IPA Learning Strategies to Develop Elementary School Student Character

Ngurah Mahendra Dinatha[1], Dimas Qondias[2]*, Dek Ngurah Laba Laksana[3], Gervarsia Virjinlia Anita Dhena[4], Yosefina Owa Meme[5]

[1] Department of Natural Science Education, STKIP Citra Bakti, Indonesia, ngurahm87@gmail.com ,
[2]Elementary school teacher education, STKIP Citra Bakti, Indonesia, dimdimqondias@gmail.com, [3]Elementary school teacher education, STKIP Citra Bakti, Indonesia, laba.laksana@citrabakti.ac.id , [4]Department of Natural Science Education, STKIP Citra Bakti, Indonesia, virjinliaa4@gmail.com, [5]Department of Natural Science Education, STKIP Citra Bakti, Indonesia, yosefinaowa@gmail.com.

Science learning is a process that allows students to gain direct experiences, enabling them to enhance their abilities to comprehend, retain, and apply the concepts they have learned. This research method involves a literature review aimed at discussing science teaching strategies for elementary school students in character development. The criteria for scientific articles used as data consist of scholarly articles sourced from national journals published within the past 5 years, from 2018 to 2023. The study reveals various science teaching strategies that can be adapted by elementary school teachers to match the students' characteristics and learning styles, including: 1) Guided Inquiry, 2) Contextual Teaching and Learning (CTL), 3) Project-Based Learning (PjBL), and Outdoor Learning. Factors influencing students' learning outcomes consist of internal and external factors. Students' learning styles constitute an internal factor, encompassing visual, auditory, kinesthetic, and visual-auditory learning styles. External factors include the students' learning environment. Character values that can be enhanced through an appropriate IPA learning strategy are values of honesty, openness and great curiosity.

Keywords: Science Teaching Strategies, Elementary School Students' Character

INTRODUCTION

Learning is essentially an effort to guide students in the learning process so that they can achieve learning goals as expected. Learning should take into account the individual conditions of students because they are the ones who intend to learn. Success in school learning is not only determined by the teacher's accuracy in transferring knowledge but also by the active participation of students in the learning process. Teaching science as a process demands a change in teaching methods from the teaching of science as a product. Learning and teaching, according to the behaviorist paradigm, involve permanent changes in behavior. In science education, the goal is not only to impart knowledge, facts, concepts, and principles about nature but also to teach problem-solving methods, train critical thinking skills, instill objectivity, cooperation, and respect for others' opinions (Wedyawati & Lisa, 2019). Science learning in elementary schools should focus on students' thinking abilities and their active involvement in the learning process. The actual form of the success of an IPA learning process can be seen from the learning results obtained by students, both from the acquisition of knowledge and student activity at the time of the learning process (Nurhayati & Qondias, 2023)

Competence in science learning in elementary school seeks to enable

students to acquire knowledge about nature that will be used for the development of existing science and can be used in the environment for survival. (Permendiknas, 2006). The subject of science in school provides knowledge about the sciences of nature and also offers a good learning experience for students. Additionally, science also imparts character development experiences that will influence students' success in their interactions with others and their environment. Success in learning science is closely linked to students' motivation to learn, which can come from external or internal sources (Pratama et al., 2019).

When creating science teaching strategies, it is essential to consider the teaching styles used by teachers. Learning styles also influence the improvement of students' learning outcomes, supported by previous research, indicating that learning styles and learning media can influence the enhancement of science learning outcomes. This research has several implications, including helping students better understand their learning styles and thus building their enthusiasm for the learning process to achieve optimal learning outcomes. Another finding is that effective teaching strategies used by teachers also influence students' classroom learning outcomes, supported by previous research (Yuwanita et al., 2020), indicating that students with a high visual learning style who are taught using the Expository Learning method achieve higher learning outcomes than students taught using the Conventional Learning method. Expository Learning emphasizes the direct delivery of learning materials from a teacher to students to help them master the learning materials optimally. Conventional Learning is the traditional teaching method, also known as lecture-based learning.

In the era of the Merdeka Curriculum, it emphasizes differentiated learning for students. Differentiated learning accommodates the individual learning needs of students. The teacher facilitates students according to their needs because each student has different characteristics, so they cannot be treated the same way. This strategy is supported by previous research findings, such as Naibaho (2023), who states that differentiated learning meets, serves, and recognizes the diversity of learners in their learning according to the readiness, interests, and learning preferences of the learners.

According to Law No. 20 of 2003, education is a conscious and planned effort to create a learning environment and learning processes so that students actively develop their potential for spiritual strength, self-control, personality, intelligence, noble character, and the skills needed for themselves, society, the nation, and the state. When it comes to character, there is a need for character education in the current era, especially in science education. Common issues in education include students' lack of politeness towards teachers and the use of inappropriate language in education. This aligns with the opinion of Budiarto (2020) that in today's society, especially among young generations, many seem to have disregarded moral values.

According to Mustika and Dafit (2019), character education has a higher meaning than moral education; character education is not only about right and wrong but refers to efforts to instill good habits that lead to high awareness and understanding. Character education needs to be integrated into the learning process. This is supported by Ansori (2020), who suggests that integrated character education in learning is achieved through the introduction of values, facilitating awareness of the importance of values, and internalizing values into the daily behavior of students through the learning process, both in and out of the classroom for all subjects.

Character optimization in IPA learning in elementary school can be formed with a variety of content learning models by performing integration of character values and monitoring the process of activities up to the evaluation carried out (Rachmawati, 2018). In line with the study, character growth and dilution in primary school children are implanted through a variety of learning models, such as problem-based, inquiry, cooperative, and contextual. (Sari & Firman, 2019). Furthermore, Suhadah et al (2021) states that character formation in schools is not solely the responsibility of teachers. Still, school curricula based on character can also be used as a reinforcement against character formation.

Seeing the urgency of character formation, which can be done through the learning process, this study discusses various learning strategies that can strengthen the character of students, primarily through learning IPA in elementary school. The purpose of this research is to analyze the results of the primary study on IPA learning strategy in developing the character of primary school students.

METHODS (FOR ORIGINAL RESEARCH ARTICLE ONLY)

The research method used is a qualitative descriptive research method in which data is collected through literary studies. The literature used in the research that has been carried out is scientific articles relating to the learning strategy of IPA and the character of elementary school students. These keywords are used to facilitate the process of obtaining data so that the data obtained is not too biased. This linear selection can later describe the various strategies that have been implemented for character formation. Data collection is carried out by browsing articles from electronic journals and other publications related to research topics with publications from 2018 until 2023, i.e. through Google Cendikia, which can reinforce the results of the analysis. The last five years have been used to reinforce and renew the results of the research obtained. In this study of articles used at the national level, this selection is done to get a picture of the topics that exist in Indonesia so that it increases its usage. The data analysis technique in this study covers three stages, namely organize, synthesize, and identify. In the first phase, the author tags and reviews the literature that will be used to be relevant to the problem studied by eliminating some articles that do not fit the topic. At this stage, the writer performs the search for ideas, purposes, and conclusions of some literature, starting from abstract reading, introduction, methods and discussion, as well as grouping literature according to specific categories. Secondly, synthesis is to unite the results of the literary organization into a synthesis to form a coherent unity by searching for inter-literary connections. Thirdly, identify is to identify issues of controversy in the literature. The subject of discussion is an issue that is considered essential to be analyzed in order to get an exciting and up-to-date article. The journal that is reviewed is a journal that meets the criteria of an article in an Indonesian-language research journal with the theme of IPA learning strategy to shape the character of students. The literary search focused on the first keyword, "IPA learning strategy", obtained 378 articles. Out of 378 such articles, three stages, i.e. organize, synthesize, and identify ten themes that correspond to the purposes of the literature review. This literature review is synthesized using a narrative method by grouping the extraction data that is similar to the measured result to meet the objective.

RESULTS AND DISCUSSION (REVIEW ARTICLE USE DISCUSSION)

From 10 articles that have already undergone screening and eligibility tests, it was found that an appropriate IPA learning strategy can shape the character of students to be better. Applying the correct method will put students in the focus of learning. This will definitely affect the learning outcomes and also the motivation of students. The character values that can be developed in IPA learning are the values of honesty, openness and great curiosity.

Allowing students to engage in higher-level thinking during science learning provides them with the opportunity to discover the truth from information and facts they experience. Science learning then becomes more meaningful and helps students gain a deep understanding while preparing them to address various challenges (Ramadhan, 2021). Science learning encourages students to cultivate curiosity and trains them to think critically and objectively when solving problems. Engaging in discussions within groups is an effective strategy for delivering science education.

One of the suitable strategies for science education is guided inquiry. According to Ramadhan (2021), guided inquiry is a strategy that places students at the center of

learning. It involves students in maximizing their abilities to analyze and systematically, critically, and logically conclude something. This strategy, which requires high-order thinking skills (HOTS), necessitates teachers to implement guided and structured inquiry methods at the elementary school level. In this approach, teachers act as facilitators, guiding students in defining problems and their solutions to form groups based on their abilities.

During the COVID-19 pandemic, students require dedicated spaces for learning. One of the science learning strategies applied during the pandemic is Contextual Teaching and Learning (CTL). According to Andriani et al. (2022), science education based on CTL can help students gain a deeper understanding of the material, making it more accessible and memorable. In the CTL approach, students learn to seek meaning from what they have learned, and the teacher acts only as a guide or facilitator. Students are thus motivated to think critically when comprehending something based on what they have learned. By employing five strategies that include relating, experiencing, applying, cooperating, and transferring, students are expected to achieve maximum competence. Meaningful learning enhances student engagement and motivation, ultimately affecting the performance of elementary school students in science learning (Mahardika, 2019).

Several prior studies have shown that effective science education strategies can be applied during a pandemic. Winangun (2021) suggests that project-based learning is a realistic practical science education strategy that can be implemented during the COVID-19 pandemic. Project-based learning focuses on core concepts and principles within a discipline and encourages students to investigate, solve problems, and engage in meaningful tasks. It is student-centered and results in tangible products. Additionally, according to Nisah et al. (2021), the Project-Based Learning model can be an alternative and effective learning strategy during the pandemic using digital technology platforms like WhatsApp Group to promote students' knowledge acquisition through projects with optimal learning outcomes.

Another strategy that teachers can use is Outdoor Learning. Agusta and Noorhapizah (2019) highlight that Outdoor Learning is a suitable strategy for providing students with direct and unique experiences. The findings of Cintami and Mukminan (Yanti et al., 2022) suggest that outdoor study aims to direct students to engage in activities that encourage them to observe the environment around them in line with the taught material. Educators can thus focus on experiences and environmental education, which significantly impact student intelligence. Utilizing the outdoor learning method, as described by Fitri et al. (2022), can provide students with a pleasant learning experience while helping them understand science topics, such as the ecosystem and the classification of animals based on their diets.

With various science teaching strategies available to teachers, educators have the flexibility to choose strategies that suit their specific student conditions and characteristics. Research results (Ramadhan, 2021) show that guided inquiry significantly contributes to student learning outcomes. Students have a better understanding of the subject when taught using inquiry methods compared to conventional methods. Comparing previous research, the application of inquiry methods in science subjects appears to be more effective. Elementary science subjects require more experiments and experiential learning, which may explain the observed improvements. Student learning outcomes, as reported by Meo et al. (2022), indicate a notable increase in learning outcomes after implementing the guided inquiry model. The results, as observed from pre-tests in Cycle I and Cycle II, demonstrate the considerable improvement in student learning outcomes in the science subject.

The implementation of the Contextual Teaching and Learning strategy can assist students in comprehending challenging materials. This teaching strategy allows students to understand the context of the subject matter directly. Consequently, when students face questions or issues, they can easily digest and resolve them, resulting in

the achievement of maximum learning objectives and outcomes. Research findings indicate that the implementation of Contextual Teaching and Learning significantly influences student learning outcomes, as evidenced by a Sig. probability value of 0.036, which is less than 0.05. This suggests that the contextual teaching and learning strategy has a significant effect on student learning outcomes (Ardiansyah & Rochmawati, 2022).

Another study, conducted by Nisah et al. (2021), demonstrates that the implementation of the Project-Based Learning model significantly improves the learning process and outcomes for elementary school students during the pandemic. The study also shows that the implementation of Project-Based Learning model results in a notable enhancement in students' understanding of science topics.

Based on the findings of Agusta and Noorhapizah (2019), the implementation of the Outdoor Learning strategy achieved excellent teaching quality. The improvement in the teaching process was accompanied by a gradual increase in students' creativity scores, with over 90% of students categorized as "creative." This observation aligns with the results reported by Yanti et al. (2022), where significant improvements in science learning outcomes were observed in elementary school students after implementing the Outdoor Study method with Inquiry Learning.

Research by Handayani (2020) emphasizes that Project-Based Learning involves the active participation of students in problem-solving tasks, which are conducted individually or in groups using a structured scientific approach within a specified timeframe, with outcomes presented in the form of a product.

Pambudi, as cited in Meilani & Aiman (2020), highlights that efforts to improve science learning outcomes are influenced not only by the teaching process but also by internal factors within students, such as motivation. Motivation for learning encompasses aspects such as persistence, resilience in the face of difficulties, interest and focused attention, achievement, and independence.

Furthermore, teachers play a vital role in instilling motivation when delivering subject matter in the classroom. Among the eight fundamental teaching skills, motivating students is crucial. This idea is supported by Mudanta et al. (2020), who argue that educators should present material with enthusiasm to foster student development and assess both learning motivation and outcomes using well-designed measurement tools.

Low student motivation can result in poor learning outcomes. According to Sukma and Trisni (2022), several factors during the learning process can contribute to low learning outcomes. One of these factors in the context of science education is the lack of innovation in selecting teaching media. This can lead to less engaging and dull science lessons, ultimately resulting in reduced student motivation and, consequently, poorer science learning outcomes.

The achievement of student learning outcomes is influenced by both internal and external factors. Internal factors come from within the learner and encompass aspects such as health, intelligence, talent, interest, motivation, and learning style, whereas external factors originate from outside the learner and include family, school, society, and the immediate environment. Interest in learning is one of the internal factors emphasized by Wiradarma et al. (2021) as influencing learning outcomes. Therefore, it is crucial to create learning experiences that capture students' interest, especially in science education.

Another factor influencing learning outcomes is study habits, as highlighted by Jannah et al. (2021). An individual's learning habits can significantly affect the ease of acquiring knowledge. Not being accustomed to studying may present challenges, even though developing a habit of studying can greatly benefit learning. Syardiansah (Jannah et al., 2021) supports this by suggesting that learning habits can have a small impact on

learning performance. If students are not in the habit of studying, their learning performance is likely to decline. However, if students are motivated to learn, their learning performance and results will improve.

Additionally, learning style is an internal factor that can influence learning outcomes. To enhance understanding, acceptance, and information processing during the learning process, it is important for students to identify and use their learning style appropriately. Learning outcomes are also influenced by external factors, including the use of learning media. Learning media refers to tools used in the learning process that help clarify the message and ensure successful learning. Astiti et al. (2021) found that learning style and the use of visual, auditory, or kinesthetic learning media significantly influence science learning outcomes for students.

In the primary school level, science education is not just about mastering concepts and principles related to nature; it also involves learning how to explore and solve problems while adopting a scientific attitude (Winangun, 2021). As stated by Arbaca in Wati et al. (2022), elementary school students, typically aged between 7 and 12 years old, begin to exhibit a high level of curiosity by investigating, trying, and experimenting with things they find interesting. They are capable of comprehending how to combine various categories of objects with different levels, and they can think systematically about concrete objects and events. This perspective is supported by Dian in Wati et al. (2022), emphasizing that character education can be implemented through science learning. By integrating character education into science education, it is expected to reveal the inherent character values within science learning and optimize their development in building students' character.

Within science education, there are numerous values that can be cultivated in everyday life, such as honesty, openness, and a sense of curiosity. This is because science subjects are typically taught using a scientific approach, involving steps like observation, experimentation, and analysis. These steps can help shape positive characteristics in students, such as honesty, discipline, cooperation, hard work, and a high level of curiosity, especially when character development begins at an early stage (Darmayasa et al., 2018).

Based on findings from Wati et al. (2022), the indicator for analyzing science content accounts for the largest percentage at 83%. This suggests that students are capable of understanding the material and developing character traits like patience, awareness, attention to detail, critical thinking, and a strong sense of curiosity. The enthusiasm of students to see, do, engage in learning, and directly experience what they have learned is evident. Students are highly active in the learning process, which is designed to align with their daily lives by teachers who engage them in interactive activities during lessons. When a teacher has a good understanding of the students' characters, they will employ various teaching strategies to create an enjoyable learning environment, especially for elementary school students.

In addressing the character of elementary school students, teachers need to reinforce their language skills. This is supported by the findings of Harlina (2020), which emphasize that language education in elementary school aims to enhance students' knowledge and character because language supports success in learning across all subjects. Through language education, students are expected to gain self-awareness, understand their own culture and that of others, use language effectively and politely, show respect for others in conversations, and develop early character traits such as friendliness, politeness, nationalism, respect for others, and mutual respect. Teachers play a crucial role in language education as role models for students, speaking in accordance with the desired character traits. To achieve the goals of language education, teachers need knowledge and understanding of language teaching strategies, including a comprehensive approach, a process approach, and a communicative approach (Harlina, 2020).

The school environment is also a key indicator of the success of character strengthening for elementary school students. The findings from Hikmawati et al. (2022) suggest that the better the school environment conditions, the more effective character development in students can be. This holds true when teachers implement enjoyable science learning activities in school, especially through fun experiments using materials available in the school environment. Character development in students is facilitated through activities such as tree planting and gardening in the school environment, which promotes a sense of environmental responsibility. This is further reinforced by the findings of Santika et al. (2022), which highlight that character development related to environmental care in elementary school should be integrated into science education. Science education directs students to better understand the importance of environmental conservation. Additionally, students are trained to be skilled in managing the environment, which becomes a habit in their lives.

CONCLUSION

In essence, education is an effort to guide students through the learning process to help them achieve their intended learning objectives. Science education provides students with direct experiences that strengthen their ability to understand, retain, and apply the concepts they have learned. Science education in primary schools is fundamentally built upon the foundation of scientific products, scientific processes, and scientific attitudes.

To create an enjoyable science learning experience in the classroom, it is crucial for teachers to select appropriate teaching strategies that align with the needs and characteristics of primary school students. Science education at the primary level is designed to introduce students to the wonders of the natural world and their surroundings while learning through play. The selection of suitable teaching strategies is a key factor in ensuring that the learning objectives are met. The various IPA learning strategies that teachers can use are adapted to the character of elementary school students and their learning style, among others: 1). Inquiry guided; 2). Contextual Teaching and Learning (CTL); 3). Project Based Learning (PjBL); Outdoor Learning. The student's learning style is an internal factor that consists of the visual learning style, the auditory, the kinesthetic and the visual-auditory learning style. The external factors include the learning environment of the student. Character values that can be enhanced through an appropriate IPA learning strategy are values of honesty, openness and great curiosity.

ACKNOWLEDGEMENTS

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