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## **QUESTIONING STRATEGY THAT WORKS TO FOSTER CRITICAL THINKING SKILLS: A STUDY IN ISLAMIC UNIVERSITY**

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**Abstract:** The aim driving the study is to develop instructional strategies that best fit students to enhance higher order thinking skills through questioning strategy. A university class consisting of thirty students is taking part in the study on Quantitative Research Methodology. The study is classroom action research with two steps. Preliminary study reveals that students had insufficient understanding towards HOTS (Higher Order Thinking Skills) and needed awareness raising towards critical thinking. A questioning strategy-based lesson plan, observation sheets, and critical thinking questionnaire were developed based on a questioning strategy approach. The findings indicate that

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the questioning strategy significantly enhances critical thinking skills. This result suggests teachers use questioning strategy to assist students' progress critical thinking. The implication of the study is that teachers should have the HOTS to facilitate and cultivate critical thinking among students and establish a thinking-oriented classroom

**Keywords:** *critical thinking; HOTS; instructional strategy; questioning strategy*

## INTRODUCTION

It has been decades that the primary educational objective has been centered around developing and nurturing students' higher order thinking abilities (Fisher, 1999; David, 2007; Chinedu et al., 2015; Hashim et al., 2018). Higher Order Thinking Skills (HOTS) has been a crucial aspect of the teaching and learning process, given that the ultimate goals of teaching-learning processes is for the students to be able to think and solve problems critically. It is obvious that the ability of HOTS has given an impact towards the improvement of the achievement. Furthermore, it is clear that traditional teaching-learning processes alone cannot contribute to a significant effect on the increase of HOTS. Therefore, the classroom application of HOTS plays an important role in order to endorse the level of students' critical thinking skills.

The above-mentioned commitment to nurture the students' HOTS is relevant and essential in world economic growth, information era, the development of information and communications technology (ICT), globalization era, a knowledge and science-based community, and a fast-paced world development. In fact, critical thinking skills are absolutely as well as compulsory skill for every individual in any setting in general and educational setting in particular. Fisher (1999) asserts that the development of students' HOTS is complementary and becomes basis for lifelong learning among them. In other words, students who can critically think, respond incessantly, and adapt

peacefully to this increasingly-fast changing world are essential (Vijayaratnam, 2012).

Obviously, teachers, educationists, and practitioners understand the importance of HOTS and realize that educational system should play role in this inculcation of HOTS. However, they still vary in responding how teaching and/or learning HOTS is to be inculcated. Consequently, it is found in many classrooms that HOTS receives little or no attention (Barnaby, 2016). Moreover, Barnaby (2016) emphasizes that even though critical thinking may occur during the teaching-learning processes, teachers rarely make an effort to sustain students' higher order thinking. This lack of emphasis on HOTS could be attributed to teachers' incompetency or disinterest in promoting critical thinking beyond content-specific learning, as supported by previous research findings. Musliha et al.'s (2021) research, for example, shows that teachers mostly use LOTs-type questions instead of HOTS type questions. This implies that HOTS receives little attention and teachers have lack of HOTS competency as well as interest.

The necessity of Higher Order Thinking Skills (HOTS) is of utmost significance for students to acquire. Firstly, it enables them to effectively address questions that arise during exams. Additionally, it equips students with the ability to respond to the demands of the real world. HOTS then becomes the ultimate goal of education to attain through appropriate approaches, systematic educational processes and learning methods. Unfortunately, a classroom scenario for better gaining such final goal of education is not much done, and this little attention is still epidemic elsewhere around the nation. On the other hand, despite this unfavorable reality, the government has started realizing the educational ideal of having thinking students within thinking classroom, under thinking curriculum. This is certainly a good move even though we still have to work hard (Zohar & Schwartz, 2005; Zohar, 2013).

Consequently, in an effort to this hard work where thinking students within thinking classroom, under thinking curriculum is to be achieved, teachers play significant role by creating activity or conducive and supportive teaching and learning environment and situation, in which HOTS is really appreciated, which provides abundance opportunity for students to explore their critical thinking. In respect of it, classroom teaching-learning activities need to be designed in such a way so that execution of HOTS varies to improve student's critical thought. The classroom application of HOTS directed by teachers not only introduces HOTS in learning as well as improve student performance in academic and skills, continuously but also prepare them to face this rapid-changing world (Howard & Gray, 2014). Today research studies show that the transfer and integration of these thinking skills into academic subject areas is not instant and automatic (Qashoa, 2013). Critical thinking instruction needs to be well-designed since teaching critical thinking in isolation is not effective. It must be holistic, crucial and integrated element in classroom curriculum (Underbakke et al., 1993; Thompson, 1997).

Generally, teachers realize that HOTS needs to be taught and practiced through systematic and procedural lessons to better improve students' critical thoughts (Howard & Gray, 2014). A research study by Ho and To (2022) indicates that Vietnamese teachers already use questioning strategy to promote students' critical thinking. Several other studies conducted by Limbach (2010) and Nagappan (2001) have found that educators acknowledge the importance of HOTS in the teaching and learning process. However, they face challenges due to their limited knowledge and skills to effectively incorporate HOTS into their instructional practices. As a consequence, the teaching practice turns back to the traditional mode of teaching. The emphasis on content-specific accomplishment has led the teacher to pay less attention to students' critical thoughts instead of focusing on efforts to complete the syllabus and provide abundant chance for students for the mastery of the strategies to answer exam questions (Sulistiyo, 2016).

The challenge is how to transform this ultimate goal of education into practical teaching strategies in which students' critical thinking could be developmentally improved. This teaching strategies may appear challenging and difficult at first because this requires mental as well as paradigm shift from talking teachers to thinking students. Teachers can provide more opportunities and activities that can lead to the development of critical thought. Further, teachers can provide the time and space for practice, brainstorming, sharing and arguments that could foster creativity. It is one way that teachers can assist students explore their thinking skills through questioning strategies.

However, research study investigating questioning strategy to improve HOTS using action research was hardly found. Therefore, conducting research study implementing questioning strategy to foster students' HOTS through classroom action research was of paramount importance. The researchers focused on how could questioning strategy be best implemented to enhance students' critical thinking skills and what are students' responses towards the use of questioning strategy to foster critical thinking skills?

## **METHOD**

The study is action research since the main question driving this research attempts to develop instructional strategies that best fit the students to enhance HOTS through questioning strategy. Each cycle comprises two meetings. Planning is designed to develop any necessary materials that are needed in the action stage. The initial step is developing a questioning strategy-based lesson plan to use in this first meeting. The lesson plan is then developed based upon the reflection result of the previous meeting. The next step is preparing some question starters to lead and stimulate class to think critically. These questions are open-ended questions emphasizing that there are no right or wrong answers. The questions are used to explore complex ideas, obtain deeper understanding of the topic under discussion, open

up issues and problems, analyze concepts, distinguish what students know from what they need to know, and follow out logical implications of thought. These activities are intended to encourage and provide the students opportunity to think critically.

Some sample question starters include:

- How are  $x$  and  $y$  related?
- What were the strengths and weaknesses of  $x$ ?
- How does it work?
- Do you agree/disagree?
- Why was it important?
- Can you give another suitable example of it?
- Which is the best? Why do you think so?
- Give and justify your opinion.

The next is constructing questionnaire of critical thinking disposition to measure students' level of critical thinking of first and second cycle. The last is developing observation guidelines and sheets to measure numbers of HOT-question produced by students and to measure time needed to respond to HOT-question starters.

Teacher starts class by asking the prepared question starters to encourage and stimulate thinking critically. The questions starters are not limited to the prepared ones and could be further improved and explored in accordance with how the class goes on and the topic under discussion. Students work individually to prepare, think and write out HOT questions. They further are to write possible responses towards their HOT questions. Students then swap their written questions without responses to other individual, and they have to answers those questions. Class discussion is then led by teacher to further deepen and explore materials, and to habituate HOTS utilizing HOT questions. In observation, researchers helped by the collaborator did observation as well as took notes on every student's activity happening in the course of teaching and learning process in classroom. Having done this, researchers and collaborator discussed the observation results. The

objectives of this observation are to identify and examine students' efforts and ability in critical thinking. Reflection gives a very detail and comprehensive portrayal upon how questioning strategies could facilitate and contribute to the development of students' critical thinking skills. The discussion reflected what had taken place during the implementation of lesson plan. Then, if it is found that students' critical thinking ability is still unsatisfactory, it then continues to the next cycle.

One class university students of State Islamic Institute of Kediri consisting of thirty students took part intensively in the study. They were six-semester students and the average age was eighteen to twenty years old. They took Quantitative Research Methodology. They were 17 male students and 13 female students. Techniques to collect data in this research are of two sorts. The first is observation which was done from the very beginning to the end of the class. Field notes from the observation were taken. The field notes were related to the frequency and ease of students in asking HOTS questions. Furthermore, it is intended to measure how class goes on and how students' thinking skill develops. The second is semi-closed critical thinking questionnaire. This questionnaire was to elicit views and experiences of students in involving in HOTS-based teaching using questioning strategy.

The quantitative data were analyzed by comparing students' critical thinking ability before and after treatment (questioning strategies) using one-sample correlated t-test in order to measure significant improvement of HOTS. On the other hand, qualitative data were analyzed typologically and inductively. The final step is interpreting and drawing conclusion. Here researchers picked the pattern or the core of the available data which had been organized, classified, and interpreted.

## FINDINGS

The need analysis reveals that students had insufficient understanding towards HOTS and needed awareness raising towards critical thinking as well as the importance of critical thinking. Learning process seemed to be less active as well as less critical and students were not engaged in the classroom teaching-learning process. Students just listened and received material through lecturing. They were not actively involved. They did not initiate classroom learning. The class became monotonous. It does trigger students to be active. It is a one-way interaction.

As a consequence, teacher highlighted the arguments that critical thinking enables a greater appreciation teaching-learning activity, enriches our enjoyment and experience of life, promotes essential skills such as critical thinking and problem-solving. Then, these arguments really convince students that critical thinking is really in need.

**Table 1. Students' Characteristics**

No.	Features of Students	Percentage
1	Being critical	4%
2	insufficient understanding about HOTS	34%
3	Passive students	22%
4	Listening students	17%
5	No challenge of thinking critically and creatively	23%

Table 1 shows that 4% students are already relatively critical, whereas, the majority (96%) of students are not critical due to various reasons. Firstly, they have insufficient understanding about HOTS (34%). Secondly, students are passive (22%). Thirdly, students just listen and receive the given lecture (17%), and the last is that students are not challenge to think creatively and critically (23%). These finding are disappointing, and consequently are not good for students in particular and for education in general.

Other findings during the observations before the treatments also indicate the followings aspects. Firstly, teaching materials were



presented in a spoon-feeding lecture style, predominantly involving direct information delivery with limited interaction. Secondly, the teacher did not provide opportunities for students to engage in creative and critical thinking during the learning process. Thirdly, the teacher demonstrated low levels of attention, knowledge, and strategies to enhance Higher Order Thinking Skills (HOTS). Fourthly, students exhibited a passive approach, merely listening and taking notes without much interaction with the material. Fifthly, students remained silent and hesitant to ask questions, even when they did not fully comprehend the content. Lastly, the academic achievements of the students were found to be poor.

These preliminary data lead us to conclude that the learning process does not encourage and facilitate critical thinking skills yet. Thus, researchers should take a planned and structured action to treat students to better improve this necessary and significant skills.

Since the objective is to foster students' critical thinking skills through questioning strategy, several activities are done in this planning. They are (1) developing questioning strategy-based lesson plan based that can enhances critical thinking skills; (2) preparing teaching treatment based on questioning strategy; (3) designing observation to record every activity in the class, and (4) designing questionnaire to measure critical thinking ability.

Teacher then implemented the lesson plan while collaborator played his role as observer, observing any event in the classroom based upon observation sheets. The first and second meetings started by greeting, praying, apperception, and checking attendance. In the first meeting, teacher raises twenty HOT-based question starters. To answer these questions, students need approximately 12 (twelve) seconds. On the other hand, in the second meeting, students need less time (8.2 seconds) to respond to the HOT-questions. This implies that it is quicker and easier for students to answer them. In practicing and formulating HOT-question, students could write 5 to 10 HOT-questions. However, in the second meeting, students could formulate 6 to 15 HOT-questions. This means that there is increase in students'

ability in HOTS. This is individual practice. These findings could be summarized as in Table 2.

**Table 2. Time taken and HOT-question**

	Time needed to respond	Number of HOT-questions
Meeting 1	12'	5-10
Meeting 2	8.2'	6-15

Finally, class discussion was held in which teacher identified and highlighted the HOTS-questions and discussed them to the whole class. This would raise students' awareness on HOTS, practice asking HOTS-questions, and practice answering critically towards HOTS-questions.

Based on the observation, students start to realize to think critically, and initiate to ask more questions, even though most of their questions were still LOT questions, but some are already HOT-questions. In addition, students seem to more willing to engage and involve, and some are still passive. This becomes evaluation point in planning for the next cycle. Reflection indicates that, in general, the learning process employing questioning strategy is pretty good. This can be seen through the students' engagement and involvement in the course of learning process. Furthermore, students said that their critical thinking ability had improved slightly. In addition, when asked how their critical thinking skills were when entering the class, they replied that their ability was either poor or low. This assures that improvement in critical thinking occurs. Further, when asked to express their views toward the questioning strategy employed, the students assert that they were challenged by the question starters and the question exploration as well. They were urged to think critically.

This planning is based upon the reflection of the previous results. Researchers and collaborator develop, improve, and revise the lesson plan to be used for the next two meetings, emphasizing that teacher needs to provide question starters, give more opportunity, and challenge students to think critically and creatively. Another

improvement of the lesson plan is that students were to practice writing HOTS questions and answering them collaboratively (groups of four to five), which is done individually.

Firstly, in the first meeting, teacher raises twenty HOT-based question starters. To answer these questions, students need approximately 5.5 seconds, quicker than the second meeting. On the other hand, in the second meeting, students need less time (3.7 seconds) to respond to the HOT-questions. This indicates that there is constant improvement in ease in answering HOT-questions.

Secondly, in practicing and formulating HOT-questions, students could write 9 to 18 HOT-questions. However, in the second meeting, students could formulate 11 to 22 HOT-questions. This means that the number of HOT-questions written by students increase significantly. This time, students worked collaboratively. The finding could be summarized as in Table 3.

**Table 3. Time taken and HOT-question**

	Time needed to respond	Number of HOT-questions
Meeting 1	5.5'	9-18
Meeting 2	3.7'	11-22

Finally, teacher identified and highlighted the HOTS-questions and discussed them to the whole class to end class. The purpose of this last class activity is to encourage and reinforce students to always think critically and creatively.

The observation in first and second meetings is on the students' efforts and ability in critical thinking. The result of this observation was used as reflections at the end of the process. It was found out that, generally, students' critical thinking as well as activeness in meeting one and 2 indicates that students' critical thinking has improved. It is found out that during the teaching learning process, students are active, creative, critical and more initiative in asking questions and in involving in classroom activities. The time taken to respond to teacher's question starters is shorter and the number of HOT-questions written are greater as shown in Table 3.

Eventually, data from observation in the course of teaching-learning process show that students showed some ease and quick at raising HOT questions and responding them, and the number also increases. More students are more active and compete to show off their HOT questions. Eventually, at the beginning of the semester term, students showed that their thinking skill improves and they started to get used to this habit in the sense that they asked HOT questions, and answer them critically.

Reflection gives the result that students showed that they asked HOT questions much easier and quicker, and responded to them likewise. It means that students show significant improvement in time take to respond to HOT-questions (shorter time) and produce more HOT-questions. This implies that questioning strategy does facilitate and is effective to foster students' critical thinking skills.

This reflection suggests the ability to think critically could be attained when questioning strategies were repeated, and constant constructive reinforcement as well as encouragement were endorsed, and this repetition continued until stable behavior in thinking creatively attained. This context-consistent repetition strengthens habit formation. That is to say, repetition strengthens habit, and factors that reinforce this process would aid design habit-formation.

**Table 4. Pair Sample Test**

	Mean	SD	Std error	Lower	Upper	t	df	Sig.
Pair 1 before-after treatment	-16.766	4.987	.910	-18.629	-14.904	-18.41	29	.000

Table 4 shows that there is significant improvement in students' critical thinking disposition before and after the treatment (questioning strategy). It means that questioning strategy is effective to foster students' critical thinking skills. Moreover, referring to Table 2 and Table 3, the improvement is constant, meaning that questioning strategy consistently increases students' critical thinking.

Furthermore, qualitative data from questionnaire indicate that students realize the importance of critical thinking. They also uttered

that their critical thinking ability had improved a lot since entering the class. Most students had reported their skill had developed well, and some others said that they improved significantly. This means that questioning strategy facilitates students to improve their thinking skills. This implies that teacher needs to challenge students by providing and stimulating class with some HOT questions as in questioning strategy.

## DISCUSSION

As a matter of fact, to mention some, many previous research studies related to HOTS with different focuses have been done. Some researchers intend to improve HOTS through certain teaching methodology. Suryamiati, et al. (2019) did study to improve higher-order thinking skill through POE (Predict, Observe, Explain) and guided discovery learning models. Polly, D. & Ausband, L. (2009) did research study to develop Higher-Order Thinking Skills through Web-Quests. Hamdan, et al. (2019) evaluated the effectiveness of HOTS's Self-Instructional Manual (SIM) in teaching and learning for assignment achievement among polytechnic students. Other researchers intended to correlate HOTS to other aspects of individual differences (Saputri, et al., 2022). Still other researchers investigated how frequently critical thinking is used in EFL Reading Comprehension textbooks at university level in Iran (Reza & Matou, 2012). Others investigate the need and willingness of teachers to develop HOTS in the teaching of science in primary schools (Hassan et al., 2017).

However, the present study, firstly, found that students lack of knowledge on how important HOTS is and how to implement it. For this, awareness raising is absolutely needed to make them realize the importance of HOTS. This is in line with the research findings found by Shafeei, et al. (2017) stating that most students have insufficient understanding towards critical thoughts. Another striking problem that teachers encountered in classroom when trying to implement

HOTS was students' attitude. They are passive students, and are just listening to lecture. Such students possess greater difficulty to adapt to new changes in general and to HOTS application in classroom in particular. Shafeei, et al. (2017) further found that problem about HOTS does not only arise from students, but also from classroom teachers who do not have or lack sufficient knowledge about HOTS. Sadly, some teachers do not know yet that HOTS is recently introduced and endorsed massively to the education system. This suggests that they are in need of continuous encouragement, workshops and training in the implementation of HOTS. This academic and practical activities apparently will help them to gain better knowledge as well as experience, particularly when they are to have a chance to share views with others in employing HOTS in their classroom lessons and this, eventually, would be beneficial for students as well as teachers in the long run.

It is natural and intuitive for teacher to ask questions. They frequently raise questions in the course teaching-learning processes. Asking questions is so common in any classroom lesson since it invites and encourages students to think. Sometimes, asking questions becomes a lecture style. Furthermore, rhetorical questions in which teachers ask questions to break classroom silence are used to encourage and to break the silence. Research finding indicates that teachers ask more than 400 questions a day (Radzi, et al., 2015).

There are several reasons why teacher uses questions. Teachers use questions to engage the students and sustain an active learning environment. They also use questions as part of the assessment of learning in order to determine how much students understand. Jariah, et al. (2005) utter that questioning strategy is characterized by flexibility as the teacher adjusts questioning based on students' responses in order to engage student in higher order thinking. King, et al. (2012) stated that teachers who are good at questioning could encourage and motivate their students, stimulate and endorse high level thinking, boost creativity and enhance self-concept in their students themselves.

However, research finding also indicates that some teachers wait approximately 0.9 seconds before getting responses from students (Radzi, et al., 2015). Despite the time needed, developing questioning strategy in classroom requires greater efforts to plan and develop good questions that can enable students to think individually and collaboratively. Questioning strategy is also intended to enable students to provide answers, and to share better answers. Apparently, these well-developed questions foster students' critical thinking as well as engagement. Traditionally, teachers ask questions to check their understanding, to check if they review on previous learning material or to see if they are ready to learn new materials (Ulum, 2016; Retnawati, et al., 2018).

King, et al. (2012) support that questioning strategy is implicit in any pedagogy. It is obvious that teachers need abundance of open questions to address various responses. Teachers must have necessary skill to pitch questions effectively to stimulate the thinking challenge, to encourage positive and critical responses. This requires students to be ready to prepare and have HOTS questions (Khan & Inamullah, 2011).

Similarly, teachers use questioning strategy as part of their teaching for many reasons (Jariah, et al., 2005). In relation to HOTS, those reasons can only be classified into two. The first, which is still LOTS, includes maintaining the flow of the learning within the lesson, engaging students with the learning, assessing what has been learned, and checking that what has been learnt is understood and applied, testing student memory and comprehension, initiating individual and collaborative thinking in response to new information, providing an opportunity for pupils to share their opinions/views, and seeking responses from their peers (Lee, 2011).

On the other hand, the second classification of questions, which are already HOT, and which is congruent with the present study, includes encouraging creative thought and imaginative or innovative thinking, fostering speculation, hypothesis and idea/opinion forming, challenging the level of thinking and possibly mark a change to a

higher order of thinking, and modeling higher order thinking using examples and building on the responses of students (King, et al., 2012). This second classification demonstrates higher order thinking in every body's thought process, and creates opportunities for the students themselves to engage in higher order thinking.

The finding of the study is in line with the study conducted by Ho & To (2022) suggesting that teachers are to provide HOTS-type questions that can challenge students' minds and stagger high-level questions to encourage students to provide critical responses. This suggests that teachers frequently raise critical questions and by the same token students respond critically. When this technique is repeated in a number of times, it works towards making this approach a habit among students. This takes time and needs constant reinforcement and encouragement. Certainly, this is in line with the habit-formation theory theorizing that when repeatedly performing behavior in this instance asking and answering questions critically in a particular context, students develop implicit associations in memory between contexts and responses. As students repeat this classroom behavior in a stable context, their intentions and goals to perform the behavior gradually become less influential, whereas habits increase in influence (Carden & Wood, 2018).

Eventually, questioning strategy which is implemented in the present study to stimulate and drive critical thought among students is in agreement with the habit formation theory highlighting habit formation offers a mechanism for behavior maintenance (Gardner & Rebar, 2022). Numerous initial endeavors to change behaviors that were successful may ultimately falter over time. However, according to theory, if a behavior becomes habitual, it is more likely to endure even in the absence of strong motivation (Gardner & Rebar, 2022). Experts have further called for habit formation to be adopted as an intervention goal (Carden & Wood, 2018). Understanding the process by which context-consistent repetition strengthens habit, and factors that reinforce this process, will aid design of habit-forming interventions. In sum, although theories of habit differ details, all



recognize the shift from goal-directed to habitual behavior through repeated learning. That is, when students are trained to be critical thinkers through questioning strategies, they will automatically get used to think critically.

## CONCLUSION

It is obvious then that critical thinking skill is vital to keep up with the rapid world development. Thus, it is a must for teachers to equip their students with this vital skill. On the other hand, most students do not realize the importance of HOTS as well as how to acquire this necessary skill. Therefore, teachers firstly must make their students realize the importance of HOTS and train them to think creatively and critically in order that they could compete in this ICT era. This classroom questioning strategy for HOTS should be well-planned for and taught to students systematically in the sense that teachers train students through questioning strategy. Then, after some classroom practice of HOT-based question strategy, the desired results are gradually attained, and the students start to get used to think creatively and critically. Put shortly, questioning strategy works to develop critical thinking skills.

Based upon the findings of the study, it is suggested for every teacher to integrate questioning strategy into his/her classroom teaching. This helps students to develop their critical thinking skills, which later promote their learning outcome. In addition, further study related to questioning strategy implemented through action research needs to be done in order to attain more appropriate practice of questioning strategy that best suits different characteristics of students.

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