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THE INFLUENCE OF THE INQUIRY LEARNING MODEL ON THE LEARNING OUTCOMES OF NATURAL SCIENCES CLASS FOUR ELEMENTARY SCHOOL

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Abstract
The learning process can influence a student's success in achieving educational goals. However, the lack of innovation in elementary school natural science learning models makes it difficult for students to assimilate the presented material. This research aims to determine the influence of the guided inquiry learning model on the learning outcome of Natural Sciences. Research methods use quantitative research methods, quasi-models experiment with a pretest-posttes-only control design pattern, and the type of instrument use using a double choice test using 2 class samples on the experimental class using. The inquiry model is guided, and the control class uses the conventional learning outcomes of students in the fourth grade of the Master of Science. This is a supported by a cognitive hypothesis test with the results of N_sig < N_table with a score of 0.015 < 0.05. test affective hypothesis test with the results of N_sig < N_table with a score of 0.000 < 0.05, and psychomotor hypothesis test, whit the results of N_sig < N_table, with score of 0.000 < 0.005. based on the research, It can be concluded that the guided inquiry learning model influence the results of natural science learning in the fourth grade of elementary.
Keywords: *guided inquiry; learning outcomes; elementary school*

Abstrak
Proses pembelajaran dapat mempengaruhi keberhasilan siswa untuk mencapai tujuan pendidikan. Namun kurangnya inovasi model pembelajaran pada pelajaran ilmu pengetahuan alam di sekolah dasar membuat siswa mengalami kesulitan untuk memahami materi yang diajarkan. Penelitian ini bertujuan melihat pengaruh model pembelajaran inkuiri terbimbing terhadap hasil belajar ilmu pengetahuan alam kelas IV SD, metode yang digunakan adalah kuasi eksperimen dengan pretest-posttest-only control desain. Sempel yang dipakai adalah sebanyak 2 kelas dipilih secara random sampling, kelas eksperiment sebanyak 30 siswa dan kontrol sebanyak 30 siswa. Hasil penelitian ini menunjukan bahwa model pembelajaran yang dipandu oleh survei mempengaruhi hasil belajar ilmu alam pengetahuan alam kelas IV di sekolah dasar. Hasil ini didukung oleh tes hipotesis dengan hasil hipotesis kognitif N_sig < N_table dengan nilai 0.015 < 0.05., hipotesis afektif dengan nilai 0.000 < 0.05 dan hipotesis psikomotor dengan nilai 0.000 < 0.05. Hasil penelitian yang diperoleh dapat disimpulkan bahwa model pembelajaran tersebut memiliki pengaruh yang dipandu pada hasil belajar ilmu pengetahuan alam kelas IV di sekolah dasar.
Kata Kunci: inkuiri terbimbing, hasil belajar, sekolah dasar

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Introduction

The learning process is a teaching and learning activity that can determine pupil success in attaining educational goals. Individuals who were previously unable or capable must change their conduct. The learning process occurs naturally in the form of student work activities, and observing students are asked to be active, but teachers must have the right of the child to learn in the true sense. So that students can develop their knowledge in understanding learning (Muhadi et al., 2022). Learning is an interrelated component that interacts to

accomplish optimal objectives. The learning processes is done in a fun, active, and non-compulsive way. Achieving a goal in the learning process, meaning that IPA learning message. Learning is comprised of a series of structured systems, including learning models, subject drills, practice tools, instructor evaluations, and learning environments. Learning can be effective if a series of learning systems are in accordance whit the learner's position. Students are the center of the learning process; they investigate and solve problems while the instructor adapts to these challenges (Amalia & Efendi, 2023). Learning in the 21st-century forms teacher and students with the skills and competencies of the 21st century. Learning processes require students to master science skills, think critically and creatively, and be able to communicate effectively (Muhadi et al., 2022).

There are often numerous learning issues, such as students receiving only theme books and worksheets without direct practice on the material being taught (Sakdiah et al., 2018). Learning natural science is an abbreviation of Natural Science, which refers to nature or natural science. IPA relates to knowledge of natural occurrences (Elyas & Trio, 2021). Science education teachers not only have problem-solving techniques, but also objective skills, teamwork, and respect for other viewpoints. (IPA) subject are important for SD students because IPA is the process of understanding nature in detail, so science does not just master the science and how it work. This knowledge can help elementary school pupils learn about themselves and their surroundings. The process of acquiring this science is presented to elementary school pupils at a cognitively appropriate level. Observing, categorizing, comprehending, anticipating, making assumptions, identifying factors, managing, planning, implementing, and communicating are essential science learning skills that must be possessed and developed(Sari et al., 2021). According to the science learning process, primary education includes seeing, classifying, approximating, conveying, predicting, and summarizing the obtained information (Anis Zahrotin, 2021).

In elementary school learning, learning outcomes are an essential assessment aspect to measure the achievement of learning goals. Students can develop natural science learning literacy and cultivate the ability to think, work, have a scientific attitude, and communicate it as an essential aspect of life competence (Astari et al., 2021). The learning outcomes is student's overall learning achievement, which indicates competence and learning outcomes is the student's overall learning achievement, which identicates competence and the degree of change in behavior. Learning outcomes are assessments instructors use to determine the consequences of student performance (Wulandari et al., 2022). Bloom asserts that indicators of learning outcomes include: (1) Cognitive skills are student abilities related to knowledge, (2) Affective skills are abilities related to a person's attitude. In this study, the measured affective domain indicators included: Activeness, Cooperation, and Honesty, (3) Psychomotor skills are abilities of students.

Using guided learning is expected to influence the results of natural science learning. Learning occurs naturally through collaboration, observation, and problem analysis, and students must be active. With the student's active participation, the student-led learning process means that teacher do not deprive the child of right to learn in the true sense (Indrawan & Yudiana, 2022). Learning success is measured by the number of concepts successfully understood by students, so high- level thinking skills, metacognition, and student's scientific attitudes (Wahida et al., 2022). To such learning outcomes, an appropriate model, strategy, medium, or learning device is required to support the effectiveness of learning processes, especially in natural science (Hasdiani, 2020). In this study, the indicators measured in experimental activities included: preparing tools and materials to conduct experiments, in

according with a worksheet instructions, recording experimental results, summarizing experimental data, and compiling experimental results repost. Low learning outcomes may result from the use of learning models that do not involve student participation or media preparation (Ririn et al., 2023). Evaluation of learning yields only a cognitive chart, whereas a teacher also considers affective and psychomotor factors into account (Yustitia et al., 2023).

The guided inquiry model requires students to critical and active thinking problems. According to Piaget, comprehension can be meaningful if students obtain it by solving problems. Learning is change in behavior resulting from a meaningful process. For to be meaningful and interesting, teacher need to be more creative in conducting learning activities so that students can understand lessons better (Muhadi et al., 2022). This equips students with the knowledge and skill required to recognize and develop their own solutions to problems (Kadek et al., 2019). According to Hanson, the phases of the guided inquiry model are as follows: (1) Orientation, Increasing student engagement with learning (creating interest), providing motivation, arousing curiosity, and building upon new and previous information, (2) Exploration, allowing a student to make an observation, analyze information and develop hypotheses based on problems presented by the teacher, (3) Concept formation, making students think critically and analytically to solve problems and draw conclusion, (4) Application, the acquired knowledge can be applied to real-world problems, (5) Closing inform, reflect, and consolidate his knowledge (Nasution & Fitriza, 2021).

Applying guided inquiry learning models can enhance the ability to solve learning problems through field research processes, improve student communication and collaboration in learning groups in discussing learning tasks, and provide learning experience through problem analysis, field observations, and students can think creatively (Suprianti et al., 2021). The guided inquiry model guides exploration to discover and process the information so that students gain experience generating conclusions to solve educator-posed problems. Inquiry learning model where teacher provide broad guidance or guidance, keep going with the activities carried out by students, and give instructions and guidance to students in carrying out activities so that students can think critically, creatively, and collaborate (Lubis et al., 2023). A learning model an activity in which students are tasked with delineating the steps required to investigate an invention and formulating their own decisions. Educators become a facilitator in identifying themes, problems, and supplementary materials.

This design's benefits include: (1) Enhancing students' problem-solving abilities. (2) Enhance the efficacy of the learners' evaluation of learning. (3) students have an authentic way of reasoning based on knowledge from the real world. (4) The group learning process teaches students to exchange intelligent opinions (Masruri et al., 2019). The National Research Council, the guided inquiry model is essential for teaching students to develop intelligent responses. The model plays a crucial role in identifying and resolving a variety of educator-identified problems, as well as in developing concepts, comprehending skills, and establishing student responsibilities when utilizing the acquired method of delivery. The guided inquiry learning model reinforces the science study method and improves students' abilities to observe, articulate, and summarize earned problems. The guided inquiry learning model derives from the cognitive assessment philosophy (Panjaitan et al., 2023). This learning flow includes this mental strategy and persuasion method (Supartiyani, 2020) . The primary objective of the guided inquiry model is to promote critical thinking to contribute to achieving desired results (Munandar, 2022).

Based on observations of science learning in fourth-grade Pondok Aren 01. According to the findings of interviews with fourth grade representatives, only active students participated

in the learning process, and the lack of innovation in learning models left students exhausted. It was observed that when the teacher finished explaining, no students were asked to explain science lessons, and students were passive because the teacher played an extremely active role in the learning process, and learning outcomes in fourth-grade science classes at elementary school decreased. Based on the above issues, research are interested in implementing learning innovations using guided inquiry model to determine the impact of the inquiry model on natural science learning outcomes.

Research methods

This research uses quantitative research methods with quasi-experimental models using pretest posttest- only design where determination of experimental classes and control of randomly selected classes. Tests are given before and at the end of learning in this study. Experimental classes receive special treatment using guided inquiry learning models, and class controls use conventional learning models. This research was carried out at SDN Pondok Aren 01 by making class IV is a population, then using class IV A as an experimental class and class IVC as a control class as a sample of this research, the questions tested have been adapted to the chain of instruments in Natural Sciences with the material style in class IV. The questions to be tested have been confirmed by the material experts and tested in another class. Based on the trials and test results, 20 questions worthy of being tested after a validity and reliability test in this study. In this study, several stages to be dine; these stages include: (1) the preparation stage, the complication stage of the research instrument in the form of instruments and statements that have been evaluated by the material experts, as well as performing the test of the instrument on the students and then calculating the validity and reliability test using SPSS version 26, (2) the data collection stage, that is, giving the question instrument to the students directly in the classroom, and (3) the final stage, which is the calculation phase of the data collected by conducting the normality test, the homogeneity of the test and testing of hypotheses.

This calculations the IBM SPSS Statistic application as a tool in facilitating the calculation carried out and concluding hypotheses, and writing the results of the research hypotheses (Widiastuti et al., 2021). The calculation of data collected by performing the normality test, the homogeneity of the test, and the testing of the hypothesis, in this calculation carried on and conclude the hypotheses and write the results form the research hypothetic. Thirty fourth-grade kids took the validity test at the Aren Cottage. The validity test findings show that they are reliable and worthy of being used in research. All stated items have r counts greater than 0.361, proven by the validity test findings above, concluding that the instruments used in this study are reliable.

Table 1. Reliability Test

Instrument	Cronbach Alpha	Conclusion
Pretest experimental group	0.862	Reliable
Postest experimental group	0.854	Reliable
Pretest control group	0.874	Reliable
Postest control group	0.935	Reliable

The purpose of the reliability test in this study is to assess the accuracy and usefulness of data collected through the questionnaire. Alpha Cronbach is calculated for each variable in the reliability test. Variable are reliable if Cronbach's Alpha score is more significant than 0.60.

the reliability test results show that each variable has an Alpha Cronbach value of more than 0,60, which confirms the credibility of the questionnaire used in this study.

Based on these findings, the following research hypotheses can be formulated: (1) H0+ Guided Inquiry learning model does not affect the learning outcome of natural sciences class four elementary school., and (2) Ha= guided inquisition learning model has an influence in the class four elementary school.

Results and Discussion

The research findings reveal how effective a guided inquiry learning model is. Several tests were carried out before examining the final results to see if the guided inquiry model significantly influenced the natural science learning in class four elementary school

Table 2. Kolmogrov-Smirnov Test Cognitive Normality Test

		Pretest Eksperimen	Post Eksperimen	Pretest Kontrol	Post Kontrol
N		30	30	30	30
Normal Parameters[a,b]	Mean	66,83	60,50	59,67	59,67
	Std. Deviation	20,278	19,885	18,380	18,751
Most Extreme Differences	Absolute	0,156	0,149	0,146	0,150
	Positive	0,130	0,149	0,088	0,150
	Negative	-0,156	-0,100	-0,146	-0,127
Test Statistic		0,156	0,149	0,146	0,150
Asymp. Sig. (2-tailed)		,059[c]	,088[c]	,100[c]	,085[c]

Based on the Kolmogrov-Smirnov test was by the research to determine the data cognitive normality test, the experimental pretest scored 0.59. the control scored 1.00, while the posttest experimental value had a value of 0.88 and the control 0.85. the control value was known, so it can be concluded that the experimental pretest value (0.59 ≥ 0.005), control pretest (1.00 ≥ 0.005), experimental posttest (0.88 ≥ 0.05) and control posttest (0.85 ≥ 0.005). The data seems to be typical.

Table 3. Kolmogrov-Smirnov Affective Normality Test

		Pre Eksperimen	Post Eksperimen	Pre Kontrol	Post Kontrol
N		30	30	30	30
Normal Parameters[a,b]	Mean	71,33	82,40	70,77	71,83
	Std. Deviation	2,412	5,282	2,555	2,743
Most Extreme Differences	Absolute	0,155	0,145	0,097	0,143
	Positive	0,155	0,121	0,097	0,109
	Negative	-0,145	-0,145	-0,085	-0,143
Test Statistic		0,155	0,145	0,097	0,143
Asymp. Sig. (2-tailed)		,064[c]	,107[c]	,200[c,d]	,123[c]

Based on the Kolmogrov-Smirnov test was by the research to determine the data affective normality, the experimental pretest, the affective normality test has a value of 0.064 and the control 2.00. the posttest value of the experiment is 1.07. So it can be concluded that the experimental pretest (0.64 ≥ 0.05), control pretest (2.00 ≥ 0.05), experimental posttest (1.07 ≥ 0.05), and control (1.23 .0.05) are normal distributed.

Table 4. Kolmogrov-Smirnov Psychomotor Normality Test

		Pretest Eksperimen	Post Eksperimen	Pretest Kontrol	Post Kontrol
N		30	30	30	30
Normal Parameters[a,b]	Mean	70,53	82,27	71,43	71,77
	Std. Deviation	4,439	5,866	3,748	4,876
Most Extreme Differences	Absolute	0,156	0,150	0,151	0,154
	Positive	0,156	0,087	0,138	0,154
	Negative	-0,142	-0,150	-0,151	-0,092
Test Statistic		0,156	0,150	0,151	0,154
Asymp. Sig. (2-tailed)		,061[c]	,084[c]	,079[c]	,069[c]

Based on the Kolmogrov-Smirnov test was by the research to determine the data psychomotor normality test, the experimental pretest scored 0.61 and the control 0.79, while the experimental posttest score was 0.84 and the control 0.69. Then it can be concluded that all of these results have typical values. Then do the homogeneity test with the help of Levena's formula. The SI threshold value is 5% (0.05). The following are the results of cognitive, affective and psychomotor homogeneity tests.

Table 5. Cognitive Homogeneity Test

Variable	Lavene	Sig.	Description
Pretest kelompok eksperimen-kontrol	1,114	0,296	Homogeneity
Posttest kelompok eksperimen-kontrol	1,070	0,305	Homogeneity

Table shows 5, with Levene formula test, was by the research to determine the data cognitive homogeneity test. The pretest value for the experimental and control classes was 0.296, while the posttest value was 0.305, as shown in the cognitive homogeneity test results table above. We may infer that the data is homogenous since the pretest results for both groups were 0.305 and 0.296, respectively.

Table 6. Affective Homogeneity Test

Variable	Lavene	Sig.	Description
Pretest group experimental-control	0.400	0.530	Homogeneity
Posttest group experimental-control	0.424	0.604	Homogeneity

Table show 6, with Levene formula test was by the research to determine the data affective homogeneity test. The pretest value for the experimental and control classes was 0.530, while the posttest value was 0.604, as shown in the affective homogeneity test results

table above. We may infer that the data is homogenous since the pretest results for both groups ware 0604 and 0.530.

Table 7. Psychomotor Homogeneity Test

Variabel	Lavene	Sig.	Description
Pretest kelompok eksperimen-kontrol	0,683	0,412	Homogeneity
Posttest kelompok eksperimen-kontrol	1,394	0,243	Homogeneity

Table 7, with Levene formula test, was by the research to determine the data psychomotor homogeneity test, it can be seen that the pretest of the two classes received a value of 0.412 and a posttest of 0.243. It can be concluded that both pretest classes have values (0.412 ≥ 0.05) and posttest (0.243 ≥ 0.05) from these results, all have normal values.

Table 8. Effect Size

Data	Effect Size	Description
Kognitif	0,62248434	Medium
Afektif	1,56137279	High
Psikomotor	1,39533391	High

Based on table 8, was by the research to determine the data effect size, it is known that the affective data obtained a value of 1.561 and the psychomotor data 1.395 belong to the high category, so it can be concluded that there is a high influence on the use of guided inquiry learning models in the affective and psychomotor domains in class IV elementary school. While cognitive data belongs to the moderate category. Based on the t-test analysis it is as follows:

Table 9. Cognitive Hypothesis Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Hasil Belajar Kognitif	Equal variances assumed	0,257	0,614	2,518	58	0,015	10,333	4,104	2,117	18,549
	Equal variances not assumed			2,518	57,898	0,015	10,333	4,104	2,117	18,550

In the table 9, was by the research to determine the data cognitive hypothesis test, the count t value is 2,518; the sun of df is 58; and the significant value is 0,015. The t test result above the significance value shows that 0,015 is less than 0.05 or 5% (0,015 < 0,05) so Ho is rejected and

H1 is accepted. This means that H1 stated that the average cognitive learning outcomes of the experimental class students were not equal to the cognitive outcomes of the accepted control class students.

Table 10. Affective Hypothesis Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Hasil Belajar Kognitif	Equal variances assumed	8,124	0,006	9,724	58	0,000	10,567	1,087	8,391	12,742
	Equal variances not assumed			9,724	43,578	0,000	10,567	1,087	8,376	12,757

Table show 10, was by the research to determine the data affective hypothesis test, the count t value is 9,724; the sum of df is 58; and the significant value is 0,000. The t test result above the significance value shows that 0,000 is less than 0,05 or 5% (0.000 ≤ 0.05), so Ho is rejected and H1 is accepted. This means that H1 stated that the average affective learning outcome of the experimental class student is not the same as that of the control class student.

Table 11. Psychomotor Hypothesis Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Hasil Belajar Kognitif	Equal variances assumed	1,394	0,243	7,540	58	0,000	10,500	1,393	7,712	13,288
	Equal variances not assumed			7,540	56,124	0,000	10,500	1,393	7,710	13,290

Based on the table above, The calculated t value is 7.540, the total df is 58, and the sig is 0.000. The t-test result above the significance value shows that 0,000 is less than 0,05 or 5% (0.000 ≤ 0.05). The conclusion drawn from the data is that the experimental class learning outcomes are not the same as those of the control. It can be concluded that the use of the linked inquiry learning model influences the results of natural science learning class four elementary school.

The results of this study are consistent with the previous research carried out (Novan et al., 2022). The use of guided inquiry models affects critical thinking and can improve learning outcomes. 955When applied the experimental class learning process, the guided inquiry model has an impact. This is shown by the success of student activities in the learning process, including their active participation in questioning, expressing ideas, analyzing,

solving issues, and being able to communicate the analysis found. According to study findings, the average value of the control class has decreased, while the average value of the experimental class employing the guided inquiry approach has grown. The guided inquiry approach has grown in the affective and psychomotor domains. The use of the guided inquiry models is in the high category of influence according to the effect size test analysis looking for the influence of the variables contained in the research, while in the cognitive domain it is in the moderate category of influence against the acquisition of science learning outcomes.

According to this study's findings, guided inquiry gives students a chance to enhance their scientific procedures and attitudes (Salama, 2022). Higher mental functions, including data analysis, inference, and objective processing features, are all part of the guided inquiry process (Masruri et al., 2019). The techniques in this model are suitable for elementary-aged children. The activities encourage students to use their critical thinking skills to solve issues (Putria et al., 2020). By presenting meaningful subject content at the level of theoretical comprehension of the subject matter, the teacher implements the guided inquiry learning paradigm (Fitria, 2018). Teachers may provide general guidance to include students in the self-guided inquiry and approach throughout the implementation phase (Nasiroh, 2021). The guided inquiry learning paradigm has the benefits of increasing the desire to study passionately and giving hope for development in accordance with each person's area of competence and interests (Kadek et al., 2019). This learning paradigm also incorporates student participation, which includes improving memory and problem-solving skills (Made Ayu Suryantari et al., 2019). Because it sees learning as a process of change, the guided inquiry model has been taken into consideration in the development of current learning psychology. As a result of an experience, behaviour (Dwi Suhesti, 2018)

The test results showed differences in the learning outcomes of the natural sciences, a difference in the treatment applied to each class, experimental classes using guided Inquiry learning models and control classes without linked Inquiry models. In application, The use of the Inquiry model guided by the experimental class appears from the control class. In the experimental class, the students were seen to be more active and creative in their learning activities and increased interaction between the students and the teacher or in the learning group. So with positive interaction between fellow learners, students can understand the material that is taught, which has an impact on increased learning outcomes.

Conclusion

Based on the previous exposition, it can be concluded that the guided inquiry model influences the learning results of natural sciences compared with the non-use of the guided inquisition model. Using a guided Inquiry model can enable students to think critically, actively and motivated in the learning process in the classroom.

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