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The Influence of Learning Styles on Students' Scientific Attitudes in Science Learning at SDN 06 Kendari

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ABSTRACT

This study aims to analyze the influence of learning styles on students' scientific attitudes in science learning at SDN 06 Kendari. Learning styles are an important factor that can influence how students understand science concepts and develop scientific attitudes such as curiosity, objectivity, openness, and honesty in the process of acquiring knowledge. The research method used is ex-post. A post facto study with a quantitative approach. The research population was all 60 fifth-grade students of SDN 06 Kendari, with a research sample of 30 people selected using the simple random sampling technique. Random sampling. The research instrument was a learning style questionnaire compiled based on visual, auditory , and kinesthetic categories , as well as a scientific attitude questionnaire developed based on scientific attitude indicators according to the elementary school science curriculum. Data were analyzed using simple linear regression. The results showed that there was a significant influence of learning style on students' scientific attitudes ($p < 0.05$). Students with a visual learning style tended to show scientific attitudes in the aspects of order and accuracy, while auditory students were superior in the aspect of openness to ideas, and kinesthetic students stood out in curiosity and exploratory activities. These findings emphasize the importance of teachers understanding students' learning styles in designing varied science learning so that they can foster optimal scientific attitudes. Thus, adjusting teaching methods based on students' learning styles is an important strategy in improving the quality of science learning in elementary schools.

I. INTRODUCTION

Science education in elementary schools plays a strategic role in shaping students' scientific mindsets, skills, and attitudes from an early age. Science learning is not only oriented toward mastering factual concepts but also directed toward developing scientific attitudes that support critical and creative thinking skills. These scientific attitudes encompass curiosity, objectivity, openness, honesty, and perseverance in the process of acquiring knowledge. According to Sardiman (2022), developing scientific attitudes in elementary schools is a crucial foundation for building a generation capable of facing the challenges of increasingly complex scientific and technological developments.

Furthermore, science learning in elementary schools also serves as a vehicle for developing science process skills. These skills include the ability to observe, classify, measure, draw conclusions, and communicate the results of observations. All of these skills can only develop optimally if students have a strong scientific attitude. Rustaman (2021) emphasized that scientific attitudes must be continuously practiced in every science learning activity so that students become accustomed to thinking systematically and appreciating facts. Therefore, teachers have a significant responsibility to design learning that not only teaches concepts but also internalizes scientific values.

However, the reality on the ground shows that elementary school students' scientific attitudes still vary widely. Some students demonstrate a strong curiosity and actively ask questions, while others tend to be passive, less enthusiastic, and even simply follow directions without any desire to explore phenomena further. This difference can be caused by various factors, one of which is students' learning styles not being fully accommodated in the learning process. According to Wulandari (2022), students with certain learning styles find it easier to develop scientific attitudes if the teaching approach applied by teachers is tailored to their characteristics.

Learning style is an internal factor that significantly determines students' success in understanding subject matter. Slameto (2021) explains that learning style is the unique way each individual absorbs, processes, and remembers information. There are three main categories of learning styles: visual, auditory, and kinesthetic. Visual learners find it easier to understand material through pictures, diagrams, and visual media; auditory learners benefit

more from oral explanations, discussions, and listening; while kinesthetic learners prefer to learn through hands-on activities, experiments, and practice. When teachers understand these variations in learning styles, science learning can be more effective and enjoyable.

In line with this, research conducted by Nugraha (2022) shows that students with visual learning styles tend to excel in accuracy and orderliness when recording observations, while auditory students are more open to scientific discussions, and kinesthetic students are more active in experiments. This proves that learning styles are closely related to the development of students' scientific attitudes. Without considering differences in learning styles, the science learning process risks only benefiting some students, while others are less likely to develop optimally.

Furthermore, science learning in elementary schools should ideally be implemented with a student-centered approach. According to Hosnan (2020), student-centered learning allows for exploration, investigation, and discovery, ultimately fostering a scientific attitude. However, if teachers fail to consider the diversity of learning styles, this student-centered learning strategy will be ineffective. Teachers must be able to adapt teaching strategies to students' learning needs to truly foster a scientific attitude.

In the context of the currently implemented Independent Curriculum, science instruction in elementary schools is directed at strengthening critical and creative thinking skills and developing the profile of Pancasila students. One element that is highly emphasized is curiosity and scientific reasoning skills. According to the Ministry of Education, Culture, Research, and Technology (2022), teachers are expected to facilitate students' active questioning, conducting experiments, and drawing conclusions based on evidence. These efforts will be more successful if teachers understand students' learning styles so that learning strategies can be tailored accordingly.

The link between learning styles and scientific attitudes is also supported by previous research. For example, research conducted by Yuliani (2022) found that kinesthetic learning styles significantly contribute to the development of students' curiosity in science experiments. Visual learners, on the other hand, are better able to develop precision in observing phenomena, while auditory learners excel in aspects of openness and scientific communication. Thus, each learning style has its own potential to shape scientific attitudes if properly facilitated.

At SDN 06 Kendari, initial observations revealed striking variations in scientific attitudes among students. Some students showed high enthusiasm when conducting science experiments, while others appeared reluctant to actively participate. This difference is thought to be related to different learning styles, but these differences have not been fully accommodated in the learning process. Therefore, research is essential to further analyze the extent to which learning styles influence students' scientific attitudes.

Based on the description above, this study was designed to analyze the influence of learning styles on students' scientific attitudes in science learning at SDN 06 Kendari. It is hoped that the results of this study can contribute to the development of more effective and varied science learning strategies, taking into account students' learning styles. Furthermore, the findings of this study are expected to provide input for teachers in improving the quality of science learning in elementary schools, particularly in fostering scientific attitudes as an important foundation for facing the challenges of future scientific developments.

II. LITERATURE REVIEW

Learning style is an internal factor that influences how students understand, remember, and process information. Learning style is defined as an individual's preference for absorbing and processing knowledge through certain methods. According to Prastowo (2021), learning styles can be categorized into three categories: visual, auditory, and kinesthetic. Students with a visual learning style tend to understand information more easily through visual and graphic media. Auditory students learn more effectively through listening to explanations or discussions, while kinesthetic students understand material more easily when directly involved in activities or experiments. This demonstrates the importance of teachers designing learning strategies that suit various learning styles so that science learning in elementary schools can be effective.

In addition to learning styles, science instruction in elementary schools is also oriented toward developing scientific attitudes. Scientific attitudes are a set of behaviors that reflect the character of scientists in seeking and processing information. According to Mulyasa (2020), scientific attitudes include curiosity, openness, honesty, objectivity, and the ability to appreciate empirical evidence. These attitudes are important to cultivate from an early age so that students become accustomed to thinking logically and systematically in understanding natural phenomena. Scientific attitudes do not develop spontaneously but need to be continuously developed through meaningful learning activities, such as simple experiments, group discussions, or environmentally-based science projects.

The relationship between learning styles and scientific attitudes has been studied by various researchers. Hidayat (2022) found that kinesthetic learning styles tend to encourage students to be more active in science experiments, while visual learning styles facilitate more careful observation of phenomena. Meanwhile, students with auditory learning styles are more open to exchanging ideas in discussions. This proves that each learning style contributes to the development of specific aspects of scientific attitudes. Thus, teachers can utilize these differences in learning styles as a potential way to foster scientific attitudes in science learning.

Similar findings were also described by Sari (2021), who revealed that learning that considers students' learning styles can increase active participation and foster curiosity. Kinesthetic students, for example, show high enthusiasm for conducting lab work, while visual learners are more thorough in recording observational data. This suggests that learning styles influence not only cognitive learning outcomes but also scientific attitudes, an important goal of science learning in elementary schools.

Based on the various studies above, it can be concluded that learning styles play a significant role in shaping students' scientific attitudes. Teachers should consider differences in learning styles when designing science learning activities. If teachers can effectively accommodate all three learning styles, scientific attitudes such as curiosity, objectivity, and openness will more easily develop. Therefore, research on the influence of learning styles on students' scientific attitudes at SDN 06 Kendari is relevant to strengthen the theoretical and practical foundations of science education in elementary schools.

III. RESEARCH METHOD

3.1 Type and Design of Research

This research is quantitative with an ex post facto design, as the independent variables are not directly manipulated but are instead examined as they are. This research design was used to determine the influence of students' learning styles on scientific attitudes. The research was conducted at SDN 06 Kendari in the even semester of the 2024/2025 academic year.

Table 1. Research Design

Research Variables	Indicator	Instrument	Scale	Data analysis
X (Learning Style)	Visual, Auditory, Kinesthetic	Learning Style Questionnaire	Likert 1–4	Simple Linear Regression
Y (Scientific Attitude)	Curiosity, Objectivity, Openness, Honesty, Perseverance	Scientific Attitude Questionnaire	Likert 1–4	Simple Linear Regression

3.2 Population and Sample

The population in this study was all 60 fifth-grade students of SDN 06 Kendari. The research sample was taken using a simple random sampling technique, resulting in 30 students as the research sample.

3.3 Research Variables

1. Independent variable (X): Learning style (Visual, Auditory, Kinesthetic).
2. Dependent variable (Y): Scientific attitude (Curiosity, Objectivity, Openness, Honesty, Perseverance).

3.4 Research Instruments

The instruments used in this study consist of:

1. Learning style questionnaire with indicators:
   a. Visual
   b. Auditory
   c. Kinesthetic
2. Scientific attitude questionnaire with indicators:
   a. Curiosity
   b. Objectivity
   c. Openness
   d. Honesty
   e. Perseverance

Each instrument uses a Likert scale with four answer choices (Strongly Agree, Agree, Disagree, Strongly Disagree).

3.5 Data Analysis Techniques

The data were analyzed using a simple linear regression test to determine the extent of influence of learning style (X) on the scientific attitude (Y) of fifth-grade students at SDN 06 Kendari. The prerequisite analysis tests in the form of normality tests and linearity tests were carried out before the hypothesis test.

IV. RESULTS AND DISCUSSION

4.1 Results

4.1.1 Descriptive Statistical Test

Based on the results of data processing, a descriptive description of the variables of students' learning styles and scientific attitudes was obtained as follows:

Table 2. Descriptive Statistical Test

Variables	N	Min Score	Max Score	Mean	Std. Dev
Learning Styles	30	65	92	78.40	6.12
Scientific Attitude	30	68	95	80.75	6.45

The data above shows that the average student learning style score is 78.40 , which is included in the good category . Meanwhile, the average scientific attitude score is 80.75 , which is also included in the good category . This illustrates that the majority of students at SDN 06 Kendari have a positive learning style and a fairly high scientific attitude in science learning.

4.1.2 Prerequisite Analysis Test

a. Normality Test

Table 3. Results of the Kolmogorov-Smirnov Normality Test

Variables	Sig.	Criteria	Conclusion
Learning Styles	0.200	Sig. > 0.05	Normally distributed data
Scientific Attitude	0.167	Sig. > 0.05	Normally distributed data

Based on the results of the normality test conducted using the Kolmogorov-Smirnov test, the significance value for the learning style variable was 0.200 and for the scientific attitude variable was 0.167. Both had significance values greater than 0.05, thus it can be concluded that the data for both variables are normally distributed. This indicates that the distribution of the research data meets the basic assumptions in parametric statistical analysis .

b. Homogeneity Test

Table 4. Results of Levene's Homogeneity Test

Variables	Sig.	Criteria	Conclusion
Learning Style & Scientific Attitude	0.348	Sig. > 0.05	Homogeneous data

Based on the results of the homogeneity of variance test conducted on the learning style and scientific attitude variable data, a significance value of 0.348 was obtained. This value is greater than the 0.05 significance level, so it can be concluded that the data has homogeneous variance. In other words, there is no significant difference in variance between the data groups analyzed. This data homogeneity indicates that the distribution of variance between groups is relatively similar, so further analysis can be conducted without any concerns about bias due to differences in variance.

4.1.3 Hypothesis Testing

Hypothesis testing was conducted using simple regression analysis to determine the effect of learning styles (X) on students' scientific attitudes (Y). The results of the analysis are shown in the following table:

Table 5. Simple Regression Coefficients

Model	Coefficient (B)	t count	Sig.	Information
Constant	42.15	3,210	0.003	Significant
Learning Styles	0.493	4,285	0,000	Significant

Table 6. Coefficient of Determination

Model	R	R Square	Adjusted R Square	Standard Error of the Estimate
1	0.571	0.326	0.302	5,892

Based on the regression coefficient table, the constant value is 42.15 and the regression coefficient of the learning style variable is 0.493 with a significance value of 0.000 < 0.05. This indicates that the learning style variable has a positive and significant effect on students' scientific attitudes. Thus, the alternative hypothesis (H$_a$) which states that learning styles have an effect on students' scientific attitudes is accepted, while the null hypothesis (H$_0$) is rejected.

The coefficient of determination (R² = 0.326) indicates that learning styles contribute 32.6% to the variation in students' scientific attitudes in science learning, while the remaining 67.4% is influenced by other factors not examined in this study. These results indicate that students' understanding and application of learning styles play a significant role in shaping scientific attitudes, although there are still other factors that also have an influence.

Thus, it can be concluded that the better the learning style that students have, the higher the scientific attitude shown in science learning at SDN 06 Kendari.

4.2 Discussion

The results of the study indicate that the learning styles of students at SDN 06 Kendari vary, with a predominance of visual learning styles. Of the 30 students who were the subjects of the study, 14 students had visual learning styles, 9 students had auditory learning styles, and 7 students had kinesthetic learning styles. The average score for visual learning styles was 82, auditory learning styles 76, and kinesthetic learning styles 74. These data show that students with visual learning styles tend to have higher achievement in understanding science material. This finding is reinforced by the students' scientific attitude scores which showed an average of 81%, with indicators of curiosity, openness to new ideas, and critical thinking skills in the good category. These results confirm that there is a positive relationship between learning styles that suit students' characteristics and the development of their scientific attitudes.

Further analysis showed that students with a visual learning style more easily understand science material through pictures, charts, or illustrations provided by the teacher. This is in accordance with Sari's (2022) opinion that the use of visual media can improve students' concentration and memory because information presented through sight is processed more quickly by the brain. Visual students at SDN 06 Kendari appeared more active in asking questions when the teacher used teaching aids or pictures, which resulted in increased curiosity as one aspect of scientific attitude. Thus, it can be concluded that the visual learning style makes a significant contribution to shaping students' scientific attitudes.

Meanwhile, students with an auditory learning style showed an average score of 76. Students in this group tend to understand science material through the teacher's oral explanation, discussions, and questions and answers. Although their scores were slightly lower than visual students, they showed superior listening skills and processing

information verbally. According to Putra (2023), students with an auditory learning style will develop optimally if the teacher provides learning based on group discussions, storytelling, or provides clear verbal instructions. At SDN 06 Kendari, auditory students appeared enthusiastic during class discussions, and this contributed to an increased scientific attitude in the form of openness to accept friends' opinions.

The group of students with a kinesthetic learning style achieved an average score of 74. Although their score was the lowest compared to other groups, kinesthetic students demonstrated excellence in hands-on learning. They were more active when teachers provided simple experimental activities such as observing changes in the state of objects or conducting science experiments in class. This aligns with Dewi's (2022) findings, which state that kinesthetic students learn more effectively through direct experience and physical activity. By providing space for experimentation, kinesthetic students can enhance their curiosity and observation skills, two important aspects of a scientific attitude.

When compared as a whole, all three learning styles contribute equally to the formation of scientific attitudes, albeit to varying degrees. The results of the correlation analysis indicate a positive relationship between learning styles and students' scientific attitudes, although the strength of the relationship varies for each learning style. Visual learners develop better scientific attitudes due to frequent stimulation with visual media, auditory learners excel in communication skills, while kinesthetic learners excel in the observational and experimental aspects. This proves that science learning will be more effective if teachers are able to facilitate students' various learning styles.

This research aligns with findings by Rahmawati (2021), who stated that learning styles suited to student characteristics can improve motivation, interest, and scientific attitudes in science learning. Similarly, research by Nugroho (2022) confirmed that visual learning styles have a more dominant contribution to improving understanding of abstract concepts in science. Research at SDN 06 Kendari supports this theory, where visual students demonstrated better achievement than auditory and kinesthetic students in scientific attitudes.

However, learning that overemphasizes one particular learning style can create inequities in the classroom. Therefore, teachers need to implement differentiated learning strategies that accommodate all learning styles. For example, using a combination of visual media (images and videos), auditory (discussions and questions and answers), and kinesthetic (practice and experiments). According to Fitriani (2023), differentiated learning can increase student engagement and foster a more equitable scientific attitude. This strategy also aligns with the Independent Curriculum approach, which emphasizes the diversity of student potential.

One of the most prominent aspects of scientific attitudes in this study was students' curiosity. This was evident in their habit of asking questions and seeking deeper understanding when presented with stimuli in the form of images or simple experiments. In line with Hidayat's (2023) opinion, curiosity is the foundation of scientific attitudes that can be developed through inquiry-based learning. At SDN 06 Kendari, inquiry-based science learning has been shown to foster curiosity in students with various learning styles, although the level of success varies.

Besides curiosity, openness to new ideas also develops well in auditory learners through group discussions. Students learn to listen, respect the opinions of their peers, and present arguments logically. Meanwhile, kinesthetic learners are better equipped to develop perseverance and observation skills due to their frequent direct interaction with experimental objects. This aligns with Lestari's (2022) opinion, which emphasizes the importance of providing opportunities for students to actively learn according to their learning styles so that a balanced scientific attitude can develop.

Thus, this study illustrates that learning styles have a significant influence on students' scientific attitudes in science learning at SDN 06 Kendari. Visual learning styles are proven to be more dominant in improving scientific attitudes, but auditory and kinesthetic learning styles also make important contributions if facilitated by appropriate learning strategies. Therefore, science teachers in elementary schools are advised to design varied learning by integrating various learning styles so that all students can develop optimal scientific attitudes.

V. CONCLUSION

Based on the results of the research that has been conducted, it can be concluded that there is a significant influence between learning styles and students' scientific attitudes in science learning at SDN 06 Kendari. Data analysis shows that students with visual, auditory, and kinesthetic learning styles have quite striking differences in the level of scientific attitudes, where students with visual learning styles tend to be superior in the aspects of observation and organizing data, while students with auditory learning styles are more prominent in discussing and conveying arguments, while students with kinesthetic learning styles show higher activity in experiments and practical work.

These findings confirm that learning styles play a crucial role in shaping students' scientific attitudes, including curiosity, openness to evidence, critical thinking, and group collaboration. Therefore, teachers need to understand the diversity of students' learning styles and adapt their teaching methods to optimally facilitate the development of scientific attitudes.

Overall, the results of this study show that the more appropriate the learning strategy is to students' learning styles, the better the scientific attitudes developed. Therefore, science instruction in elementary schools should integrate a variety of approaches to effectively accommodate all students' learning styles and maximize learning objectives.

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