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Improving Understanding of Pancasila Values Based on Bruce and Weil Model in Science Learning in Elementary School

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Abstract: This study aims to improve students' understanding of Pancasila values in science learning in elementary schools by applying Bruce and Weil's learning model, especially the Social Interaction Model, which emphasizes the importance of cooperation and discussion. The research was conducted on grade IV students at SDN 19 Kampung Baru Kota Pariaman using the experimental method and Static Group Comparison design. Two groups were involved: an experimental class that applied the Bruce and Weil model, and a control class that used the conventional lecture method. Data were collected through learning outcome tests and analyzed statistically. The results showed that the application of the Bruce and Weil model had a significant effect on improving the understanding of Pancasila values. The average posttest score of the experimental class was 85, while the control class reached 70. Hypothesis testing resulted in a tcount of 22.70, greater than the ttable of 1.68 at the 0.05 significance level, so the alternative hypothesis (Ha) was accepted. Bruce and Weil's model proved effective in improving the understanding of Pancasila values through active participation of students in science learning. This model is recommended as an effective alternative to integrate Pancasila values in science learning in elementary schools.

Keywords: Bruce and weil model; Natural science learning; Understanding Pancasila

Introduction

Pancasila education in elementary schools plays an important role in shaping the character and morals of students as the nation's next generation (Afian, 2023; Elisa et al., 2022; Novaria et al., 2023). Through learning Pancasila Education, students are expected to be able to understand and apply the basic values contained in Pancasila, which include divinity, humanity, unity, democracy, and justice (Anita et al., 2024; Asiah, 2024; Wumu & Buhungo, 2023). However, the learning results of Pancasila Education in various schools, including SDN 19 Kampung Baru Kota Pariaman, still show inadequate results. The low involvement of students in the learning process and learning methods that tend to be monotonous are the main challenges that hinder the achievement of learning objectives. Based on observations, the dominant lecture method in learning Pancasila Education is less effective in attracting students' interest and encouraging them to actively participate (Karlina & Hindriana, 2023; Latifah et al., 2023; Nurwahidah et al., 2023; Salim et al., 2023).

The importance of adopting a learning model that can involve students more actively has long been recognized by educational experts. According to Bruce et al. (2014) in Joyce et al. (2024) and Kaur Tandon et al. (2021), an effective learning model is one that is able to encourage social interaction, cooperation, and discussion in the classroom, because learning that involves active interaction can improve students' understanding of the material being taught (Gumilar & Marwoto, 2023; Paraniti et al., 2024; Utaminingsih et al., 2024). Therefore, learning models that focus on social interaction and collaboration between students, such as

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the learning model developed by Bruce and Weil, are considered relevant and effective in the context of Pancasila values education (Nashihah & Harjunowibowo, 2023; Okyranida et al., 2023; Swandana et al., 2023). Bruce and Weil's Social Interaction Model offers an approach that allows students to work in groups and discuss to solve problems, which in turn develops critical thinking skills and deepens their understanding of the material being studied (Buhungo et al., 2024; Musdalifah et al., 2023; Putra et al., 2023; Putri et al., 2024).

In the context of learning theory, social interaction in learning is considered as one of the important components in developing students' thinking ability and understanding. Vygotsky (1978) in Kellogg (2021), in his theory of the "zone of proximal development", states that social interaction can facilitate students' cognitive development, especially when they work in groups and get help from peers or teachers. Bruce and Weil's learning model that focuses on social interaction is in line with Vygotsky's theory, where students are expected to learn from their peers and develop through group collaboration and discussion. Through this model, students not only learn Pancasila values passively, but also internalize the values through the process of problem solving and active discussion, which is expected to be more memorable and meaningful for them (Campbell-Meier & Goulding, 2021; Cong-Lem & Nguyen, 2024; Lantolf et al., 2021; Smagorinsky & Lang, 2023).

Several studies support the effectiveness of social interaction-based learning models. According to research by Johnson et al. (2009) in Laurent et al. (2023) published in the Journal of Educational Psychology, learning that focuses on cooperation and social interaction is proven to improve students' understanding of abstract concepts and moral values. The study also found that students who learned through interactive learning models showed positive attitudes and higher learning outcomes compared to students who learned through conventional methods. In the context of Pancasila Education, Bruce and Weil's model can encourage students to collaborate in understanding and practicing the values taught, thus improving their understanding and appreciation of the material (Rachman et al., 2024; Shi et al., 2025).

Although there are various interactive learning models that have been implemented in elementary schools, Bruce and Weil's model is unique in its approach to learning moral values through social interaction. According to Bruce et al. (2014) in Joyce et al. (2024), this model not only relies on discussion and cooperation in groups, but is also designed to encourage students to become individuals who think critically and have deep understanding. This approach is highly relevant in character education, including Pancasila Education, as it helps students to not only understand the values cognitively, but also apply them in a social context. This model, by involving students actively in the learning process, can help overcome the obstacles that have been faced in learning Pancasila Education which is still conventional.

This research aims to improve students' understanding of Pancasila values in science learning in elementary schools by applying Bruce and Weil's learning model, especially the Social Interaction Model, which emphasizes the importance of cooperation and discussion. This research focuses on analyzing the effect of Bruce and Weil's learning model on the understanding of Pancasila values in science learning in elementary schools. By using experimental method, this research compares the effectiveness of Bruce and Weil model with conventional lecture method. The results of this study are expected to make a positive contribution in the development of learning methods that are more effective and can be widely applied. The findings of this study are also expected to be a reference for educators in applying learning models that are able to increase students' involvement and understanding of Pancasila values, as well as motivate the application of these values in everyday life at school and outside school.

Method

This study used an experimental method with a Static Group Comparison design to test the effect of Bruce and Weil's learning model, specifically the Social Interaction Model, in improving understanding of Pancasila values in science learning at elementary school. The research subjects were fourth grade students at SDN 19 Kampung Baru Kota Pariaman, who were divided into two groups: the experimental class using the Bruce and Weil learning model, and the control class using the conventional lecture method. The choice of location at SDN 19 Kampung Baru was based on the need to improve the understanding of Pancasila values through a more interactive learning method and in accordance with the characteristics of students.

Data collection was conducted through a test of understanding of Pancasila values consisting of questions relevant to the concept of Pancasila in the context of science learning. This test was given to both groups after learning to measure the difference in understanding of Pancasila values. In addition, classroom observations were conducted to assess the process of student interaction and engagement during learning, which served as additional data to understand

the dynamics of Bruce and Weil's model implementation in the classroom context.

The data analysis technique used statistical tests, specifically the t-test, to compare the mean scores of the comprehension test results between the experimental and control classes. This test aims to determine the significance of the difference in results between the two groups, so that the effectiveness of Bruce and Weil's model in improving students' understanding of Pancasila values in science learning can be measured.

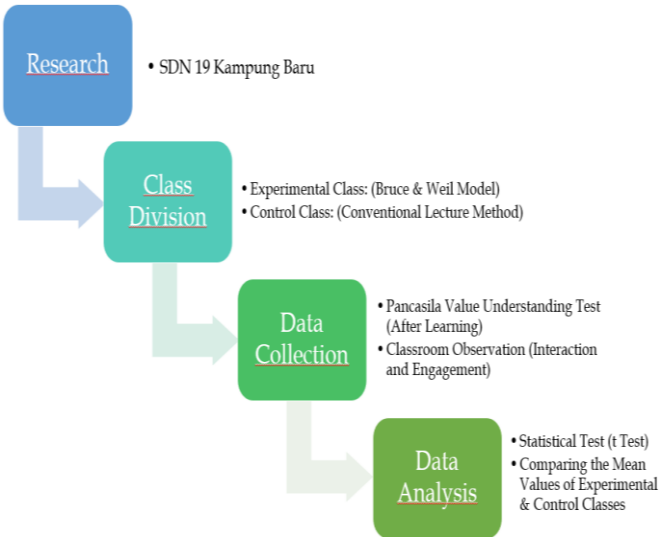

Figure 1. Research flow

Result and Discussion

Improvement of Students' Cognitive Understanding

Based on the table 1, there is a significant increase in students' cognitive understanding after the application of the Bruce and Weil model in the experimental class. The average value of students' pre-test before learning with this model is 70, which shows the students' initial level of understanding of Pancasila Education material integrated in science learning. After the learning process that prioritizes social interaction through group discussions and collaboration, the average value of students' post-test increased to 85, indicating an increase in cognitive understanding by 21.40%. This increase shows that Bruce and Weil's model is effective in improving students' understanding, especially in linking science concepts with Pancasila values through an interactive learning approach.

Table 1. Improvement of Students' Cognitive Understanding

Aspects Assessed	Percentage Result
Pre-test Average	70%
Post-test Average	85%
Increase in Cognitive Understanding	21.40%

Student Activity Observation

Results of Student Activity Observation

Observations made during the learning process showed that the use of Bruce and Weil's model had a positive impact on student participation and interaction in learning science with Pancasila values embedded. As many as 80% of students are actively involved in group discussions, which shows an increase in student involvement in science materials related to Pancasila. Students were more enthusiastic in expressing their opinions, listening to their peers' views, and participating in problem solving relevant to science concepts and moral values. Learning with this social interaction approach allows students to learn through cooperation and discussion, which supports their understanding of both the science material and the practical application of Pancasila values.

In addition, 85% of students showed good cooperation skills during group activities. In this social interaction-based science learning, students have the opportunity to develop social skills, such as supporting group members' opinions, sharing tasks, and appreciating each member's role. This active engagement shows that Bruce and Weil's model not only improves students' cognitive understanding of science and Pancasila values, but also trains them in important social skills in a collaborative environment, which can be applied both inside and outside the science context. The results of student activity observations are depicted in the figure 2.

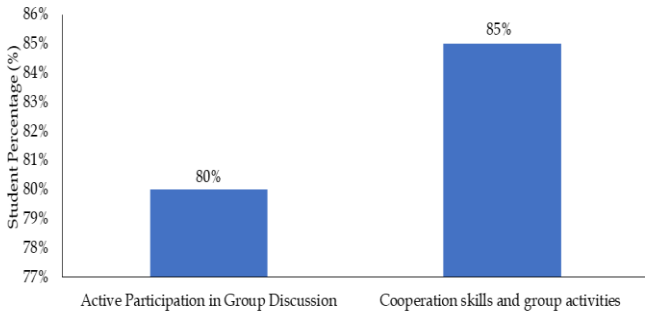

Figure 2. Student activity graph

To strengthen this finding, a comparison of post-test scores between the experimental class using the Bruce and Weil model and the control class using the conventional lecture method was conducted. The post-test results showed an average score of 85 in the experimental class, while the control class only reached an average of 70. Statistical testing with the t-test resulted in tcount =22.7t_{count} = 22.7 count=22.7, which is greater than ttable=1.68t_{table} = 1.68ttabel=1.68 at a significance level of 0.05. These results indicate a significant difference between the two groups, so the alternative hypothesis (Ha) is accepted.

Thus, the application of Bruce and Weil's model is proven to have a significant positive effect on student learning outcomes in Pancasila values in science learning.

Comparison of Learning Outcomes between Experimental and Control Classes

To strengthen these findings, a comparison of post-test scores between the experimental class using the Bruce and Weil model and the control class using the conventional lecture method was conducted. The post-test results showed an average value of 85 in the experimental class, while the control class only reached an average of 70. Statistical testing with the t-test resulted in tcount = 22.7, which is greater than ttable = 1.68 at the 0.05 significance level. These results indicate a significant difference between the two groups, so the alternative hypothesis (Ha) is accepted. Thus, the application of Bruce and Weil's model is proven to have a significant positive effect on students' understanding of Pancasila values in science learning. This model offers an effective approach to integrating character values in science learning, making the learning process not only academically relevant but also morally and socially.

The results of this study confirm the effectiveness of Bruce and Weil's model, which focuses on social interaction and collaboration, in improving students' understanding of Pancasila values in the context of science learning. This finding is consistent with Vygotsky's theory that emphasizes the importance of social interaction in the learning process, where students' understanding of science concepts associated with Pancasila values can be further developed through cooperation with peers. This model allows students not only to understand science concepts cognitively, but also to explore related moral values through discussion and problem solving together in the context of science.

This research also supports previous findings showing that collaborative learning models can improve learning outcomes. Bruce and Weil's model provides an opportunity for students to learn in a more interactive atmosphere, which is very important in science learning, where scientific concepts often require understanding through experimentation and discussion. Based on test results and observations, it is concluded that this model is effective in improving students' understanding and active participation in learning Pancasila values through science learning, which makes it a relevant learning alternative to be applied at the elementary school level (Lee & Song, 2024; Núñez-Cortés et al., 2024; Wu, 2024).

Based on the observation, Bruce and Weil's model that emphasizes social interaction has a positive impact on students' participation and cooperation in learning science concepts related to moral values. As many as 80% of students were actively involved in group discussions, which not only increased students' engagement in science lessons but also deepened their understanding of the importance of collaboration in science and everyday life. This supports Vygotsky's theory of the "zone of proximal development," which states that students can achieve better understanding through social interaction. Here, students get the opportunity to learn not only from the teacher's teaching but also from the experiences and views of their peers, thus enriching their understanding of the science concepts taught.

A total of 85% of students also showed an improvement in their ability to work together during group activities, which is an important skill in collaboration-based science experiments. According to Johnson et al. (2009) in Laurent et al. (2023), cooperation in groups helps students develop social skills such as communication and respect for others' opinions, which is in line with science learning that often requires teamwork in observing natural phenomena or solving scientific problems. Learning that involves collaboration like this allows students to understand science concepts while applying social and moral values that are important in Pancasila Education (Ubago-Jimenez et al., 2024).

This social interaction-based learning is also in line with Bruce and Weil's views which emphasize the importance of active student involvement in the learning process. Their Social Interaction model aims to deepen the understanding of science concepts through discussion, sharing experiences, and solving scientific problems collectively. According to Bruce and Weil (2014) in Joyce & Calhoun (2024), this model can increase students' motivation because they feel they have a role in their own learning, so the process of learning science becomes more meaningful and relevant to their lives.

International studies by Johnson and Johnson (2009) in Laurent et al. (2023) also show that cooperative learning improves student learning outcomes, especially in social and communication skills that are important in science. Bruce and Weil's collaboration-based model allows students to work together in solving science problems and understanding Pancasila concepts, making the learning process more effective and interesting. Johnson and Johnson's findings show that students in cooperative learning tend to be better able to understand complex concepts and build positive interpersonal relationships that support scientific work.

National research by Kurniawati et al. (2023) also found that the implementation of a social interaction-based learning model in primary schools improved students' ability to internalize moral values in a real learning context. Students involved in active group discussions showed better understanding of scientific

concepts associated with the values of togetherness and cooperation. This is in line with the findings in this study that Bruce and Weil's model is effective in teaching moral values relevant in daily life through science subjects.

In addition, research by Kong et al. (2024) shows that collaborative learning improves motivation and academic outcomes, which is also relevant in science learning. In the context of Pancasila Education, this means that students not only understand Pancasila values theoretically, but also apply them in collaborative activities that require cooperation and tolerance, important qualities in scientific exploration. Slavin also found that collaboration-based learning helped less engaged students to become more active in the learning process, in line with observations that students became more enthusiastic in discussing and sharing views when learning science concepts.

The use of Bruce and Weil's model in Pancasila Education through science learning also supports the theory of culturally responsive education proposed by Al-Omoush et al. (2022), which emphasizes that learning that is relevant to cultural and social values can increase student engagement. In science learning that links scientific concepts with Pancasila values, students learn values such as mutual cooperation, respect for differences, and cooperation in harmony, which are relevant in life and science. Thus, this model not only improves students' cognitive understanding, but also internalizes social and cultural values relevant in their daily lives, which is important in the study of science (Lu et al., 2024; Tangoi & Hattab, 2024; Witri & Kurniawati, 2023).

This research supports the view that Bruce and Weil's model is an appropriate approach for basic education, particularly in learning Pancasila Education integrated in science lessons. The model is not only effective in improving cognitive understanding, but also strengthening social skills and positive attitudes towards diversity, which are relevant in science. With the interactive approach, students learn to respect different opinions, listen to each other and collaborate in scientific problem solving, showing that a social interaction-based learning approach can improve students' character and knowledge in various aspects of basic education.

Conclusion

This research shows that the application of Bruce and Weil's social interaction-based learning model is effective in improving students' understanding of Pancasila values in the context of science learning in elementary schools. This model, through a collaborative approach and group discussions, succeeded in increasing students' active participation and deepening their understanding of the concepts taught. A comparison of post-test scores between the experimental and control classes showed a significant increase in the group using the Bruce and Weil model. In addition to improving cognitive understanding, this model also helps students develop social skills such as cooperation, tolerance, and critical thinking ability, which are important in internalizing the values of Pancasila. Therefore, Bruce and Weil's model can be considered as an effective alternative approach in learning Pancasila Education integrated with science learning at the elementary school level.

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Conflicts of Interest

In writing this article, the authors do not have any conflict of interest.

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