Journal of Educational Sciences
Journal homepage: https://jes.ejournal.unri.ac.id/index.php/JES

P-ISSN 2581-1657
E-ISSN 2581-2203

A Study of Collaborative Skills: Comparing the Effectiveness of ARIAS Interest and TS-TS Models in Elementary Education

Anis Hanifah*, Sri Lestari Handayani
Primary School Teacher Education, Universitas Muhammadiyah Prof. Dr. Hamka, Jakarta, 12130, Indonesia

ARTICLE INFO

Article history:

Received: 09 June 2025
Revised: 16 June 2025
Accepted: 19 June 2025
Published online: 24 July 2025

Keywords:

Collaboration,
ARIAS Interest Type,
Two Stay Two Stray,
IPAS,
Learning,
Fifth-Grade Students

* *Corresponding author:*

E-mail: 2101025096@uhamka.ac.id

Article Doi:

https://doi.org/10.31258/jes.9.4.p.2977-2985

A B S T R A C T

The development of 21st-century skills, particularly student collaboration, has become increasingly important in elementary education. This study aims to compare the effectiveness of the ARIAS learning model (Interest type) and the Two Stay Two Stray (TS-TS) model in enhancing student collaboration during Integrated Science and Social Studies (IPAS) learning among fifth-grade students. The research employed a quantitative approach with a quasi-experimental method using a pretest-posttest control group design. Two classes from SDN Cengkareng Barat 16 Pagi were selected as samples, with each class implementing one of the two learning models. Data were collected through validated observation sheets designed to measure student collaboration levels. The results revealed a significant difference in collaboration levels between the two experimental groups, with the TS-TS model demonstrating a greater positive impact on students' collaborative abilities compared to the ARIAS (Interest type) model. Statistical analysis confirmed that the TS-TS approach was more effective in fostering teamwork, communication, and peer interaction skills. These findings suggest that the TS-TS model is a more suitable learning strategy for enhancing student collaboration in IPAS subjects, providing valuable insights for educators seeking to implement collaborative learning approaches in elementary integrated curriculum settings.

1. Introduction

Education in the 21st century demands the mastery of higher-order thinking skills (HOTS) as well as social competencies such as communication, collaboration, creativity, and critical thinking. One of the key skills emphasized in modern learning is collaboration the ability of students to work together, share ideas, take responsibility for their roles, and complete tasks as a group. This collaborative skill is crucial to instill from elementary school onwards, as it forms the foundation for developing social character and success in both academic pursuits and real-life interactions.

In integrated subjects like Natural Sciences and Social Sciences (IPAS), students are not only expected to understand concepts but also actively engage in observation, analysis, and conclusion-drawing through social interactions, including group discussions and simple experiments. Therefore, selecting an appropriate instructional model plays a vital role in fostering students' collaborative abilities. Handayani & Arifin (2021) state that the right instructional model can significantly enhance the scientific process skills of prospective elementary school teachers. Additionally, analyzing conceptual errors or misconceptions remains a critical focus in learning evaluation.

One instructional model that emphasizes student motivation and active participation is the ARIAS model (Assurance, Relevance, Interest, Assessment, Satisfaction). Developed by Keller, this model focuses on building student motivation through five components. In this research context, emphasis is placed on the "Interest" component, which aims to cultivate students' interest and emotional engagement through relevant and engaging learning experiences. Previous studies have shown that the ARIAS model effectively increases student interest, group interaction, and classroom participation (Yasin & Nihayah, 2022).

Apart from ARIAS, the Two Stay Two Stray (TS-TS) model is frequently used in group-based learning. As part of cooperative learning approaches, TS-TS involves two group members staying in place to explain their discussion results, while the other two move to different groups to share information. This model provides opportunities for students to exchange opinions and listen to diverse perspectives. However, according to Muhsin et al. (2025), TS-TS does not fully encourage comprehensive participation, particularly among passive or less confident students.

Based on this background, this study aims to compare the effectiveness of the ARIAS model (focusing on the "Interest" type) and the TS-TS model in enhancing students' collaborative skills in IPAS learning. The research was conducted at SDN Cengkareng Barat 16 Pagi with fifth-grade students as participants, aiming to evaluate which instructional approach is most effective in developing 21st-century social skills.

Hadi & Anggrasari (2021) reported that the digital literacy-based ARIAS model is highly effective in improving critical thinking skills among elementary school students, although the primary focus was not on collaboration. Nevertheless, the findings highlight that the "Interest" phase in ARIAS creates strong emotional involvement, which positively impacts social interactions in the classroom. Yasin & Nihayah (2022) noted that cooperative settings within the ARIAS model such as peer discussions and workgroups have a positive impact on group dynamics and student interactions during learning. Indriyani et al. (2023) tested the effectiveness of ARIAS in enhancing self-efficacy among elementary school students. The results showed that ARIAS successfully increased students' confidence in the learning process, including collaborative activities in the classroom. Rahmawati, Kasdi, and Riyanto (2020) found that the ARIAS model effectively boosts student motivation and problem-solving skills among fifth-grade elementary school students. The social engagement fostered by ARIAS demonstrated improved interactions and

collaboration among students throughout the learning process. Overall, these studies underscore the potential of the ARIAS model to enhance collaborative skills, making it a promising approach for integrating social competencies into modern education.

Based on this background, this study aims to compare the effectiveness of the ARIAS model (focusing on the "Interest" component) and the Two Stay Two Stray (TS-TS) model in enhancing students' collaborative skills in integrated science and social studies (IPAS) learning among fifth-grade students at SDN Cengkareng Barat 16 Pagi. This research seeks to provide empirical evidence regarding which instructional approach is most effective in developing 21st-century social skills, particularly collaboration, within cross-curricular learning contexts such as IPAS.

2. Methodology

This study uses a quantitative approach with a quasi-experimental method and a posttest-only control group design. This design is used to determine the effect of two different learning models on students' collaboration skills without conducting a comprehensive pretest to minimize the learning effect from the initial measurement. The subjects of this study were fifth-grade students at SDN Cengkareng Barat 16 Pagi during the 2024/2025 academic year. The sample was selected using purposive sampling, namely two classes considered academically equivalent. Class V-A was designated as the experimental class using the ARIAS model of the Interest type, and class V-B as the control class using the Two Stay Two Stray (TS-TS) model, with each class consisting of 32 and 31 students, respectively.

The research instrument was an observation sheet for collaboration skills, which had been validated through expert judgment by academic experts and declared valid in terms of content, and its reliability was tested using Cronbach's Alpha formula, with a reliability coefficient of >0.80, indicating a high level of consistency. Data were collected through direct observation during the learning process and analyzed using the independent sample t-test statistical technique to determine differences in collaboration skills between the two groups. Data processing was conducted using the latest version of SPSS software.

3. Results and Discussion

Before the instrument was used in the study, two expert lecturers conducted a validity test to ensure the instrument's suitability and quality. The first lecturer was an expert in the field of language, while the second lecturer was an expert in the field of evaluation. The assessment results from the language expert lecturer showed an average score of 3.86, indicating that the instrument had met the linguistic aspects very well. Meanwhile, the assessment from the evaluation expert showed an average score of 3.71, indicating that the instrument was also quite good

from an evaluation perspective. Thus, the instrument was deemed suitable for use in the next stage of research.

Before conducting the hypothesis test, a prerequisite analysis test was first conducted to ensure that the data obtained met the assumptions of parametric statistics. One of the prerequisite tests conducted was a normality test, which aimed to determine whether the learning outcomes data of students in the experimental and control classes were normally distributed (Sonjaya et al., 2025). In this study, the normality test was conducted using Kolmogorov-Smirnov with Lilliefors correction. The basis for decision-making in the normality test is that if the significance value (Sig.) > 0.05, then the data can be declared normally distributed. Conversely, if the significance value ≤ 0.05, then the data is declared not normally distributed (Quraisy, 2022). The calculations were performed using the SPSS program. The results of the normality test are presented in Table 1 below:

Table 1. Normality Test Results

Class	Kolmogrof-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Results of Meet1 Control Class	.123	31	.200	.960	31	.290
Meet3 Control Class	.181	31	.011	.932	31	.051
Meet1 Experiment Class	.178	32	.012	.955	32	.199
Meet3 Experiment Class	.166	32	.026	.937	32	.063

Based on the results of the normality test using Kolmogorov-Smirnov with Liliefors correction, it is known that the significance value for the experimental group is 0.200 and for the control group is 0.162, which indicates that these values are above the significance threshold of 0.05. Thus, it can be concluded that the data in both groups are normally distributed according to the Liliefors test. This finding is reinforced by the results of the Shapiro-Wilk test, which also shows significance values of 0.266 for the experimental group and 0.94 for the control group. Therefore, the assumption of normality is fulfilled, and the data is suitable for further analysis.

After performing the normality test calculations in accordance with the requirements, the homogeneity test must be considered to determine whether the variance of the data from the two groups is the same or not (Naitili & Nahak, 2023). To test homogeneity in this study, Levene's test was used. The basis for decision-making in the homogeneity test is that if the significance value (Sig.) > 0.05, the data can be declared homogeneous. Conversely, if the significance value ≤ 0.05, the data is declared non-homogeneous (Agustian et al. 2025). The calculations were performed using the SPSS program. The results of the homogeneity test are presented in Table 2 below:

Table 2. Homogeneity Test Results

Levene Statistic	df1	df2	Sig.
2.406	3	122	.071

After conducting a homogeneity test, the results showed that the variance between the experimental class and the control class was homogeneous, as indicated by a significance value greater than 0.05. This indicates that the data from both groups had an equivalent distribution and met one of the requirements for using the t-test. With the fulfillment of the normality and homogeneity requirements, the analysis can proceed to the inferential stage using the independent sample t-test. This test is used to determine whether there is a significant difference between the average collaboration scores of students who participated in learning with the ARIAS Interest model and students who participated in learning with the TS-TS model.

Based on the results of the homogeneity test, it is known that the data from both groups, both the experimental class and the control class, have homogeneous variances. This is evidenced by the significance value (Sig.) in Levene's Test being greater than 0.05, so it can be concluded that the variances of the data from both groups are equivalent. Thus, the requirements for conducting an independent t-test have been met. After determining that the data is normally distributed and has homogeneous variance, the next step is to perform an independent sample t-test to determine whether there is a significant difference between the collaboration skills of students using the ARIAS Interest model and those using the TS-TS model. This test was used because the research design involved two different groups and the data were obtained from a single posttest conducted on each group. The results of the t-test are presented in Table 3 below:

Table 3. Average Results

	Class	N	Mean	Std. Deviation	Std. Error Mean
Results	Control Class	31	42.97	2.523	.453
	Experiment Class	32	86.09	1.553	.274

To determine the statistical significance of the differences in collaboration levels between the two groups, an independent sample t-test was conducted. The results of the t-test are presented in Table 4 below:

Table 4. Results of the Independent Sample t-Test

	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Results	2.017	.161	-81.998	61	.000	-43.026	.526	-44.178	-42.074
			-81.404	49.588	.000	-43.026	.530	-44.190	-42.062

Based on the results of the independent sample t-test that was conducted, a significance value (Sig. 2-tailed) smaller than the significance threshold of 0.05 was obtained. This indicates that there is a statistically significant difference between the collaboration abilities of students using the ARIAS Interest model and those using the TS-TS model in IPAS learning. This difference indicates that the learning model has an influence on student collaboration outcomes. Specifically, the average collaboration scores of students in the experimental class were higher than those in

the control class, suggesting that the ARIAS Interest model is more effective in enhancing students' collaborative abilities.

However, to determine the extent of the learning model's influence on these differences, an effect size calculation is necessary. Effect size analysis is important to provide an understanding of the strength of the intervention or treatment administered to the experimental group, not merely based on statistical significance alone. The effect size results can be seen in the following Table 5:

Table 5. Effect Size Results

Class	Average	Standard Deviation	Effect size (Cohens d)	Description
Experiment	86,09	1,553	2,004	Large Effect Size
Control	43,06	2,539		

Based on the results of calculating the effect size using Cohen's d formula, a value of 2.004 was obtained. This value is categorised as a large effect size according to Cohen's criteria. This value indicates that the treatment in the experimental class had a very strong influence on learning outcomes compared to the control class. The average score in the experimental class was 86.09 with a standard deviation of 1.553, while the control class had an average of 43.06 with a standard deviation of 2.539. The significant difference between the two groups reinforces the effectiveness of the learning intervention applied in this study. Thus, these results support the notion that the learning model used in the experimental class is capable of having a significant impact on improving students' understanding, both in terms of academic achievement and the stability of learning outcomes, as reflected in the smaller standard deviation.

Collaboration in the context of education encompasses five main aspects: active participation, effective communication, shared responsibility, tolerance, and joint decision-making. This study aims to determine the effectiveness of two learning models, namely the ARIAS Interest type and Two Stay Two Stray (TS-TS), in improving students' collaboration skills in the IPAS subject in Grade V at SDN Cengkareng Barat 16 Pagi. The primary focus is on comparing students' collaboration levels after implementing both models through a quasi-experimental approach with a posttest-only control group design. Based on post-learning observation data, it was found that in the experimental class using the ARIAS Interest model, 27 out of 32 students (87.10%) were in the Very Good category in terms of collaboration, while 5 students (12.90%) were in the Good category. These results indicate that almost all students in that class successfully demonstrated optimal collaborative behaviour after participating in interest-based and personal involvement-based learning. On the other hand, in the control class taught using the TS-TS model, 26 students (83.87%) were in the Very Good category, and 5 students (16.13%) were in the Good category. Although the number of students in the ‘Very Good’ category was quite high, the overall average score of the TS-TS class was slightly lower than that of the experimental class. Additionally, the range of posttest scores in the control class showed slightly more variation, indicating that student engagement was not uniform.

The use of the ARIAS learning model is very important in the science teaching and learning process so that students do not get bored. When the ARIAS model is used in science lessons, students are more actively involved in learning and collaboration. The application of the ARIAS learning model in the classroom has the potential to broaden students' understanding, increase their enthusiasm for learning, and improve learning outcomes and achievements. This can be demonstrated when the learning is put into practice. When researchers used the ARIAS learning model to conduct their research, they found that students were more engaged and motivated to learn. This model improves students' understanding of the material, making science learning more interesting and less monotonous (Wanningrum & Sukmawati, 2023).

Additionally, Kusuma & Hamidah (2019) added that the ARIAS Interest approach specifically enhances collaborative skills because students feel more emotionally and socially engaged in group activities. They do not merely follow the teacher's instructions but actively form communication and strategies with their group members. Meanwhile, the Two Stay Two Stray (TS-TS) model is an effective cooperative learning strategy in fostering communication between groups. According to Darmawan & Harjono (2020), this model can foster students' courage in expressing their opinions and expand their understanding through information exchange. However, its effectiveness highly depends on students' initial readiness and the dynamics of the formed group. In the context of social applications, contextually and collaboratively designed learning has been proven to strengthen students' literacy and numeracy (Handayani & Arifin, 2021).

In IPAS learning that emphasises observation, exploration, and problem solving, the use of the ARIAS model provides greater benefits because it combines the cognitive and affective aspects of students. When students are interested in the material, they are more motivated to actively contribute to the group, listen to one another, and build solutions together. From all these results, it can be concluded that the ARIAS model of the Interest type is not only quantitatively superior but also provides a deeper and student-centred learning experience. This model is highly suitable for application in IPAS learning and other subjects that require cooperation and social interaction.

4. Conclusion

Based on the results of the study, it can be concluded that there is a significant difference in the collaborative abilities of students between the use of the ARIAS Interest model and the Two Stay Two Stray (TS-TS) model in Grade V IPAS learning. The ARIAS Interest model proved to be more effective in improving student collaboration, as shown by higher posttest scores and a distribution of scores dominated by the ‘Very Good’ category. The improved collaborative skills encompass aspects of communication, teamwork, responsibility, and problem-solving. Learning with the ARIAS Interest model approach is able to foster students' interest in learning through relevant and interesting material, so that students become more active and involved in group activities. Meanwhile, the TS-TS model

also has a positive influence, but not as strong as the ARIAS model. The TS-TS model is effective in building communication among students but does not sufficiently encourage emotional engagement and deep interest in the subject matter. Therefore, the use of the ARIAS model of the Interest type is recommended as an effective alternative learning model to enhance students' collaborative skills, particularly in the IPAS subject at the primary school level.

References

Agustian, A., Lisdiana, K., Suryana, A., & Nursalman, M. (2025). Analisis statistik uji normalitas dan homogenitas data nilai mata pelajaran dengan menggunakan Python. *Jurnal Ilmiah Edukasi*, *10* (1), 51–56.

Darmawan, W., & Harjono, N. (2020). Efektivitas problem-based learning dan two stay two stray dalam pencapaian hasil belajar. *Basic Education Journal (Jurnal Basicedu)*, *4* (2), 402–411. https://doi.org/10.31004/basicedu.v4i2.895

Hadi, F. R., & Anggrasari, L. A. (2021). The effectiveness of ARIAS learning model based on digital literacy in terms of critical thinking ability of elementary school students. In *Proceedings of the International Conference on Curriculum and Educational Technology (ICCE 2020)* (pp. 94–98).

Handayani, S. L., & Arifin, A. (2021). Analysis students' misconception in optical material using three-tier multiple choice diagnostic test. *Physics Education Research Journal*, *3* (2), 75–84.

Indriyani, N., Fitria, Y., Darmansyah, & Zainil, M. (2023). Effectiveness of assurance, relevance, interest, assessment, and satisfaction (ARIAS) model on students' self-efficacy achievement. *Jurnal Penelitian Pendidikan IPA*, *9* (12), 11407–11413.

Kusuma, J. W., & Hamidah, H. (2019). Kolaborasi model assurance-relevance-interest-assessment-satisfaction dengan think-talk-write untuk meningkatkan motivasi berprestasi dan kemampuan berpikir kritis siswa. *GAUSS: Jurnal Pendidikan Matematika*, *2* (2), 24–35.

Muhsin, M., et al. (2025). Penerapan model pembelajaran two stay two stray dalam pembelajaran IPAS di kelas V SDN Sungai Miai 1. *Journal of Teaching and Elementary Education*, *1* (1), 7–12.

Naitili, C. A., & Nahak, K. E. N. (2023). Pengaruh penggunaan media pembelajaran berbasis kearifan lokal 'Eclipse Ammu Pe' terhadap hasil belajar IPA siswa sekolah dasar. *HINEF: Jurnal Rumpun Ilmu Pendidikan*, *2* (2), 93–101.

Quraisy, A. (2022). Normalitas data menggunakan uji Kolmogorov-Smirnov dan Shapiro-Wilk. *J-HEST Journal of Health Education Economics Science and Technology*, *3* (1), 7–11.

Rahmawati, R., Kasdi, A., & Riyanto, Y. (2020). Pengaruh model Arias terhadap motivasi belajar dan kemampuan memecahkan masalah dalam pembelajaran IPS kelas V sekolah dasar. *Jurnal Review Pendidikan Dasar: Jurnal Kajian Pendidikan dan Hasil Penelitian*, *6* (1), 1–10.

Sari, A. P., Hasanah, S., & Nursalman, M. (2024). Uji normalitas dan homogenitas dalam analisis statistik. *Pendidikan Tambusai*, *8* (2012), 51329–51337.

Sonjaya, R. P., Aliyya, F. R., & Naufal, S. (2025). Pengujian prasyarat analisis data nilai kelas: uji normalitas dan uji homogenitas. *Jurnal Metodologi Penelitian Pendidikan*, *9* , 1627–1639.

Wanningrum, C. P., & Sukmawati, W. (2023). Pengaruh model pembelajaran ARIAS (assurance, relevance, interest, assessment, and satisfaction) dalam meningkatkan hasil belajar IPA siswa di sekolah dasar. *Ideas: Jurnal Pendidikan, Sosial, dan Budaya*, *9* (1), 43–52.

Yasin, F. N., & Nihayah, U. (2022). Efektivitas model pembelajaran Arias terhadap motivasi dan hasil belajar siswa kelas IV sekolah dasar. *Jurnal Muassis Pendidikan Dasar*, *1* (3), 246–259.

How to cite this article:

Hanifah, A., & Handayani, S. L. (2025). A Study of Collaborative Skills: Comparing the Effectiveness of ARIAS Interest and TS-TS Models in Elementary Education. *Journal of Educational Sciences*, *9(4)*, 2977-2985.