

Question Card Game to Improve Senior High School Students' Higher-Order Thinking Skills in Biology Learning

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Abstract

Technology development in the world of education will affect the existing curriculum. Whether or not an education is successful depends largely on the curriculum used. The curriculum is the spearhead for the implementation of education. In a curriculum, there are various supporting aspects. One of them is the learning model. Various learning models have been tried to develop student's thinking skills, for example, using the medium of question cards. Playing question card media can trigger direct student involvement in learning to increase high-level thinking skills and motivation to be more active in studying. This research is a Collective Action Research (CAR) study. "activities of planning, acting, observing/evaluating, and reflecting." Students' HOTS ability before applying learning motivation with a class XI student support question card at one of the state high schools in Banten, which obtained an average of 63.89, was then used to calculate the average percentage to determine the level of students' HOTS ability. After an average percentage score of 63.89% is converted to a five-scale LAP, the student's pre-cycle HOTS ability level is relatively low (40-64). Based on data analysis and discussion of the research results that have been described, implementing learning to play question cards can increase student learning motivation and HOTS.

Keywords: Curriculum, Learning Model, Question Cards, Learning Motivation.

INTRODUCTION

The Decree Number 20 of 2003 concerning the National Education System adopts a taxonomy to foster attitudes, knowledge, and skills (Republic of Indonesia). The regulation of the Minister of Education and Culture Number 21 of 2016 concerning Content Standards for Elementary and Secondary Education (BSNP, n.d) explains that the three competency areas have different acquisition trajectories (psychological processes). Attitude is obtained through the activity of "accepting, doing, enjoying, living and practicing". Knowledge is obtained through the activities of "remembering, understanding, applying, analyzing, evaluating, creating". Skills are acquired through the activities of "observing, asking, trying, concluding, presenting and creating". Regulation of the Minister of Education and Culture No. 22 of 2016 (BSNP, n.d.) concerning process standards for primary and secondary education talks about how the learning process in educational units takes place in an interactive, inspiring, fun, challenging way, encourages student participation and provides appropriate space for talents, interests, and physical development and student psychology. Based on the description above, the 2013 curriculum requires students to have good attitudes and knowledge and the skills to reason, process, and present creatively, productively, critically, independently, creatively,

collaborate, and communicate concretely abstractly. The field through a series of learning by observing, asking, trying, reasoning, presenting, and creating. The teacher's task is to develop these skills interactively, inspiring, fun, stimulating, and motivating students to participate actively, creatively, and independently following students' physical and psychological development.

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With the implementation of the curriculum 2013, which emphasizes developing students' thinking skills, educators/teachers must be able to design and develop learning so that students are trained to predict, design, and predict solutions to real-life problems. Therefore, higher-order thinking skills will become the most important thing in education. According to Rofiah (2013), Higher Order Thinking Skills (HOTS) is defined as the wider use of the mind to find new challenges. HOTS, or Higher Order Thinking, is a process that goes beyond remembering and retelling known information. Higher-order thinking skills are the ability to relate, apply, and transform existing knowledge and experience to think critically and creatively for decision-making and problem-solving in new situations. Various learning models have been developed to maximize students' comfortable strengths in learning and developing their thinking skills. One is to provide learning motivation to be more active in studying (Fitriana et al, 2022). Learning motivation is something that is contained in an

individual where there is a desire to do something to achieve a goal (Emda, 2017). According to (Saputri, 2018), motivation is a change in energy in a person's character characterized by the emergence of feelings (emotions) and reactions to achieve goals. Thus, the emergence of dynamics is characterized by the existence of energy changes in a person may be recognized or not.

The problem-based learning model is a model that requires genuine investigations, namely investigations that require real solutions to real problems (Trianto, 2009). Question cards in learning are carried out to stimulate student interest in learning, and this is done. Research results DePorter, Bobbi, and Hernacki (2011) that everyone has different learning styles, and learning styles related to visualizing objects will facilitate student learning. Halimah's research (2019) also shows that picture cards can be applied to improve reading skills in children with mild mental retardation. Dony et al. (2018) argue that using cardholders can increase student motivation, thinking skills, and honesty to improve student learning outcomes. Student learning outcomes when using cardholders are better than without cardholders (Lestari, 2018).

The need for thinking skills in the curriculum 2013 is in line with the views of Anderson, L.W. and Krathwohl (2010) when applying Bloom's taxonomy index to measure higher-level thinking skills, including analysis, evaluation, and creation/creation: (1) analysis: students are proficient at separating material into several parts by drawing and understanding how one part relates to another. Other; (2) assessment: students can make decisions based on certain standard criteria (3) make: students know how to plan in a planned way to carry out and complete the tasks given. In problem-based learning, students discover a concept of knowledge through various process skills. Through this process, students will be encouraged to participate directly and actively in learning a topic concept. Learning with this method will also hone students' process skills. As you know, processing skills are tendencies that can be used to discover a concept or knowledge. Playing question card media can trigger direct student involvement in learning, thereby increasing higher-order thinking skills (HOTS).

METHOD

The location of classroom action research is class XI at one of the senior high schools in Indonesia during the semester of the second academic year of 2022. The subjects of this classroom action research were all 37 students in class XI, consisting of 28 male and nine female students. The object of this research is to improve students' HOTS abilities and increase students' learning interests. This research is a Collective Action Research (RAC) study. "the activities of planning, acting, observing/evaluating, and reflecting" (Nyoman,

2012). At the planning stage, some of the activities that will be carried out in Cycle I are the determination of Core Competencies (KD), the indicators that will be used in research, and the preparation of learning materials based on the topics to be studied. Provided for each meeting, carried out lesson plans, prepared question cards, and prepared assessment instruments. In the action stage, learning follows the lesson plan (RPP) that has been prepared. Meetings are carried out in one Cycle 3 times, face-to-face meetings two times, and tests one time at the end of the Cycle. The observation/evaluation stage is carried out to observe all activities carried out by teachers and students in the learning process. Student activities that have been observed will be recorded in the observation documentation. At the end of the Cycle, a final evaluation is carried out.

The reflection stage is carried out to evaluate HOTS abilities. The purpose of reflection is to build on the strengths found, weaknesses, and obstacles faced to achieve the desired goals. The reflection results can be the basis and reference for improving and refining the research stages in the next Cycle. Implementation of the action will be stopped if the evaluation results have shown that these results must be achieved. Data on students' HOTS abilities were collected using the test method. The test used is a multiple-choice test. Data from this study were analyzed using quantitative descriptive analysis. Data analysis was carried out after getting all the data. Agung (2011) states: "Quantitative descriptive analysis is a data processing method that is carried out by synthesizing systematically in the form of numbers and/or percentages related to each other related to research objects to reach general conclusions. To find the average or mean, the following formula is used.

$$M = \frac{\sum X}{n}$$

Description :

M = Average

X = Learning outcomes score

N = Total Students (Agung, 2011) (1)

Furthermore, to find out the percentage of the average score, the following formula is used.

$$M\% = \frac{M}{SMI} \times 100\%$$

Description :

M % = Average

M = Average Score

SMI = Ideal Maximum Score (Agung, 2011) (2)

The results of the analysis of the average percentage obtained are then converted into a standard reference assessment (PAP) with five scales to determine the extent to which the criteria for learning outcomes are. The guidelines used are shown in Table 3.2 below.

Table 1. Five-Scale Benchmark Reference Assessment Conversion Guidelines (PAP)

Percentage (%)	Criteria
90-100	Very Good
75-89	Good
65-74	Enough
40-64	Less
0-39	Very Less

The criteria for students' HOTS abilities in this study were if students' HOTS abilities reached a minimum criterion level of 75% (Good).

RESULTS AND DISCUSSION

Based on the results of the pre-research analysis (pre-cycle), obtained an average of 63.89 on students' HOTS ability. After an average percentage score of 63.89% is converted to a five-scale LAP, the student's pre-cycle HOTS ability level is relatively low (40-64). Based on the above data, there is a shift in learning. To improve the HOTS ability of Class XI students at one of the State High Schools in Banten for the 2022 academic year, the motivation to learn student HOTS is applied, assisted by a question card game.

Learning cycle 1 takes place in 3 meetings, namely, two meetings to take action and one meeting to test students' HOTS abilities. The duration of each meeting is 3 x 45 minutes. The topic of study in cycle I is the topic of sub-topic 1. Students are given a questionnaire and answer the questions according to the topics learned during the learning process using the APP learning model. The results of the cycle I in the form of HOTS skills are obtained from the written test. The written test is used in an objective essay format. HOTS capacity data were analyzed for research results.

Based on the data analysis results, students' average HOTS ability is 71.09, which is then used to calculate the average percentage to determine the level of students' HOTS abilities. The average percentage score of 71.09% was converted with a lap scale of 5, so the HOTS ability level of Term I students is sufficient (65-74). Need to meet the success criteria, the research continued on Cycle II.

There are many reasons why goals are not achieved. In this study, students have yet to be used to thinking at higher levels. This solution helps students understand the importance of HOTS ability. Each student's abilities are different, so which student has the best capacity?

Analyzing the stimulus is easy, while underprivileged students will find it more difficult. This is overcome by paying more attention to students who miss out by explaining how to analyze the stimulus provided. When working in a group, only some actively perform tasks. This is overcome by motivating students to be actively willing to work in groups. Only a few students dared to ask. This is addressed by encouraging students to ask questions when they have a problem.

Learning cycle II takes place in 1 meeting to apply actions and to conduct tests to measure students' HOTS competence. The object of research in cycle II is topic 2. Based on the results of data analysis, the average student HOTS competency score was obtained at 79.20. Therefore it was used to calculate the average percentage to determine the level of student HOTS ability. If the average percentage is converted into a five-scale PAPA, then the HOTS level of Cycle II students is good (75-89). Because it met the success criteria, the search was stopped until Act II.

Based on the second cycle data analysis results, students' HOTS ability reached 79.20% of good grades. Therefore, this research follows the objectives, so the study is stopped until cycle II. Based on the overall search results, data analysis can be seen in Table 2.

Table 2. Students' HOTS ability results

No	Cycle	Learning Outcomes		
		Average	Average Percent	Criteria
1	Pra	63,89	63,89%	Less
2	I	71,09	71,09%	Enough
3	II	79,20	79,20%	Good

Based on the Table 2, there is an increase in the HOTS ability of class XI students from Pre-Cycle to Cycle I and Cycle II. Therefore, students' learning motivation with the help of question card games can improve the HOTS ability of class XI students.

Through supporting question card games for student learning motivation, students practice higher-order thinking to discover concepts learned through small group learning and high-level learning strategies. Students begin by analyzing, evaluating, and creating activities. Implementing question card support in the APP allows students to build their knowledge from what they already have. Using question cards, students analyze the questions asked, then answer based on their understanding of this topic. Students know how to solve the problem of biology lessons according to the study's material so that they can master it. High-level skills, also known as HOTS, are essential to understanding the material. The 2013 curriculum requires students to be able to analyze, evaluate and create. This follows research conducted by Mulyani (2017) that using maps can improve students' skills and learning outcomes by 86.1%. The learning model is based on the problem is one of several different learning models

teachers can use to activate students in their learning. This is in line with Nara (2014) that using play learning can significantly improve students' creative thinking and academic performance. Learning while playing can increase student motivation and learning outcomes (Yu et al, 2021; Trajkovik et al., 2018).

The use of real-world problems characterizes problem-based learning models. This learning model can be used to train and improve critical thinking and problem-solving skills and gain knowledge about important concepts. Question cards are used as one of the ways to motivate students to improve their HOTS skills (Aspini, 2020; Bethan, 2016). By answering questions on question cards, students learn to analyze the triggers in the questions so that they can answer them. Through practice, answering these questions has an impact on improving student learning outcomes.

CONCLUSION

Based on data analysis and discussion of the research results that have been explained, implementing learning to play question cards can increase student learning motivation and increase the HOTS of class XI students at the high school level.

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