

## The Creative Thinking Skill of Biological Learning Students at Candi Baru High School

Adieba Warda Hayya<sup>1)</sup>

<sup>1)</sup>Tadris Biologi Institut Agama Islam Kudus  
adiebawarda@iainkudus.ac.id

### ABSTRACT

The aim of this study was to describe the skill of students to think creatively about Biology at Candi Baru high school (HS). The study used a qualitative approach using a case study method. The population in this study was students of Candi Baru HS from the academic year 2016/2017. This research uses randomized cluster sampling. Samples were XI Mathematic and Science (MIA) 6, 7, and 8 classes. Data collected by observation and document collection, using a human instrument, an observation sheet and a categorization sheet. Data research included the quality of the student's; answers, works, and responses during the learning process. Data analysis was carried out descriptively by comparing the results of the research with information derived from literature or theory. The results showed that students' level of creative thinking skill is still low and the assessment provided by the teacher has not reached the students' creative thinking skill.

**Keywords : creative, creative thinking, creative thinking skill, creative thinking of biological learning, higher order thinking**

### INTRODUCTION

The ability to think creatively is the principal aim of education. Creative thinking is explicitly mentioned as a valuable educational goal in curricula around the world (Hadzigeorgiou, Fokialis, & Kabouropoulou, 2012) Some of the countries that focus on creative thinking are g Sweden, Australia, United Kingdom, Malaysia, and Hong Kong. These countries highlight the importance of equipping students with creative thinking skills. (Hui, 2003; Papaleontiou- Louca, Varnava-Marouchou, Mihai, & Konis, 2014; Piawa, 2010).

Today's world is the product of the creative thinking of several individuals. Communication, transportation, medicine and other technology tools are examples of creative thinking products. This encourages the enormous demand for creative workforce capacity is very large, so they expect schools to teach and assess student creativity (Beghetto, 2010)

Biology is one discipline that can contribute to the attainment of that goal. Through learning Biology, the nation's progress towards science and technology can train scientists. Also

through Biology, we can teach many of skills that underlie creativity, such as asking questions, giving challenges, making connections, and solving problems.

Creative thinking skills are the ability of individuals to use their minds to produce original, novel ideas. The ability to think creatively is shown by the ability of students to produce multiple ideas (fluency), the ability to provide different answers from previous answers (flexibility) and the ability to provide unique, fresh and unexpected ideas when faced with a question (novelty).

The study was conducted at one of Semarang's favorite and famous high schools, and in this study we disguised the name of the school as Candi Baru HS. There is no valid information at the school about the ability to think creatively. Based on the results of teacher interviews, it is understood that students' creative thinking skills are high, but based on the results of field observations, it indicates that students' creative thinking skills are still weak. The poor ability of students to think creatively is measured by the few ideas that students express during learning, other than that there are no new ideas or ideas communicated by students while learning takes place. Students prefer not to answer questions from the teacher or simply answer them with simple responses.

The explanation shows that knowledge about students' creative thinking skills needs to be understood so that both teachers and students can build learning that promotes creative thinking skills. Everybody has imaginative abilities that can be improved by learning. This research explains students' creative thinking skills in studying biology at Candi Baru HS. In order to explore this emphasis, this study will use qualitative approaches to make it easier for researchers to deal with reality in order to obtain in-depth data. Statistics were derived from observations on the quality of student answers to questions, the quality of student work in the execution of assignments, and the quality of student responses during the course of study.

The findings of this research are insights that help discuss knowledge about students' creative thinking skills so that help the teacher use them as a tool for the learning process in the classroom. The results of the description and analysis of students' creative thinking skills in learning biology are also useful for improving the teaching practices of the teacher. In addition, the findings are useful to the government as a guide to the implementation of learning preparation policies that can promote the innovative thinking of students. Based on the definition, the purpose of the research is to find a representation of students' creative thinking skills in learning biology at Candi Baru HS.

## **RESEARCH METHOD**

The study lasted four months using a case study approach. The population of Candi Baru HS students in the school year 2016/2017 was nine classes. Sampling using cluster sampling methods, namely XI MIA 6, XI MIA 7 and XI MIA 8 groups. Data collection methods using observation and record processing aided by instruments in the form of human instruments, observation sheets and categorization sheets. Data were given in the quality of the student's answers to the questions, the quality of the student's work in carrying out the assignment, and the quality of the student's response during learning.

The data analysis methodology used in this research is a qualitative method data analysis technique (Creswell, 2014). Data analysis shall include the processing of data, the reading of all data, the coding of data, the coding of each category, the presentation of a description/theme in the form of a narration and the making of interpretation/interpretation data.

## **RESULT AND DISCUSSION**

### **The Quality of Student Answers to Questions**

During the study, we collected answers from the questions given by the teacher. The questions given were test questions, block 1 question, and block 2 tests, and the questions in the worksheet. They gave the questions to all students of class XI MIA 6, XI MIA 7, and XI MIA 8, while they only gave the questions contained in the worksheet to students of class XI MIA 6 and XI MIA 7.

The test questions put to the teacher are a matter of a closed type description. Another question is the block test, which is a combined evaluation of the two materials which have been studied. The test block consisted of 40 multiple-choice questions and 5 closed questions. While the test consists of 20 multiple-choice questions and 5 item description items. Table 1 presents the quality of students' answers to questions. From table 1 it is known that students have a variety of ways to answer, but only few student answer original things.

It is known from the explanation above that the test questions test blocks 1 and 2 are multiple-choice questions and closed descriptions, so that the answers are only in the form of student memories of the material that there are no student ideas in answering questions. Besides, the answers to the questions in the workbook indicate, the students' ideas are because the questions are in the form of open-ended questions.

### **The Quality of Student Work in the Execution of Assignments**

The tasks got during the study are the tasks of reporting on the practice: blood smears, blood pressure, and compound content in food ingredients, and creating cards, drawing the structure of the ruminant digestive organs, and downloading Obesity and Food Ingredient Test games.

The format of the practicum report assigned to the teacher is the title, objectives, tools and materials, work methods, observations and conclusions. Based on the analysis carried out, it is difficult to find the creative thinking skills of the students, because the format of the practicum

report did not provide the space for students to convey their ideas. Researchers are therefore unable to further analyze student responses. The format of the report submitted to the students is in the form of a closed description.

Making a card is an assignment to students on the material structure and function of tissue cells in plants and animals. Table 2 presents qualitative data on the tasks of the card. Students were assigned to draw tissue from the teacher on 8x10 cm paper. From the assignments collected by the students, it can be analyzed that the students have different ways to solve the problems of the teacher.

Besides making cards, another task given by the teacher was to draw the structure of the digestive organs of ruminant animals in groups. In class XI MIA 6, students did well in their respective groups. Students show that they have various solutions in doing the assignments given by the teacher, this is determined from the work of students. Students have various ways to present pictures of animal digestion through an image. Students can show the digestive system of ruminant animals by distinguishing each organ with a distinct color, students also give the names of the digestive organs of animals drawn. However, only five groups did original things, the group gave a sign for the order of food coming into going out.

We also see this in class XI MIA 7, students have a variety of ways to present the digestion of ruminant animals through a picture. Students can show the digestive system of ruminant animals by distinguishing each organ with a distinct color, students also give the names of the digestive organs of animals drawn. However, only two groups gave signals for the order in which food out, and 1 group gave a detailed description of each organ.

Similar to class XI MIA 8, students also have a variety of ways to present the digestion of ruminant animals through a picture. Students can show the digestive system of ruminant animals by distinguishing each organ with a distinct color, students also give the names of the digestive organs of animals drawn. However, only one group did an original thing than the others, the group gave a sign for the order of food coming in and going out, and there was one group that gave detailed explanations of each organ.

From the explanation above, it is known that some groups work with things different from other groups and provide improvisation in doing the task. This shows that students' creative thinking ability is still low, but the number of groups that do this is still small, even in class XI MIA 7 and XI MIA 8 only 1 group does original things.

Another task is downloading obesity and food games can not be analyzed because there is no authentic evidence of students doing, and researchers can not observe directly when students play games because they are not done during school hours.

Table 1. The Quality of Students' Answers to Questions

XI MIA 6 Class			
Questions	Answer Summary	Number	Example
"The disease generally begins with what is eaten and how it is eaten." What do you think of this statement?	Justifying the phrase, "The disease generally begins with what is eaten and how it is eaten," without giving his opinion.	18	
	Give answers by giving examples to reinforce his opinion.	5	
	Explain the answers to the questions presented with the scientific explanation	5	
How is the essence of our body feeding according to what you know?	answer shortly that eating is a source of energy and so on	22	
	explain how food is useful for the body	3	
	have almost the same answer that eating is nourishing the body	3	
What behaviors are you going to have in relation to the	states agree that eating while standing is not good	15	

<p>lifestyle of eating while standing? Please complete with your point!</p>	<p>Express authorisation is followed by scientific explanations</p>	<p>1</p>	<p>3. Menurut saya makan sambil berdiri itu hal yang kebiasaan yang tidak baik. Karena dengan sambil berdiri itu banyak dampak buruk bagi dengan makan sambil berdiri makanan yang akan langsung turun secara kasar yang bisa luka / mteri pada lambung dan alat pencernaan lainnya.</p>
	<p>States no problem eating while standing as long as it is not often</p>	<p>13</p>	<p>3. Menurut saya sih-sih apa apabila makan sambil berdiri apabila tidak berlebihan, namun apabila keadaan dan situasi memungkinkan untuk sedikit duduk maka jangan makan sambil berdiri, karena makan sambil berdiri itu untuk kesehatan tubuh. Namun apabila boleh untuk makan memilih makan sambil duduk.</p>
	<p>States agree that eating while standing is not good and will remind friends and others who eat while eating while standing up</p>	<p>2</p>	<p>3. Setelah membaca artikel tersebut, saya musti akan mengingatkan kepada orang-orang yang makan sambil berdiri dan memberi informasi mengenai dampak apa yang akan terjadi jika makan sambil berdiri.</p>

XI MIA 7

Questions	Answers Summary	Number	Example
<p>"The disease generally begins with what is eaten and how it is eaten." What do you think of this statement?</p>	<p>Justifying the phrase, "The disease generally begins with what is eaten and how it is eaten," without giving his opinion.</p>	<p>17</p>	<p>1. Ya saya setuju, karena pada umumnya bisa saja me yg dimasak tidak higienis / tidak sehat. Selain itu cara makannya juga sangat perlu diperhatikan, makan dan berdiri menimbulkan berbagai macam penyakit yg tidak disalahkan dan akan beresek lanjut.</p>
	<p>States agree, and scientifically express their reasons, and they are able to combine their knowledge in order to be able to express their opinions.</p>	<p>7</p>	<p>1) Benar sekali bahwa suatu penyakit dapat diderita suatu orang jika penyebab salah satunya adalah makanan yang dikonsumsi. Karena tubuh manusia membutuhkan zat-zat tertentu untuk benar-benar secara normal. Apabila makanan yang dikonsumsi mengandung zat yang dapat merusak organ tubuh, maka akan terganggu aktifitas normal suatu tubuh dan jika aktifitas normal suatu tubuh terganggu, maka penyakit akan mulai bermunculan di organ-organ di dalam tubuh. Penyebab kedua munculnya es penyakit yaitu cara makannya. Memang benar, karena jika makannya salah, maka mungkin ada suatu bakteri / virus masuk bersama makanan. Adapun penyakit yg tidak disebabkan oleh makanan yaitu PDB, HIV/AIDS, dsb.</p>
	<p>answer by writing examples of foods that can cause disease</p>	<p>2</p>	<p>1. Ya, setuju. Karena tidak semua tubuh manusia menerima se makanan. Ada beberapa yang memiliki organ sensitif misalnya bumbu masakan yang mengandung cabe, menta, dan asam yang akan penyakit tertentu. Cara makannya juga berpengaruh. Orang dengan berdiri dan duduk tentu akan memiliki dampak yang</p>
	<p>Answer that illness may come from thought</p>	<p>1</p>	<p>1. Pernyataan tersebut adalah benar, namun kurang tepat. Karena menurut saya penyakit yg paling awal timbul kita tertawa penyakit yaitu pikiran kita. Misalnya saja saat kita mendapatkan masalah lalu pikiran kita menjadi sehingga menyebabkan mood kita drop. Kita (tentu saja) sering kali malas makan, dan saat makan sekalipun, kadang kita bisa saja makan sambil tiduran atau berdiri sambil mengigitkan hal yg lain, dan juga sa mood kita sdg sdok baik tertidur kita menginginkan makanan yg "enak" seperti pizza, atau yg lain, makannya yg sering kita anggs "enak" biasanya tidak terlalu "sehat", sehingga dari makanan itulah kita dapat terkena suatu penyakit.</p>

<p>How is the essence of our body feeding according to what you know?</p>	<p>answer shortly that eating is a source of energy and so on</p>	<p>17</p>	<p>2. Hakekat makan bagi tubuh kita untuk memperoleh zat-zat yang diperlukan oleh tubuh. Agar bisa melakukan kegiatan sehari-hari dengan energi yg dari makan.</p>
	<p>explain how food is useful for the body</p>	<p>15</p>	<p>2. Makanan merupakan salah satu dari dua kebutuhan hidup seorang manusia. Makanan adalah kegiatan menjaga energi yang dibutuhkan setiap hari dan sangat penting untuk kelangsungan hidup. Jika seseorang tidak atau sedikit makan, maka energi untuk melakukan segala macam kegiatan dalam hari tersebut tidak akan terdistribusikan pada tubuh. Hal ini karena energi yang dibutuhkan untuk melakukan kegiatan sehari-hari tersebut. Hal ini akan berpengaruh pada kegiatan sehari-hari karena energi yang dibutuhkan untuk melakukan kegiatan sehari-hari tersebut akan berkurang. Akibatnya, seseorang akan mengalami kelelahan dan energi yang dibutuhkan untuk melakukan kegiatan sehari-hari tersebut akan berkurang. Akibatnya, seseorang akan mengalami kelelahan dan energi yang dibutuhkan untuk melakukan kegiatan sehari-hari tersebut akan berkurang.</p>
<p>What behaviors are you going to have in relation to the lifestyle of eating while standing? Please complete with your point!</p>	<p>states agree that eating while standing is not good</p>	<p>17</p>	<p>3. Siap saja, karena makan sambil berdiri itu tidak baik kesehatan tubuh dan kurang sepuas, maka saya akan mulai membiasakan makan sambil duduk di saat makan.</p>
	<p>Express authorisation is followed by scientific explanations</p>	<p>5</p>	<p>3. Gaya hidup makan sambil berdiri itu hal yang tidak dilakukan oleh manusia. Karena bila kita tetap makan minum sambil berdiri dalam jangka waktu yang akan terjadi intarsi sel-sel kerongkongan yang akan kumulatif dan menyebabkan kanker saluran esofagus.</p>
	<p>States no problem eating while standing as long as it is not often</p>	<p>6</p>	<p>3. Saya menyukai hal dalam gaya hidup makan berdiri dengan memilih diucapkan dengan kebalikannya. Biasanya makan sambil berdiri itu karena saya baru tahu dengan makan yang sebentar saja karena tidak menyebarkan hal yang tidak begitu signifikan tetapi bila makan makanan tersebut berarti itu akan menimbulkan jadi kebiasaan. Saya menaruh garis lurus kebiasaan itu.</p>
	<p>Explain that eating while standing is a lifestyle that has become a habit, so the attitude that must be taken is to follow these developments.</p>	<p>1</p>	<p>3. Mengingat gaya hidup makan sambil berdiri memang tidak menyakitkan bagi kesehatan. Namun, karena gaya hidup tersebut dilakukan dalam kehidupan kita, maka kita perlu akan membiasakan gaya hidup tersebut, dan hanya sedikit yang penting kita bisa membiasakan tersebut. Maka, sikap yang perlu kita lakukan yaitu kita mengikuti perkembangan kebiasaan dalam kehidupan kita.</p>
	<p>Provide solutions to themselves and others.</p>	<p>2</p>	<p>3. Saya akan memberi/mencarikan tempat duduk bila dengan orang yang sedang makan sambil berdiri. Untuk membantu sesama menghindari penyakit. Lalu akan menyarankan pedagang kafe/lms untuk menyediakan kursi untuk pelanggannya.</p>

Explanation :

Question : Questions which students got

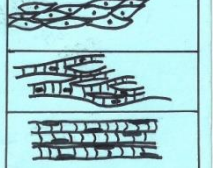
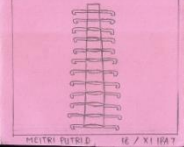
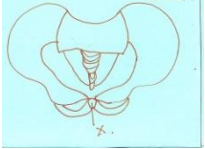



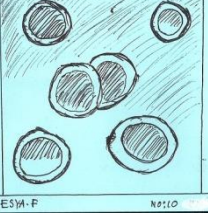
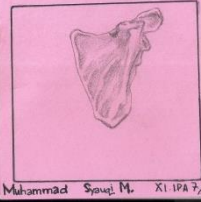


Answer Summary : Summary of Student Content Answers

Number : Number of students working on it

Example : Example of student answers

Table 2. Quality of Student Work Outcomes in the Performance of the Card Making Task

Student Work	Total			Examples of Student Work Results		
	A	B	C	A	B	C

2 Dimensions	15	7	<p>JARINGAN OTOT</p> <ol style="list-style-type: none"> <li>1. Otot polos</li> <li>2. Otot lurik</li> <li>3. Otot serung</li> <li>4. Otot longkang</li> </ol> 	<p>SISTEM GERAK ALAT GERAK PASIF SUMBU TUBUH</p> <ol style="list-style-type: none"> <li>1. Tulang leher</li> <li>2. Tulang punggung</li> <li>3. Tulang pinggang</li> <li>4. Tulang ekor</li> </ol> 	<p>SISTEM GERAK BAGIAN PERUT</p> <ol style="list-style-type: none"> <li>1. Ilium</li> <li>2. Pubis</li> <li>3. Xiphoid process</li> <li>4. Symphysis pubis</li> </ol> 
3 Dimensions	15	24	<p>JARINGAN PENGUAT (TULANG)</p> <ol style="list-style-type: none"> <li>1. Tulang Rawan Hialin</li> <li>2. Tulang Rawan Fibrosa</li> <li>3. Tulang Rawan Elastis</li> <li>4. Tulang Rongga</li> </ol> 	<p>SISTEM GERAK ALAT GERAK PASIF ANGKETA GERAK BAWAH</p> <ol style="list-style-type: none"> <li>1. Femur</li> <li>2. Patella</li> <li>3. Tibia</li> <li>4. Fibula</li> <li>5. Tarsal art</li> </ol> 	<p>SENDI</p> <ol style="list-style-type: none"> <li>1. Pelana</li> <li>2. Engsel</li> <li>3. Pelana</li> <li>4. Pasak</li> </ol> 
Add Shading	12	13	<p>JARINGAN PENGUAT DARAH</p> <ol style="list-style-type: none"> <li>1) Eritrosit</li> <li>2) Leukosit</li> <li>3) Trombosit</li> <li>4) Pembuluh Darah</li> </ol> 	<p>SISTEM GERAK ALAT GERAK PASIF ANGKETA BAGIAN DADA</p> <ol style="list-style-type: none"> <li>1. Selangka</li> <li>2) Bellebat</li> <li>3. Rusuk</li> <li>4. Dada</li> <li>5. Punggung</li> </ol> 	<p>SISTEM GERAK Tulang Dada</p> <ol style="list-style-type: none"> <li>1. Manubrium</li> <li>2. Corpus</li> <li>3. Xiphoid process</li> <li>4. Costae sat</li> </ol> 
Add colouring	5	-	<p>Jaringan Lemfa</p> <p>Jaringan - Penguat</p> <ol style="list-style-type: none"> <li>1. Cairan limfa</li> <li>2. Sel</li> <li>3. Lemfa</li> <li>4. Pembuluh darah</li> <li>5. Darah</li> <li>6. Parah limfoid</li> <li>7. Parah limfoid</li> </ol> 	-	-

Explanation :

Student Work

: Summary of Student Work Outcomes

Total

: Number of students working on it

A

: XI MIA 6 Class

B

: XI MIA 7 Class

C

: XI MIA 8 Class



## **The Quality of Student Responses during Learning**

During the study, the material presented by the teacher included the structure and function of cells that make up tissues in plants and animals, the motion system, the circulation system and the digestive system. The teacher communicates the material of the structure and function of cells that make up tissues in plants and animals, as well as the motion system, using the lecture method. While the material structure and role of the cells that make up the network in the circulatory system and the digestive system is communicated through discussion and practice. The teacher's questions during learning are just a reminder for students. Similarly, during practicum, teacher or student questions are often about the resources and materials needed, as well as the research that needs to be completed.

From all the answers to questions, work results and student responses during the learning collected, it is known that students' creative thinking abilities can only be determined from students' assignments in the form of making cards, working on problems in worksheets, and drawing the structure of digestive organs of ruminants. Based on the analysis, it is known the questions given by the teacher to students to produce creative thinking skills is the questions with open-ended questions. Open-ended questions are items that ask only concerning the principal problem being discussed, without giving specific directions in answering it. Thus, students can develop their thoughts in answering questions, as long as they are relevant to the principal problem being asked. Divergent questions, also known as open questions, elicit a wide range of responses that often require substantive elaboration. Divergent questions do not have a single "best" response. Educators use divergent questions to stimulate dialog and explore a range of issues related to the topic. (Tofade, Elsner, & Haines, 2013)

It is understood from the above that open-ended questions enable students to organize ideas and state their responses in accordance with their own words or phrases. The broad scope of the answers will assess the creative thinking skills of students Whereas *closed-ended* questions are questions that only have one correct answer (Agustianingsih & Mahmudi, 2019). From this point of view, it can be seen that the closed-ended questions are questions that have been answered to certain issues or that there are other limitations. The students' answers, then, are the answers that the teacher needs or answers that are already limited. No novel ideas were then found on the answer sheet.

For addition, there are multiple-choice questions that often do not allow students the ability to compose their thoughts, making it difficult to test students' creative thinking skills. The question of the type of multiple-choice is a dilemma, the answer of which must be chosen from a number of possibilities and the answers given. Every multiple-choice question shall include the subject and the option of answer. Valenti (2003:320) also argues that multiple-choice questions only show memories and are difficult to quantify higher thought processes, apart from the fact that the probability of guessing answers is still big, and that communication between students when working on test questions is more accessible. (Valenti, Neri, & Cucchiarelli, 2003)

Multiple-choice tests have several functional benefits, but multiple-choice tests can not assess other essential abilities in education and other information. Some skills are too complex to be measured effectively with multiple-choice question. Other skills and types of knowledge cannot be measured if the test-taker is shown a list that includes the correct answer (Livingston, 2009). Multiple-choice assessments are often used to determine the ability to remember, to learn, to relate, to grasp relationships, and to apply concepts. In fact, the multiple-choice test often allows students not accustomed to writing ideas using their own words, so the risk of guessing the answers is big and difficult to track. We know that one indicator of creative thinking ability is fluency, which means students can provide novel ideas.

On the basis of the above analysis, it can be concluded that multiple-choice questions are questions, the answers to which must be selected from a variety of choices and the answers given. As a result, multiple-choice questions can not assess students' creative thinking skills due to the limitations of student responses. Whereas, based on findings and observation of learning biology in the classroom, students' creative thinking skills are still weak. This is because there are no questions during learning that make students exchange thoughts or information, because all questions are about students' memories.

Teacher questions are a very important component of classroom communication and play a very important role in facilitating student learning. Teachers' questions during learning influence students' cognitive processes (Chin, 2007). There are two types of questions that teachers can use in the learning process, that is closed-ended and open-ended questions, but only open-ended questions that can stimulate the students to develop their higher-order thinking skills (Agustianingsih & Mahmudi, 2019) Closed-ended questions can test comprehension, while open-ended questions have many potential answers that are not predetermined.

Research on teacher questions has also shown that closed-ended questions are used by teachers rather than open-ended questions in the overall teaching practices in the classroom (Tofade et al., 2013). Valid assessment of higher order thinking skills requires that students be unfamiliar with the questions or tasks they are asked to answer or perform and that they have sufficient prior knowledge to enable them to use their higher order thinking skills in answering questions or performing tasks (King, Goodson, & Faranak Rohani, 2011). So it is known that the teacher questions is important in learning, especially to encourage students' creative thinking skills because the questions with the open-ended questions help students to convey ideas and ideas they have.

A number of research ideas related to efforts to improve students' creative thinking skills can be summarized from the explanation above. Another such theory is that students are inspired to consciously express ideas when they get questions from the teacher. This can be done if students have insights on the subject or outside the subject. Some of the ways students can do that are reading books, journals, articles, or research findings related to the lesson. Students may master science and technology in books, papers, or articles with reading habits.

In addition, students will carry out research in the area of science. Work can be bundled in a realistic way. After the practicum has been completed, students should be allowed to communicate the results they have obtained from the practicum. Communicating the results is intended to encourage students to communicate or express new knowledge and validate it to the teacher. This makes students have a lot of ideas or thoughts about their ability to think creatively.

The next idea is that students are supposed to see the issue from various points of view when they get a question from the teacher. This is useful in such a way that the solutions offered by students are diverse or new, because novelty is one of the important aspects of the ability to think creatively. In addition, students are expected to have the ability to select alternate problem-solving solutions. It is achieved so that students are familiar with a variety of problems-solving and encourage students to solve problems with a variety of solutions. Moreover, although there is a learning potential that enhances the ability to think creatively, in reality the assessment is not yet supported. So it is expected that there is an assessment of students' creative thinking ability.

## CONCLUSION

Based on the research that has been done about students' creative thinking ability in Biology learning in Candi Baru HS, it can be concluded that students' creative thinking ability in Biology learning is still low. The assessments used by teachers have not been able to measure creative thinking ability, because assessments only measure students' cognitive abilities. In addition, students have not been facilitated to think creatively in biology learning.

## REFERENCES

- Agustianingsih, R., & Mahmudi, A. (2019). How to design open-ended questions?: Literature review. *Journal of Physics: Conference Series*, 1320(1). <https://doi.org/10.1088/1742-6596/1320/1/012003>
- Beghetto, R. A. (2010). Creativity in the Classroom. In *Cambridge Handbook of Creativity* (pp. 447–463). <https://doi.org/10.1002/j.2162-6057.1968.tb00110.x>
- Chin, C. (2007). Teacher questioning in science classrooms: Approaches that stimulate productive thinking. *Journal of Research in Science Teaching*, 44(6), 815–843. <https://doi.org/10.1002/tea.20171>
- Creswell, J. W. (2014). *Research Design (Pendekatan kualitatif, Kuantitatif, dan Mixed)*. Yogyakarta: Pustaka Pelajar.
- Hadzigeorgiou, Y., Fokialis, P., & Kabouropoulou, M. (2012). Thinking about Creativity in Science Education. *Creative Education*, 03(05), 603–611. <https://doi.org/10.4236/ce.2012.35089>
- Hui, M. F. (2003). Problems and Issues of the Teaching and Learning of Creativity in Hong Kong Schools. *Apjted*, 6(1), 103–124.
- King, F., Goodson, L., & Faranak Rohani, M. (2011). Higher Order Thinking Skills • Definition • Teaching Strategies • Assessment A publication of the Educational Services Program, now known as the Center for Advancement of Learning and Assessment. In *Center for Advancement of Learning and Assessment*. Retrieved from <http://ilt.msu.edu/issues/june2016/lee.pdf><http://www.cala.fsu.edu/0Awww.ascd.org/memberbooks/0Awww.21stcenturyskills.org/0Ahttp://www.>
- Livingston, B. S. a. (2009). Constructed-Response Test Questions: Why We Use Them; How We Score Them. *R & D Connections*, 11(11), 1–8. Retrieved from [http://144.81.87.152/Media/Research/pdf/RD\\_Connections11.pdf](http://144.81.87.152/Media/Research/pdf/RD_Connections11.pdf)
- Papaleontiou- Louca, E., Varnava-Marouchou, D., Mihai, S., & Konis, E. (2014). Teaching for Creativity in Universities. *Journal of Education and Human Development*, 3(4). <https://doi.org/10.15640/jehd.v3n4a13>
- Piawa, C. Y. (2010). Building a test to assess creative and critical thinking simultaneously. *Procedia - Social and Behavioral Sciences*, 2(2), 551–559. <https://doi.org/10.1016/j.sbspro.2010.03.062>
- Tofade, T., Elsner, J., & Haines, S. T. (2013). Best practice strategies for effective use of questions as a teaching tool. *American Journal of Pharmaceutical Education*, 77(7). <https://doi.org/10.5688/ajpe777155>

Valenti, S., Neri, F., & Cucchiarelli, A. (2003). An Overview of Current Research on Automated Essay Grading. *Journal of Information Technology Education: Research*, 2, 319–330. <https://doi.org/10.28945/331>