

# The Tri Kaya Parisudha-Based SFAE Learning Model Has A Positive Impact on Fifth-Grade Students' Science Knowledge Competencies

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## Abstrak

*Pembelajaran yang berlangsung khususnya mata pelajaran IPA belum sesuai dengan amanat kurikulum 2013. Kompetensi pengetahuan IPA siswa sekolah dasar yang masih rendah. Penelitian ini bertujuan untuk menganalisis pengaruh model pembelajaran SFAE berbasis Tri Kaya Parisudha terhadap kompetensi pengetahuan IPA siswa. Jenis penelitian ini adalah quasi experiment dengan menggunakan rancangan non-equivalent control group design. Populasi penelitian ini adalah seluruh siswa kelas V sebanyak 443 siswa, dengan penentuan sampel menggunakan teknik cluster random sampling. Metode pengumpulan data menggunakan metode tes jenis uraian (essay). Data hasil penelitian dianalisis menggunakan teknik analisis statistik deskriptif dan analisis statistik inferensial (uji-t). Hasil uji hipotesis menggunakan teknik uji-t dengan rumus polled varians, diperoleh thitung sama dengan 4,67 lebih dari ttable sama dengan 1,998 pada taraf signifikansi 5% dengan dk sama dengan 63, sehingga Ha diterima dan H0 ditolak. Maka disimpulkan bahwa model pembelajaran SFAE berbasis Tri Kaya Parisudha berpengaruh terhadap kompetensi pengetahuan IPA siswa. Implikasi penelitian ini diharapkan model pembelajaran SFAE berbasis Tri Kaya Parisudha sebagai model pembelajaran inovatif untuk mendorong keaktifan siswa dan meningkatkan hasil belajar.*

**Kata Kunci:** SFAE, tri kaya parisudha, kompetensi pengetahuan IPA

## Abstract

Learning that takes place, especially science subjects, is different from the mandate of the 2013 curriculum. The science knowledge competence of elementary school students still needs to improve. This study aims to analyze the effect of the SFAE learning model based on Tri Kaya Parisudha on students' science knowledge competence. This type of research is a quasi-experiment using a nonequivalent control group design. The population of this study was all grade V students, as many as 443 students, with sample determination using a cluster random sampling technique. The data collection method used an essay-type test. The research data were analyzed using descriptive statistical techniques and inferential statistical analysis (t-test). The results of hypothesis testing using the t-test technique with pooled variance formula obtained a t-count equal to 4.67 more than the t-table equal to 1.998 at a 5% significance level with dk equal to 63, so Ha is accepted, and H0 is rejected. So it is concluded that the SFAE learning model based on Tri Kaya Parisudha affects students' science knowledge competence. This research implies that the SFAE learning model based on Tri Kaya Parisudha is expected to be an innovative learning model to encourage student activeness and improve learning outcomes.

**Keywords:** SFAE, tri kaya parisudha, science knowledge competence

## 1. INTRODUCTION

The rapid development of science and technology requires Indonesia to improve the quality of education to create human resources that can compete in the global era (Hermanto, 2020; Ilham, 2019). Therefore, the government is making various efforts to improve the quality of education in Indonesia, which is marked by improvements in every aspect of education, especially the curriculum. Life skills in the 21st century are not enough to memorize, so learning in formal schools places more emphasis on aspects of collaboration,

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communication, higher-order thinking skills, as well as creativity and innovation, which is termed 4C (Communication, Collaboration, Critical Thinking and Problem-Solving, and Creativity and Innovation) (Landa-Blanco & Cortés-Ramos, 2021; Muliastri, 2020; Reichert et al., 2021; Suhirman & Khotimah, 2020). These 4Cs are the real abilities that the 2013 Curriculum wants to aim at (Waseso, 2018). The 2013 curriculum is a curriculum that mandates the essence of a scientific approach to learning, which can balance the development of attitudes, skills, and knowledge competencies of students to build soft skills and hard skills. One of the lesson content integrated into the 2013 curriculum is science content. Natural Sciences (IPA) deals with how to find out systematically about nature, which does not only contain facts, concepts, or principles, but its implementation through a process of discovery through scientific methods and demands a scientific attitude, which is, of course, very useful for students' lives because directly related to the universe and human life (Rianti dan Nulhakim 2017; Astuti, 2020).

The era of Revolution 4.0 had an impact on the world of education, which required everyone to change their way of thinking about education because now Indonesia is still struggling with the problem of improving the quality of education at various levels of education, as evidenced by a survey of student abilities by PISA. The results of the 2018 PISA survey show that Indonesia is in the 74th position out of 79 countries participating in the assessment (Hewi dan Shaleh, 2020). It indicates that learning outcomes are still unsatisfactory, so Indonesia must continue improving. However, in reality, the learning that takes place, especially in science subjects, is not by the mandate of the 2013 curriculum. Observations with the homeroom teacher of class five, Gugus I, North Kuta, show that students tend to feel bored when listening to subject matter that emphasizes rote memorization. The lack of students actively involved in the learning process causes them to be embarrassed and afraid when asked to appear in front of the class. When asked to convey ideas or opinions, they tend to ask other friends, and only certain students dare to express their ideas. Students also need to be more honest when the test is carried out. They try to find answers by cheating because of their limited memory capacity. This condition causes students to be unable to receive learning material properly, which impacts students' low knowledge competence. Student activeness can support learning success because indicators of student activity can be observed from the readiness, involvement, concentration, and cooperation of students in the learning process (Carlucy et al., 2018; Ningsih et al., 2018; Sarini & Selamet, 2019). Active students will construct their knowledge to stimulate and develop their talents, practice critical thinking, and solve problems in everyday life. In the education system, assessments are important to determine whether students have achieved predetermined competency targets. Based on the results of the data analysis of the fifth-grade students' daily test scores, it was found that most of the students had low science knowledge competence, namely 61.17% of students who had not reached the target of 65% mastery of knowledge competence with a predicate sufficiently in line with PAP. Students are declared passed if they have at least 65% mastery with a sufficient predicate, so it is expected that students can have knowledge competence of at least 65% mastery of knowledge competence with a sufficient predicate (Anak Agung Gede Agung, 2020).

One way to do this is to design and implement innovative learning models, one of which is the Student Facilitator and Explaining (SFAE) learning model. The SFAE learning model is a cooperative learning model in which students are given the opportunity as peer tutors to explain the material to their friends (Rahmatullah et al., 2021; Yanto & Juwita, 2018). Providing opportunities for students to present ideas, thoughts, or opinions to other students can improve linguistic skills, which is reflected when students can process information critically and systematically, ask questions, answer, appreciate, and present opinions, ideas, or ideas and conclude material lessons that are discussed competently with

words of complex meaning, either orally or in writing (Harefa & Telukdalam, 2021; Mustikasari et al., 2019). The learning process with this cooperative type is carried out by grouping students into a collaborative and heterogeneous group, thereby encouraging students to construct knowledge through social interaction with other students. It aims to train students to develop leadership attitudes and mutual respect when interacting because, in the learning process, students are required to cooperate in completing tasks (activities or problem-solving) by complementing each other, helping and exchanging ideas with friends who have different backgrounds (Harefa & Telukdalam, 2021; Ruhullessin et al., 2019). The advantage of the SFAE model is that it encourages students to learn and become the best in their class by practicing critical, active, creative thinking skills, and fostering a sense of tolerance and independence in solving problems, through interactive activities and exchanging information, opinions or experiences openly (students become a facilitator) to broaden students' insights or find the truth of a concept (Amelia & Syahputra, 2019; Mustikasari et al., 2019).

Previous research findings also state that the SFAE learning model can help improve students' knowledge competence (Saisabila, 2018). The SFAE learning model influences student outcomes (N. P. A. Dewi et al., 2020; Mustikasari et al., 2019; Riadi et al., 2022; Rianti & Nulhakim, 2017). Innovation in the learning process needs to be carried out to optimize the competence of students' science knowledge in a shift in social and cultural values due to global factors that affect the order of life, mindset, and even people's behavior, especially students as the younger generation. Associating science subject matter with one of the values of local wisdom, especially Bali, can be done to make the learning process more meaningful. So in its application, the SFAE learning model is combined with Tri Kaya Parisudha. Tri Kaya Parisudha is one of the local wisdom that has values originating from universal Hindu religious concepts, which contain three aspects that must be observed to control and balance the harmony between human thoughts, words, and actions (Ariasa & Gede Agung, 2020; Ernawati, 2018; Karmini et al., 2021). The teachings of Tri Kaya Parisudha are used as a basis for regulating humans in fostering harmonious and harmonious relationships with other God's creatures and the natural surroundings to achieve happiness (A. A. I. M. U. Dewi et al., 2020; Widiasih, 2019). This study aimed to analyze the Tri Kaya Parisudha-based SFAE learning model for fifth-grade students' science knowledge competencies. Applying the Tri Kaya Parisudha-based SFAE learning model is expected to improve critical, active, and creative thinking skills in solving various study group frame problems so that students get good knowledge to apply in everyday life.

## **2. METHOD**

The research carried out is included in the type of quantitative research, namely experimental research with a quasi-experimental design. The form of the quasi-experimental design used is the Nonequivalent Control Group Design. The initial step to determine the research subject is the population studied. The population is the entire group of people with certain characteristics and qualities determined by the researcher with the hope of being generalized and further studied. Then conclusions are drawn (Firmansyah & Dede, 2022; Hermawan, 2019). In other words, the purpose of holding a population is so that researchers can determine the size of the sample members to be taken from members of the population and limit the generalization area. The population in this study included all fifth-grade students in Gugus I, North Kuta, 2022/2023 academic year, totaling 443 students, consisting of 15 classes from 7 schools. The study population was then tested for equality using a one-way analysis of variance (Anava A). Once it is known that the population is academically equivalent, a representative is taken from the population to serve as a research object called a

sample. The sample is part of the population that will be investigated directly by the researcher and taken by a sampling technique (A.A. Gede Agung, 2018; Firmansyah & Dede, 2022). The sampling technique to determine this study's experimental and control classes used a cluster random sampling technique by lottery. After drawing lots of the seven schools in Gugus I, North Kuta, two classes were obtained as research samples, namely class VB SD No. 1 Dalung as many as 34 students as the experimental group, and class VA SD No. 2 Dalung, as many as 31 students as the control group.

The data analyzed in this study is data regarding science knowledge competencies, so the data collection method used is the test method. A test method is an assessment tool containing a series of tasks that must be done to get a score (interval), which aims to measure the understanding and competence of a person or group of people tested after learning something (A.A. Gede Agung, 2018). The instrument used to collect data on students' science knowledge competence is the form of an essay test. Instrument testing is carried out before the test is first used, and conducted validity test. If an instrument can provide precise and accurate measurement results, which reflect the actual state of what is being measured, then the instrument is said to have high validity (can collect information according to the question) (Ndiung & Jediut, 2020; Situmorang & Purba, 2019). The validity test used is content validity, which is the measurement accuracy based on the instrument's content. Item validity was carried out to identify good and poor test items used as a whole. Testing the validity of the science knowledge competency test items in the form of essays used in this study was the product moment correlation formula by Carl Pearson. It obtained three invalid and seven valid questions from the 10 test items that had been tried out. The second is reliability. A measuring instrument is reliable if the results of a measurement show constancy or consistency if the measurement is repeated many times on the same subject, as long as the aspects measured in the subject are still the same (Janna dan Herianto, 2021). The internal consistency reliability test technique, Alpha Cronbach, uses the criteria put forward by Nunnally and Streiner (Yusup, 2018). Based on the calculation results, from the seven declared valid questions, the  $r_i$  score was 0.73, meaning that the description test questions in this study were classified as reliable. Science knowledge competence data that has been collected was analyzed using descriptive statistical analysis methods and inferential statistics. The descriptive analysis method finds the mean, median, mode, standard deviation, and variance. Meanwhile, the inferential statistical analysis method used is the t-test. Before analysis, a data analysis prerequisite test was carried out, including a normality test for data distribution, using the chi-square formula. The test criteria are at a significance level of 5% with degrees of freedom ( $dk$ ) = 5. If  $\chi^2_{count} \leq \chi^2_{table}$ , then the data is normally distributed. Homogeneity test of variance, using Fisher's test (F test), with testing criteria at a significance level of 5%, with  $df_1 = k - 1$ , and  $df_2 = n - k$ , if  $F_{count} \leq F_{table}$  then the homogeneity testing criteria is said to be homogeneous. To test the hypothesis of this study using the t-test with the pooled variance formula, with the criteria if  $t_{count} > t_{table}$  at a significance level of 5% with  $dk = n_1 + n_2 - 2$ , then  $H_0$  is rejected, and  $H_a$  is accepted.

### 3. RESULT AND DISCUSSION

#### Result

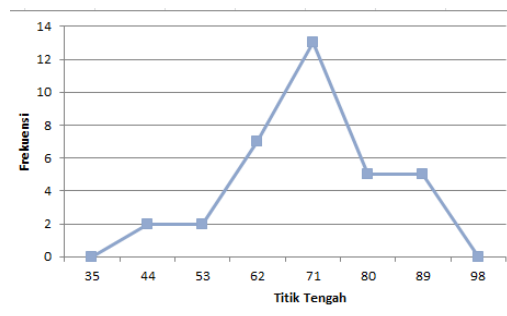
The study was conducted in the experimental group, which was treated with the SF AE model based on Tri Kaya Parisudha, and the control group was not given any treatment or applied conventional learning. However, at the beginning of the study, each group was given a pre-test first, then the research was carried out in 6 meetings in each group and ended with giving a post-test. Then look for normalized score gain data from the pre-test and post-test scores of students' science knowledge competencies in each group to see the increase in

students' abilities. Based on the results of quantitative descriptive statistical analysis, the science knowledge competency data of the experimental group, which was taught through the Tri Kaya Parisudha-based SFAE learning model, showed the average score of gain normalized score = 0.71 with mode = 0.75, median = 0.72, and standard deviation = 0.12 and variance = 0.015. In addition, the minimum normalized score gain score is 0.40, and the maximum score is 0.92. Whereas the control group's science knowledge competency data were not taught through the SFAE learning model based on Tri Kaya Parisudha, showing the average score of normalized gain score = 0.56 with mode = 0.46, median = 0.54, standard deviation = 0.16 and variance = 0.027. The minimum normalized score gain score is 0.28, and the maximum normalized score gain score is 0.80. The summary of the results of data analysis gain normalized scores of science knowledge competencies in the experimental group, and the control group is presented in Table 1.

**Table 1.** Description of Science Knowledge Competency Score Data

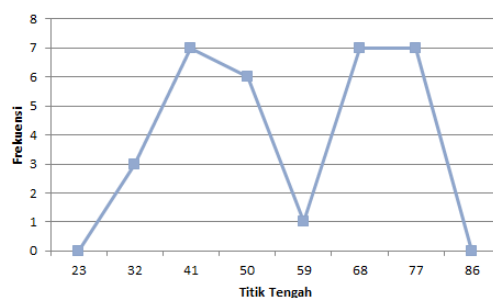
Analysis Results	Science Knowledge Competency	
	Experiment Group	Control Group
Average (Mean)	0.71	0.56
Mode (Mo)	0.75	0.46
Median	0.72	0.54
Standard deviation	0.12	0.16
Variance	0.015	0.027
Minimum GS <sub>n</sub> Score	0.40	0.28
Maximum GS <sub>n</sub> Score	0.92	0.80

The results of the trend of the normalized gain score of the science knowledge competence of the experimental group can be described through the slope of the frequency distribution polygon curve in Figure 1.



**Figure 1.** Polygon Graph of the GS<sub>n</sub> Score of the Science Knowledge Competence of the Experimental Group

Based on Figure 1, it is known that the mean is smaller than the median, and the median is smaller than the mode ( $M < Me < Mo$ ), thus forming a negative squint curve, which shows that most of the values in the experimental group tend to be high. Furthermore, the average gain normalized score of science knowledge competence of students in the experimental group  $M = 0.71$  is categorized by the classification of gain normality score, which is in the high category. Meanwhile, the tendency of the control group's normalized gain score of science knowledge competence can be described through the slope of the frequency distribution polygon curve in Figure 2.



**Figure 2.** Polygon Graph of the GSn Score of the Control Group's Science Knowledge Competence

Figure 2 shows that the mean is greater than the median, and the median is greater than the mode ( $M > Me > Mo$ ), thus forming a positive skew curve, which indicates that most of the values in the control group tend to be low. Furthermore, the average gain normalized score of science knowledge competence of students in the control group  $M = 0.56$  is categorized by the classification of the gain normality score, which is in the medium category. Furthermore, hypothesis testing was carried out with t-test analysis. However, an assumption or prerequisite test must be carried out, including the data distribution normality and variance homogeneity tests. The results of the normality test analysis for the distribution of gain data normalized scores for the experimental and control groups are presented in Table 2.

**Table 2.** Results of the Data Distribution Normality Test

Sample	N	$\chi^2_{\text{count}}$	$\chi^2_{\text{table}}$	Description
Experiment Group	34	3,913	11,07	Normal distribution
Control Group	31	3,96	11,07	Normal distribution

Based on Table 2, it can be seen that the normalized score gain data for the experimental group and the control group are normally distributed. The results of data gain analysis for the normalized score of the experimental group obtained  $\chi^2_{\text{count}} (3.913) < \chi^2_{\text{table}} (11.07)$  at a significance level of 5% with  $dk=5$ , so  $H_0$  was accepted, and  $H_a$  was rejected. Meanwhile, the results of the analysis of data gain normalized scores for the control group obtained  $\chi^2_{\text{count}} (3.96) < \chi^2_{\text{table}} (11.07)$  at a significance level of 5% with  $dk=5$  so that  $H_0$  was accepted and  $H_a$  was rejected. The results of the homogeneity test of variance data gain normalized scores for the experimental and control groups are presented in Table 3.

**Table 3.** Variance Homogeneity Test Results

Sample	$S_x^1$	$S_x^2$	Df	$F_{\text{count}}$	$F_{\text{table}}$	Description
Experiment Group	0,015		$df_1=1$			
Control Group		0,027	$df_2=63$	1,8	3,993	Homogenous

Based on Table 3, it is found that  $F_{\text{count}} (1.8) < F_{\text{table}} (3.993)$ , so the data gain a normalized score of science knowledge competence between the experimental group and the control group has a homogeneous variance. After testing the prerequisites for data analysis, it continued testing the research hypothesis, using the t-test analysis with the pooled variance formula. A summary of the results of hypothesis testing is presented in Table 4.

**Table 4.** Results of t-test Analysis

Sample	n	Dk	$\bar{x}$	s <sup>2</sup>	T <sub>count</sub>	t <sub>table</sub>	Description
Experiment Group	34	63	0,71	0,015	4,69	1,998	H <sub>0</sub> rejected
Control Group	31		0,56	0,027			

Based on the results of the analysis in Table 4, it shows that tcount (4.69) > ttable (1.998) at a significance level of 5% with dk = 63, so that H<sub>0</sub> is rejected and H<sub>a</sub> is accepted. So, there is a significant influence of the Tri Kaya Parisudha-based SFAE learning model on the science knowledge competence of fifth-grade students.

## Discussion

The results of the scientific knowledge competence data analysis show differences in the learning outcomes of students taught through the Tri Kaya Parisudha-based SFAE learning model with students not taught through the Tri Kaya Parisudha-based SFAE learning model. This significant difference indicates a significant influence of the Tri Kaya Parisudha-based SFAE learning model on the science knowledge competence of fifth-grade students of Gugus I, North Kuta. Significant differences in the science knowledge competencies of students taught through the Tri Kaya Parisudha-based SFAE learning model and students not taught through the Tri Kaya Parisudha-based SFAE learning model are due to differences in treatment in the learning process. One of the advantages of the SFAE learning model is that it encourages the growth of courage to express opinions openly because, in the learning process in class, teachers provide opportunities for students to become peer tutors in explaining the material being studied or conveying ideas, thoughts, and opinions to their friends (Widiasih, 2019; Yanto & Juwita, 2018). Such a learning process will motivate students to learn and participate actively through group interactions and be critical in dealing with every problem to become the best in their class. Student motivation and activity in class are two factors that can support the success of the learning process and optimal learning outcomes (Hajhashemi et al., 2018; Stellmacher et al., 2020). Applying the SFAE learning model is combined with one of the local wisdom with values from Hindu teachings, Tri Kaya Parisudha, which will form quality human beings because they balance thoughts, words, and actions in behavior. Humans will create destruction in the world if they do not have an attitude of religiosity in dealing with the influence of scientific and technological developments in the era of the industrial revolution 4.0 (Sulaksana & Mahadewi, 2022; Suparya, 2021).

Thus, it is hoped that the application of the SFAE model based on Tri Kaya Parisudha will not only increase intellect (4C abilities) but be accompanied by an attitude of religiosity so that students can solve problems in everyday life and face the demands of an ever-evolving era. The SFAE learning model activities can encourage and train students to be active, creative, and think critically in the learning process through interaction and collaboration with their friends so that there is a balance in cognitive, affective, and psychomotor competencies. Compared to conventional learning, students become passive because learning activities tend to be centered on the teacher. A lack of students' active portion in the learning process can reduce learning motivation and cause boredom, impacting learning outcomes. This finding is reinforced by the findings of previous studies, which state that the student facilitator and explaining learning model assisted by non-projection visual media has a significant effect on the science knowledge competence of fourth-grade students at SD Gugus Letda Made Putra, North Denpasar (Saisabila, 2018). A positive relationship exists between applying the Student Facilitator and Explaining the learning model and students' critical thinking skills in mathematics (Riadi et al., 2022). There is a significant difference in pretest-posttest scores (before and after) using the Student Facilitator And

Explaining learning model on the critical thinking skills of fifth-grade students at SDN Lamper Tengah 01 Semarang (Mustikasari et al., 2019). There are differences in mathematics learning outcomes between groups of students taught using the Tri Kaya Parisudha-based SFAE learning model and those taught using conventional learning (Widiasih, 2019). Thus, it can be concluded that the Tri Kaya Parisudha-based SFAE learning model affects fifth-grade students' science knowledge competence. This research implies that the Tri Kaya Parisudha-based SFAE learning model is expected to be an innovative learning model to encourage student activity and improve learning outcomes.

#### 4. CONCLUSION

The results showed that the SFAE learning model based on Tri Kaya Parisudha made students active, creative, and critical during the learning process. It emphasized students' ability to construct knowledge through social interaction with other students to increase motivation to learn and influence science knowledge competence. Thus, it can be concluded that the Tri Kaya Parisudha-based SFAE learning model affects the science knowledge competence of fifth-grade students. It is recommended that teachers use the SFAE learning model based on Tri Kaya Parisudha as an innovative learning model to encourage student activity and improve learning outcomes. It is suggested that other researchers use this study's results as a reference for further, more in-depth research on different data sources or samples, especially on natural science content, to impact students' natural science knowledge competence positively.

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