

THE EFFECT OF THE INQUIRY LEARNING MODEL ON SOCIAL SCIENCE LEARNING OUTCOME AND SAINS LITERACY IN GRADE IV STUDENTS OF ELEMENTARY SCHOOL CLUSTER IV AT BEBANDEM DISTRICT

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ABSTRACT

The focus of this study is to discover how the inquiry learning approach affects science literacy and learning outcomes. The sample consisted of 55 persons chosen by random sampling techniques, while the research population included of 246 people. This study uses a posttest control group design and is quasi-experimental. An essay-style questionnaire measuring learning, motivation, data, and scientific critical thinking abilities was used to gather the study's data. The MANOVA statistical test was used to assess the data. With a F value of 39.457 and a significance level below 0.05, the results of this study show that: 1) the inquiry learning approach has an impact on the scientific learning outcomes of grade IV students at Elementary School Cluster IV, Bebandem District. 2) With a F value of 31.107 and a significance level below 0.05, the inquiry learning model has an impact on the science literacy of grade IV students at Elementary School Cluster IV, Bebandem District. 3) There is an influence of the inquiry learning model on the science learning outcomes and science literacy of grade IV students of Elementary School Cluster IV, Bebandem District. These results are evidenced by the F value of 32.903 with a significance of less than 0.05. This study provides empirical evidence regarding the effectiveness of the inquiry learning model on science learning outcomes and science literacy at the elementary school level.

Keywords: inquiry, IPAS, litearcy, learning outcomes



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INTRODUCTION

PISA or the Program for International Student Assessment is a global study that examines the success of educational structures by evaluating key learning achievements necessary for accomplishment in the modern era. PISA systematically assesses the literacy competencies in reading, mathematics, and science among students aged 15, with this evaluation conducted triennially by the Organisation for Economic Co-operation and Development (OECD) (Ministry of Education and Culture, Research and Technology, 2023). The Organization for Economic Co-operation and Development (OECD) has 37 member countries and 44 affiliated nations, adding up to 81 countries in 2022 for the Programme for International Student Assessment (PISA). Indonesia's performance in the PISA 2022 testing has improved by five places in terms of reading literacy as compared to 2018 (Marwanti et al., 2024; Purab & Purwono, 2022). Likewise, the disciplines of science and mathematics experienced an increase of five and six

positions, respectively, within the rankings. It is unfortunate, therefore, that the levels of literacy in science, mathematics, and reading are exhibiting a decline. In the domains of literacy encompassing science, mathematics, and reading, Indonesia's mean PISA scores are recorded at 359, 366, and 383, respectively. As per the Ministry of Education and Culture, Research, and Technology, the pandemic has precipitated a decline in international learning outcomes reflected in PISA 2022; however, Indonesia's standing in PISA 2022 may improve in comparison to 2018 due to the resilience of the nation's educational system in recovering from the adverse impacts of the pandemic on learning outcomes (Liestari & Muhardis, 2020).

Indonesia has the lowest level of reading literacy, according to the PISA average score conclusions. The dire PISA scores are a result of Indonesian pupils' less demanding reading habits (Zahra et al., 2022). A teacher needs to conduct reading literacy AKM in the classroom for all subject areas so that students are ready to take AKM and at the same time increase their literacy skill of reading as one of 21st hundred skills (Hariyantini et al., 2025). However, in elementary schools, teachers are still using teacher centered learning (Teacher Center). Improper learning model and lack of teaching materials will cause bad learning results; people cannot receive even the information provided to them during a learning process. The learning outcomes of IPAS were at a mean score (54, ranging from 0-100 points) (Rati et al., 2024).

These results of early investigations by researchers also support the issues with social studies education and poor learning outcomes. According to the findings of the researcher's initial investigation, consisting comprised observations at SD Cluster IV, Bebandem District, learning took place utilizing the teacher's book and a sharing learning model or lecture (teacher center). In the first semester of the 2021–2022 academic year, the average learning outcomes of new students reached 64.71% with a learning completeness rate of only 23.53%, according to the researcher's preliminary research, which focused on the learning process carried out by teachers in grade IV of SD Negeri 3 Budakeling and SD Negeri 7 Bhuana Giri. the findings of the first inquiry, which included seeing and talking with every participant in Bebandem District's Cluster IV. The researcher gathered data on the UAS score from each primary school in this group based on the findings of the initial inquiry. The researcher provided the following information regarding the UAS score from Bebandem District's Cluster IV, comprising ten primary educational institutions.

Table 1. UAS Results for Elementary School Cluster IV Bebandem 2022/2023

School Name	Class	Uas Value Conversion	Many Students	Students who achieve UAS scores		Students who do not achieve UAS scores	
				STUDENT	%	STUDENT	%
SDN Budakeling	1 IV	65 – 80	23	10	43.48%	13	56.52%
SDN Budakeling	2 IV	65 – 80	25	8	32.00%	17	68.00%
SDN Budakeling	3 IV	65 – 80	28	6	21.43%	22	78.57%
SDN Bhuana Giri	1 IV	65 – 80	26	9	34.62%	17	65.38%
SDN Bhuana Giri	2 IV	65 – 80	19	7	36.84%	12	63.16%
SDN Bhuana Giri	3 IV	65 – 80	21	10	47.62%	11	52.38%
SDN Bhuana Giri	4 IV	65 – 80	31	9	29.03%	22	70.97%
SDN Bhuana Giri	5 IV	65 – 80	22	9	40.91%	13	59.09%
SDN Bhuana Giri	6 IV	65 – 80	24	8	33.33%	16	66.67%
SDN Bhuana Giri	7 IV	65 – 80	27	5	18.52%	22	81.48%
Sum			246	81	337.78%	165	662.22%
Average			32.93%			67.07%	

(Source: Preliminary Study Results and Data Processing Results from Researchers)

Following table 1's findings. It is known that Cluster IV Bebandem students continue to have low semester scores. As a matter of fact, many students have yet to achieve their UAS scores. Most previous research results as well as data collected directly from the field demonstrate the poor learning outcomes of primary school pupils. This suggests that IPAS primary school students' learning outcomes require improvement. Learning outcomes serve as a meter to measure how well the learning process was executed, regardless of whether students have acquired skills and planned

learning objectives (Andari et al., 2024). Science literacy skills and science learning outcomes are two important things in science learning in elementary school (Larosa, 2023; Rati et al., 2024). Research results Nugraha (2022) shows that there is a significant relationship between science literacy ability and science learning outcomes of elementary school students.

According to OECD (2023), That students may engage in science-related problems and issues as well-informed citizens is referred to as scientific literacy. Students appreciate that putting science classes into terms they understand makes them more motivated and engaged, wherein difficult ideas can be deemed possible; it works. It enhances critical thinking and problem solving by relating science concepts to real-world happenings, social concerns and each student's life. The science itself, and the relationship between science and society, are focused on in scientific literacy. The science theory is vital since it aids in understanding science and is the main instrument for addressing problems. Since the nature of science is the epistemology of science, which is defined as the value and belief in science, students could comprehend how evidence could further understanding of science (Fausan et al., 2021; Marini & Warpala, 2025). Scientific literacy can be used through inquiry models, which comprise problem and hypothesis creation, orientation and stimulation, data collection and observation, data analysis and discussion, conclusion drawing, and results communi(Marwanti et al., 2024; Yuhanna & Retno, 2025).

The ability to analyze and design scientific investigations, interpret data and evidence scientifically, and explain events scientifically are all necessary for a person to be willing to participate in reasoned discourse about science and technology. The inquiry defense model is one of the learning strategies that educators can employ to address the issue of primary school pupils' poor learning outcomes and lack of science literacy. Richard Suchman created the inquiry learning approach for the first time in 1962. The above approach places a strong emphasis on helping students know how to investigate and explain an occurrence. As a result, learning involves not only listening and comprehending; it also involves researching and explaining events. The use of the inquiry learning framework in primary schools has been studied by a number of earlier scholars.

The results of the study show that the application of the inquiry learning model can improve the learning outcomes of Social Sciences for grade IV elementary school students. Classroom action research conducted by Kholifah et al. (2021) The results obtained are that the use of the inquiry learning model can improve the science learning outcomes of grade V elementary school students. Aprilia et al. (2021) Claimed that inquiry-based learning is one of the lessons that may be used to teach science literacy. According to some of the study's findings, elementary school pupils' science literacy and learning outcomes could be enhanced by the inquiry-based learning approach. In order

to address the issue of low learning outcomes and science literacy among elementary school pupils in Cluster IV, Bebandem District, the inquiry learning methodology will be employed. Prior studies have demonstrated that the inquiry-based learning model can improve students' literacy, learning outcomes, and motivation. This is due to the fact that the inquiry learning paradigm gives pupils the chance to go through the discovery stage (Khoirudin et al., 2024; Rianti et al., 2021; Rohaili et al., 2021).

As stated in the previous description, the inquiry learning model will be used to address the issue of low IPAS and science literacy learning outcomes among grade IV students at SD Negeri 3 Budakeling and SD Negeri 7 Bhuana Giri in Cluster IV of Bebandem District. This model's impact on science and science literacy learning outcomes among grade IV students in SD Cluster IV Bebandem District is the title of the study.

RESEARCH METHODS

The experimental research design used in this study is a quasi-experiment, additionally referred to as a pseudo-experiment. The inability to alter the conditions of the previously established classes led to the choice of quasi-experiments. Posttest Control Group Design is the pseudo-experimental research design that had been used. A population is a group of things or people with certain number and features chosen by the researcher to be examined and from which conclusions are eventually made. The study's population consists of the cluster's 246 elementary school students. In this investigation, simple random sampling was used. Using this method, random samples composed of groups are taken. The purpose of this is to acquire sample classes. The experimental and control classes are subsequently determined by re-randomization. Out of the 55 pupils in total, two groups—one experimental class and one control class—will be formed.

Table 2. Research Sample

Yes	School Name	Number of Students	Treatment Groups
1.	SD N 3 Budekeling	28 students	Experimental Group
2.	Elementary School N 7 Bhuana Giri	27 students	Control Group
		55 students	

The steps taken in this study consist of three stages, namely the preparation, implementation and termination of the experiment. The elaboration of each of these stages is: Experimental Preparation Stage; At this stage of preparation, several things were carried out, namely (1) selecting the experimental class and control class from the current sample, (2) gathering instructional materials, media, and learning aids for the experimental and control groups, and, (3) constructing study instruments such as

science literacy and science learning evaluations to evaluate results, and (4) validating research instruments. Experimental Implementation Stage At the stage of implementing the experiment, the steps taken are to carry out *treatment* in the experimental class 8 times by carrying out inquiry learning and carrying out learning in the control class 8 times. Experiment Termination Stage, At this point, both the experimental class and the control class take a post-test at the completion of the experiment. The Manova test was subsequently applied to examine the post-test outcomes. The following table delivers a clear view of the research tools and data collection strategies.

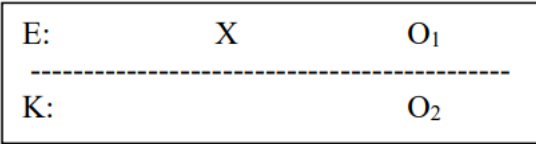


Figure 1. Posttest Control Group Design

Table 3. Data Collection Methods

Yes	Variable	Collection Method Data	Research Instruments
1	IPAS Learning Outcomes	Test	Multiple-choice questions
2	Science Literacy	Test	Multiple-choice questions

Instruments are measuring machines used to collect data, and the test instruments used during this study urge students to answer questions to the best of their abilities. One tool for assessing science and science literacy learning outcomes is the use of pretest and posttest questions. There are ten science literacy items and twenty learning outcome exam items. The two phases of the data analysis approach used in this study were the hypothesis test and the analysis prerequisite test. Prior to conducting the hypothesis test, a normality test and a correlation test between variables happen. The Manova test was utilized for assessing the correlation between the two bound variables and the hypothesis test.

RESULTS AND DISCUSSION

Results

Table 4 includes the following description of the data from the research discoveries on how to compute of the center size (mean, median, mode) and the size of the data spread (standard deviation).

Table 4. Recapitulation of Results of Score Calculation of Student Social Science Learning Outcomes and Student Science Literacy

	A1Y1	A1Y2	A2Y1	A2Y2
Average	92,6786	91,7857	81,4815	82,5926
Median	95	92,5	80	85
Mood	95	95	85	85
Std. Deviation	5,85032	6,41386	7,31369	5,77967
Massive	34,226	41,138	53,490	33,405
Stretch	20	20	25	20
Minimum Score	80	80	70	70
Maximum Value	100	100	95	90
Total	2595	2570	2200	2230

Data Normality Test Results

The normality test of the distribution of data in the data group using *SPSS-17.00 for windows the* Kolmonogov-Smirnov statistical test at a significance of 0.05. Based on the normality test of the data distribution that has been carried out, the following results were obtained.

Table 5. Verify that the data distribution is normal.

Variable	Kolmogorov-Smirnov			Information
	Statistics	Df	Sig.	
A1Y1	0,213	28	0,083	Normal distribution
A1Y2	0,197	28	0,079	Normal distribution
A2Y1	0,166	27	0,054	Normal distribution
A2Y2	0,254	27	0,060	Normal distribution

It is evident from Table 5 above that the statistical value of Kolmogorov-Smirnov is greater than 0.05 for every variable. All data distributions are therefore regularly distributed.

Variance Homogeneity Test Results

The results of the analysis of the *Box's M* test and the *Levene's Test* test were obtained as shown in Table 6.

Table 6. Box'M Test Analysis Results

Box's M	0,349
F	0,112
df1	3
df2	1038839,269
Sig.	0,953

Furthermore, related to the Levene Test Analysis Results can be presented in table 7 below.

Table 7. Results of *Levene's Test Analysis*

	F	df1	df2	Sig.
IPAS Learning Outcomes	1,451	1	53	0,234
Science Literacy	0,536	1	53	0,467

Based on Table 6 and Table 7, it appears that the significance numbers produced either jointly or individually are greater than 0.05. Thus, it means that the variance-covariance matrix for the variables of social science learning outcomes and students' science literacy is homogeneous.

Correlation Test Results Between Bound Variables

The correlation test was carried out using *product moment correlation* at a significance level of 5% to determine the type of statistics used for the hypothesis test.

Table 8. Results of Product Moment Correlation Test Analysis

Statistics		Y1	Y2
Y1	Pearson Correlation	1	0,051
	Sig. (2-tailed)		0,941
	N	53	53
Y2	Pearson Correlation	0,051	1
	Sig. (2-tailed)	0,941	
	N	53	53

The correlation test's findings demonstrated that information on the science literacy and social studies learning outcomes of SD Cluster IV's grade IV pupils, Bebandem District who participated in learning with the inquiry learning model got a price $r_{y1y2} = 0.051$ and data on students who learned with conventional learning got a price of $r_{y1y2} = 0.051$. The r-value of the experimental group table with 28 subjects was 0.345, while the r-value of the control group table with 27 subjects was 0.326. Based on these results, it was obtained that the r value of the table was calculated $< r$ at a significance level of 5%, so it can be concluded that the data on the learning outcomes of science and science literacy of grade IV students of SD Cluster IV Bebandem District who participated in learning with the inquiry learning model and students who studied without the inquiry learning model were not correlated.

Hypothesis Test Results

There are three hypotheses proposed in this study. For the testing of the three research hypotheses, *Multivariate* analysis was used.

Results of the First Hypothesis Test

The results of the *Multivariate Test* analysis of social studies learning outcomes data for students with *SPSS 17.00 for windows* obtained the results as shown in Table 9.

Table 9. Hypothesis Test Results of Social Science Learning Outcomes
Data for Students

Source	Bound Variables	JK	Df	RJK	F	Sig.
Escort	Social studies learning outcomes	1723,334a	1	1723,334	39,457	0,000
Deep	Social studies learning outcomes	2314,848	53	43,676		
Total	Social studies learning outcomes	4038,182	54			

With a F price of 39.457 and a significance level below 0.05, the aforementioned analysis's findings demonstrate that the inquiry learning model has an impact on the learning outcomes of IPAS students in grade IV of SD Cluster IV, Bebandem District. This indicates that the alternative hypothesis (H_a) is accepted and the zero (H_o) hypothesis is rejected.

Hypothesis Test Results 2

The results of the *Multivariate Test* analysis of student science literacy data with *SPSS 17.00 for windows* were obtained as shown in Table 10.

Table 10. Results of Hypothesis Test of Student Science Literacy Data

Source	JK	Df	RJK	F	Sig.
Escort	1161,676b	1	1161,676	31,107	0,000
Deep	1979,233	53	37,344		
Total	3140,909	54			

The analysis above indicates that the science literacy of grade IV students at SD Gugus IV, Bebandem District, is influenced by the inquiry learning methodology, as evidenced by a F price of 5.071 with a significant level below 0.05.

Hypothesis Test Results 3

Additionally, with the use of SPSS 17.00 For Windows, an analysis was conducted using Manova to determine the differences in the social studies and science literacy learning outcomes of students who learn utilizing the two learning models. Table 11 provides an overview of the Manova analysis.

Table 11. Summary of Analysis Results of Social Science Learning Outcomes and Student Science Literacy with Manova

Effect	Statistics	F
Learning Model	Pillai's Trace	32,903b
	Wilks' Lambda	32,903b
	Hotelling's Trace	32,903b
	Roy's Largest Root	32,903b

Table 11 above suggests that the significance value is less than 0.05 and the price of F is 32.903. This indicates that the alternative hypothesis (H_a) is accepted and the zero (H_o) hypothesis is rejected. These findings also demonstrate that the inquiry-based learning paradigm has an impact on the science learning outcomes and science literacy of fourth-grade students in SD Cluster IV, Bebandem District.

Discussion

Based on the data analysis, the learning outcomes and scientific literacy data passed the analysis prerequisite tests, namely normality, homogeneity, and no correlation between variables. Therefore, the hypothesis results are presented as follows:

There is an Inquisition Learning Outcome of Social Studies for Grade IV Students of SD Cluster IV, Bebandem District

From the analysis process carried out on the research data, the results of the F value of the social studies learning outcomes have been obtained by F value by 39, 457 with a significance smaller than 0.05. In addition to being evidenced by an F value, the average score of the IPAS learning outcomes of the experimental group and the control group was very different. The average score for the experimental group was 92.67 while for the control group it was 81.48. The difference in the average score for the group demonstrated that social studies students who used the Inquiri learning model had superior learning results than those who did not take part in the model. Based on the study's findings, it is evident that instruction utilizing the inquiry learning paradigm helps to maximize the learning outcomes for elementary school-aged IPAS pupils. The guided inquiry learning model is theoretically founded on the theory of discovery learning, which holds that students should actively engage with concepts and principles in order

to later gain experience and carry out experiments that enable them to discover concepts and principles on their own (Dalilah & Inayah, 2024). Students in elementary school achieve better social studies learning results when the inquiry paradigm is applied (Sembiring, 2025)

There is an Influence of the Inquisition Learning Model on Science Literacy of Grade IV Students of SD Cluster IV, Bebandem District

In terms of learning outcomes, the results of the study show that learning with the inquiry learning model has a significant effect on the science literacy achieved by grade V students. This is evidenced by the value of F by 31,107 with a significance smaller than 0.05. In addition to being evidenced by an F value, the average science literacy score of the experimental group and the control group was very different. The average score for the experimental group was 91.78 while for the control group it was 82.59 Based on the results of the study, it is in line with the results of the research that the inquiry learning model is significant in improving science literacy (Fatmawati & Pertiwi, 2024). With or without the assistance of teachers, students can find information using the inquiry learning methodology. The teacher only serves as a facilitator in the learning process, and the inquiry learning approach can assist pupils in understanding concepts and ideas (Ananda et al., 2024).

Simultaneously There is an Influence of the Inquiri Learning Model on the Learning Outcomes of Social Science and Science Literacy of Grade IV Elementary School Cluster IV Bebandem District

Drawing from the findings of the conducted data analysis, it was determined that the inquiry learning model can concurrently improve students' science learning outcomes and science literacy. The results of this study support the claim that the inquiry learning model has an impact on science literacy ability and cognitive learning outcomes. The data analysis results demonstrate that learning with the inquiry learning model positively contributes to the optimization of science learning outcomes and science literacy of grade V students (Yani et al., 2023). Instead of merely receiving instructions from professors, students are encouraged to ask questions, observe, evaluate, and come up with answers on their own using the inquiry model. Improved learning outcomes and science literacy among elementary school pupils can result from kids becoming more critical, self-reliant, and knowledgeable about their own studies (Febrian et al., 2025). The research component of guided inquiry is expected to be able to improve students' science literacy (Eviota & Liangco, 2020).

CONCLUSION

The following conclusions can be drawn from the research and discussion findings: The inquiry learning model has an impact on science learning outcomes, students' science literacy, and the science learning outcomes and science literacy of grade IV students in SD Cluster IV, Bebandem District. To get better or more comprehensive results or descriptions of the inquiry learning model on science learning outcomes and science literacy, it is advised that additional researchers carry out comparable studies using different plant parts and their roles over an extended period of time. The investigation was restricted to specific scientific domains. This limits the results to this particular subject, making it challenging to extrapolate the efficacy of the inquiry learning paradigm to other scientific subjects or more general scientific ideas.

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DECLARATION

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Conflict of Interest	From the initial planning to data collection, classroom application, analytical procedures, and manuscript writing, the entire research process was conducted independently by the authors, following ethical and transparent research practices.

Additional Information	Thus, the authors confirm that the findings and conclusions reported herein are the result of an unbiased and transparent process, free from any personal or institutional interests, with the sole purpose of enriching scientific understanding in the educational domain.
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