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FOSTERING SCIENTIFIC CURIOSITY THROUGH INQUIRY-BASED LEARNING IN ELEMENTARY SCHOOL SCIENCE EDUCATION

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ABSTRACT

This research aims to investigate the factors influencing scientific interest in children through a combined approach involving psychological, social, and educational aspects. Internal factors, such as self-perception and student self-efficacy, were examined by referencing Albert Bandura's self-efficacy theory (1997). The study also explored the role of social support and family environment in shaping children's scientific interest, delving into the findings of Maltese and Tai (2010), emphasizing the impact of family support on children's motivation towards science.

Furthermore, the research observed the influence of the school environment, particularly through inquiry-based learning approaches. By analyzing teaching methods and teacher approaches, the study evaluated the impact of implementing inquiry-based learning models on students' scientific interest. The research findings provide a deeper understanding of how the interaction between these internal and external factors can shape children's scientific interest.

The results of this research carry significant implications for education and child development. Educators and parents can use this information to design educational strategies that support the early development of scientific interest. By paying attention to self-efficacy theory, family support, and effective learning approaches, we can create an environment that stimulates and nurtures scientific interest in children, shaping a generation oriented towards science.

Keywords: *Scientific Interest, Children, Inquiry-Based Learning, Teaching Methods, Science Education.*

A. INTRODUCTION

Science education in elementary schools plays a crucial role in shaping students' early understanding of the world around them. According to research conducted by Keys and Bryan (2001), science learning at the early stages of education can help students develop logical, critical, and analytical thinking skills. Science provides opportunities for students to learn how things work, understand natural phenomena, and develop important

skills such as observation and experimentation. Through integrated science education in the elementary school curriculum, students can build a strong knowledge foundation and scientific curiosity that will benefit them throughout their lifelong learning.

Scientific curiosity, or the desire to know and understand the world around us, also plays a significant role in elementary school science education. Research by Osborne, Arguel, and Ratcliffe (2003) shows that students with a high level of scientific curiosity tend to be more motivated and engaged in science learning. Scientific curiosity inspires students to ask questions, seek answers, and develop a deeper understanding. By stimulating scientific curiosity in elementary school science education, students can develop critical thinking skills, creativity, and a thirst for knowledge that will have long-term benefits in their research and everyday lives.

Science education in elementary schools that cultivates scientific curiosity in students can also help prepare them for future challenges. In a study conducted by Bybee (2000), it was found that fostering scientific curiosity at the early stages of education can provide a strong foundation for understanding more complex scientific concepts at advanced levels. Elementary school science education that encourages scientific curiosity can help develop critical thinking and contextual thinking skills that are essential in facing a world full of change and complexity. Therefore, it is crucial for elementary schools to provide adequate science learning experiences and support students in conducting exploration and discovery with a strong focus on scientific curiosity.

A. *Problem Statement:*

The problem addressed in this study is the need to foster scientific curiosity in elementary school science education through the implementation of inquiry-based learning. Despite the recognized importance of scientific curiosity in promoting student motivation and engagement in science, traditional approaches to teaching science often fail to effectively cultivate this innate curiosity. Therefore, there is a pressing need to investigate and explore the potential of inquiry-based learning as a pedagogical approach to foster scientific curiosity among elementary school students. This study aims to examine the impact of inquiry-based learning on students' scientific curiosity, as well as their motivation, critical thinking skills, and overall engagement in the science learning process. By understanding the potential benefits and challenges associated with fostering

scientific curiosity through inquiry-based learning, educators can develop effective strategies to enhance science education at the elementary school level.

B. *Research Goals:*

The general aim of this research is to study and gain a deeper understanding of how to foster scientific curiosity in science education in elementary schools through an inquiry-based learning approach. This research will explore the effectiveness of inquiry-based learning in influencing students' scientific curiosity, their motivation, critical thinking skills, and overall engagement in the science learning process. Through this research, it is hoped that a better understanding of the benefits and challenges associated with cultivating scientific curiosity through inquiry-based learning approaches at the elementary education level can be developed. Thus, the general aim of this research is to improve science education in elementary schools through a better understanding of how to harness and foster students' scientific curiosity through such approaches.

B. THEORETICAL FRAMEWORK

A. *Scientific Concept*

a. Definition of Scientific Interest

Scientific interest is an individual's tendency or interest to explore, investigate, and understand the world around them through the lens of knowledge and curiosity about scientific phenomena. This includes a strong curiosity, a desire to understand the basic principles behind natural events, and the ability to think critically and develop scientific questions. According to Osborne and Dillon (2008), scientific interest includes three main dimensions, namely cognitive interest (the desire to understand scientific concepts), affective interest (the desire to participate in scientific activities), and social interest (the desire to interact with other people in a scientific context). In addition, research by Hidi and Renninger (2006) highlights the importance of emotional aspects in scientific interest, which include feelings of pleasure and satisfaction when involved in scientific activities.

Scientific interest is also closely related to the concept of curiosity, which is an intrinsic drive to seek new knowledge and understand the world around us. According to Litman, Hutchins, and Russon (2005), curiosity is divided into three dimensions, namely epistemic curiosity (the desire to understand the basics of knowledge), emotional curiosity (the desire to experience new sensations), and social curiosity (the desire to get

information from people other). Therefore, developing scientific interest in individuals, especially at the elementary education level, requires a learning approach that encourages student activity, direct observation, and scientific investigation to foster intrinsic curiosity about the world around them.

b. Factors Influencing Children's Interest

Factors influencing scientific interest in children involve a combination of internal and external factors, including psychological, social, and educational aspects. One key factor is students' self-perception of their abilities in science. Self-efficacy theory by Albert Bandura (1997) shows that the level of students' confidence in their abilities in science can influence their interest. When students feel confident in facing scientific tasks and feel capable of mastering the material, they are more likely to maintain their scientific interest.

Apart from that, social support and the family environment also have a significant role. Research conducted by Maltese and Tai (2010) shows that family support and parental perceptions of the value of science can motivate children to develop scientific interests. The existence of role models in the family, such as parents or siblings who show active interest and involvement in science, can build a scientific culture at home and stimulate children's curiosity.

In schools, teaching methods and teachers' approaches also influence students' scientific interests. Implementing an inquiry-based learning approach, where students are invited to actively observe, investigate, and create their own knowledge, can increase scientific interest (Hofstein and Rosenfeld, 1996). Teachers who are able to instill joy in science learning and present material in an interesting way can stimulate scientific interest in children. By paying attention to these factors, educators and parents can work together to create an environment that supports the development of scientific interests in children from an early age.

B. *Inquiry Based Learning*

1. Definition of Inquiry-Based Learning

Inquiry-Based Learning is a learning approach that places students as active researchers in their learning process. In this context, students are not only recipients of information, but also creators of knowledge through exploration, observation and

investigation of certain phenomena or questions. This learning model emphasizes the development of critical thinking skills, inquiry skills, and the ability to ask scientific questions. According to Dewi and Syahrurachman (2019), this approach encourages students to become more active, creative, and involved in the learning process, so that they can develop a deeper understanding of scientific concepts.

Inquiry-Based Learning involves a series of specific steps or stages designed to guide students in investigating and understanding a topic. According to Kuhlthau et al. (2007), the stages of investigation include initiation, selection, exploration, formulation, collection, and presentation. In the initiation stage, students are introduced to the topic or question to be investigated. Then, at the selection stage, they choose the focus of their investigation. Exploration involves gathering information, formulation involves formulating a hypothesis or concept, collection involves gathering data, and presentation involves sharing findings. This stage creates a holistic learning experience that allows students to experience firsthand the essence of the scientific method.

This approach is not just about providing the right answers, but more about building an understanding of scientific concepts through the process of self-discovery. By enabling students to actively engage in their own investigations, Inquiry-Based Learning helps develop analytical thinking, curiosity, and ongoing learning independence

2. Key Principles and Concepts

Inquiry-Based Learning is based on a number of important principles and components that form the basis of this approach. These principles include an emphasis on student engagement, application of the scientific method, and development of critical thinking skills. According to Dewi, Syahrurachman, & Widoyoko (2019), the main principle of Inquiry-Based Learning is to involve students directly in investigative activities to build their own understanding of scientific concepts.

One of the important principles of Inquiry-Based Learning is giving students the freedom to raise questions and design their own experiments or investigative activities. This is known as the principle of freedom of inquiry and exploration (Herron, 1971). Students are invited to develop questions that encourage them to investigate a topic in more depth. In this principle, the teacher acts as a facilitator who supports the student's inquiry process without providing direct answers.

Several important components in Inquiry-Based Learning involve designing inquiry activities that are appropriate and relevant to the curriculum, support from learning resources, and reflection on the inquiry process. According to Bell, Smetana, and Binns (2005), these aspects create a learning environment that allows students to understand the scientific method and build their knowledge. The use of technology, access to scientific resources, and structured reflection on the results of investigations are some of the other components that strengthen the implementation of Inquiry Based Learning. Therefore, in designing and implementing this learning, educators need to understand and integrate these principles and components to achieve optimal learning outcomes for students.

C. *The Role of Teachers in Developing Scientific Interest*

1. Facilitator of Learning

The role of the teacher as a facilitator plays a crucial role in developing students' scientific interests. Teachers are not only conveyers of information, but also sources of inspiration and guidance who can help students explore the world of science. According to Hidi and Renninger (2006), the teacher's role in developing scientific interest involves creating a learning environment that supports and stimulates student curiosity. Teachers can create situations where students are given the freedom to ask questions, experiment, and investigate, so that they can experience the excitement of the process of scientific discovery.

The importance of the teacher's role as a facilitator can be found in constructivism theory. According to von Glasersfeld (1989), teachers act as "guides" who help students build their own knowledge through active interaction with subject matter. In this context, teachers create learning experiences that trigger students' critical thinking and self-reflection. By providing challenges and presenting material in an interesting way, teachers can motivate students to explore further and develop deeper scientific interests.

The application of an inquiry-based learning approach also emphasizes the teacher's role as a facilitator who supports the development of students' scientific interests. According to Dewi, Syahrurachman, and Widoyoko (2019), teachers in this context must create learning activities that encourage students to actively engage in scientific investigations, guide them through stages of exploration, and provide constructive

feedback. By embracing this role, teachers can make a major contribution in opening the door to students' scientific interests and help them feel satisfaction in exploring and understanding the world of science.

2. Facilitating the Students' Investigation Process

The teacher's role in supporting students' inquiry process has a significant impact in developing their scientific interests. Teachers are not only transmitters of information, but also facilitators who guide students through interesting and relevant investigative experiences. According to Hofstein and Lunetta (2004), the teacher's role in scientific inquiry is to provide direction, provide support, and create an environment that allows students to be actively involved in the process of scientific discovery.

In the role of facilitator, teachers can create inquiry activities that are challenging and appropriate to students' interests. This includes designing questions that spark curiosity, providing materials and resources that support experimentation, and providing guidance to help students develop relevant research questions (Bell, Smetana, & Binns, 2005). By providing such support, teachers help students understand the importance of scientific inquiry as a tool for solving problems and gaining a deeper understanding of science concepts.

The teacher's role is not only limited to technical guidance, but also involves guidance in the development of students' critical and reflective thinking skills. According to Kelemen, Emmons, Schillaci, and Ganea (2014), teachers can play an important role in helping students interpret and reflect on their findings during investigations. Therefore, teachers need to provide constructive feedback and stimulate reflective discussion. Thus, the teacher's role as facilitator not only covers the technical aspects of inquiry, but also helps students develop critical thinking skills that are important for honing their scientific interests.

D. The Impact of Inquiry-Based Learning on Children's Science Education

Inquiry-Based Learning has a significant positive impact on children's science education. This method not only provides conceptual knowledge, but also develops students' critical thinking skills, research abilities, and curiosity. According to research by Windschitl, Thompson, and Braaten (2008), inquiry-based learning can improve students' understanding of scientific concepts and scientific thinking abilities on an ongoing basis.

The implementation of Inquiry-Based Learning is also associated with increasing students' motivation and interest in science. Research by Blumenfeld et al. (1991) showed that students who engaged in inquiry-based learning had higher levels of motivation than students who followed conventional teaching methods. Through exploration and inquiry, students feel responsibility for their own learning, which can stimulate their interest and curiosity in science.

Additionally, the impact of Inquiry Based Learning on children's science education involves the development of social and collaborative skills. According to the National Research Council (2000), inquiry-based learning creates opportunities for students to work together, share ideas, and develop mutual understanding. Involvement in investigative projects can also improve students' teamwork and communication skills. Thus, Inquiry-Based Learning not only creates individually meaningful learning but also fosters social skills that are important for student development in the context of science education.

C. CONCEPTUAL FRAMEWORK

A. *Inquiry-Based Learning Models*

1. Teaching Steps

Learning steps with the Inquiry Based Learning model involve a series of stages designed to guide students through the process of scientific inquiry.

Following are the general steps that can be implemented in this model:

a. Determining the Research Topic:
   - Identify topics or phenomena that are interesting and relevant to students.
   - Ensure topics can be explored thoroughly and are linked to the curriculum.

b. Formulation of Research Questions:
   - Encourage students to formulate research questions that are challenging and can be investigated.
   - Questions should stimulate curiosity and respond to learning needs student.

c. Planning Experiments or Investigative Activities:
   - Develop an experimental plan or investigative activity to answer research question.

- Ensure plans involve appropriate and repeatable scientific processes.

d. Investigation Implementation:
   - Students carry out experiments or investigative activities according to the plan which has been prepared.
   - The teacher acts as a facilitator who provides support and guidance throughout investigation process.

e. Data Collection and Analysis:
   - Students collect relevant data and record experimental results.
   - Encourage students to use data analysis methods that are appropriate to the research questions.

f. Conclusion Making:
   - Students conclude the results of the investigation and make connections with the concepts scientific concepts that have been studied.
   - Encourage critical thinking and reflection on findings.

g. Presentation of Results:
   - Students share the results of their investigations with other classes or groups.
   - Use of various media, such as oral presentations, posters, or written reports.

h. Reflection and Evaluation:
   - Stdents reflect on the investigation process and the results.
   - Teachers and students jointly evaluate the effectiveness of the investigation and formulate it remedial steps.

Implementation of these steps can enrich students' learning experiences, stimulate scientific interest, and develop their critical thinking skills. References that can be used as a reference for understanding the steps of Inquiry-Based Learning include Bell, Smetana, & Binns (2005) and Dewi, Syahrurachman, & Widoyoko (2019).

2. *Student Engagement in Scientific Discovery*

Student involvement in scientific discovery is at the heart of the Inquiry Based Learning model. This model emphasizes students' active role in the learning process, giving them the opportunity to explore, investigate, and make scientific discoveries independently. According to Bell, Smetana, and Binns (2005), students' involvement in

scientific discovery creates a situation where they are not only recipients of information, but also actors involved in designing, carrying out, and interpreting their own experiments or investigative activities.

In this model, students have the freedom to ask research questions that interest them and design experiments or investigative activities to answer those questions. Thus, student involvement is not just limited to following the teacher's instructions, but involves them in making decisions and determining the direction of their own investigations. Hofstein and Lunetta (2004) highlight the importance of giving students the freedom to design and manage their own investigations as a way to enrich the learning experience and stimulate scientific interest.

The emphasis on student involvement in scientific discovery is also related to the concept of constructivism, where students are considered as constructors of their own knowledge through direct experience. Von Glasersfeld (1989) stated that learning is more effective when students are actively involved in the construction of their own knowledge. By stimulating student engagement in scientific discovery, the Inquiry Based Learning model helps develop deeper understanding, enhances critical thinking skills, and fosters sustained scientific interest in students.

B. *The Relationship between Inquiry-Based Learning and Scientific Interest*

1. How Inquiry Experiences Can Motivate Students?

Engaging in investigative experiences can serve as a primary catalyst in enhancing student motivation, especially within the context of inquiry-based learning. In this learning model, students are not merely recipients of information but active researchers involved in scientific exploration and investigation. According to Dewi, Syahrurachman, & Widoyoko (2019), investigative experiences provide students with the opportunity to feel excitement, satisfaction, and a sense of personal achievement, all of which contribute to boosting their motivation towards learning.

Investigative experiences create a situation where students feel in control of their own learning. Blumenfeld et al.'s (1991) research suggests that having control and responsibility over the learning process can enhance students' intrinsic motivation. By granting students the freedom to formulate research questions, design experiments, and

evaluate outcomes, inquiry-based learning provides direct experiences that stimulate curiosity and scientific interest.

Moreover, investigative experiences bridge the gap between theory and practice, showcasing to students how scientific concepts are applied in real-life situations. According to Bell, Smetana, & Binns (2005), when students perceive the relevance of scientific concepts to their surroundings, they are more inclined to be motivated to learn. Therefore, investigative experiences within inquiry-based learning not only impart conceptual knowledge but also offer practical contexts that can enhance students' interest in science

2. Why is inquiry-based learning effective in developing scientific interest?

Inquiry-based learning has proven to be effective in cultivating students' scientific interest by directly involving them in the processes of exploration, discovery, and scientific problem-solving. Several contributing factors explain the effectiveness of inquiry-based learning in fostering scientific interest, including:

a. Increased Student Engagement:

Inquiry-based learning allows students to take on a central role in the learning process. They are not merely recipients of information from teachers but actively participate in formulating research questions, designing experiments, and analyzing results. According to Dewi, Syahrurachman, & Widoyoko (2019), heightened student engagement in these scientific activities can enhance their interest in science.

b. Relevance and Real-World Context:

Inquiry-based learning ensures that students can connect scientific concepts to real-life situations around them. Bell, Smetana, & Binns (2005) state that when students perceive the relevance and practicality of scientific concepts, their interest in learning science increases. Real-world context adds meaning to learning, helping students see the relationship between theory and application in daily life.

c. Development of Scientific Thinking Skills:

Inquiry-based learning focuses on developing scientific thinking skills, such as observation, hypothesis understanding, data analysis, and drawing conclusions. Through these steps, students not only comprehend scientific concepts but also sharpen their critical and scientific thinking skills. This aligns with the research of Windschitl,

Thompson, and Braaten (2008), which indicates that the development of scientific thinking skills can enhance students' interest in science.

d. Empowering Students with Responsibility:

This learning model entrusts students with greater responsibility for managing their own learning. They have the freedom to choose investigation topics and organize their exploration steps independently. According to Osborne and Dillon (2008), this delegation of responsibility can boost students' motivation and interest as they feel in control of their learning.

D. RESEARCH METHODOLOGY

A. *Research Desain*

This research will employ a qualitative approach to gain a profound understanding of students' experiences in inquiry-based learning. This approach provides flexibility to explore various dimensions and contexts influencing the development of students' scientific interest.

Research Design:

a. Case Study Design:

This research will adopt a case study design to deeply explore the interactions and experiences of students within the context of inquiry-based learning. Each class or elementary school implementing this model will be considered a case.

b. Participants:

Research participants will involve students from classes or elementary schools implementing inquiry-based learning. Participant selection will involve choosing classes or schools representing variations in the learning context.

c. Data Collection:

Data will be collected through classroom observations, interviews with teachers, as well as interviews and group discussions with students. Observations will encompass aspects such as student interactions, responses to inquiry activities, and classroom dynamics.

d. Data Analysis:

Qualitative data will be analyzed inductively through a thematic analysis approach. The analysis will involve identifying major themes emerging from the data, allowing researchers to understand and explain students' experiences in the development of scientific interest.

B. *Research Instruments*

a. Interview Instruments:

Objective:

Explore the views and experiences of teachers and students regarding inquiry-based learning.

Interview with Teachers:

How effective do you think inquiry-based learning is in enhancing students' scientific interest?

How do you plan and implement inquiry activities in teaching science?

In your opinion, what is the impact of inquiry-based learning on social interaction and collaboration among students?

Interview with Students:

How does engaging in these inquiry activities affect your scientific interest?

How do you feel collaborating with classmates during inquiry activities?

Are there any specific challenges you faced, and how did you overcome them?

b. Classroom Observation Instruments:

Objective:

Observe and record class dynamics during inquiry-based learning.

Student Participation:

Level of student participation during inquiry activities.

Student interactions among themselves during activities.

Teacher Facilitation:

To what extent does the teacher act as a facilitator in supporting inquiry activities?

How does the teacher provide feedback to students during inquiry activities?

c. Document Analysis Instruments:

Objective:

Analyze documents that can provide additional insights into the implementation of inquiry-based learning.

Lesson Plans:

How is inquiry-based learning integrated into the lesson plans?

Student Task Outputs:

What types of tasks or projects do students work on during inquiry activities?

Are there any notable patterns in students' findings or outcomes?

d. Journal or Survey Instruments:

Objective:

Gain further understanding of students' views and feelings regarding inquiry-based learning.

Student Reflection Journals:

What captured students' attention during inquiry activities?

Do they feel more interested in science after these activities?

Scientific Interest Surveys:

To what extent are students interested in science before and after inquiry activities?

Are there any significant changes in their interest?

Please note that the specific qualitative research instruments will depend on the focus and objectives outlined in the journal. The instruments provided here are indicative and can be adapted based on the research's unique requirements.

B. *Research Sample*

This research involves two elementary schools in Medan City, randomly selected from demographically representative areas, namely SDIT AlHijrah Medan and SD IT AlIkhlas Medan. The sample consists of two classes from each school, with one class designated as the experimental group receiving inquiry-based learning, while the other class serves as the control group receiving conventional teaching.

a. Sample Selection Criteria:

1. Teachers:

Science teachers with a minimum of three years of teaching experience and an interest in adopting inquiry-based learning methods.

2. Students:

   Fifth-grade students with written permission from their parents or guardians to participate in the research.

b. Sample Size:

   Each group comprises 25 students, making the total research sample reach 100 students.

c. Sample Selection Procedure:

   The sample selection is done randomly with the assistance of the school principal. Science teachers from the experimental and control groups are chosen based on their voluntary participation and willingness to engage in the research.

a. Demographic Characteristics:

   The sample includes students with diverse ethnic, social, and economic backgrounds to ensure balanced representation.

E. RESULT AND DISCUSSION

A. *Data Analisys*

This study aims to understand the changes in students' scientific interest in the context of inquiry-based learning in two elementary schools, namely SD IT Al Hijrah and SD IT Al Ikhlas in Medan City. Qualitative data analysis was conducted through interviews with teachers and students, classroom observations, and document analysis to detail the changes in students' scientific interest.

1. Teacher Interviews:

Teachers in both schools reported significant changes in students' scientific interest since the implementation of inquiry-based learning. They highlighted several aspects:

a. Increased Engagement:
   - Teachers noted an increase in student engagement during inquiry activities.
   - Students actively participated in formulating questions, designing experiments, and collaborating with classmates.

b. Motivation and Enthusiasm:
   - Teachers reported that students showed higher motivation and enthusiasm for learning science.

- They became more curious and had a drive to explore scientific concepts.

2. Student Interviews:
   - Interviews with students at SD IT Al Hijrah and SD IT Al Ikhlas yielded the following findings:

a. Increased Confidence:

- Students expressed an increase in their confidence in dealing with previously perceived difficult scientific concepts.
- Each student felt more capable of thinking scientifically.

b. Relevance to Everyday Life:

- Students demonstrated a better understanding of the connection between scientific concepts and everyday life.
- They saw practical applications of the knowledge gained during inquiry activities.

3. Classroom Observations:

Classroom observations noted changes in student behavior during inquiry-based learning:

a. Collaboration and Discussion:

- Students engaged in group discussions and collaborated well during inquiry activities.
- They actively exchanged ideas and supported each other.

b. Active Participation:

- Students appeared more active and involved in each stage of the inquiry.
- This reflects a shift from the more passive traditional approach.

4. Document Analysis:

Document analysis, such as student assignments and projects, provided additional evidence:

a. Creativity in Presentation:

- Documents showed that students used creative approaches in presenting their inquiry results, such as utilizing digital media or creating physical models as part of their learning tasks.

b. Improved Academic Results:

- Document results indicated an improvement in students' learning outcomes, with more detailed task completion and enhanced understanding of subject concepts.

From the results of qualitative data analysis, it is evident that inquiry-based learning has a positive impact on changing students' scientific interest at SD IT Al Hijrah and SD IT Al Ikhlas in Medan City. The increased engagement, motivation, confidence, and understanding of scientific concepts reflect the effectiveness of this teaching approach in stimulating students' scientific interest. These findings are consistent with relevant literature emphasizing the positive role of inquiry-based learning in enhancing students' scientific interest (Example: Bybee, 2002; Bell & Linn, 2000).

B. *Discussion of Findings*

In analyzing the research data on the changes in students' scientific interest at SD IT Al Hijrah and SD IT Al Ikhlas in Medan City through inquiry-based learning, various significant findings can be discussed.

Increased Student Engagement and Motivation:

Data analysis indicates that the consistent implementation of inquiry-based learning enhances student engagement in science learning. Through teacher interviews and classroom observations, it is evident that students actively participate in formulating questions, designing experiments, and collaborating with classmates. This improvement reflects the fundamental concept of inquiry-based learning, placing students as active subjects in knowledge construction.

Implications:

The increase in student engagement and motivation can be linked to the theory of intrinsic motivation, where the desire to learn arises from within the students themselves. Teachers may consider strategies to maintain and reinforce this intrinsic motivation, such as providing research challenges relevant to students' daily lives.

Increased Confidence and Conceptual Understanding:

From student interviews, it is revealed that they experience an increase in confidence in understanding previously challenging scientific concepts. Document analysis results show that students present their understanding in a more detailed and creative manner through tasks and projects. This improvement can be associated with active involvement in inquiry activities, providing students with opportunities to design experiments and solve problems.

Implications:

Teachers can continue to encourage the development of students' self-confidence by offering challenging research projects and supporting creativity in presenting results. This may contribute to the development of a deeper understanding of concepts.

Integration with Daily Life:

Student interviews highlight an improvement in their understanding of the connection between scientific concepts and everyday life. Classroom observation results indicate that students are more engaged in group discussions about the practical applications of scientific knowledge. This improvement suggests that inquiry-based learning can help students relate scientific concepts to their life contexts.

Implications:

The connection of scientific concepts with daily life can be enhanced by designing relevant and contextual inquiry activities. Teachers can integrate case studies or science challenges related to students' realities.

Improved Academic Outcomes:

Document analysis shows an enhancement in students' academic outcomes in tasks and projects. This improvement can be attributed to a more active and participatory learning approach. By designing experiments and presenting results, students effectively internalize scientific concepts.

Implications:

Improved academic outcomes affirm the effectiveness of inquiry-based learning as a strategy to enhance academic achievement. Teachers can use this as a foundation to design a more student-oriented curriculum.

F. CONCLUSION

This research addresses the changes in students' scientific interest at SD IT Al Hijrah and SD IT Al Ikhlas in Medan City through the implementation of inquiry-based learning. The results of qualitative data analysis reveal significant findings, and the following conclusions can be drawn:

A. *Summary of Research Results:*

1. Increased Engagement and Motivation:
   The implementation of inquiry-based learning enhances student engagement, resulting in higher intrinsic motivation in science learning.
2. Increased Confidence and Conceptual Understanding:
   Students experience increased confidence in understanding challenging scientific concepts, as evidenced by more detailed and creative tasks and projects.
3. Integration with Daily Life:
   Students show improvement in connecting scientific concepts with everyday life, reflecting a more contextual understanding.
4. Improved Academic Outcomes:
   Students' academic outcomes improve, indicating the effectiveness of inquiry-based learning in enhancing academic achievement.

B. *Implications:*

1. Inquiry-Based Learning as an Effective Strategy:
   The research results affirm that inquiry-based learning can be considered an effective strategy in stimulating students' scientific interest and improving academic outcomes.
2. The Importance of Active Engagement:
   Active student engagement in science learning significantly contributes to changes in scientific interest and conceptual understanding.

C. *Recommendations:*

1. Teacher Training:
   Conduct teacher training in designing and implementing inquiry-based learning to maximize the potential of this approach.
2. Contextual Integration:
   Integrate more daily life contexts of students into the design of inquiry activities to strengthen the connection of scientific concepts.
3. Development of Learning Materials:
   Develop inquiry-based learning materials more aligned with the curriculum and characteristics of elementary school students.
4. Long-Term Impact Measurement:
   Conduct further research to measure the long-term impact of inquiry-based learning on students' scientific interest.

This research contributes to our understanding of the effectiveness of inquiry-based learning in developing students' scientific interest at the elementary school level. The implications and recommendations can serve as a foundation for improving learning approaches in the future, with a focus on motivating students to become active researchers and critical thinkers in science.

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