

## STUDENTS' QUESTIONING SKILLS IN ENVIRONMENTAL POLLUTION COURSE USING CASE STUDY METHODS

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### Abstract

*Questioning skills are very important for prospective teacher students to master in order to help students learn actively in class later. Students' questioning skills are empowered through case study learning of environmental pollution subjects. Because it discusses pollution in the environment, a solution needs to be found. The purpose of this study was to determine the questioning skills of prospective teacher students in environmental pollution course using case study method. This qualitative descriptive research was conducted in the odd semester of the 2020/2021 academic year. The measurement instrument was in the form of scoring the students' questioning skill level based on the cognitive level of the revised bloom taxonomy. The research data were analyzed by using the percentage technique. The results showed that the questions asked by students at the low order thinking skills level were 83.33% and the high order thinking skills level was 26.66%. Furthermore, it is necessary to habituate students with asking questions with more intensive assistance and teachers can provide more examples of questions at the high order thinking skills level.*

**Keywords:** Case study, Hots, Lots, Questioning skill, Students

### 1. INTRODUCTION

Questioning skills are one of the basic teaching skills that prospective teachers need to master. Prospective Teacher students who are skilled at asking questions will be able to make students actively respond to learning and interested in learning. Cahyani, et al. (2015) stated that questions from teachers to students can be useful for obtaining an overview of student knowledge, promoting students to think, avoiding boring classroom conditions due to the absence of discussions, providing interactions in the learning process, and involving students actively in learning. Teacher questions in class can encourage students to think critically, further good questions can encourage good thinking (Yuliawati, et al., 2016).

Questioning skills can be possessed due to cognitive processes, intellectual processes, or thought processes. Thinking is the process of finding and knowing the relationship between objects, ideas, and concepts to gain understanding. So, this questioning skill can support critical thinking skills (Zulkifli & Hashim, 2019).

Critical thinking skills are skills that young generations need in the 21st century.

Various studies have been conducted on questioning skills, both for teachers and students and students. The results of research on teacher questioning skills conducted by Yuliawati, et al. (2016) show that teachers ask questions at the level of cognitive knowledge, understanding / comprehension, application or those categorized as low order thinking skills (LOTS) and analysis. The level of cognitive analysis was categorized as high order thinking skill (HOTS). Meanwhile, questions at the other HOTS level, namely evaluation and create did not appear. Research by Cahyani, et al., (2015) shows that students generally ask questions at the comprehension and application level.

Questioning skills can be possessed by every student who is a teacher candidate. However, having good questioning skills needs to be trained (Santoso, et al., 2017). Students have the ability to ask questions that are good if given examples and trained. Training or teaching student questioning skills can be done through learning methods (Santoso, et al. 2017) or with the help of

various media (Zulkifli & Hashim, 2019). One of them is through the case study learning method in the environmental pollution course.

Environmental pollution is one of the current crucial issues that need to be provided to prospective teacher students in the biology education study program. This course equips students with knowledge about environmental pollution and its management and so that students can care about the environment. The method used in learning is a case study.

Case studies are conducted by asking students to look for problems about pollution in the world and in the environment around humid tropical rainforest areas through articles according to the lecture topic, then asking students to analyze existing cases and study the aspects in them. Furthermore, students are asked to make decisions in the form of solutions that can be submitted regarding the cases they choose.

Case studies are active student learning methods that ask students to apply analytical knowledge and skills to solve complex problems related to the material discussed (Giacalone, 2016). Roell (2019) adds that case studies are a learning method based on descriptions of real events or hypothetical situations that require solutions and action. Students are expected to be able to make a decision or possible solution steps to the problem. Therefore, learning this case study is expected to encourage students to have the skills to ask questions.

## 2. RESEARCH METHOD

Qualitative descriptive research by looking at the level of student questioning skills based on the cognitive level of Bloom's revised taxonomy. The research was conducted on students of Biology Education Study Programs, Faculty of Teacher Training and Education, Mulawarman University class 2017 odd semester 2020/2021 academic year. The research was carried out from September to December 2020. The data collection instruments were in the form of treatment instruments and measurement instruments. The treatment instruments are in the form of Lesson Plans and Worksheets. The

measurement instrument in the form of scoring the student's questioning skill level based on the cognitive level of the revised bloom taxonomy was used against the results of the questions compiled by students. A total of 20 students who took the environmental pollution course were asked to compile three questions. The questions that have been compiled are analyzed by using the percentage technique to the cognitive level

## 3. RESULT AND DISCUSSION

Environmental pollution learning is carried out using the case study method. The discussion on environmental pollution lectures includes the definition of environmental pollution, water, air, soil, and indoor pollution. In the discussion, students are asked to determine a solution to pollution problems that exist in the world and in the surrounding environment. In each learning activity, group and classical discussions are carried out to discuss pollution cases or problems that are being discussed. During the discussion, students were also given the opportunity to do question and answer. At the end of the semester session, students are asked to compile 3 questions related to the environmental pollution lecture material that has been discussed. The results of the analysis of student questioning skills are shown in Table 1.

Table 1. The results of the analysis of student question levels based on the revised Bloom Taxonomy

No.	Cognitive Level	Number of Questions (%)	Number of Students
1	C1/Knowledge	3,33%	2
2	C2/Comprehension	51,67%	20
3	C3/Application	28,33%	15
4	C4/Analysis	13,33%	6
5	C5/Evaluation	3,33%	2
6	C6/Create	0%	0

Based on the results of the analysis, it is known that students have been able to ask questions at the knowledge till evaluation level. No student has yet to ask questions at the create stage. Most of the questions asked

by students were at the Comprehensions level with a total of 51.67%. Next is the application level of 28.33. At the level of analysis of 13.33%. These results indicate that the questions posed by students are still dominated by questions at the low order thinking skills level of 83.33%, namely at the level of knowledge, comprehension and application. However, students were also able to ask questions at the high order thinking skills level at the analysis and evaluation level of 26.66%.

Regarding the number of students who were able to ask questions, all students had questions at the comprehension level. Fifteen students were able to compile questions at the application level and six students were able to compose questions at the analysis level. Two students were able to ask questions at the evaluation level and two others asked questions at the knowledge level.

The results showed that more student questions were at the low order thinking skills level compared to high order thinking skills in line with the research of Cahyani et al. (2015) and Yuliawati, et al., (2016). Asking skills related to learning experience, knowledge and understanding. The higher the level of understanding the student has, the more complex questions will be asked. Own understanding is influenced by the method factor, reinforcement from the teacher, and interaction with friends. So it can be said that the questioning skills of students are also influenced by these three factors. In addition, the more intensity students ask, the more students get used to asking questions and can make students more critical. As stated by Prilanita & Sukirno (2017) that students' skills to ask questions are not innate but rather shaped and developed. Agustini & Sopandi (2017) added that the number of questions at the LOTS level could be caused by the lack of initial abilities of students and unsuitable strategies.

Questioning skills can be developed through teacher guidance and mentoring efforts with certain methods (Santoso, 2017). One of the factors that support the ability to ask questions at both the LOTS and HOTS levels is the learning method. The

learning method applied is a case study. This method also makes students face real cases, both simple and complex, which can make students feel familiar and close to the material being studied, so they feel interested in learning. Students are given the opportunity to choose various topics according to the cases being studied, from which students' curiosity about cases related to the material can be raised.

Case studies as a learning method involve a process of discussion and negotiation which often raises questions for students such as how and why (Minniti, et al., 2017). Bonney (2015) adds that the activities of studying cases and discussing encourage students to think so that they can raise curiosity and questions. Giacalone (2016) explains that case studies involve two stages, namely identifying key concepts and offering solutions to the cases at hand. This stage requires students to be able to analyze the situation through various questions related to the case and think about how to solve the case. Furthermore, when students are faced with real situations and ask students to make decisions, it can encourage students to connect knowledge with decision-making skills. Students are required to think and even think deeply about what happened, how it happened and how decisions about solutions were taken or to explore innovative ways of making decisions.

The follow-up that can be done related to the results of this study is to make improvements in the steps to teach questioning skills. Research by Agustini & Sopandi (2017) and Zulkifli & Hashim (2019) shows that if taught regularly, students' questioning skills can improve. At first the level of asking students was at the low order thinking skills level, but at every meeting the skills to ask questions at the high order thinking skills level experienced an increase. In addition, teachers can also provide more examples of questions at the high order thinking skill level so as to motivate students to have better questioning skills and critical thinking skills. This is as stated by Yuliawati, et al., (2016) that educators who ask questions can promote students' thinking skills and questions at the

high order thinking skills level can stimulate students to have critical thinking skills.

#### 4. CONCLUSION

Based on the research results, it is known that the questions asked by students at the low order thinking skills level were 83.33%, the high order thinking skills level was 26.66%. The follow-up that can be done is to familiarize students with asking at the high order thinking skills level in lectures with more intensive mentoring and the teacher can provide more examples of questions at the high order thinking skills level to students.

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