

# Efforts to Overcome Students' Difficulties in Understanding the Concept of Story Problems with the Problem-Solving Method and the Question and Answer Method in Science Learning

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**Abstract:** Science learning concepts are organized logically and systematically from the simplest to the most complex concepts. Students experience difficulties in solving word problems. Word problems have an important role and are often used to assess students' ability to solve problems in questions. The purpose of this study was to determine the effect of the problem solving method and the question and answer method in overcoming students' difficulties in understanding the concept of story questions. The research method uses quantitative methods with one group pretest posttest. The sample in the study was 30 people. The research results obtained that the problem solving method and question and answer method both have a significant value of  $0.000 < 0.005$ . So that it can be said that the two methods have a significant influence in efforts to overcome students' difficulties in understanding the concept of word problems.

**Keywords:** Problem Solving; Question and Answer Method; Science Learning; Students' Difficulties; story questions; Understanding Concept

## Introduction

Learning is a process in activities towards changing human personality in the form of behavior, knowledge, and so on (Hapudin, 2021; Shahbana et al., 2020). The learning is a change in personality which manifests itself as a new pattern in the form of skills, attitudes, habits, personality. Learning is defined as a process of interaction between students and teachers with learning resources in a learning environment (Jufrida et al., 2019; Munna & Kalam, 2021).

In learning, the teacher acts as a teacher, and students are students who must learn to achieve learning outcomes. But not all learning activities go well, there are factors that cause learning delays. For example, students' interest in learning is lacking, variations in

performance are not good, and learning environmental factors are not yet supportive in the learning process (Regmi & Jones, 2020).

In science learning, student activity is very important (Santika et al., 2022). Activities in science learning are based on two aspects, namely active in acting (hands activity) and active in thinking (minds activity) (Thambu et al., 2021). Science learning has objectives, including developing students' knowledge, understanding, and analytical skills about the environment and its surroundings (Archambault et al., 2022; Dewi et al., 2021; Widiyatmoko, 2023).

Science learning concepts are organized logically and systematically from the simplest to the most complex concepts. The meaning of story questions in natural sciences are questions that are asked in the form

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of descriptions or stories, both orally and in writing (Dulamma et al., 2021). Word problems are sentences that are used every day where the meaning of concepts and expressions can be expressed using science symbols and formulas. In learning at school, science subjects are one of the focuses of students. This is because many students find it difficult to solve science questions. In particular, the researcher received information that students had difficulty solving word problems. Word problems have an important role and are often used to assess students' ability to solve problems in questions.

Abidin (2014), states that word problems are questions that are presented in the form of short stories. The stories told can be about everyday life or other problems. Science story problems are science questions that are expressed in sentences in the form of stories that must be changed into natural science sentences or equations in natural science. When solving word problems, many students experienced difficulties and made mistakes (Adu et al., 2015). According to Sudirman (2017) said that students had difficulty solving word problems because they did not pay attention to reading and understanding each sentence, what was known in the problem, what was needed and how to solve the problem correctly.

Problem solving for students is routinely trained and accustomed to solving problems that they do not understand (Chi et al., 1989; Luckin & Cukurova, 2019), gradually their thinking skills will develop, in addition to developing thinking skills, the basic ability to solve problems on scientific questions will also develop, but not only in solve scientific problems of course, but even in solving everyday life problems they can solve them without problems.

One way to overcome the problem of difficulty is the problem-solving method and the question and answer method. Problem solving is a series of learning activities, meaning that the implementation of problem solving involves a series of activities that must be completed by students (Alberida et al., 2018). Problem solving requires students not only to listen, record and remember topics, but use problems to think, communicate, seek and process information, and finally make decisions. While the question and answer method are a way of presenting learning in the form of questions that need to be answered, especially from teacher to child, but also from child to teacher. Using this method correctly and sufficiently will stimulate children's interest and motivation to learn (Sudirman, 2017).

In this case, the researcher used a strategy to overcome students' difficulties in understanding the concept of word problems using the Problem-Solving method and the Question and Answer method. The researcher hopes that this learning strategy can

overcome students' difficulties in understanding science story questions, and so that they can improve student performance in science classes.

## Method

In this study, researchers used a quantitative approach with empirical research methods. According to Sugiyono (2015) the experimental approach can be understood as a research method used to determine the effect of certain treatments on other controlled conditions (Pandey & Pandey, 2021). This research was conducted in Anagata Bimbel in science subjects. The population in this study were students of class 11 SMA. The sample in this study were students of class 11 SMA, numbering 30 People.

The research instruments used in this study were test questions in the form of 3-item essays, teacher activity observation sheets and student questionnaires. The test technique in this study was carried out 2 times before and after treatment. The data generated are in the form of pre-test and post-test data from experimental and control class students. The observation technique that will be used by researchers is participatory observation. Observations were made during learning at schools where research was conducted to collect data in the form of teacher and student learning activities. While the questionnaire was filled in by students in the experimental class after students were treated by applying problem-solving learning and question and answer strategies.

## Result and Discussion

The data obtained is in the form of quantitative data derived from the results of student story questions before the application of the problem-solving method and the question and answer method and the results of student tests after the application of the problem-solving method and question and answer method.

### *Problem Solving Method Normality Test*

The normality test carried out in this study was using the Shapiro Wilk test with the help of SPSS 25 (Ananda et al., 2022). The use of the Shapiro Wilk test was due to the amount of data being less than 100 people. In this study the normality test used a significant level of 5%. The following are the results of the pretest and posttest normality test of the problem-solving method.

The results of the pretest and posttest normality test for the problem-solving method showed a significant value  $> 0.05$ . In the pretest, a significant value of  $0.109 > 0.05$  was obtained, which means that the pretest data

was normally distributed. In the posttest, a significant value of  $0.088 > 0.05$  was obtained, which means that the posttest data is normally distributed.

**Table 1.** Normality Test

	Statistic	Shapiro-Wilk df	Sig.
Pretest Problem solving	0.943	30	0.109
Posttest Problem Solving	0.940	30	0.088

a. Lilliefors Significance Correction

*Student Pretest and Posttest Results Using the Problem Solving Method*

The pretest is carried out to determine students' initial abilities so that it can become a general description of students' abilities (Mayleta et al., 2022). By knowing the student's initial abilities, the teacher can find out which students need to get more attention and students who only need to be directed. In an effort to overcome students' difficulties in word problems the researcher used the problem solving method. With the problem solving method, students are expected to be able to solve a problem they face (Setiawan & Wijayanti, 2021). The following are the results of the student pretest.

**Tabel 2.** Pretest Results for Students with the Problem Solving Method

Categories	Amount
Very good	0
Good	1
Enough	11
Not enough	16
Fail	2

In the pretest results, it can be seen that there are still many students who are in the less category with a total of 16 students, 1 student in the good category, 11 students in the sufficient category and 2 students in the failed category. From the results of the pretest, it can be seen that there are still many students who have difficulty solving word problems. This can be caused by many things, one of which is students' lack of understanding of the questions presented. In solving word problems, understanding the concept of the problem is very necessary. So to overcome this, a

**Table 4.** Hypothesis Testing

		N	Mean Rank	Ranks Sum of Ranks	Posttest_Problem_Solving - Pretest_Problem_solving
Posttest_Problem_Solving - Pretest_Problem_solving	Negative Ranks	0 <sup>a</sup>	0.00	0.00	
	Positive Ranks	30 <sup>b</sup>	15.50	465.00	
	Ties	0 <sup>c</sup>			
	Total	30			
Z					-4.914
Asymp. Sig. (2-tailed)					0.000 <sup>d</sup>

a. Posttest\_Problem\_Solving < Pretest\_Problem\_solving

b. Posttest\_Problem\_Solving > Pretest\_Problem\_solving

c. Posttest\_Problem\_Solving = Pretest\_Problem\_solving

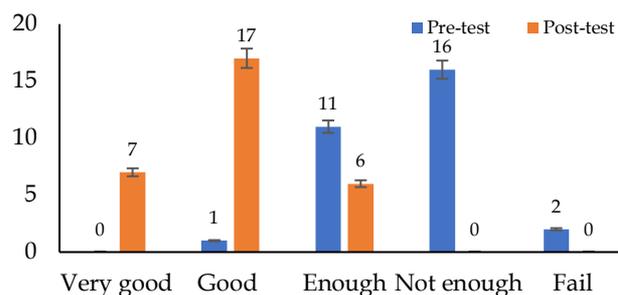
d. Wilcoxon Signed Ranks Test

treatment is given with the application of problem solving methods to overcome students' difficulties in understanding the concept of story problems. The following are the results of the student posttest.

**Table 3.** Posttest Results for Students with the Problem-Solving Method

Categories	Amount
Very good	7
Good	17
Enough	6
Not enough	0
Fail	0

The results of the posttest show the difference in the results of the pretest scores of the previous students where the results of the posttest show that there are a lot of student scores in the good category, totaling 17 people, then 7 people in the very good category and 6 people in the moderate category. The following is a graph of the differences in students' pretest and posttest scores.



**Figure 1.** Differences in Students' Pretest and Posttest Scores Using the Problem-Solving Method Test the Hypothesis Problem Solving Method

Based on the assumption test on the data from the pretest and posttest results of the problem solving method, the hypothesis test used is a non-parametric statistical test, namely by using the Wilcoxon test using SPSS 25 using a significance level of 5% ( $\alpha = 0.05$ ), following the results of the pretest hypothesis test and posttest problem solving method.

The results of testing the hypothesis above showed that there was an increase in students' posttest scores. The increase in the pretest value to the posttest value is 15.50. So it can be said that there are differences in students' pretest scores before being given treatment and posttest results of students after being given treatment. These results can be seen in the Asymp.sig value of  $0.000 < 0.005$  so it can be concluded that the hypothesis is accepted, that is, there are differences in pretest and posttest values, which means the problem-solving method has a significant effect.

*Question and Answer Method Normality Test*

The normality test carried out in this study was using the Shapiro Wilk test with the help of SPSS 25. The use of the Shapiro Wilk test was due to the amount of data being less than 100 people. In this study the normality test used a significant level of 5%. The following are the results of the pretest and posttest normality tests using the question and answer method (Kartikawati & Wibawa, 2020).

**Table 5.** Normality Test

	Shapiro-Wilk		
	Statistic	df	Sig.
Pretest_QnA	0.943	30	0.109
Posttest_QnA	0.935	30	0.065

a. Lilliefors Significance Correction

The results of the pretest and posttest normality test for the problem-solving method showed a significant value  $> 0.05$ . In the pretest, a significant value of  $0.109 > 0.05$  was obtained, which means that the pretest data was normally distributed. In the posttest, a significant value of  $0.065 > 0.05$  was obtained, which means that the posttest data is normally distributed.

*Student Pretest and Posttest Results Using the Question and Answer Method*

The pretest was conducted to determine students' initial abilities so that it can be a general description of students' abilities (Aulia, 2021; Hikmawati et al., 2020). By knowing the student's initial abilities, the teacher can find out which students need to get more attention and students who only need to be directed. In an effort to overcome students' difficulties in word problems, researchers used the question and answer method. With the question and answer method, students are expected to be able to solve a problem they are facing. The following are the results of the student pretest.

**Table 6.** Student Pretest Results Question and Answer Method

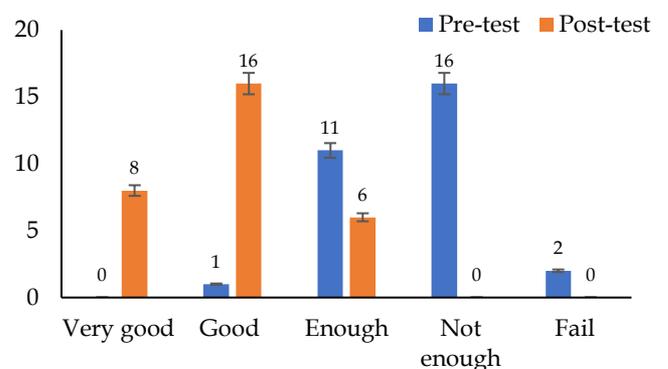
Categories	Amount
Very good	0
Good	1
Enough	11
Not enough	16
Fail	2

In the pretest results, it can be seen that there are still many students who are in the less category with a total of 16 students, 1 student in the good category, 11 students in the sufficient category and 2 students in the failed category. From the results of the pretest, it can be seen that there are still many students who have difficulty solving word problems. This can be caused by many things, one of which is students' lack of understanding of the questions presented. In solving word problems, understanding the concept of the problem is very necessary. So, to overcome this, a treatment is given by applying the question and answer method to overcome students' difficulties in understanding the concept of story problems. The following are the results of the student posttest.

**Table 7.** Student Posttest Results Question and Answer Method

Categories	Amount
Very good	8
Good	16
Enough	6
Not enough	0
Fail	0

The results of the posttest show the difference in the results of the pretest scores of the previous students where the results of the posttest show that there are a lot of student scores in the good category, totaling 16 people, then in the very good category 8 people and in the sufficient category 6 people. The following is a graph of the differences in pretest and posttest scores of students using the question and answer method.



**Figure 2.** Differences in Students' Pretest and Posttest Scores Using the Question and Answer Method

**Table 8.** Hypothesis Testing

		N	Mean Rank	Ranks Sum of Ranks	Posttest_QnA- Pretest_QnA
Posttest_QnA- Pretest_QnA	Negative Ranks	0 <sup>a</sup>	.00	.00	
	Positive Ranks	30 <sup>b</sup>	15.50	465.00	
	Ties	0 <sup>c</sup>			
	Total	30			
	Z				-5.025
Asymp. Sig. (2-tailed)					.000 <sup>d</sup>
a. Posttest_Problem_Solving < Pretest_Problem_solving		c. Posttest_Problem_Solving = Pretest_Problem_solving			
b. Posttest_Problem_Solving > Pretest_Problem_solving		d. Wilcoxon Signed Ranks Test			

*Hypothesis Test Question and Answer Method*

Based on the assumption test on the pretest and posttest results of the question and answer method, the hypothesis test used is a non-parametric statistical test, namely by using the Wilcoxon test using SPSS 25 using a significance level of 5% ( $\alpha = 0.05$ ), along with the test results hypotheses pretest and posttest question and answer method.

The results of testing the hypothesis above showed that there was an increase in students' posttest scores. The increase in the pretest value to the posttest value is 15.50. So it can be said that there are differences in students' pretest scores before being given treatment and posttest results of students after being given treatment. These results can be seen in the Asymp.sig value of 0.000 <0.005 so it can be concluded that the hypothesis is accepted, that is, there are differences in pretest and posttest values, which means that the question and answer method has a significant effect.

Based on the results of the study, the ability to solve students' word problems before being given treatment was generally still in the low/less category and failed, only a few students were in the sufficient or good category. Meanwhile, after being given the treatment, the average student scores were in the good category and there were up to the very good category, although there were still a few students who were still in the sufficient category. Students who are in the moderate category on the posttest also experience an increase from the pretest scores. When viewed from the increase, the problem-solving method and the question and answer method both have a significant effect, the difference is only seen in the number of students in the very good and good categories. In the very good category, there were 7 problem solving methods, while the question and answer method consisted of 8 people. Furthermore, in the good category the problem-solving method totaled 17 people while the question and answer method totaled 16 people.

**Conclusion**

Based on the research results, it can be concluded that the problem-solving method and the question and

answer method both have a significant influence. The problem-solving method and the question and answer method both have a significant value of 0.000 <0.005. So that it can be said that the two methods have a significant influence in efforts to overcome students' difficulties in understanding the concept of word problems.

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**Conflicts of Interest**

The authors declare no conflict of interest.

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