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Analysis of The Establishment of Scientific Attitudes in Elementary School Students Through a Scientific Approach

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Abstract

This study analyzed elementary students' attitudes through a scientific approach. This survey study was conducted from January to September 2023. The subjects were fourth-grade elementary school students at SDIT Samawi Bantul. The research sample consisted of 54 fourth-grade students, including 22 male and 32 female students. Data were collected using a questionnaire. Two analysis methods were employed: descriptive statistics and inferential statistics, with data analyzed in SPSS 25. The results of the study indicated that the formation of scientific attitudes in elementary school students can be facilitated through the implementation of a scientific approach. Scientific attitudes encompass the following: The first finding indicates that environmental awareness attained a score of 80.40%, thus falling within the "strong" category. The second finding indicates that cooperation attained a score of 77.80%, thus falling within the "strong" category. The third finding indicates that honesty attained a score of 75.90%, thus falling within the "strong" category. The fourth finding indicates that curiosity attained a score of 72.20%, thus falling within the "strong" category. The fifth finding indicates that creativity attained a score of 66.20%, thus falling within the "strong" category. The sixth finding indicates that critical thinking attained a score of 60.20%, thus falling within the "moderately strong" category. These scores indicate that scientific attitudes have been developed in fourth-grade students through the application of the scientific approach. The results of this study will provide information on the importance of this approach in instilling scientific attitudes in elementary school students.

Keywords: Character Education, Scientific Attitude, Scientific Approach, Elementary School

A. Introduction

Education has a significant role in advancing and enlightening the nation's life as well as a means of developing well-rounded individuals. Education is the main foundation in

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shaping a strong and high-quality future generation (Sugiartini et al., 2024). Education is used as the main driver in preparing human resources as a requirement for realizing national development. Education has become a necessity for individuals in developing their potential. Educational activities in schools are based on the learning process, which is an interaction between students, teachers, and learning resources in a learning environment to achieve learning objectives (Jariyah et al., 2024). Education does not only emphasize the knowledge possessed. However, it also serves as a means of shaping students' attitudes and character (Apriliyani et al., 2018). Learning can occur through the process of acquiring knowledge and skills, mastering abilities and habits, as well as shaping students' attitudes and character (Septi et al., 2023). Learning at school contributes to improving intellectual abilities and shaping good attitudes in students. Students' attitudes require positive feedback so they can receive learning effectively, as attitudes are an individual's tendency to act and influence cognitive aspects of students (Permana, 2019).

Challenges in nation-building amid the rapid development of technology and information as a result of globalization (Masithoh & Anintyawati, 2022) have led to continuous changes in the world of education (Ekaputra et al., 2024). In the digital age, it is very easy for students to access any information from the internet, which has an impact on their character, including: 1) Students are easily influenced by information they receive through the internet; 2) Students become lazy in their studies and less responsible for their tasks; 3) Students develop gadget addiction because they spend more time playing with gadgets than studying, leading to vision problems. Therefore, a wise approach to internet use is necessary. If students can use the internet effectively, it can help develop their character positively; conversely, improper use can have negative consequences.

The establishment of scientific attitudes in students is the duty and responsibility of teachers. As agents of learning, teachers must have expertise and authority in carrying out the learning process (Rostika & Prihantini, 2019). Good teachers will pay attention to the quality of each stage of the learning process (Utariadi et al., 2021). The formation of scientific attitudes in students can be achieved through a scientific approach, also known as the scientific method. In this approach, students are required to solve various problems effectively and wisely. The scientific approach can make the learning environment more active (Daulay et al., 2019). Additionally, through this approach, it is hoped that students can

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think scientifically and are able to learn and collaborate in groups to solve problems given by teachers so that they can achieve optimal learning outcomes (Subekti et al., 2021). The teaching and learning process is expected to bring about certain changes in students toward improvement so that they possess specific competencies (Suwintara et al., 2022).

Based on observations conducted on fourth-grade students at SDIT Samawi Bantul, it was found that the scientific attitudes of students in learning activities had been formed quite well. Several teachers had already implemented a scientific approach in their teaching process. Students' curiosity began to show when they encountered something new that they had never learned before. Some students actively ask questions directly to the teacher when receiving information. However, there are still students who are shy about asking questions or expressing their opinions in class, preferring instead to ask their peers. This is due to a lack of self-confidence in expressing their questions. Teachers have not fully implemented the scientific approach, as they still pay less attention to students who are not very active. The implementation of the scientific approach in learning provides an opportunity for every teacher to always involve students in learning activities. Therefore, this research is very important to analyze students' scientific attitudes through the implementation of the scientific approach in elementary schools.

B. Research Methodology

This study used a survey research method, conducted from January to September 2023. The population in this study was all students at SDIT Samawi Bantul, totaling 324 students. The sampling technique used was simple random sampling. The research sample consisted of 54 fourth-grade students, comprising 22 male students and 32 female students. Data collection techniques used a questionnaire or survey guide, with the research instrument being a closed-ended questionnaire/survey form that had been tested through two stages: 1) data validity testing using the Pearson Product Moment correlation formula; 2) reliability testing using the Cronbach's Alpha formula. Data analysis techniques in this study used descriptive statistics and inferential statistics. Descriptive statistics are data presented in the form of tables, graphs, mode calculations, median, mean, and so on. Inferential statistics are statistical techniques used to analyze sample data, with the results applied to the population (Sugiyono, 2018). The research data was processed using the SPSS 25 application. The

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results of the data obtained were converted into percentages (%) and then arranged in descending order from the highest to the lowest data, and finally presented in the form of bar charts.

C. Results and Discussion

1. Results

The research results found that there are six aspects of scientific attitude, including: 1) caring for the environment; 2) cooperation; 3) honesty; 4) curiosity; 5) creativity; and 6) critical thinking. The results of the analysis of scientific attitude characteristics are presented in Figure 1.

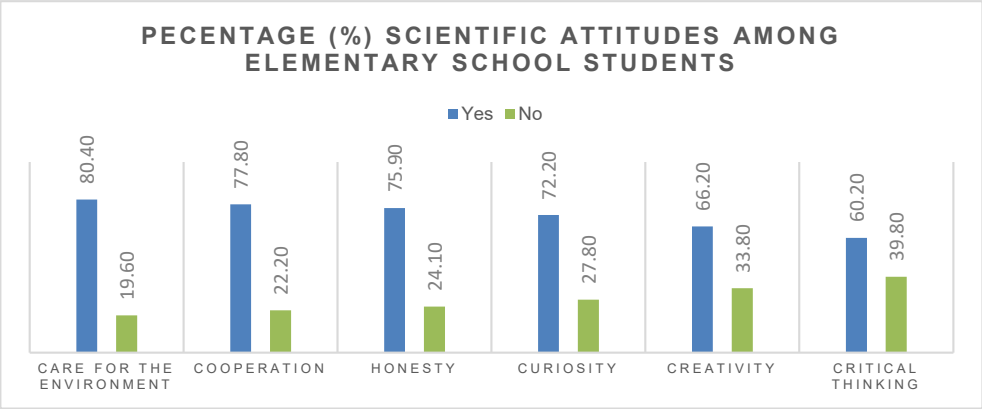

Figure 1. Characteristics of Scientific Attitudes in Elementary School Students

Care fot The Environment

The environmental awareness attitude indicator is used to determine the level of students' environmental awareness attitudes in participating in learning activities. Based on the data from the questionnaire distribution, there are five statements in the environmental awareness attitude indicator that were filled out by the respondents. The results of the environmental awareness analysis show that students who chose the answer “yes” with a score of 217 out of 270 statements on the formation of environmental awareness obtained a percentage of 80.40%, while students who chose the answer “no” with a score of 53 out of 270 statements on the formation of environmental awareness obtained a percentage of 19.60%.

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Students choose statements about caring for the environment based on the belief that they possess this character trait, which will help them in their learning activities. Caring for the environment can be defined as efforts to preserve, protect, and restore the natural environment. One way to raise environmental awareness and instill life values is through education (Fitriati et al., 2019). The development of an environmentally conscious character can also be implemented through an environmentally aware learning process (Masithoh et al., 2023). To maintain a clean and well-preserved natural environment, every individual needs to have an environmentally conscious character, thereby preventing environmental damage in their surroundings (Yudianti et al., 2020). Thus, the percentage of scientific approach implementation in instilling an environmentally conscious character is 80.40%, and the students' character is categorized as “strong”.

Cooperation

The cooperation attitude indicator is used to determine the level of students' cooperation attitude in participating in learning activities. Based on the data from the questionnaire, there are five statements in the cooperation attitude indicator that were filled out by the respondents. The results of the analysis of cooperative attitudes show that students who chose the answer “yes” with a score of 126 out of 162 statements on the formation of cooperative attitudes obtained a percentage of 77.80%, while students who chose the answer “no” with a score of 36 out of 162 statements on the formation of cooperative attitudes obtained a percentage of 22.20%.

Students chose statements about cooperative character based on the belief that such character is possessed by students as a foundation for engaging in learning activities. Cooperative character is a combination of individual attitudes possessed by each student and different group attitudes (Rahayu et al., 2020). Cooperation, as a scientific attitude requiring interaction with others, is essential and should be developed from primary education onwards. Cooperation is a combination of the individual attitudes of each student and different group attitudes. Thus, the percentage of scientific approach implementation in instilling cooperative attitude character is 77.80%, and the students' character is categorized as “strong”.

Honesty

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The honesty attitude indicator is used to determine the level of honesty in students' attitudes toward learning activities. Based on the data from the questionnaire, there are five statements in the honesty attitude indicator that were filled out by respondents. The results of the honesty attitude analysis show that students who chose the answer “yes” with a score of 205 out of 270 statements on the formation of honesty attitude obtained a percentage of 75.90%, while students who chose the answer “no” with a score of 65 out of 270 statements on the formation of honesty attitude obtained a percentage of 24.10%.

Students chose statements about honesty based on the belief that this character trait is essential for learning activities. Honesty is reflected in behavior that is accompanied by sincerity, polite language that is truthful, and actions based on evidence and truth (Mulyani et al., 2023). Honesty is one of the elements of spiritual strength, noble character, and personality. Thus, the percentage of the application of the scientific approach in instilling the character of honesty is 75.90%, and the students' character is categorized as “strong”.

Curiosity

The curiosity attitude indicator is used to determine the level of curiosity attitude of students in participating in learning activities. Based on the data from the questionnaire distribution, there are 5 statements in the curiosity attitude indicator that were filled in by the respondents. The results of the analysis of curiosity revealed that students who chose the answer “yes” with a score of 117 out of 162 statements formed a curiosity attitude, obtained a percentage of 72.20%, while students who chose the answer “no” with a score of 45 out of 162 statements formed a curiosity attitude, obtained a percentage of 27.80%.

Students chose statements about curiosity based on the belief that they possess this trait as a resource for learning activities. Students' understanding of curiosity stems from need and strangeness (Jannah et al., 2021). The attitude of curiosity that arises from a need is related to the effort to seek explanations and then find solutions to a problem so that it can produce products or findings that can be utilized by many people, while the attitude of curiosity that arises from curiosity is related to how a person interprets a phenomenon, the purpose of which is only limited to description and explanation, so that it is only an understanding. Thus, the percentage of application of the scientific approach in instilling the character of curiosity is 72.20%, and the students' character is categorized as “strong”.

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Creativity

The creativity attitude indicator is used to determine the level of students' creativity attitudes in participating in learning activities. Based on the data from the questionnaire, there are five statements in the creativity attitude indicator that were filled out by the respondents. The results of the creativity attitude analysis show that students who chose the answer “yes” with a score of 143 out of 216 statements on the formation of creativity attitudes obtained a percentage of 66.20%, while students who chose the answer “no” with a score of 73 out of 216 statements on the formation of creativity attitudes obtained a percentage of 33.80%.

Students choose statements about creativity based on the belief that they possess this trait as a resource for learning activities. Creative thinking skills are one of the focuses of learning, and learning needs to be designed in such a way that it has the potential to develop students' creative thinking skills (Manurung et al., 2020). The development of students' creativity needs to be carried out in conjunction with the development of ways to evaluate or measure it. Characteristics of students with a creative attitude include: a) being able to generate many ideas in a short time; b) being able to connect and combine various different things; c) being able to develop something simple; d) being able to work in detail and complexly; e) having a strong sense of curiosity; f) being willing to take risks; g) being quick to respond and independent; h) enjoying seeking unique ideas. Thus, the percentage of the application of the scientific approach in instilling the character of creativity is 66.20%, and the students' character is categorized as “strong”.

Critical Thinking

Critical thinking attitude indicators are used to determine the level of critical thinking attitudes among students participating in learning activities. Based on the data from the questionnaire, there were five statements on critical thinking attitudes that respondents filled out. The results of the critical thinking attitude analysis show that students who chose the answer “yes” with a score of 130 out of 216 statements on the formation of critical thinking attitudes obtained a percentage of 60.20%, while students who chose the answer “no” with a score of 86 out of 216 statements on the formation of critical thinking attitudes obtained a percentage of 39.80%.

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Students choose statements of critical thinking based on the belief that they possess these characteristics as preparation for learning activities. In critical thinking, students first reflect on the cause and effect of the problems they will face, which will determine the decisions they make and lead to objective conclusions (Anggraeni et al., 2022), developing students' mindsets so that they can think more broadly (Rohmah et al., 2022). Elementary school students in higher grades (grades IV, V, and V) must be trained to think critically in depth when facing daily challenges, whether at school, at home, or in the neighborhood while playing with their friends. Thus, the percentage of scientific approach application in instilling critical thinking character is 60.20%, and the students' character is categorized as “sufficiently strong”.

2. Discussion

Character refers to the traits, temperament, disposition, attitude, and behavior inherent in an individual's personality. Character is one of the aspects that teachers must pay attention to when guiding students, as it can influence the learning environment and student learning outcomes. By fostering good character in students, a positive learning environment and optimal learning outcomes can be created. Elementary school-aged children are at the right age to instill character values. This period is a golden age that should be accustomed to good behavior (Siswanto et al., 2021). Failure to cultivate character will result in problematic personalities in adulthood. To prevent this, schools must be committed to building the character of the nation's children (Sari & Puspita, 2019). Each student has a different character (Suroto, 2024), so teachers are required to instill good character traits in students. Such as: scientific attitude, responsibility, discipline, curiosity, cooperation, concern for the environment, and so on.

Scientific attitudes are essential for students in the learning process because they can motivate students in learning activities. Scientific attitudes are a reflection of behavior in learning, responding to problems, carrying out tasks, and developing oneself. Scientific attitudes can have a positive impact on students (Suryantini, 2018). A scientific attitude includes curiosity, respect for facts, critical thinking, discovery and creativity, open-mindedness and cooperation, perseverance, discipline and responsibility, and sensitivity to the surrounding environment (Utomo et al., 2020). Curiosity can motivate students to be more

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active in learning. The character of curiosity can encourage students to think creatively, such as creating something based on a student's curiosity. The character traits of discipline and responsibility are important values in the development of students' social attitudes (Melati et al., 2021). Critical thinking is also an aspect of scientific attitude, as it enables students to analyze facts in learning (Hagi & Mawardi, 2021). Therefore, improving critical thinking is one of the tasks of a teacher, striving for various methods and approaches in learning activities to realize the expectations and demands of the changing times (Lieung, 2019). The establishment of scientific attitudes is important for students because it can motivate learning activities. The cultivation of scientific attitudes in learning encourages students to learn more to understand and discover (Widyaningrum & Wicaksono, 2018). The development of scientific attitudes in students will be more optimal if students engage in the discovery process through direct observation of the learning objects they study using learning media (Suryantari et al., 2019). With scientific attitudes that are instilled and developed within students, they are expected to be sensitive to their environment, able to investigate what they discover, identify what they do not yet know, and act to solve problems in their environment using their own abilities (Magdalena et al., 2020).

A scientific attitude is an attitude possessed by every scientist or academic in facing and solving scientific problems to obtain good results naturally. A scientific attitude is defined as a student's readiness to behave and react to a problem and the ability to accept other people's opinions well (Sutardi, 2022). A person is said to have character if they successfully absorb the character values desired by society because character plays an important role in the development of students' social attitudes (Setyawatiningsih, 2020). The formation of a scientific attitude in students is the task of educators through active and innovative learning activities. The learning process in the classroom shapes students' character attitudes and can influence the learning atmosphere. This learning process is inseparable from the roles of teachers and students (‘Ainiyah & Masithoh, 2023). Learning using a scientific approach plays an important role in fostering scientific attitudes in elementary school students. Learning experiences using the scientific approach can instill scientific attitudes in students and have a positive impact on cognitive, affective, and psychomotor learning outcomes (Masithoh, 2018). Therefore, scientific attitudes need to be developed early on, with the hope that they can serve as a foundation for solving problems in daily life (Asiani et al., 2021).

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D. Conclusion and Suggestion

Based on the research data, it can be concluded that scientific attitudes can be developed through the application of a scientific approach to elementary school students. This can be seen from the percentage scores of the six scientific attitudes that were developed, namely: 1) environmental awareness, 80.40%, strong category; 2) cooperation, 77.80%, strong category; 3) honesty at 75.90% in the strong category; 4) curiosity at 72.20% in the strong category; 5) creativity at 66.20% in the strong category; and 6) critical thinking at 60.20% in the moderately strong category. These scores indicate that scientific attitudes have been developed in students through the application of the scientific approach in fourth-grade students at SDIT Samawi Bantul. The results of this study are expected to provide information on the importance of applying the scientific approach in instilling scientific attitudes in elementary school students through more engaging and enjoyable active and innovative learning.

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