



The Impact of the Problem-Based Learning Model on Student Error Reduction in Integrated Social Science Learning

Daska Azis¹, M. Hafizul Furqan², Muhjam Kamza^{3✉}, Annisa Fitri Pramono⁴

Universitas Syiah Kuala Banda Aceh, Indonesia^{1,2,3,4}

E-mail: daska@unsyiah.ac.id¹, mhafizulfurqan@unsyiah.ac.id², muhjam.kamza@unsyiah.ac.id³,
af.pramono15@gmail.com⁴

Abstrak

Miskonsepsi yang terjadi pada mata pelajaran IPS terpadu disebabkan karena luasnya cakupan materi yang menyebabkan siswa kesulitan dalam memahami konsep yang disampaikan oleh guru. Miskonsepsi merupakan kesalahan dalam memahami dan menjelaskan konsep menurut diri sendiri berdasarkan pengalaman yang ada. Penelitian ini bertujuan untuk mengetahui pengaruh model *problem based learning* dalam menurunkan miskonsepsi peserta didik pada mata pelajaran IPS terpadu. Jenis penelitian ini adalah penelitian eksperimen dengan menggunakan desain tipe *one grup pretest-posttest design*. Teknik pengambilan sampel pada penelitian ini adalah teknik *total sampling* (penelitian populasi). Sampel pada penelitian ini adalah siswa kelas VIII-E MTsS Insan Qur'ani Aceh Besar yang berjumlah 27 orang. Teknik pengumpulan data berupa pemberian tes kepada peserta didik, yaitu pre-test dan post-test yang dilengkapi dengan *three tier diagnostic test*. Hasil penelitian menunjukkan skor rata-rata miskonsepsi peserta didik pada pre-test sebesar 33,33%, dan pada post-test sebesar 15,06%. Maka, terdapat penurunan miskonsepsi peserta didik setelah penerapan model *problem based learning* sebesar 54,81%. Hasil uji hipotesis pada penelitian ini diperoleh $-t_{hitung} < -t_{tabel}$ sehingga H_a diterima dan H_0 ditolak. Maka hipotesis pada penelitian ini adalah terdapat penurunan nilai miskonsepsi setelah penerapan model *problem based learning*. Kesimpulan penelitian yaitu penerapan model *problem based learning* dapat menurunkan miskonsepsi peserta didik pada mata pelajaran IPS terpadu materi interaksi antarruang negara-negara ASEAN kelas VIII MTsS Insan Qur'ani Aceh Besar.

Kata Kunci: Miskonsepsi, Model Pembelajaran, *Problem Based Learning*, IPS Terpadu.

Abstract

The misconceptions that occur in integrated social studies subjects are caused by the wide scope of material, which causes students to have difficulty understanding the concepts conveyed by the teacher. A misperception is an error in understanding and explaining a concept based on previous experience. This study aims to determine the effect of the problem-based learning model on reducing students' misconceptions in integrated social studies subjects. This type of research is experimental and uses a one-group pretest-posttest design. This study employs a total sampling technique (population research). The sample in this study was from class VIII-E MTsS Insan Qura'ni Aceh Besar, totaling 27 people. The data collection technique is in the form of giving tests to students, namely a pre-test and post-test that are equipped with a three-tier diagnostic test. The results showed that the average score of students' misconceptions on the pretest was 33.33%, and the post-test was 15.06%. So, there is a decrease in students' misconceptions after the application of the problem-based learning model of 54.81%. The results of hypothesis testing in this study were obtained so that H_0 was accepted and H_1 was rejected. So the hypothesis in this study is that there is a decrease in the value of misconceptions after the application of the problem-based learning model. The study concludes that the application of the problem-based learning model can reduce students' misconceptions in integrated social studies subjects about the interaction between ASEAN countries (class VIII MTsS Insan Qur'ani Aceh Besar).

Keywords: Misconceptions, Learning Model, *Problem Based Learning*, Integrated Social Studies.

INTRODUCTION

Education is a requirement in social life since it is the catalyst for the development of latent potential in society. Education is a process that aids in the development of individuals so that they can confront all of life's challenges and changes. Success in education is contingent upon the teaching and learning process, and educators play a crucial role in deciding this success. The success of teachers in teaching does not depend on the quantity of material delivered, but rather on the exact meaning or concept contained in the material. But many students don't understand what is being taught, and they often have trouble understanding what is being said. This leads to a lot of confusion.

Integrated social study is one of the subjects that is frequently misunderstood. Students have trouble comprehending the topics presented by the teacher, resulting in misconceptions in integrated social studies classes. A misperception is an inaccuracy in comprehending and explaining an idea based on one's personal experience. Students and instructors in the field of study often harbor misconceptions.

Based on the results of the initial interview with the MTsS Insan Qur'ani teacher, Nanda Elian S.Pd., he stated that integrated social studies had become one of the most uninteresting subjects for the majority of students since understanding integrated social studies material requires careful thought and a broad understanding. This is because the IPS integrates a variety of disciplines, including history, geography, economics, and sociology. Due to the vast scope of content that must be studied, students have difficulties grasping the material offered, and faults in understanding concepts frequently lead to misperceptions among students.

The problem-based learning model is one of the learning strategies that can improve students' grasp of a concept in integrated social studies learning. Students are allowed to think creatively and actively contribute to the development of their reasoning under this approach to instruction (Triasningsih, 2020). The problem-based learning paradigm can be interpreted as one that initiates the learning process by exposing pupils to real-world situations (Hanipah & Sumartini, 2021; Musdiani & Muslia, 2020). To stimulate students and make it easier for them to study material, the problem-based learning model is effective for boosting student comprehension and eliminating misconceptions. Additionally, this strategy can motivate students to create contextual works (Hidayatun et al., 2015; Wati et al., 2016; Winoto & Prasetyo, 2020).

According to Berg, Kohle, and Norland, misconceptions can also be construed as a contradiction or incompatibility between the notion perceived by a person and the term employed by the concerned scientist (Dwilestari & Dessty, 2022; Wawan Eka Setiawan & Neri Egi Rusmana, 2020). There are numerous references indicating that the problem-based learning model can improve students' comprehension and eliminate misconceptions; however, it is often examined in the sciences. This study intends to investigate the effect of the problem-based learning paradigm on eighth-grade MTsS Insan Qur'ani Aceh Besar students' misconceptions in integrated social studies courses.

RESEARCH METHODS

This study employs a quantitative methodology and a one-group pretest-posttest design for experimental research. The research was carried out at MTsS Insan Qura'ni Aceh Besar from January 12 to 19, 2022. This study's population consisted of 27 students from MTsS Insan Qura'ni class VIII-E. The total sampling technique (population research) was utilized, hence the number of samples in this study was the complete population of 27 students.

Methods for collecting data were carried out using testing procedures, which included pre-test and post-testing of the data. The examination consists of multiple-choice questions with explanations attached to each answer choice (three-tier diagnostic test). The purpose of this test is to ascertain whether or not students have any misconceptions regarding integrated social studies topics. For test questions to be used, they must first be

subjected to a quantitative analysis to determine the extent to which they are valid and reliable in classes other than the sample class. The researchers also examined the data for homogeneity, normality, three-tier diagnostics, and hypotheses. As can be seen in Table 1, the following standards will be applied to categorize the students' misunderstandings.

Table 1. Categories of Grouping Misconceptions

No	Category	Tier 1	Tier 2	Tier 3
1	Understand Concept	Correct	Correct	Convinced
2	Don't Understand Concept	Wrong	Wrong	Not Sure
3	Misconception	Correct	Wrong	Convinced
4		Wrong	Correct	Convinced
5		Wrong	Wrong	Convinced

(Source: Qodriyah et al., (2020))

The next stage, which follows the categorization of student test results and the calculation of the proportion of students who have misconceptions, is to categorize misconceptions according to Table 2, which may be found below:

Table 2. Criteria for Assessment of the Percentage of Misconceptions

Student Presentation	Category
0-30%	Low
31-60%	Medium
61-100%	High

(Source: Qodriyah et al., (2020))

RESULTS AND DISCUSSION

Three-Tier Diagnostic Test

The Three-Tier Diagnostic Test was administered to measure the extent of students' misconceptions regarding subjects in Integrated Social Studies. Table 3 shows how many students got each pre-test question right. Here is a table with that information.

Table 3. Percentage of Understanding Level of Each Item Pre-test

Question Number	Understanding Level					
	PK	%	TPK	%	M	%
1	10	37,04	6	22,22	11	40,74
2	22	81,48	1	3,70	4	14,81
3	10	37,04	6	22,22	11	40,74
4	8	29,63	8	29,63	11	40,74
5	12	44,44	7	25,92	8	29,63
6	1	3,70	9	33,33	17	62,96
7	23	85,18	2	7,41	2	7,41
8	9	33,33	9	33,33	9	33,33
9	16	59,26	6	22,22	5	18,52
10	14	51,85	3	11,11	10	37,04
11	10	37,04	6	22,22	11	40,74
12	10	37,04	8	29,63	9	33,33
13	6	22,22	9	33,33	12	44,44
14	14	51,85	5	18,52	8	29,63
15	14	51,85	6	22,22	7	25,92
Amount	179	663	91	337,01	135	500
Average	11,93	44,2	6,06	22,47	9	33,33
Criteria	-	Medium	-	Low	-	Medium

(Source: Calculate Results, 2022)

The percentage of students' level of understanding of each pre-test item is shown in Table 3. The average number of students who have misconceptions is 33.33 percent, with 44.2 percent understanding the concept and 22.47 percent not understanding the concept. Based on the assessment criteria in Table 2 for the percentage of students' misconceptions, the students' misconceptions fall into the moderate category because the percentage of students' misconceptions obtained is greater than 30%. Table 4 below shows a table of the percentage of students' understanding levels on each post-test item.

Tabel 4. Persentase Tingkat Pemahaman Setiap Butir Soal Post-test

Question Number	Understanding Level					
	PK	%	TPK	%	M	%
1	18	66,66	3	11,11	6	22,22
2	27	100	-	-	-	-
3	18	66,66	3	11,11	6	22,22
4	16	59,26	5	18,52	6	22,22
5	20	74,07	4	14,81	3	11,11
6	13	48,15	6	22,22	12	44,44
7	27	100	-	-	-	-
8	17	62,96	6	22,22	4	14,81
9	24	88,88	3	11,11	-	-
10	22	81,48	1	3,70	4	14,81
11	18	66,66	2	7,41	7	25,92
12	19	70,37	4	14,81	4	14,81
13	16	59,26	6	22,22	5	18,52
14	22	81,48	2	7,41	3	11,11
15	23	85,18	3	11,11	1	3,70
Amount	300	1111	48	177,5	61	226
Average	20	74,06	3,2	11,83	4,06	15,06
Criteria	-	High	-	Low	-	Low

(Source: Calculate Results, 2022)

The percentage of students' level of understanding of each post-test item is shown in Table 4. The average number of students who have misconceptions is 15.06 percent, with 70.06 percent understanding the concept and 11.83 percent conceptions is 15.06 percent, with 70.06 percent understanding the concept and 11.83 percent not. Student misconceptions meet the low criteria, according to Table 2, because the percentage score of misconceptions obtained by students is less than 30%.

After categorizing the students' misconceptions, the next step is to determine the magnitude of the decrease in students' misconceptions following the application of the problem-based learning model by using the formula for the percentage decrease in percentage proposed by Sudijono (2018).

$$\text{Persentase (\%)} = \frac{\text{Beginning} - \text{Ending}}{\text{Beginning}} \times 100\%$$

$$\text{Persentase (\%)} = \frac{33,33 - 15,06}{33,33} \times 100\%$$

$$\text{Persentase (\%)} = 54,81\%$$

The results of the calculation presented above show that the average score of students' misconceptions in the pre-test results is 33.33 percent, while the post-test results are 15.06 percent. This indicates that a reduction in the number of students who hold incorrect beliefs can be obtained after the implementation of the problem-based learning model. 54.81 percent.

Figure 1 depicts a representation illustrating the reduction in students' misunderstandings before and after the implementation of the problem-based learning paradigm. This diagram can be seen at the bottom of the page.

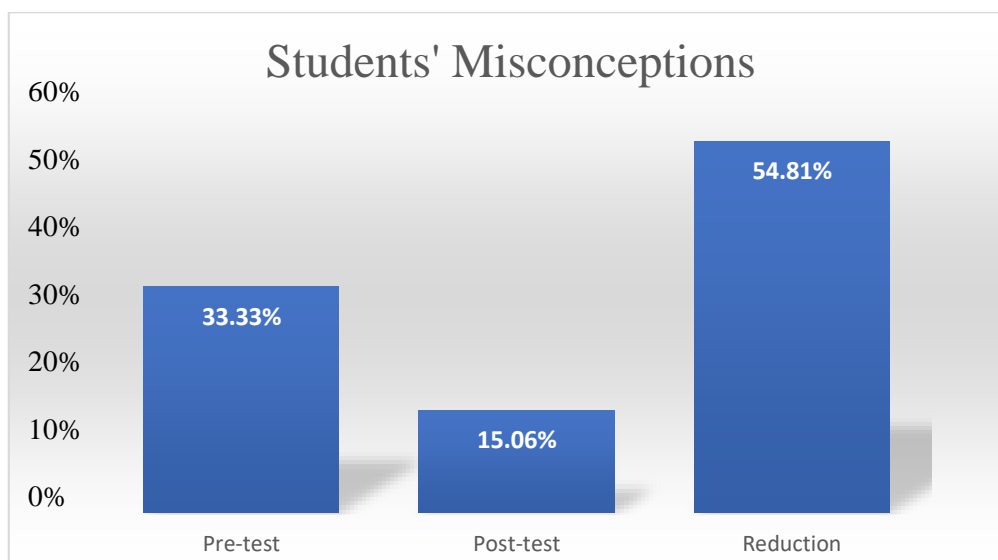


Figure 1. Diagram of Reducing Misconceptions in Students
(Source: Calculate Results, 2022)

Hypothesis testing

This test of the hypothesis was carried out to determine the implications that can be drawn from the data acquired concerning the impact that problem-based learning has on lowering the number of misconceptions held by students. This is done by giving students a pre-test and a post-test, which shows how many misconceptions they had before and after the lesson.

Following the completion of the calculations, the value of the t-count was found to be -17.23. To demonstrate whether or not the hypothesis is accepted, the value of t-count will be compared with the value of t-table at a significance level of 5 percent with degrees of freedom $dk = 27 + 27 - 2 = 52$ and the value of t-table = -2.01. When the results of this comparison were examined, it was found that $t\text{-count} < t\text{-table}$ indicated that H_a accepted and H_0 rejected. It follows that if H_a is accepted, then the hypothesis being tested in this investigation will also be accepted. After implementing the problem-based learning paradigm, the conclusion that can be drawn is that there is a reduction in the amount of value that is contributed by misconceptions.

Discussion

The researcher divides students into several groups during the integrated social studies learning process using a problem-based learning model. The researcher would then present real problems by displaying illustrations about land conversion to students after explaining the land conversion material to them via PowerPoint. The researcher will then hand out the Student Performance Sheet (LKPD), and students will be asked to answer questions or solve problems on the LKPD with their group mates. These questions are about the problems that come up when farmland is turned into places to live and work.

Students appear to be preoccupied with resolving the researcher's issues, and they occasionally inquire if there are any difficulties in discussing with their group members. The benefits of implementing a problem-based learning model include the ability to create a pleasant learning environment that fosters enthusiasm and interest in student learning, thereby improving student learning outcomes (Hasriyani et al., 2022; Purba et al., 2016; Savitri & Manuaba, 2022; Sayono, 2013). The following activity is for students to present the results of group work in front of other friends while other students observe what is said and provide suggestions or input to friends who are making presentations. Students are taught courage at this stage so that they can express themselves in front of their peers.

The application of the problem-based learning model is an alternate method for reducing students' misunderstandings of the interaction material across ASEAN nations' spaces. Using the problem-based learning

model can also help students develop the higher-order thinking abilities necessary for systematic problem-solving (Pratiwi & Setyaningtyas, 2020; Satwika et al., 2018; Sunarti & Nurul Fadilah, 2019; Utami, 2019). This is consistent with Nurcahyo & Winanti (2021) assertion that the process of constructing and finding solutions through the use of the problem-based learning model is already a stage of higher-order thinking skills.

The findings of this study are consistent with the findings of Rizki et al., (2020) in their study titled "Application of Problem-Based Learning Models to Reduce Students' Misconceptions About the Concept of Redox Reactions." According to the findings, the problem-based learning model reduced students' misconceptions by 76.05 percent. As a result, it can be concluded that the problem-based learning model has been effective in improving students' problem-solving abilities and assisting students in understanding the concepts that are taught correctly.

CONCLUSION

The average score of students' misconceptions on pre-test results is 33.33 percent, and it is 15.06 percent on post-test results. As a result, the application of the problem-based learning model reduces students' misconceptions by 54.81 percent. The results of the hypothesis test $t\text{-count} < t\text{-table}$ show that H_a is accepted and H_0 is rejected. As a result, the value of misconceptions decreases after using the problem-based learning model. It is suggested that future researchers conduct additional research, specifically by using a problem-based learning model but at different grade levels and materials, as well as finding other alternative ways to help reduce misconceptions in students.

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