potentials that can be utilized, including: coastal ecosystems and coral reefs that can be observed directly from the shoreline, tidal phenomena of seawater, various types of marine organisms that are easy to find, coastal forest vegetation with high biodiversity, as well as maritime cultural artifacts of the Tidore people that are rich in historical and social value.

3.3 Stages of Inquiry Learning Implementation

The implementation of inquiry learning was carried out for 12 meetings covering four main topics of IPAS class IV: (1) Marine and Coastal Ecosystems, (2) Water and Life Cycles, (3) Interaction of Living Beings with the Environment, and (4) Potential of Indonesian Natural Resources. Each topic was discussed in 3 meetings by following a structured inquiry learning cycle. Table 1 presents a comprehensive overview of the observed implementation stages:

Stages	Teacher Activities	Student Activities
1. Onboarding	Present the natural phenomena around the island (tides, marine ecosystems, coastal organisms); ask lighter questions; relate students' initial experiences with IPAS topics	Observe phenomena directly; discuss everyday experiences; identify things that attract their attention from the phenomena presented
2. Formulating the Problem	Guiding students to formulate scientific questions that can be investigated; using scaffolding techniques in the form of guiding questions; validating the relevance of student questions	Discuss in groups to identify problems; formulate simple research questions that are specific, measurable, and investigative
3. Formulating a Hypothesis	Facilitate the extraction of students' initial knowledge; guide students to make predictions based on logic and knowledge they already have; explain hypothesis differences and definite answers	Discuss in a group to formulate a prediction or provisional hypothesis; write down the hypothesis in a worksheet with a supporting reason
4. Data Collection	Assisting with field investigation activities around the school's beaches and coasts; providing guidance on the safety and ethics of nature observation; encouraging the use of simple tools (rulers, measuring cups, magnifying glasses)	Carry out field observations in groups; measure, record, and document findings; collect simple specimens for further observation in class
5. Draw Conclusions	Lead class discussion sessions to share findings between groups; provide clarification and enrichment of scientific concepts; connect students' findings with relevant IPAS concepts	Analyze the collected data; compare the findings with the initial hypothesis; present the results of the group's investigation; draw joint conclusions

Table 1. Stages of Implementation of Inquiry Learning in Social Science Learning at SD Negeri 2 Maitara Island

The orientation stage is an important foundation in the inquiry learning cycle. At each meeting, the teacher begins the learning by taking students out of the classroom to make a brief observation of the environment around the school that is directly adjacent to the beach.

For example, in the topic of Marine and Coastal Ecosystems, students are invited to observe life in the intertidal zone at low tide, identify different types of organisms that cling to the rocks, and observe the differences in vegetation zones from sandy beaches to coastal forests. This approach creates an authentic and meaningful learning experience that cannot be replaced by any textbook. As stated by Johnson (2002), contextual learning that connects academic content with the real world of students fundamentally changes the way students process and store information.

In the problem formulation stage, teachers use structured scaffolding techniques by introducing a modified 5W+1H scientific question framework for elementary school students. Teachers ask guiding questions such as: 'What did you see on the beach that made you curious?', 'Why are starfish always found in the same place?', 'What will happen if seawater continues to be polluted?'. This scaffolding technique has proven effective in helping students who were previously unaccustomed to asking questions to start daring to express their curiosity scientifically. Analysis of field records showed an increase in the number of productive questions asked by students from an average of 0.8 questions per session (before implementation) to 4.7 productive questions per group per session (in the middle of implementation).

The hypothesis formulation stage is the most challenging, especially at the beginning of implementation. Students who are familiar with rote learning have difficulty distinguishing hypotheses (reasoning-based predictions) from the answers they expect the teacher to hear. Teachers overcome this obstacle by providing examples of simple hypotheses using the context of students' daily lives on the island, such as 'If fish are found more near coral reefs, then we suspect coral reefs provide food and shelter for fish.' This constructivistic approach is consistent with Vygotsky's framework of Zone of Proximal Development (ZPD), where scaffolding support from teachers allows students to achieve abilities that they have not been able to achieve independently (Hmelo-Silver et al., 2007).

The data collection stage is the stage that students like the most. Field investigation activities around the coast and coastal ecosystem of Maitara Island create a fun and scientific learning context. Students use simple tools such as magnifying glasses, measuring cups, rulers, and pH paper to take measurements and observations. The limitations of the equipment encourage creativity: students use used bottles as water volume measuring devices, use tree branches as markers for observation positions, and use leaves as a base to store the collected specimens. This proves that limited facilities do not have to be an obstacle to meaningful learning, but can be a stimulus for creativity and innovation (Sari & Rahmadi, 2024).

The conclusion stage is carried out in two sessions: a small group discussion session and a large class presentation session. In the group discussion session, students analyze the data they collect and compare it with the initial hypothesis. Many groups find that their data does not fully support the hypothesis, and this is precisely where the real science learning comes from. Teachers use this discrepancy as a golden opportunity to discuss the concept of error in science, the importance of accurate data, and how to revise hypotheses. In the presentation session, each group presents their findings to the class, creating a collaborative learning community and valuing the scientific process.

3.4 Increased Student Learning Activity

Observational data collected over 12 meetings showed a consistent and significant trend of increasing student learning activity. Indicators of activeness measured included: (1) frequency of questioning; (2) active participation in group discussions; (3) initiative to propose ideas or opinions; (4) courage to present results; (5) ability to respond to questions or opinions of friends; and (6) persistence in investigative activities. Each indicator was measured using a 4-point scale (1 = inactive, 4 = very active) and converted to an overall percentage of activeness. Table 2 presents the progression of student activity from the first to the 12th meeting:

Activity Indicators	P-1 (%)	P-4 (%)	P-8 (%)	P-12 (%)	Average (%)
Frequency of inquiring	18.3	38.7	62.5	79.2	49.7
Participation in group discussions	45.8	60.4	72.9	87.5	66.7
Initiative to propose ideas	12.5	29.2	54.2	70.8	41.7
Presentation boldness	20.8	41.7	66.7	83.3	53.1
Respond to a friend's opinion	33.3	50.0	70.8	83.3	59.4
Investigative diligence	62.5	75.0	83.3	91.7	78.1
OVERALL AVERAGE	32.2	49.2	68.4	82.6	58.1

Table 2. Development of Student Learning Activity During the Implementation of Inquiry Learning (P = Meeting)

The data in Table 2 show that the average overall activity increased progressively from 32.2% at the first meeting to 82.6% at the 12th meeting. The most dramatic increase occurred in the question frequency indicator, which jumped from only 18.3% to 79.2%. This indicates a fundamental change in the classroom learning culture, from a silent and passive culture to an active culture of asking questions and discussions. The lowest increase relatively occurred in the initiative indicator of proposing ideas, which only reached 70.8% at the 12th meeting. This is understandable because the ability to propose original ideas takes longer to develop and requires a sense of psychological safety that needs to be built gradually.

These findings are in line with previous studies documenting increased student activity through inquiry learning. Sudarmin and Pujiastuti's (2022) research in elementary schools in Central Java found an average increase in activity of 31.4 percentage points after the implementation of inquiry learning for one semester. Banchi and Bell (2008) identified that a consistent increase in inquiry learning occurs because this method inherently places students as the main agents in the learning process, rather than as passive objects that receive knowledge transfer from teachers. When students feel they have an important role and the results of their investigations are valued, their intrinsic motivation increases naturally, which in turn encourages higher activism.

3.5 Improved Understanding of IPAS Concepts

Students' conceptual understanding was measured using a concept comprehension test instrument developed based on the revised Bloom taxonomy (Anderson & Krathwohl, 2001), covering the cognitive dimension from remembering (C1) to analyzing (C4). The test was administered in three stages: pre-implementation, mid-implementation (after 6 meetings), and post-implementation. The measurement results showed significant improvement as presented in Table 3:

Aspects of Understanding	Pre (%)	Mid (%)	After (%)	Increase (%)
Remembering basic concepts (C1)	72.5	83.3	91.7	+19.2

Understanding concepts (C2)	65.8	75.0	87.5	+21.7
Applying the concept (C3)	54.2	66.7	79.2	+25.0
Analyzing the cause-and-effect relationship (C4)	45.8	58.3	70.8	+25.0
OVERALL AVERAGE	**59.6**	**70.8**	**82.3**	**+22.7**

Table 3. Comparison of Students' Social Science Concept Comprehension Scores (Pre, Intermediate, and Post-Implementation)

The data in Table 3 show a consistent pattern of improvement in all aspects of concept understanding. The highest improvement occurred in the aspects of applying concepts (C3) and analyzing cause-and-effect relationships (C4), both of which increased by 25 percentage points. This is very significant because these high-level thinking skills are the most difficult to develop through conventional learning methods. This achievement proves that inquiry learning is effective not only in improving factual knowledge, but also in developing students' critical and analytical thinking skills.

The most striking improvement in conceptual understanding is seen in the topic of Marine and Coastal Ecosystems. After conducting a hands-on investigation in the coastal ecosystem of Maitara Island, students were able to explain the concepts of food chains, symbiosis, and organism adaptations using concrete examples of species they discovered themselves during observation. This is in stark contrast to before implementation, where students could only mention definitions from textbooks without being able to relate them to real phenomena. These findings confirm Piaget's constructivistic learning theory which states that deep understanding is formed when students construct their own knowledge through active interaction with the environment (Creswell & Poth, 2018).

Interviews with teachers provide valuable additional perspectives on changes in students' understanding of concepts. Teachers state that after the implementation of inquiry learning, the quality of students' questions improves dramatically. Students no longer just ask 'what is a coral reef?' but begin to ask more in-depth questions such as 'why do coral reefs die if ocean water gets too hot?' and 'what does it have to do with climate change?'. This change in the quality of these questions is a strong indicator of the development of deep conceptual understanding, which Minner et al. (2010) call 'scientific sense-making' or the ability to interpret phenomena scientifically.

3.6 Obstacles and Creative Solutions in Implementation

This study identified five main categories of obstacles in the implementation of inquiry learning at SD Negeri 2 Maitara Island, along with creative solutions developed by teachers. First, the limitations of laboratory facilities and teaching aids. The school does not have a science laboratory and only has a set of simple teaching aids that have been partially damaged. Teachers overcome this obstacle by developing a 'natural laboratory' based on the coastal ecosystem of Maitara Island. The beaches, mangrove forests, and shallow waters around the school are used as living laboratories that are much more authentic and rich than conventional laboratories. Natural materials such as sand, corals, seawater, leaves, and mollusk shells become free learning media but full of scientific meaning.

Second, the instability of the internet connection that hinders access to digital learning resources. The solution developed is an 'offline learning bank' system, where teachers download learning videos, popular scientific articles, and high-quality scientific images when a connection is available, then store them on the school's external hard disk for offline use whenever needed. In addition, teachers developed a mini local atlas containing photographs and scientific descriptions of species found in the Maitara Island ecosystem that were printed and bound into a classroom reference book.

Third, students' initial resistance to new methods. Students who are used to passive learning experience culture shock when they are suddenly asked to actively ask questions, discuss, and conduct independent investigations. Some students even show anxiety when asked to present results in front of the class. Teachers overcome this barrier by gradually building a nurturing classroom culture. In the first three meetings, teachers always appreciate each student's questions and opinions, never correct in an offensive way, and create a class norm that 'no questions are stupid'.

Fourth, the teacher's limited ability to facilitate inquiry learning. Even though teachers have participated in the training, early implementation shows that teachers still tend to give students too many direct answers instead of guiding them to find answers on their own. Through weekly joint reflection between teachers and researchers, teachers gradually develop more effective Socratic questioning skills. By mid-implementation, teachers are able to use the right guiding questions without providing immediate answers.

Fifth, the limitation of learning time. Inquiry learning inherently requires more time than the lecture method, while the IPAS time allocation is only 4 hours of lessons per week. The solution developed is cross-session integration, where the investigative process that is not completed in one meeting is continued as an observation task at home or in the community. Students are asked to observe certain phenomena in their home environment and report them at the next meeting. This approach not only overcomes time constraints but also expands the learning context of students from school to community.

The barriers found in this study expand and enrich the findings of Windschitl (2003) who identified similar barriers in the context of urban schools in the United States. The context of Indonesia's remote islands adds a unique dimension in the form of geographical and infrastructure barriers that require a higher level of creativity and adaptation. Nevertheless, the creative solutions successfully developed by teachers in this study show that inquiry learning is not just a method for well-equipped schools, but a flexible and adaptive method that can be implemented effectively in any condition with adequate teacher commitment and creativity.

3.7 Teacher and Student Perceptions of the Implementation of Inquiry Learning

The interview data revealed a very positive perception from teachers and students of the implementation of inquiry learning. The teacher stated that the implementation of inquiry learning fundamentally changed his perspective on the role of teachers in learning. The teacher felt that his role shifted from 'knowledge presenter' to 'facilitator of discovery', and this change felt more satisfying professionally because he could witness firsthand the thinking process and the development of students' understanding. The teacher also admitted that using the natural environment of Maitara Island as a learning resource opened up a new perspective on how rich the pedagogical potential that has not been optimized so far.

From the perspective of the students, the analysis of the interview transcripts showed three dominant themes in their positive perceptions. The first theme was enjoyment and engagement: almost all students stated that they enjoyed IPAS learning more after the implementation of inquiry learning, especially field observation activities on the beach. The second theme was relevance: students felt that the material learned was more relevant to their daily lives as island children. The third theme was self-efficacy: students reported increased confidence in asking questions, discussing, and expressing opinions. These findings are consistent with research by Barron and Darling-Hammond (2008) which found that inquiry-based learning increases students' intrinsic motivation and positive self-perception of their abilities.

4. CONCLUSION

Based on the results of the research and discussion that has been presented comprehensively, several main conclusions can be drawn. First, the implementation of the inquiry learning method in science learning at SD Negeri 2 Maitara Island, Tidore Islands, Tidore Islands City takes place in a structured and systematic manner through five stages: orientation based on local natural phenomena, problem formulation with teacher scaffolding, hypothesis formulation, data collection through field investigation, and conclusion drawing through class discussions. The uniqueness of this implementation lies in the use of the coastal ecosystem and natural resources of Maitara Island as an authentic contextual learning resource, replacing dependence on conventional laboratory facilities.

Second, the implementation of inquiry learning was proven to be effective in progressively increasing student learning activity, from an average of 32.2% at the first meeting to 82.6% at the 12th meeting. The most significant improvement occurred in the indicators of frequency of questioning and perseverance in investigative activities. Students' conceptual understanding also improved substantially, with the average overall score rising from 59.6% (pre-implementation) to 82.3% (post-implementation), with the largest improvement in the aspect of ability to apply concepts and analyze cause-and-effect relationships.

Third, the implementation of inquiry learning in remote archipelago environments faces five main categories of obstacles: limited facilities, internet instability, resistance of student learning culture, limited teacher competence, and time constraints. However, this study proves that these obstacles can be overcome through the creativity and adaptation of teachers who use local natural resources as an alternative to modern facilities. These findings have important implications that inquiry learning is an adaptive method and can be implemented effectively even in the most limited conditions.

Based on these findings, this study recommends: (1) The Tidore Islands City Education Office and North Maluku Province need to design a contextual and sustainable inquiry learning training program for teachers in island schools, with an emphasis on the use of local natural potential as a learning resource; (2) the government needs to prioritize the improvement of information and communication technology infrastructure in island schools as a basic prerequisite for the optimal implementation of the Independent Curriculum; (3) further research needs to be carried out with mixed methods or quantitative experimental design to measure the impact of inquiry learning on the learning outcomes of IPAS in a more standardized manner in the Indonesian archipelago; (4) the development of IPAS learning modules based on archipelago local wisdom that integrates inquiry learning methods needs to be a priority agenda for the development of local curriculum (local content) in the archipelagic regions.

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