

# The Influence of Contextual Teaching and Learning (CTL) Learning Model on 21<sup>st</sup> Century Skills of Students in Class X Biology Learning

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## ABSTRAK

**Abstract:** The low 21<sup>st</sup> century skills of students in learning biology, because the learning process is still teacher-centered, teachers are still dominant in applying conventional learning. Efforts that can be made to overcome these problems are by applying the Contextual Teaching and Learning (CTL) model. The purpose of this study was to see the effect of the CTL model on the 21<sup>st</sup> Century skills of students. This research is quasi-experimental research. The population of this study were students of class X SMAN 12 Kerinci. Hypothesis test data analysis was carried out using the t-test. The results showed that the value of 21<sup>st</sup> Century skills of students in learning biology material, ecology and environmental change in the experimental class was higher than the control class. The average value of 21<sup>st</sup> Century skills of students which includes (a) Critical thinking skills in the experimental class were obtained 72.04 while the control class was obtained 61.13. (b) Communication skills in the experimental class obtained 75.90 while the control class obtained 68.06. (c) Collaboration skills in the experimental class obtained 79.81 while the control class obtained 68.79. (d) Creativity skills in the experimental class obtained 79.92 while the control class obtained 72.73. So, So, it can be concluded that applying the CTL learning model can significantly improve the 21st century skills of students.

**Abstrak:** Rendahnya keterampilan abad 21 siswa dalam pembelajaran biologi, karena proses pembelajaran masih berpusat pada guru, guru masih dominan dalam menerapkan pembelajaran konvensional. Upaya yang dapat dilakukan untuk mengatasi permasalahan tersebut adalah dengan menerapkan model *Contextual Teaching and Learning (CTL)*. Tujuan penelitian ini adalah untuk melihat pengaruh model CTL terhadap keterampilan abad 21 siswa. Penelitian ini merupakan penelitian eksperimen semu. Populasi penelitian ini adalah siswa kelas X SMAN 12 Kerinci. Analisis data uji hipotesis dilakukan dengan menggunakan uji-t. Hasil penelitian menunjukkan bahwa nilai keterampilan abad 21 siswa dalam pembelajaran materi biologi, ekologi dan perubahan lingkungan pada kelas eksperimen lebih tinggi daripada kelas kontrol. Nilai rata-rata keterampilan abad 21 siswa meliputi (a) Keterampilan berpikir kritis pada kelas eksperimen diperoleh 72,04 sedangkan kelas kontrol diperoleh 61,13; (b) keterampilan komunikasi pada kelas eksperimen diperoleh 75,90, sedangkan pada kelas kontrol diperoleh 68,06; (c) Keterampilan kolaborasi pada kelas eksperimen diperoleh 79,81 sedangkan pada kelas kontrol diperoleh 68,79d) keterampilan kreativitas pada kelas eksperimen diperoleh 79,92 sedangkan pada kelas kontrol diperoleh 72,73. Jadi, dapat disimpulkan bahwa penerapan model pembelajaran CTL dapat meningkatkan keterampilan abad 21 siswa secara signifikan.

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Education is now expected to follow developments in the field of science and technology that are increasingly developing in the 21st Century (Afriyenni, et al., 2020). The development of science, technology and life in the 21<sup>st</sup> century is so rapid and causes changes in various fields of life, both information and lifestyle. Likewise in Indonesia, the development of science and technology has changed various aspects of the life of the Indonesian people. In response to this, it is necessary to prepare good quality human resources, especially for students (Agustina, 2015).

The 2013 curriculum has actually accommodated 21<sup>st</sup> Century skills, both in terms of content standards, process standards, and assessment standards. For example, in the standard process, educators are required to apply learning with a scientific approach that will realize student-centered learning (Redhana, 2019). The National Education Association has identified 21<sup>st</sup> Century skills as “The 4Cs” skills which include critical thinking, communication, collaboration and creativity.

Critical thinking skills are skills to carry out various analyses, assessments, evaluations, reconstructions, decision-making that lead to rational and logical actions (King, 2010). Critical thinking can be used as a driving factor for increasing students' knowledge (Soprandu and Chatri, 2020). Communication skills are skills to express new thoughts, ideas, knowledge, or information, both in writing and orally. Collaboration skills are the skills to work together effectively and show respect to diverse team members, exercising fluency and willingness to make decisions needed to achieve common goals (Greenstein, 2012). Creativity skills are skills to find new things that have not existed before, are original, develop new solutions for each problem, and involve the ability to generate new, varied, and unique ideas (Filis, et al., 2010).

Based on the results of the interview questionnaire to the teacher, it was found that the teacher had never provided learning to train critical thinking, creativity, communication and collaboration of students. The teacher only conveys the learning material in front of the class using the lecture and question and answer method. On average, students are not active in asking questions or giving opinions, so that students seem less participating in the learning process.

Based on the results of interview questionnaires to students, it was found that on average students were less interested in and enjoying biology subjects, because biological material is difficult to solve and because biological material contains a lot of scientific terms, teachers have never used a learning model that can develop 21<sup>st</sup> century skills of students. The teacher only explains learning through lecture, discussion and question and answer methods without providing variations of other learning models, so that it will have a negative impact on biology learning outcomes.

Learning reform that shifts from educator-centred learning to student-centred learning is the answer to efforts to develop 21<sup>st</sup> century skills in students (Redhana, 2019). Awareness of the importance of encouraging 21<sup>st</sup> Century skills in students is an important thing that needs to be developed by teachers in learning. 21<sup>st</sup> Century skills can be developed in learning through the application of learning models. One of the learning models that can be applied in developing 21<sup>st</sup> Century skills is the Contextual Teaching and Learning (CTL) learning model. The CTL learning model is expected to be able to develop students' 21<sup>st</sup> Century skills, such as critical thinking, collaboration, communication and creativity.

Moving on from previous research (Wulandari, et al., 2019), regarding the application of the CTL learning model, it has been proven to be able to encourage 21<sup>st</sup> Century skills to students, one of which is critical thinking skills. Destria (2019) also confirmed that the results of her research that applied the CTL model to 21<sup>st</sup> Century skills showed that critical thinking, creativity, communication, and collaboration developed after applying the CTL learning model. In the 21<sup>st</sup> century national education paradigm, it is also emphasized that the skills that must be possessed by 21<sup>st</sup> century students / human resources are contextual learning abilities (Moeloe, et al., 2010).

The CTL learning model is a learning model that allows the involvement of students' activities to seek, process and find concrete learning experiences through trying, doing, and experiencing activities (Rusman, 2012). CTL can help students see meaning in an academic subject being studied connecting disciplines with their contexts in everyday life (Jonhson in Fitriyanti, 2019).

The steps for using the CTL learning model are: (a) Develop the idea that students will learn more meaningfully by working alone, discovering and constructing their own new knowledge and skills, (b) Carrying out inquiry activities as far as possible for all topics. Develop students' curiosity by asking questions., (c) Create a learning community (learning in groups)., (d) Present models as examples of learning. (e) Reflect at the end of the meeting (Sugiyanto, 2007).

Based on the description of the background of the problem and the results of previous research, the researchers are interested in conducting research with the title "The Influence of Contextual Teaching and Learning (CTL) Learning Models on 21<sup>st</sup> Century Skills of Students in Biology Learning Class X SMAN 12 Kerinci".

## METHOD

This research is a quasi-experimental research. The population is class X students of SMAN 12 Kerinci who are registered in the 2020/2021 Academic Year. The sample of this study was taken randomly, so that the X MIA1 class was obtained as the experimental class and the X MIA2 class as the control class. Data analysis was performed using t test.

## FINDING

The data obtained in this study are the 21<sup>st</sup> Century skills of students which include critical thinking, communication, collaboration and creativity in the experimental class by applying the CTL learning model and control by applying the conventional learning model.

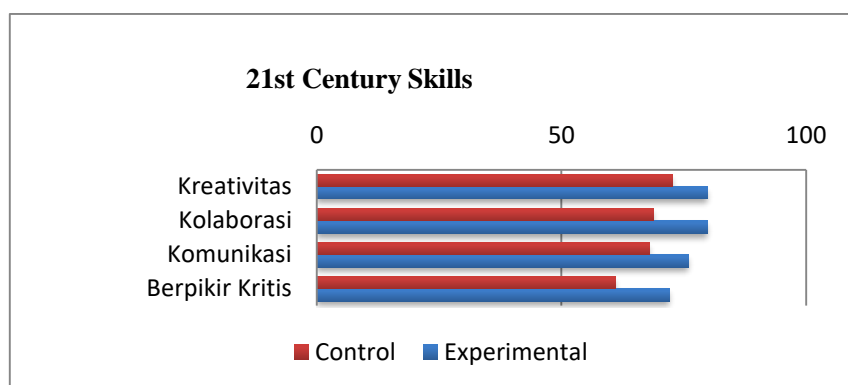
### Finding of Student 21<sup>st</sup> Century Skills Data

Data Value of 21st Century skills of students in the experimental class and control class, is presented in table 1.

**Table 1. Data Value of 21<sup>st</sup> Century Students' Skills.**

21 <sup>st</sup> Century Students' Skills	Experiment Class	Control Class
Critical Thinking	72,04	61,13
Communication	75,90	68,06
Collaboration	79,81	68,79
Creativity	79,92	72,73

If presented in graphical form, the average value of 21st Century skills of students in the experimental class and control class can be seen in the following figure 1.



**Figure 1. Average Value of 21<sup>st</sup> Century Skills Learners**

Based on Table 1 and Fig. 1, it is known that the average value of 21st Century skills of students in the experimental class is higher than the control class.

## DISCUSSION

### Critical Thinking Skills

Critical thinking is a skill to interpret and evaluate information and arguments to create solutions (Fisher, 2011). Based on the results of research on critical thinking skills, the results of learning biology are obtained through tests in the form of critical thinking questions on ecological materials and environmental pollution. The average value of learning outcomes in the critical thinking skills of the experimental class is 72.04 while the control class is 61.13. Judging from the results of hypothesis testing with t-test showing H1 is accepted, because the significance level is  $0.00 < 0.05$ , it means that the experimental class that uses the CTL learning model has a positive effect on students' critical thinking skills compared to the control class that uses conventional learning. This is in line with the research results of Antika (2019) and Destari (2019), which also show that the results of students' critical thinking skills tests after using the CTL learning model have improved.

The high value of critical thinking skills in the experimental class is influenced by the steps of the CTL learning model at the stages of working alone, self-finding/inquiry, constructivism and learning community. Bybee in Syamsurizal, et al., (2014), states that learning in the view of constructivism, students must be able to construct their own knowledge by carrying out active activities in learning such as finding information on their own and independent learning, so that the information is already in the memory of students to become new knowledge. Because it follows the steps of the CTL learning model in its implementation, learning is developed through group discussions or learning communities. Group members consist of students with various abilities, consisting of 4—5 people in 1 group. This is supported by KeenGwe (2009) which states "diverse students imply that teachers provide opportunities for each student to learn in a safe and conducive environment".

Each student in the discussion group, students can work directly to understand the material and find problems that are considered a problem for students. To solve these problems, students are asked to work alone, and find their own / inquiry by connecting in their daily lives, thus spurring students to construct their own new knowledge and skills. When learning takes place, it is seen that students find more new ideas that are poured based on their respective understandings obtained from the experience

of students. Amalia and Advinda (2020), stated that the inquiry process during learning has a constructive impact that provides many opportunities to increase the effectiveness of teaching and learning.

In the control class the value of critical thinking skills is lower than the experimental class, because the control class uses conventional learning, namely using discussion and lecture methods. In this case, the proportion of the lecture method is greater than the time provided by the teacher to carry out discussions, so that the time for students to share with the theme is less, and this will lead to low enthusiasm of students in participating in the learning process.

When students are faced with discussions, students find it difficult to interact with friends and teachers. Only a few students are active in discussion, the rest of the students are more silent and rely more on the explanation of the material presented by the teacher, students are also less able to solve problems during discussion so that it will affect the development of students' critical thinking skills.

### **Communication Skills**

Communication skills can be defined as message transmission that involves shared understanding between the contexts in which communication occurs (Lufri, et al., 2021). The value of communication skills in this study was obtained from the observation assessment sheet of students' communication skills. The average value obtained is 75.90 in the experimental class and 68.06 in the control class. From the results of hypothesis testing with t-test shows H1 is accepted, because the significance level is  $0.003 < 0.05$ , meaning that the experimental class that uses the CTL learning model has a positive effect on students' communication skills compared to the control class that uses conventional learning. In line with the results of Rahmi and Suparman's research (2019), they state that applying the CTL model can improve 21<sup>st</sup> Century skills, one of which is communication.

The high average value of the experimental class compared to the control class is influenced by the activities of the CTL learning model itself. The CTL model requires students to express their findings based on student analysis. Good students' communication skills are assessed based on indicators, namely speaking in a clear voice, using various sources as information, participation in groups, eye contact and explaining conclusions. From all indicators, it can be seen that on average, students are enthusiastic to explore information and provide explanations. However, to speak clearly and make eye contact when explaining their opinions, there are still some students who focus on one direction. Overall, the CTL model is able to improve and hone students' communication skills.

For conventional learning, there are still many students who are embarrassed to ask questions, nervous when explaining, there are still many students who explain the results of the discussion without looking at the audience. So communication skills are still lacking by using conventional learning models. This is also caused by more accustomed to using the lecture method, so communication skills are reduced.

### **Collaboration Skills**

One of the skills needed by students in the 21<sup>st</sup> century is collaborative skills (Novisya, 2020). Cintamulya (2015) also states, the world of education needs to prepare human resources who have several skills, one of which is collaboration skills needed in the 21<sup>st</sup> Century.

The average value of collaboration skills obtained based on the results of the study was 79.81 in the experimental class and 68.79 in the control class. From the results of hypothesis testing with t-test shows H1 is accepted, because the significance level is  $0.00 < 0.05$ , meaning that the experimental class that uses the CTL learning model has a positive effect on students' collaboration skills compared to the control class that uses conventional learning. In line with Rahmi and Suparman's research (2019), they state that applying the CTL model can improve 21<sup>st</sup> Century skills, one of which is communication.

The high value of collaboration skills in the experimental class is caused by the steps of the learning model applied, namely CTL. In the learning process that affects the value of collaboration is higher than the control class because when learning activities are carried out with the learning community or group discussions. Furthermore, participants in this learning model are asked to find their own solutions to the problems contained in the material being studied. Students also find answers in real-life contexts, so that students are seen to actively participate in collaboration skills.

According to Enoch (in Evinur and Yusnidar., 2015), learning with real-world contexts allows students to be able to strengthen, expand, apply their knowledge and academic skills in various settings within school and outside of school, in order to solve simulated problems.

Judging from the indicators for assessing students' collaborative skills in CTL learning, on average students are able to contribute to providing new ideas or ideas, participants are also able to manage time, because the ideas obtained do not focus on teaching materials, but ideas that come from the real life of students. So that everything summarizes problem solving, investigation techniques and cooperation between group members and takes a long time. Burke, (2011), states that collaborative learning can develop collaboration skills and can increase the learning value of students.

It is different with the control class that uses conventional learning, students look passive based on the results of the observer's assessment of collaboration skills. This is because conventional learning uses the lecture method more so that participants in discussion activities are more likely to be less enthusiastic about collaboration, problem solving is fixated on teaching materials so that time management in the control class is far from good.

### **Creativity Skills**

Obtaining learning outcomes on creativity skills, namely through work assessments in the form of posters on ecological and environmental change materials. In this assessment of creativity skills, the aspects that are assessed are originality, flexible thinking (Flexibility), detailed thinking (Elaboration) and (Fluency). Based on the average value of creativity skills in the experimental class obtained 79.92 while the control class obtained 72.73.

Judging from the results of hypothesis testing with t-test showing H1 is accepted, because the significance level is  $0.00 < 0.05$ , it means that the experimental class that uses the CTL learning model has a positive effect on students' creativity skills compared to the control class that uses conventional learning. In line with the results of Winarti's research (2015), CTL learning shows that it is more effective than the control class, from 4 indicators of creative thinking ability, namely fluent thinking, flexibility, originality and elaboration.

The high value of creativity skills in the experimental class is influenced by the activities of the CTL learning model. CTL learning steps that form the value of creativity, namely learning that emphasizes participants to be able to connect the material into the real life of students, so that students are able to construct their own new knowledge and skills. So, when giving a performance task, namely making posters, students are seen to be able to pour their posters by connecting them in the daily lives of students. The results of the poster assessment analysis show the authenticity of the work, flexible thinking, detailed thinking and fluent thinking of students.

Daud, et al., (2012), asserted that through his experience and knowledge, a person will try to find various ideas so as to create new ideas or products that are better than before. So what is meant by appropriate learning to find these various ideas in making posters is by applying the CTL learning model. Rahmi and Suparman (2019), stated that the CTL model is one of the learning models that can be applied to improve 21st century skills such as creativity skills.

In contrast to the control class that applies the conventional learning model, the value of creativity skills is lower than the experimental class. This is because conventional learning does not require students to explore information that is connected in real life, so that students' skills are limited to what is in the book. It was also found that there were still many students who made assignments in the form of posters glued to the results of searching from the internet. The results of the creativity assessment analysis show that there is a lack of originality in the work, flexible thinking, detailed thinking, and fluent thinking.

### **CONCLUSION**

Based on the results of the study, it can be concluded that the Contextual Teaching and Learning (CTL) learning model has a significant positive effect on the 21st century skills of students which include: critical thinking skills, communication, collaboration and creativity.

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