



# The Effect of Providing HOTS (Higher Order Thinking Skills) Based Questions on Students' Critical Thinking Ability in Islamic Religious Education Subjects at SMP Negeri 10 Palembang

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## Abstrak

Penelitian ini bertujuan untuk mengeksplorasi dan menganalisis dampak dari pemberian soal yang dirancang berdasarkan prinsip *Higher Order Thinking Skills* (HOTS) terhadap kemampuan berpikir kritis siswa dalam mata pelajaran Pendidikan Agama Islam (PAI). Dalam penelitian ini, metode yang digunakan adalah pendekatan kuantitatif, di mana data yang dikumpulkan berupa angka-angka yang diperoleh dari responden yang terlibat. Berdasarkan hasil analisis yang dilakukan, ditemukan bahwa tidak ada pengaruh yang signifikan mengenai pemberian soal berbasis HOTS dan kemampuan berpikir kritis siswa dalam konteks pembelajaran Pendidikan Agama Islam (PAI). Dengan kata lain, dapat disimpulkan bahwa meskipun soal HOTS dirancang untuk meningkatkan kemampuan berpikir kritis, hasilnya menunjukkan bahwa pemberian soal tersebut tidak memberikan dampak yang berarti terhadap kemampuan berpikir kritis siswa. Temuan dari penelitian ini mengindikasikan perlunya kajian lebih lanjut mengenai faktor-faktor lain yang mungkin dapat memengaruhi kemampuan berpikir kritis siswa pada mata pelajaran ini. Oleh karena itu, penelitian lanjutan sangat penting untuk memahami secara lebih komprehensif mengenai aspek-aspek yang dapat berkontribusi pada peningkatan kemampuan berpikir kritis siswa.

**Kata Kunci:** HOTS, Berpikir kritis, PAI.

## Abstract

*This study explores and analyses the impact of giving questions designed based on the principles of higher-order thinking Skills (HOTS) on students' critical thinking skills in Islamic Religious Education (PAI) subjects. In this study, the method used is quantitative, where the data collected is in the form of numbers obtained from the respondents involved. Based on the results of the analysis conducted, it was found that there was no significant effect regarding the provision of HOTS-based questions and students' critical thinking skills in the context of Islamic Religious Education (PAI) learning. In other words, it can be concluded that although HOTS questions are designed to improve critical thinking skills, the results show that the administration of these questions does not significantly impact students' critical thinking skills. The findings of this study indicate the need for further studies on other factors that may affect students' critical thinking skills in this subject. Therefore, further research is essential to understand more comprehensively the aspects that can contribute to improving students' critical thinking skills.*

**Keywords:** HOTS, Thinking, PAI.

## Introduction

Education is important in preparing the younger generation to face future challenges. Signs of an educational process have existed since the beginning of human existence, although still in a very primitive form. This shows that education has existed since ancient times. However, because of its simplicity, people at that time may not have realized that what they were doing was part of the educational process. (Citriadin, 2019, p. 1)

Education is a process carefully and consciously designed to create an atmosphere and learning methods that encourage students to play an active role in their self-development. The goal of education is to equip students with spiritual strength, the ability to organize themselves, good attitudes, intelligence, noble morals, and skills needed for their welfare, their communities, and their countries. (Yusuf, 2018, p. 10) Education is important in preparing and developing Human Resources (HR). As a practical branch of science, education focuses on applications and actions that affect students. (Alpian et al., 2019, pp. 67–68)

The 21st-century learning concept emphasises developing higher-order thinking skills (HOTS). In general, HOTS refers to a thinking ability that involves the remembering stage and critical and creative thinking skills. HOTS is a transformational concept in education that emerged in the early 21st century, aiming to prepare human resources to face the challenges of the Industrial Revolution 4.0. (Suyanto et al., 2023, p. 82)

HOTS (Higher Order Thinking Skills) are advanced thinking skills. This ability includes various levels of thinking, starting from C1 (Remembering), C2 (Understanding), and C3 (Applying) to higher levels such as C4 (Analyzing), C5 (Evaluating), and C6 (Creating). HOTS is at the cognitive level, and HOTS is at the C4 to C6 level, namely, the ability to analyse, evaluate, and create. (Ahmad & Sukiman, 2019, p. 142) HOTS questions encourage students to think critically and creatively, not just memorize. They measure students' knowledge and ability to solve problems through analysis, evaluation, and creation. Thus, HOTS is categorized as a higher thinking skill that focuses on problem-solving skills. (Irmawati et al., 2021, p. 249)

Higher-order thinking Skills (HOTS), or what is often referred to as higher-order thinking skills, is a way of thinking that promotes transfer, critical thinking, and problem-solving. (Mariam et al., 2020, p. 172) For example, students

combine knowledge and ideas to analyse, speculate, generalize, and synthesize to conclude. When a person relates new information to information already stored in memory and then reorganizes or develops the information to help achieve goals or solve problems, higher-order thinking skills become apparent. (Lilawati et al., 2024, p. 167) Teachers can use higher-order thinking Skills (HOTS)- based test questions to train students in these skills. HOTS-based tests can help students develop critical, reflective, metacognitive, and creative thinking abilities. (Kristanto & Setiawan, 2020, p. 370)

Learners are considered problem-solvers if they can analyze a problem and apply their knowledge in a new situation. This ability is known as higher-order thinking skills (HOTS) in the academic world. HOTS includes the ability to integrate, analyze, and utilise knowledge and experience critically and creatively when making decisions, especially in solving problems that arise in new and unfamiliar situations. (Septiana et al., 2024, p. 72)

Based on this explanation, researchers are interested in conducting a study on how the HOTS concept is applied in learning Islamic Religious Education (PAI) in junior high schools. This study aims to analyze the concept of HOTS in Islamic Education learning in junior high schools and whether HOTS can affect students' critical thinking skills at that level.

## Method

The research method is a step or approach specifically chosen to solve problems that arise in a study. (Purnia & Alawiyah, 2020, p. 21) According to Cholid Narbuko and Abu Ahmadi, research is an activity that includes searching, recording, formulating, and analysing to prepare reports on these activities. (Veronica et al., 2022, p. 2) This research was conducted at SMP Negeri 10 Palembang. The approach used is the quantitative method. The quantitative research method utilizes statistics to process data so that the information obtained and the results presented are in the form of numbers. (Sahir, 2021, p. 13) Quantitative methods are applied statistical methods to collect quantitative data from a research study. (Munir et al., 2021, p. 1) Quantitative research aims to find answers to questions by applying a structured design in accordance with the research systematics. (Paramita et al., 2021, p. 10)

This study used quantitative data, which consists of numbers obtained from respondents. The sample consisted of 30 grade VIII students at SMP Negeri 10 Palembang. Data collection techniques included questionnaires. The data were then analyzed statistically to assess the effect of variable X on variable Y by utilizing the product moment correlation formula.

## Results and Discussion

In this study, the researcher distributed 30 questionnaires to 30 students from class VII.8 at SMP Negeri 10 Palembang. The questionnaires contained ten questions, all of which were multiple-choice questions based on the principle of higher-order thinking Skills (HOTS).

### A. Providing HOTS (Higher Order Thinking Skills)-Based Questions at SMP Negeri 10 Palembang

Providing questions oriented towards higher-order thinking Skills (HOTS) is an important element in this research. Through the questionnaire distributed by the researcher at SMP Negeri 10 Palembang related to HOTS-based questions, the researcher can summarise the results related to the questions asked to the respondents as follows: 93, 80, 80, 73, 87, 80; 93; 87; 80; 87; 87; 87; 73; 73; 80; 80; 87; 80; 87; 80; 80; 73; 73; 87; 87; 87; 87; 87; 73; and 80.

Based on the scores obtained from the raw data regarding the administration of HOTS-based questions that have been processed, the following information can be known:

1. Range Value (R) :  
 $R = H - L$   
 $= 93 - 73$   
 $= 20$
2. Many Classes (K) :  
 $= 1 + 3,3 \text{ Log } n$   
 $= 1 + 3,3 \text{ Log } 30$   
 $= 1 + 3,3, (1,47)$   
 $= 1 + 4,851$   
 $= 5,861 = 5 \text{ (rounded)}$
3. Interval Length (i)  
 $= \text{Range} / \text{Many Classes}$   
 $= 20 / 5$   
 $= 4$
4. Frequency distribution table of giving hots-based questions

**Table 1. Frequency Score of Giving HOTS-Based Questions**

Interval Class	F	X	x'	Fx'	Fx' <sup>2</sup>
72-75	6	73,5	-2	-12	24
76-79	0	77,5	-1	0	0
80-83	10	81,5 (M)	0	0	0
84-87	12	85,5	1	12	12
88-91	0	89,5	2	0	0
92-95	2	93,5	3	6	18
Amount	30	-	-	$\Sigma Fx' = 6$	$\Sigma Fx'^2 = 54$

Based on the table above, the data obtained shows that the average is 82, with the highest score of 93 and the lowest score of 73.

$$M_x = M' + i \left( \frac{\Sigma Fx'}{N} \right)$$

$$M_x = 81,5 + 4 \left( \frac{6}{30} \right)$$

$$M_x = 81,5 + 4 (0,2)$$

$$M_x = 81,5 + 0,8$$

$$M_x = 82,3 = 82$$

$$SDx = i \sqrt{\frac{\Sigma fx'^2}{N} - \left( \frac{\Sigma fx'}{N} \right)^2}$$

$$SDx = 4 \sqrt{\frac{54}{30} - \left( \frac{6}{30} \right)^2}$$

$$SDx = 4 \sqrt{1,8 - (0,2)^2}$$

$$SDx = 4 \sqrt{1,8 - 0,04}$$

$$SDx = 4 \sqrt{1,76}$$

$$SDx = 4 \times 1.326$$

$$SDx = 5,304 = 5$$

After calculating the mean and standard deviation, the next step is to determine the category High, Medium, and Low (TSR) as follows:

1. High Category (H)  
 $= M_x + 1 \cdot (SDx)$   
 $= 82 + 1 \cdot (5)$   
 $= 82 + 5$   
 $= 87$
2. Low Category (L)  
 $= M_x - 1 \cdot (SDx)$   
 $= 82 - 1 \cdot (5)$   
 $= 82 - 5$

= 77

3. Medium category  
 = Between H and L  
 = Between 87 and 77  
 = Between 77 and 87  
 = Range 77 to 87

Based on the raw data, the determination of the TSR category indicates that there are two respondents in the high category, which has a percentage of 7%. On the other hand, 22 respondents fall into the medium category, which has a percentage of 73%, and six respondents in the low category, which has a percentage of 20%.

**Table 2. Category Classification High, Medium, Low on Variable X**

No	Classification	F	Persentase
1	High	2	7%
2	Medium	22	73%
3	Low	6	20%
Total		30	100%

Based on the results obtained and tabulated, the administration of HOTS-based questions shows that two respondents (7%) are at a high level, 22 respondents (73%) are at a medium level, and six respondents (20%) are at a low level. From these results, the researcher concluded that applying higher-order thinking Skills (HOTS)-based questions at SMP Negeri 10 Palembang was in the moderate category.

**B. Critical Thinking Skills of Students at SMP Negeri 10 Palembang**

The HOTS-based questions were designed based on data from questionnaires distributed by researchers at SMP Negeri 10 Palembang related to critical thinking skills. From the questionnaire, the researcher managed to collect and present the results of the questions asked to the respondents as follows: 87; 87; 93; 53; 87; 100; 53; 93; 73; 73; 93; 87; 93; 100; 73; 73; 80; 93; 80; 80; 93; 93; 73; 93; 100; 80; 93; 87; 93 and 93.

Based on the scores obtained from the raw data regarding critical thinking skills that have been tabulated, the results can be found as follows:

1. Range Value (R) :  
 $R = H - L$   
 $= 100 - 53$   
 $= 47$
2. Many Classes (K) :  
 $= 1 + 3,3 \text{ Log } n$   
 $= 1 + 3,3 \text{ Log } 30$   
 $= 1 + 3,3, (1,47)$   
 $= 1 + 4,851$   
 $= 5,861 = 5 \text{ (rounded)}$
3. Interval Length (i)  
 $= \text{Range} / \text{Many Classes}$   
 $= 47 / 5$   
 $= 9,4 = 9 \text{ (rounded)}$
4. Frequency distribution table of giving questions based on critical thinking skills

**Table 3. Frequency of critical thinking ability scores**

Interval Class	F	X	x'	Fx'	Fx' <sup>2</sup>
47-55	2	51	-2	-4	8
56-64	0	60	-1	0	0
65-73	5	69 (M)	0	0	0
74-82	4	78	1	4	4
83-91	5	87	2	10	20
92-100	14	96	3	42	126
Amount	30	-	-	$\Sigma Fx' = 52$	$\Sigma Fx'^2 = 158$

The table shows that the average value is 85, with a maximum value of 100 and a minimum value of 53.

$$M_y = M' + i \left( \frac{\Sigma Fy'}{N} \right)$$

$$M_y = 69 + 9 \left( \frac{52}{30} \right)$$

$$M_y = 69 + 9(1,733)$$

$$M_y = 69 + 15,597$$

$$M_y = 84,597 = 85 \text{ (rounded)}$$

$$SD_y = i \sqrt{\frac{\Sigma f x'^2}{N} - \left( \frac{\Sigma f x'}{N} \right)^2}$$

$$SD_y = 9 \sqrt{\frac{54158}{30} - \left( \frac{52}{30} \right)^2}$$

$$SD_y = 9 \sqrt{5,26 - (1,73)^2}$$

$$SDy = 9\sqrt{5,26 - 2,99}$$

$$SDy = 9\sqrt{2,27}$$

$$SDy = 9 \times 1,506$$

$$SDy = 13,5 = 14 \text{ (rounded)}$$

After knowing the mean and standard deviation, the next step is to determine the category high, medium, and low, as follows:

1. High Category (H)  
 $= My + 1 \cdot (SDy)$   
 $= 85 + 1 \cdot (14)$   
 $= 85 + 14$   
 $= 99$
2. Low Category (L)  
 $= My - 1 \cdot (SDy)$   
 $= 85 - 1 \cdot (14)$   
 $= 85 - 14$   
 $= 71$
3. Medium category  
 $= \text{Between T and R}$   
 $= \text{Between 99 and 71}$   
 $= \text{Between 71 and 99}$   
 $= 71 \text{ to } 99 \text{ Kategori Sedang}$

Based on the raw data, the TSR category assignment shows that two respondents, with a percentage of 7%, fall into the high category. A total of 22 respondents, with a percentage of 73%, are in the medium category, while six respondents, with a percentage of 20%, fall into the low category

**Table 4. Classification of High, Medium, Low Categories Variable Y**

No	Classification	Frequency	Persentase
1	High	3	10%
2	Medium	25	83%
3	Low	2	7%
Total		30	100%

Berdasarkan nilai yang telah didapat dari data diatas, setelah pengolahan soal-soal berbasis *Higher Order Thinking Skills* (HOTS) ditabulasikan, maka dapat diketahui bahwa 3 responden termasuk dalam kategori tinggi dengan persentase 10%, 25 responden berada di kategori sedang dengan persentase 83%, dan 2 responden masuk kategori rendah dengan persentase 7%. Oleh karena itu, peneliti

menyimpulkan bahwa pemberian soal berbasis HOTS di SMP Negeri 10 Palembang tergolong dalam kategori sedang.

### C. The Effect of Providing HOTS (Higher Order Thinking Skills) Based Questions on Students' Critical Thinking Ability at SMP Negeri 10 Palembang

**Table 5. Calculation to find "r"**

No	Responden	X	Y	X <sup>2</sup>	Y <sup>2</sup>	XY
1	R -1	93	87	8649	7569	8091
2	R -2	80	87	6400	7569	6960
3	R -3	80	93	6400	8649	7440
4	R -4	73	53	5329	2809	3869
5	R -5	87	87	7569	7569	7569
6	R -6	80	100	6400	10000	8000
7	R -7	93	53	8649	2809	4929
8	R -8	87	93	7569	8649	8091
9	R -9	80	73	6400	5329	5840
10	R -10	87	73	7569	5329	6351
11	R -11	80	93	6400	8649	7440
12	R -12	87	87	7569	7569	7569
13	R -13	87	93	7569	8649	8091
14	R -14	87	100	7569	10000	8700
15	R -15	73	73	5329	5329	5329
16	R -16	73	73	5329	5329	5329
17	R -17	80	80	6400	6400	6400
18	R -18	80	93	6400	8649	7440
19	R -19	87	80	7569	6400	6960
20	R -20	80	80	6400	6400	6400
21	R -21	80	93	6400	8649	7440
22	R -22	73	93	5329	8649	6789
23	R -23	73	73	5329	5329	5329
24	R -24	87	93	7569	8649	8091
25	R -25	87	100	7569	10000	8700
26	R -26	87	80	7569	6400	6960
27	R -27	87	93	7569	8649	8091
28	R -28	87	87	7569	7569	7569
29	R -29	73	93	5329	8649	6789
30	R -30	80	93	6400	8649	7440
Amount		2468	2549	204100	220847	209996

From the table, we can identify the following components:

$$N = 30 \qquad \Sigma X^2 = 204100$$

$$\Sigma X = 2468 \qquad \Sigma Y^2 = 220847$$

$$\Sigma Y = 2549 \qquad \Sigma XY = 209996$$

The next step is to find  $r_{xy}$  Th the formula:

$$r_{xy} = \frac{N \sum XY - (\sum X)(\sum Y)}{\sqrt{\{N \sum X^2 - (\sum X)^2\} \{N \sum Y^2 - (\sum Y)^2\}}}$$

$$r_{xy} =$$

$$\frac{30 \times 209996 - (2468)(2549)}{\sqrt{\{30 \times 204100 - (2468)^2\} \{30 \times 220847 - (2549)^2\}}}$$

$$r_{xy} =$$

$$\frac{6.299.880 - 6.290.932}{\sqrt{(6.123.000 - 6.091.024)(6.625.410 - 6.497.401)}}$$

$$r_{xy} = \frac{8.948}{\sqrt{31.976 \times 128.009}}$$

$$r_{xy} = \frac{8.948}{\sqrt{4.093.215.784}}$$

$$r_{xy} = \frac{8.948}{63.978,244}$$

$$r_{xy} = 0,139$$

To understand the value of the correlation coefficient, we can refer to the criteria for the r-value set as follows:

Coefficient Interval	Level of Relationship
0,00 – 0,199	Very weak
0,20 – 0,399	Weak
0,40 – 0,599	Medium
0,60 – 0,799	Strong
0,80 – 1,000	Very Strong

The calculation results show that the correlation index value is 0.139. When compared to the table, the value of r (0.139) within the range of 0.00 to 0.199 is categorised as a very weak correlation. This indicates that no significant influence exists between the administration of higher-order thinking Skills (HOTS) based questions and students' critical thinking skills at SMP Negeri 10 Palembang. For interpretation using the Product Moment "r" table, the hypothesis can be stated as follows:

(Ha) Alternative Hypothesis: A significant positive relationship exists between applying higher-order thinking Skills (HOTS)-

based questioning and critical thinking skills among SMP Negeri 10 Palembang students.

(Ho) Null Hypothesis: There is no significant positive relationship between applying Higher Order Thinking Skills (HOTS)-based questioning and critical thinking skills among SMP Negeri 10 Palembang students.

Based on the calculation above, the relationship between variables X and Y, namely the effect of giving HOTS (Higher Order Thinking Skills) based questions on students' critical thinking skills at SMP Negeri 10 Palembang, does not show significance. Therefore, the alternative hypothesis (Ha) is rejected, while the null hypothesis (Ho) is accepted. This indicates no significant relationship exists between the administration of HOTS questions and students' critical thinking skills at SMP Negeri 10 Palembang.

### Conclusion

Based on the results of research and data analysis regarding the effect of giving questions using the HOTS (Higher Order Thinking Skills) approach on students' critical thinking skills at SMP Negeri 10 Palembang, it can be concluded that the number of students in the high category is two students or 7%, the medium category consists of 22 students or 73%, and the low category consists of 6 students or 20%. Thus, the provision of HOTS questions in SMP Negeri 10 Palembang can be categorized as very low, especially since most students are in the moderate category with a percentage of 73%.

The critical thinking skills of students at SMP Negeri 10 Palembang showed that three students (10%) had high critical thinking skills, 25 students (83%) were at a moderate level, and two students (7%) were in the very low category. Overall, the critical thinking skills of students in this school were at a moderate level. In analysing the effect of giving higher-order thinking Skills (HOTS) based questions on students' critical thinking skills, the researcher applied the product moment correlation formula, and the results showed that there was no influence between the two variables.

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