Vol 10(2) (2021): 148-159
DOI: http://dx.doi.org/10.24235/sc.educatia.v10i2.9356

SCIENTIAE EDUCATIA: JURNAL PENDIDIKAN SAINS

http://www.syekhnurjati.ac.id/jurnal/index.php/sceducatia

Application of Biology Learning Based on Local Wisdom Cibulan Tourism to Improve Students' Critical Thinking Skills

Wati[a], Kartimi[b*], Asep Mulyani[a]

[a] Department of Biology Education, Faculty of Education and Teacher Training, IAIN Syekh Nurjati Cirebon, Indonesia
[b] Department of Chemistry Education, Faculty of Education and Teacher Training, IAIN Syekh Nurjati Cirebon, Indonesia

[*]Corresponding author: Jl Perjuangan by Pass Sunyaragi Kesambi Kota Cirebon, Jawa Barat, Indonesia. E-mail addresses: kartimi.iain@gmail.com

article info

Article history:
Received: 18 November 2021
Received in revised form: 04 November 2021
Accepted: 22 December 2021
Available online: 31 December 2021

Keywords:
Critical thinking skills
Ecosystems
Local wisdom
Tourism

abstract

Local culture-based learning is a form of learning that combines school with community culture. This study aims to examine the differences in critical thinking skills between students who apply and do not apply the learning of local wisdom science in Cibulan Tourism and the response of students who apply to learn local wisdom science Cibulan Tourism. This research was conducted in April 2019 at SMA Negeri 1 Jalaksana, Kuningan Regency. The population of all X classes in SMA Negeri 1 Jalaksana was 200. The sampling technique used is purposive sampling. The sample consisted of X MIPA 1 totaling 31 and X MIPA 5 totaling 31 students. Pretest-posttest control group research design with data collection techniques using observation, tests, questionnaires, and documentation. The results showed that the percentage of experimental class student activity was better than the control class, with a difference of 5.1% at the second meeting. The improvement in critical thinking skills shows an average N-gain of 0.57 for the experimental class and 0.15 for the control class. Percentage of questionnaire students strongly agree 19%, Agree 35% and do not know 45% while disagreeing and strongly disagree 0%. Research conclusions: There was an increase in student learning activities at each meeting between the classes that applied and did not apply local wisdom-based learning Cibulan tourism local wisdom. Students respond well to applying local wisdom-based learning Cibulan tourism on ecosystem material with a percentage reaching 69% and included in the strong category. Local culture-based learning can improve students' critical thinking skills.

1. Introduction

The low quality of science education in Indonesia is thought to be due to the lack of attention to the socio-cultural environment of students. Education tends to be a means of social stratification and the school framework as it exchanges with understudies what is known as dead information, namely, the knowledge that is too book-centered/textbookish. Science learning which is only directed at achieving scientific knowledge or mastery of concepts alone, causes students to only memorize concepts in science but cannot apply every scientific concept learned

when dealing with problems in everyday life. Science is a process of finding knowledge with empirical methods using logical and systematic observation and a combination of critical thinking to make the information held valid (Rai, 2013). Science learning provides opportunities for students to be scientific and local culture to facilitate maximum benefits (Suastra, 2010).

Learning that emphasizes students to master a concept also causes students' thinking skills not to develop optimally. Students who have strong critical thinking skills can evaluate arguments and deserve acceptance based on their thinking. Students' critical thinking skills must be developed through learning so that students are literate in knowledge and able to apply each of their knowledge to solve problems faced in everyday life. Practicing critical thinking helps students understand the intent and purpose of the problem to make alternative decisions (Riyanto & Mariani, 2019). Innovative biology learning can be applied in schools, one of which is local cultural science-based learning that combines the cultures that develop in the local community with the school curriculum to create contextual learning (Hariri et al., 2016).

Learning with local culture-based implementation has another effect on students. Besides increasing the introduction of the surrounding culture, it also integrates science material with local culture as teaching materials (Hidayatulloh, Kartimi, & Roviati, 2014). Local wisdom in the form of ecological aspects in the form of natural resources can be used as a source of formal and non-formal learning. Local potential can be developed into local wisdom because one of the characteristics of local wisdom is teaching people to love nature (Puspasari et al., 2019). Natural science (IPA) has a nature in terms of the characteristics of the material, which is descriptive (factual), which generally answers the problem of "what" and is memory (memorization). Science mostly has the characteristics of declarative (conceptual) material, which usually answers the "why" question and is proving; on the other hand, science also has procedural characteristics, which usually answer the "how" question and are step by step. The characteristics of science material are dominant in evidence, so every problem in science should be directed to contextual problems. Contextual problems rely heavily on the environment around students with all their advantages.

Critical thinking skills are skills where someone wants to always know about the information to achieve a deep understanding. According to Fisher (2011), the core of critical thinking is as follows: 1) Distinguish the components within the case beneath thought, especially the conclusions and reasons; 2) Clarifying and interpreting a statement and an idea; 3) Identify and evaluate an assumption; 3) Evaluating arguments that come from various types; 4)Assessing the ability to accept or acceptability, especially regarding credibility and claims; 4) Evaluate, analyze and make decisions; 5) Draw a conclusion, and 6) Generate arguments. Critical thinking is also a process of finding logical and reflective reasons for making statements and actions. This study related to critical thinking begins with analyzing to evaluate the information obtained. Critical thinking is also a mental process in analyzing and evaluating various information obtained through observation, experience, induction and deduction processes, and communication (Anggriani, Karyadi & Ruyani, 2019). Widayanti (2020) argues that students' critical thinking skills are still low due to direct learning that does not involve student participation and has never been trained to think from planning to evaluating answers.

Kuswana (2013) revealed that using strong critical thinking skills allows students to evaluate arguments and deserves acceptance based on their thoughts. Students' critical thinking skills must be developed through learning so that students are literate in knowledge and able to apply each of their knowledge to solve problems faced in everyday life. Innovative biology learning can be applied in schools, one of which is local cultural science-based learning that combines the cultures that develop in the local community with the school curriculum to create contextual learning (Wahyuningsih, 2014).

Anisa (2017) carried out the proper investigation that local potential-based learning provides students with opportunities for direct experiential learning to collect various information and analyze according to student experience so that learning is more meaningful. Critical thinking helps students to solve various problems in real life. Critical thinking trains students to think effectively based on the information they have. The millennial era certainly requires quick and effective decisions, so that students need to be trained to think critically. Critical thinking is a comprehensive introduction to better reasoning (Arfianawati, Sudarmin, & Sumarni, 2016). Based on the depiction of the foundation over, the researchers are interested in research related to students' thinking skills, so the researchers took the title "Application of Science Learning Based on Neighborhood Intelligence Cibulan tourism in ecosystem teaching materials to Improve Critical Thinking Skills for Class X Students of SMAN 1 Jalaksana Kuningan Regency

2. Method

The method used in this research is the descriptive quantitative method. Data is taken from student performance using student worksheets. The statistical test used was the n-gain Hake test, substituting pretest and posttest tests. True experimental design or also called an experiment, because, in this design, researchers can control all external variables which affect the course of the experiment. The sampling technique used is purposive sampling. The research design used is a pretest-posttest control group design (Creswell, 1994). The research was conducted by comparing the experimental and control classes. In the experimental class, a learning method based on the local wisdom of Cibulan tourism was applied, while in the control class, the learning method used was the conventional method.

The research model is a pretest-posttest control group design. The research design used is the pretest-posttest control group design. Observations are seen from the results and learning process assessors. Observations can be seen from students' presentation activities. Students' critical thinking levels are seen from analyzing, evaluating, making decisions, drawing inferences, generating arguments, evaluating different types of arguments, clarifying, interpreting statements and ideas. - ideas, analyze, evaluate and produce explanations, identify elements in the case being considered, mainly reasons and conclusions, distinguish and assess suspicions, assess acceptability, especially credibility and claims, test questionnaires seen from how much students assess learning based on local wisdom Cibulan Tourism in improving students' critical thinking skills.

Table 1. Data collection technique

Data	Data source	Instrument	Information
Observation sheet	Student	Observations based on indicators of students' critical thinking skills	At the time of learning
Observation sheet	Student	The test is within the shape of different choices based on pointers of essential considering aptitudes.	Before and after learning
Questionnaire	Student	Questionnaire	At the time after learning

3. Result and discussion

Description of student learning activities with the application of Cibulan tourism-based local wisdom learning in ecosystem teaching materials

Student activities during the learning process based on Critical Thinking Skills, all activities carried out by students were assessed by five observers, with each observer divided into five groups. Observations on student activities were observed using the Student Activity Guide Sheet,

which contained a whole series of activities starting from the preliminary activities of the core activities to the closing activities by referring to the nine indicators of students' critical thinking skills, according to Fisher (2011) with nine indicators used. The data on the results of this student activity is qualitative data, which are then analyzed to determine the average of all learning activities that have been carried out.

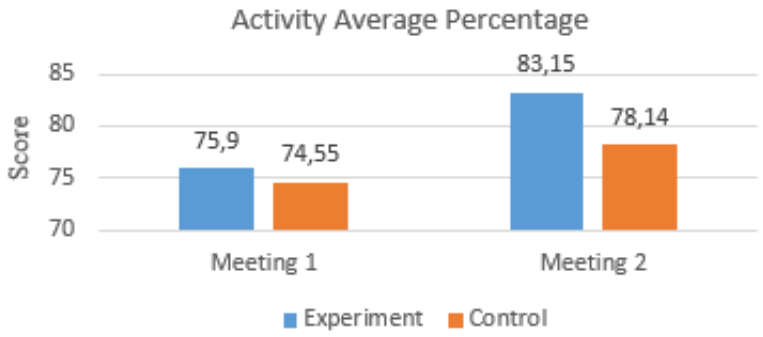

Figure 1. Chart of contrasts in understudy learning exercises between control and test classes in common

Student learning activities were observed in research that applied biology learning based on local wisdom Cibulan tourism in ecosystem teaching materials. Observations of student learning activities were carried out by observers when learning took place in the experimental class, namely the class that applied and did not apply Biology Learning Based on Local Wisdom Cibulan Pad Tourism. The student activities have been adjusted to the developed competency-based curriculum (KBK) critical thinking skills indicators. The student learning activities observed in this study consisted of five aspects of the competency-based curriculum (KBK) indicators according to Fisher (2005), namely: (1) Analyzing, evaluating, and making decisions, (2) Attracting inferences; (3) Generating arguments; (4) Evaluating arguments of different types; (5) Clarifying, interpreting statements and ideas; (6) Analyze, evaluate and produce explanations; (7) Distinguish the components within the case beneath thought, in specific the reasons and conclusions; (8) Identify and evaluate assumptions; (9) Assessing acceptability, especially credibility and claims, (Wahyuningsih, 2014).

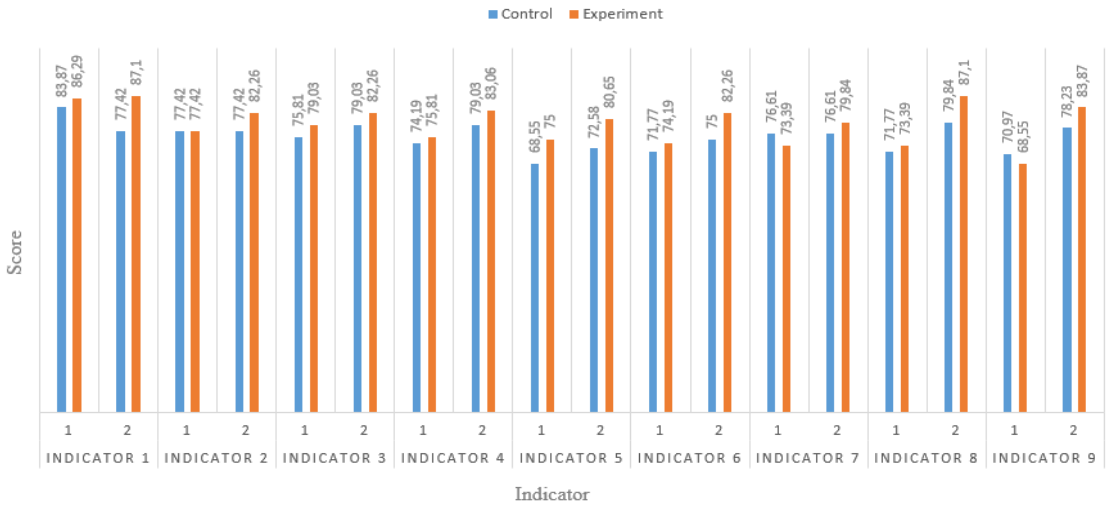

Figure 2. Graph of recapitulation of student learning activities in control and experiment classes

Observational data obtained are then analyzed and interpreted based on student activity when participating in learning to get a conclusion, student learning activities during learning have increased at each meeting, the data can be seen in the graph of contrasts in understudy movement

between the exploratory lesson and the control course at the same time general. According to Kurniahtunnisa et al., (2016), the standard rate of understudy movement in the Trial class is higher than the average percentage of the control class. Learning activities for the experimental class have better-thinking skills than the control class. The Cibulan local cultural science learning application provides the opportunity to observe science objects through observations outside the classroom directly. Approaching the object of reality helps students think more, and the teacher has prepared critical thinking steps in drawing conclusions based on local culture-based learning outcomes. From the indicators measured, students' skills have achieved a good score. This is in line with research (Sochibin, Dwijayanti, & Marwoto, 2009) that Inquiry learning, where students find knowledge concepts with guidance, can develop critical thinking skills. The learning activities of experimental class students are stimulated by the application of Biology Learning Based on Cibulan Tourism Local Wisdom. Students are more active and more enthusiastic about learning (Eggen, 2016).

Based on the observation results data, the experimental class has a higher percentage of almost every competency-based curriculum (KBK) indicator observed in the learning process, especially in the Posttest score. While the Pretest scores for the experimental class and the control class still vary in each indicator, it can be assumed that the application of Biology Learning Based on Cibulan Tourism Local Wisdom in the experimental class can improve students' critical thinking skills. Observational data obtained showed that based on the graph of learning activities, both in general and the indicators for each meeting, there was no significant difference between students' learning activities in the experimental and control classes. However, the experimental class always had a higher percentage of learning activities than the control class at each meeting. The experimental class's criteria for student learning activities are always in the excellent category from the first meeting and very good at the second meeting for each competency-based curriculum observed indicator. In contrast, the criteria for student learning activities in the control class at the first meeting are good. In contrast, at the second meeting, student activities were suitable in several meetings with competency-based curriculum indicators that he observed (Hariri et al., 2006).

The experimental class has a high level of activeness and critical thinking ability by applying Biology Learning Based on Cibulan Tourism Local Wisdom. In this case, the focus is on developing problem-solving skills from similar cases. Skills are not taught by the teacher but are discovered and developed by students themselves through problem-solving activities. Meanwhile, the control class has lower activeness and critical thinking ability than the experimental class. The control class still applies conventional learning methods, namely lectures. Sulistyowati (2014) states that the lecture method applied in learning forces students to concentrate using little ears. The lecture method makes it difficult for students to determine the teacher's analytical, synthetic, critical, and evaluative ideas. The lecture method creates a monotonous learning atmosphere so that students feel bored quickly. Thus, applying Biology Learning Based on Local Wisdom Cibulan Tourism on the concept of Ecosystem teaching materials is considered effective in the learning process (Ruseffendi, 2010).

Description of the differences in critical thinking skills improvement between experiment and control class

Critical thinking skills are shown to achieve a deep understanding of learning Biology in particular. Deep understanding allows us to understand the meaning behind an idea that directs our daily lives. According to Fisher (2005), indicators of critical thinking skills in this study refer to indicators of critical thinking skills. The indicators of critical thinking skills, according to Fisher (2005) in this study, include (1) Analyzing, evaluating, and making decisions, (2)

Attracting inferences; (3) Generating arguments; (4) Evaluating arguments of different types; (5) Clarifying, interpreting statements and ideas; (6) Analyze, evaluate and produce explanations; (7) Distinguish the components within the case beneath thought, in specific the reasons and conclusions; (8) Distinguish and assess suspicions; (9) Assessing acceptability, especially credibility and claims.

The indicators to be achieved in this research are the nine indicators proposed by Fisher in his 2005 book, such as the nine indicators stated above. The advantages of critical thinking skills, according to Fisher, because that indicators one to nine are interrelated and cover everything. These nine indicators are included in the material in the ecosystem material, so it is suitable for use in this research and high school ecosystem material. According to other experts, the nine indicators can also represent critical thinking skills and improve the thinking skills of high school students.

Students' basic considering abilities can be made strides by relevant learning or direct learning to the place of observation. In this study, learning was carried out by applying learning based on local wisdom Cibulan tourism in ecosystem teaching materials. Contextual learning increases students' thinking skills, as seen in the graph above.

The application of learning based on neighborhood intelligence Cibulan Tourism in this teaching material shows different results in the pretest and posttest between the experimental and control classes. They can be seen in Figure 3 below.

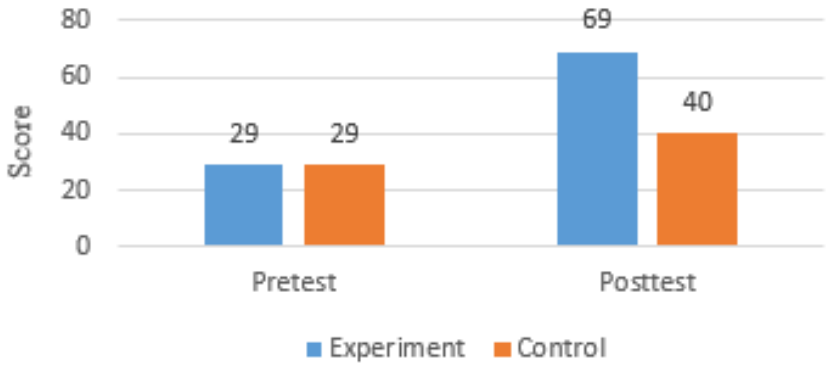

Figure 3. Graph of average pretest and posttest values for experiment class and control class

Meanwhile, the practice of learning based on the local wisdom of Cibulan Tourism gave different results. This can be seen through the graph of the average value of the N-gain indicator value of students' critical thinking skills among experimental and control class students and seen in Figure 4 below.

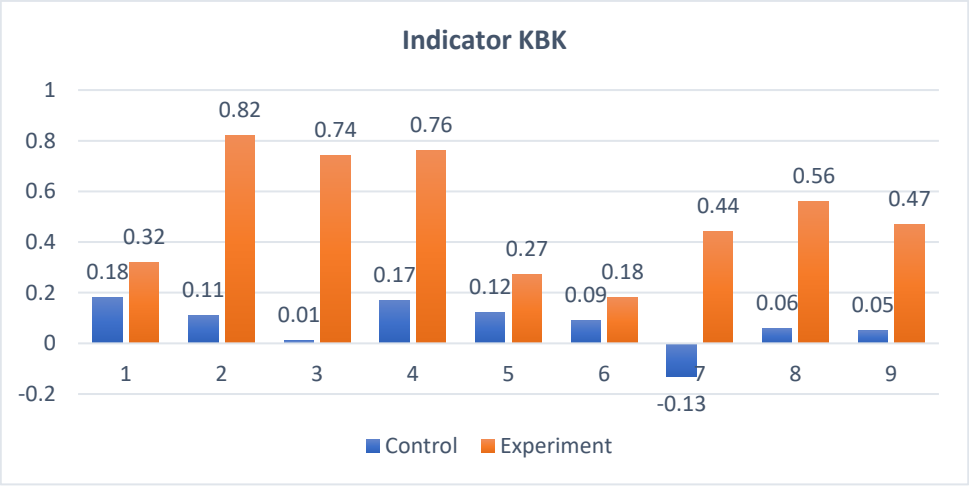

Figure 4. Graph of average N-gain index of student critical thinking skills between experimental and control classes

The improvement of students' critical thinking skills can come from tests carried out before starting learning, called a pretest. The test indicators were adapted from Fisher (2005). The research results on the application of local Cibulan cultural learning show that there are indicators where students still need additional treatment: clarifying, interpreting statements and ideas, and analyzing, evaluating, and generating explanations. Based on learning activities, students are less enthusiastic about finding new ideas from the results of their analysis. The inactivity of students makes the tendency of students to be less able to create new ideas. It was also found by Ramawati (2016) that students seemed passive in discussing; some students answered not thoughtfully.

Critical thinking indicators were not fully improved in this study. Several indicators are superior, and some are low, so additional treatment is needed. Indicators of thinking that are still at a low level, it turns out that students are still not used to thinking about analyzing to create new ideas. This condition is also experienced by Widayanti (2020); the weakness of students' critical thinking skills is caused by learning that does not give students active thinking, and there are no questions from teachers who train students to think to solve problems. Based on the graph above, it can be concluded that students' critical thinking skills are not optimal from all indicators.

The graphic of preliminary test and posttest scores from students in those classes show the posttest scores in the two classes. Meanwhile, the result from other tests indicates that the score's significance is smaller than the actual score. This indicates that the control and experimental class are divergent. These results show us the final knowledge between the experimental class that applied Biology Learning Based on Cibulan Tourism Local Wisdom and the control class who did not apply the learning (Wahyuningsih, 2014).

Analysis of differences in critical thinking skills improvement of experiment class and control class students

This occurs between the students in control calls as well as experimental classes. It can be measured through statistical tests. This test uses two steps: a prerequisite test and a different test. The research was carried out for the prerequisite test with the Liliefors or Kolmogorov and the homogeneity test. These two analysis were used to find out if there were data collected from these tests or not. The prerequisite test is used to decide the next step in the statistical test. Meanwhile,

the statistical one aims to determine whether there is a dissimilar in improving students' critical thinking in experimental and control classes.

To find out whether there is an increase in students' critical thinking skills when applying the Cibulan Tourism local wisdom-based learning method and whether there is a divergence in critical thinking skills between the class that applies the Cibulan Tourism Wisdom-based Biology learning method and the class that does not apply it, it is necessary to have a test. The test is carried out before learning (pretest). The problem is 50 in the form of multiple-choice (the questions have been tested to be suitable for as many as 40 questions).

The application of Biology Learning Based on Cibulan Tourism Local Wisdom in learning, especially ecosystem material, is considered adequate because it can improve students' critical thinking skills. This is in line with the goal of critical thinking proposed by Johnson in Susilowati (2013), stating that the purpose of critical thinking is to achieve a deep understanding. Deep understanding allows us to understand the meaning behind an idea that directs our daily lives. Motivated by the desire to find an answer and a solution in problem-solving, critical thinkers examine their thinking processes and those of others to see if they make sense. They evaluate the implied thinking of what they hear and read, then examine their thought processes when writing, solving problems, making a decision, or developing a project (Sukmara, 2007).

Description of student responses to the application of biology learning based on local wisdom Cibulan tourism on ecosystem materials

Student questionnaires were used to determine student responses to Biology Learning Based on Cibulan Tourism Local Wisdom on Ecosystem Teaching Materials. The questionnaire was completed at the end of the learning process. The questionnaire was distributed to students accepted into the experimental class, namely the class that was given special treatment in applying Biology Learning Based on Local Wisdom Cibulan Tourism on Ecosystem Teaching Materials. Giving a questionnaire to the experimental class aims to determine student responses to Cibulan Tourism-Based Local Wisdom learning application. Each student must answer or fill out 20 questionnaires related to learning that has been carried out in two class meetings and one outside class meeting. The student questionnaire contains student responses that indicate strongly agree to disagree from the learning carried out vigorously, and students check the answers they feel in the learning process that has been carried out.

Student response questionnaires were divided into positive and negative questions, ten positive questions, and ten negative questions, with 20 questions. Student questionnaires are closed because students only strongly agree, agree, do not know, disagree, and strongly disagree. Students are only given answers by checking the answers according to how they feel during the learning carried out during two meetings in the classroom and one outside meeting—class with a learning system based on local Wisdom Cibulan Tourism.

Student questionnaires on the application in the experimental class, namely the class that was given special treatment in the application of Biology Learning Based on Local Wisdom Cibulan Tourism in general, can be seen in Figure 5 below.

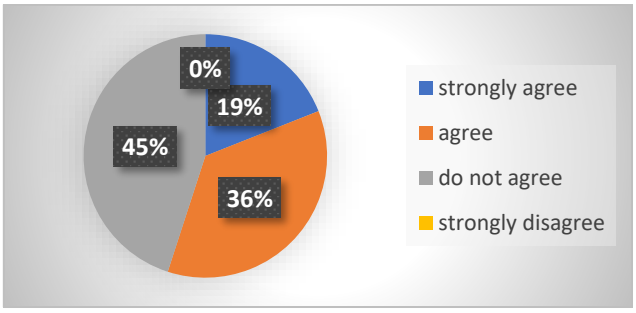

Figure 5. Questionnaire diagram of student responses to the application of biology learning based on local wisdom Cibulan tourism in general

Figure 5 shows a diagram of the percentage of student response questionnaires to the application of Biology learning based on Cibulan tourism local wisdom on ecosystem teaching materials in general. based on the diagram, it can be seen that students' responses to the application of Biology learning based on Cibulan tourism local wisdom on the ecosystem material are 19% of students responding strongly agree, 36% students responding Agree, 45% students responding do not know and 0% students giving responses disagree and strongly disagree. Based on these data, it can be concluded that learning biology based on Cibulan tourism local wisdom in the ecosystem only received a good or positive response from students. The articulation in the student reaction survey consisted of ten positive questions and ten negative questions. The statements in the questionnaire are divided into three dimensions. Dimension 1 Student responses to learning biology based on local wisdom Cibulan tourism on ecosystem teaching materials. This aspect is developed into learning response indicators in the form of response to the application of local Wisdom-based biology learning, benefits of local wisdom-based biology learning, and students' curiosity about local wisdom-based biology learning. Dimension 2 Student responses to the local wisdom-based biology learning process Cibulan Tourism on Ecosystem teaching materials, developed into indicators, namely student interest in local wisdom-based biology learning, ability to re-deliver the material being studied, student activity in learning with local wisdom-based biology learning, and students' learning motivation by learning biology based on local wisdom.

Dimension 3 Student responses to learning outcomes with local wisdom-based biology learning in Cibulan tourism ecosystem teaching materials, developed into indicators, namely Student responses to learning outcomes with local wisdom-based biology learning in Cibulan tourism ecosystem teaching materials, Student insights about biology-based learning materials Local wisdom and progressing students' critical thinking skills by learning biology based on local wisdom on ecosystem materials. These three dimensions follow the learning that has been done and is divided into 20 positive and negative questions, which must be answered by students who apply Cibulan Tourism-based local wisdom learning. Based on the graph, many students stated that they did not know by 45% of the total 31 students, while those who answered agreed 35%; this shows that high school students are still not familiar with contextual learning, but like the learning seen from when learning many students who actively ask questions and are active to answer questions from the teacher. Student responses in learning are also good. They ask more questions about material related to natural events, and explanations related to local wisdom also make students more understanding and enthusiastic. Local wisdom-based learning that is found around the place of residence makes students much more responsive and enthusiastic.

Perdimensional student response questionnaires on the application of Biology learning based on Cibulan tourism local wisdom on the ecosystem course material can be seen in Figure 6 below.

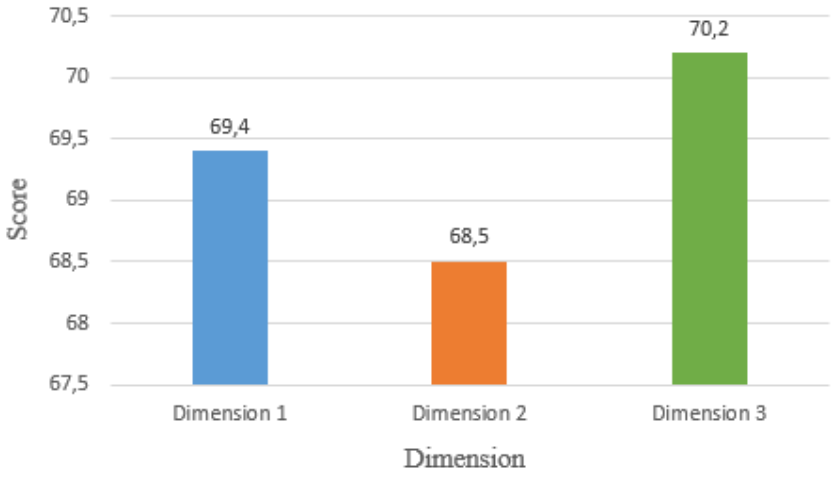

Figure 6. Diagram of perdimensional student response questionnaire to biology learning based on local wisdom Cibulan tourism

Figure 6 appears the rate of understudy reaction surveys to the application of Biology learning based on Cibulan tourism local wisdom on the material of perdimensional ecosystems. Based on the picture, it can be seen that the highest student response is indicated by dimension 3 (student responses to learning outcomes with biology learning based on local wisdom Cibulan tourism on ecosystem teaching materials) of 70.2%, this dimension observes student responses through aspects of student insight and improvement. Students' critical thinking skills. Dimension 2 (student responses to the biology learning process based on local wisdom Cibulan tourism on ecosystem teaching materials) shows the lowest student response at 68.5%. This dimension observes student interest, ability to return material, student activity in learning, and student motivation to study. Dimension 1 (student responses to learning biology based on local wisdom Cibulan Tourism on Ecosystem Teaching materials) shows a response of 69.4. This dimension observes student responses through aspects of learning benefits and curiosity. Based on these data, it can be concluded that students have a solid or high response in each dimension, between one dimension and another, the difference is thin and not much different.

The results of calculating the average percentage of student response questionnaires per dimension are obtained in dimension 3, namely student responses to learning outcomes with local wisdom-based biology learning Cibulan tourism on ecosystem teaching materials in dimension 2, namely student responses to the biology learning process based on local wisdom Cibulan tourism in ecosystem teaching materials, and in dimension 1, namely student responses to biology learning based on local wisdom Cibulan tourism on ecosystem teaching materials the percentage is not greater than dimension three but greater than dimension 2 Student responses based on these three dimensions have a strong category, (Sunaryo, 1989). Local culture integrated learning can improve students' critical thinking skills but is still in the moderate category so that other learning developments are needed (Hunaepi et al., 2020)

Students' good response to learning biology by applying biology learning based on local wisdom Cibulan tourism in ecosystem teaching materials is the innovation they receive in a learning atmosphere at school. Biology learning by applying biology learning based on local wisdom Cibulan tourism can create a new, active and effective learning atmosphere to create a fun, not monotonous learning environment, and students do not feel bored and provide opportunities for students to explore their knowledge in class. Thus students are motivated to

participate in learning and respond well to biology learning by applying Biology Learning Based on Cibulan tourism local wisdom in ecosystem teaching materials (Suharsaputra, 2012).

4. Conclusion

There is an increase in students' critical thinking skills between classes that apply and those who do not apply local wisdom-based learning Cibulan tourism. Classes that applied learning based on local wisdom Cibulan tourism experienced a significant increase compared to classes that did not apply learning based on local wisdom Cibulan tourism. The difference in the improvement of students' critical thinking skills was significant. The average N-Gain value for the experimental class is 0.57, and the average N-Gain value for the control class is 0.15. Students gave an excellent response to learning based on local wisdom Cibulan tourism on ecosystem materials with a percentage reaching 69% and included in the strong category. Local culture-based learning can improve students' critical thinking skills.

References

Anggriani, F., Karyadi, B., & Ruyani, A. (2019). Kemampuan berpikir kritis siswa melalui pembelajaran berbasis lingkungan untuk studi ekosistem sungai. *PENDIPA Journal of Science Education*, *3*(2), 100-105. https://doi.org/10.33369/pendipa.3.2.100-105

Anisa, A. (2017). Meningkatkan keterampilan berpikir kritis peserta didik melalui pembelajaran IPA berbasis potensi lokal Jepara. *Jurnal Inovasi Pendidikan IPA*, *3*(1), 1-11. http://dx.doi.org/10.21831/jipi.v3i1.8607

Arfianawati, S., Sudarmin, S., & Sumarni, W. (2016). Model pembelajaran kimia berbasis etnosains untuk meningkatkan kemampuan berpikir kritis siswa. *Jurnal Pengajaran MIPA*, *21*(1), 46-51. https://doi.org/10.18269/jpmipa.v21i1.36256

Creswell, J. W. (1994). *Research design: Qualitative & quantitative approaches*. Sage Publications, Inc

Eggen, P. (2016). *Strategi dan model pembelajaran: Mengajarkan konten dan ketrampilan berpikir*.

Fisher, A. (2005). *Berpikir kritis sebuah pengantar. (alih bahasa oleh Benyamin Hadinata).* Jakarta: Erlangga.

Fisher, A. (2011). *Critical thinking: An introduction*. Cambridge university press.

Hariri, A. I., Kartimi, & Mulyani, A. (2016). Penerapan pembelajaran berbasis sains budaya lokal ngaseup pada konsep sistem reproduksi manusia untuk meningkatkan keterampilan berfikir kritis siswa kelas XI Maja. *Science Educatia: Jurnal Pendidikan Sains*, 5(1) http://dx.doi.org/10.24235/sc.educatia.v5i1.961

Hidayatulloh, S., Kartimi, K., & Roviati, E. (2014). Penerapan Pembelajaran Berbasis Sains Lokal Melalui Budaya Minum Jamu Untuk Meningkatan Hasil Belajar Siswa Pada Materi Jaringan Tumbuhan Di Kelas XI MA Darul Falah Kabupaten Indramayu. *Scientiae Educatia: Jurnal Pendidikan Sains*, *3*(2), 71-82.

Hunaepi, H., Firdaus, L., Samsuri, T., Susantini, E., & Raharjo, R. (2020). Efektifitas perangat pembelajaran inkuiri terintegrasi kearifan lokal terhadap keterampilan berpikir kritis mahasiswa. *Scholaria: Jurnal Pendidikan dan Kebudayaan*, *10*(3), 269-281. https://doi.org/10.24246/j.js.2020.v10.i3.p269-281

Kurniahtunnisa, K., Dewi, N. K., & Utami, N. R. (2016). Pengaruh model problem based learning terhadap kemampuan berpikir kritis siswa materi sistem ekskresi. *Journal of Biology Education*, *5*(3), 310-318. https://doi.org/10.15294/jbe.v5i3.14865

Kuswana, W. S. (2013). *Taksonomi berpikir [thinking taxonomy].* Remaja Rosdakarya.

Puspasari, A., Susilowati, I., Kurniawati, L., Utami, R. R., Gunawan, I., & Sayekti, I. C. (2019). Implementasi Etnosains dalam Pembelajaran IPA di SD Muhammadiyah Alam Surya

Mentari Surakarta. *SEJ (Science Education Journal)*, *3*(1), 25-31. https://doi.org/10.21070/sej.v3i1.2426

Rai, S. I. A. (2013). Pendidikan sains berlandaskan budaya lokal tri kaya parisudha. In *PROSIDING: Seminar Nasional Fisika dan Pendidikan Fisika*, *4(1)*

Ramawati, I. (2016). Pemanfaatan lingkungan sekitar sebagai sumber pembelajaran untuk meningkatkan kemampuan berpikir kritis. *Jurnal Geografi Gea*, *16*(1), 66-87. https://doi.org/10.17509/gea.v16i1.3469

Riyanto, O. R., & Mariani, S. (2019). Mathematics critical thinking reviewed from self-efficacy and motivation of learning in arias learning. *Journal of Primary Education*, *8*(5), 243-250. Retrieved from https://journal.unnes.ac.id/sju/index.php/jpe/article/view/32690

Ruseffendi, H. E.T. (2010). *Dasar-dasar Penelitian Pendidikan dan Bidang Non-Eksakta Lainnya.* Bandung: Penerbit Tarsito

Sochibin, A., Dwijananti, P., & Marwoto, P. (2009). Penerapan model pembelajaran inkuiri terpimpin untuk peningkatan pemahaman dan keterampilan berpikir kritis siswa SD. *Jurnal Pendidikan Fisika Indonesia*, *5*(2).

Suastra, I. W. (2010). Model pembelajaran sains berbasis budaya lokal untuk mengembangkan potensi dasar sains dan nilai kearifan lokal di SMP. *Jurnal Pendidikan dan Pengajaran*, *43*(1). http://dx.doi.org/10.23887/jppundiksha.v43i1.1697

Suharsaputra, U. (2012). *Metode Penelitian*. PT. Refika Aditama

Sukmara, D. (2007). *Implementasi Life skill dalam KTSP*. Mughni Sejahtera

Sunaryo. (1989). *Strategi Belajar dan Mengajar Ilmu Pengetahuan Sosial*. Jakarta: Dekdikbud Direttoral Jendral Pendidikan Tinggi Objek Pengembangan Lembaga Pendidikan Tenaga Pendidikan.

Susilowati. (2013). Membelajarkan ipa dengan integrative science tinjauan pustaka kemampuan berpikir kritis (Critical Thinking Skills) dalam implementasinya pada kurikulum 2013. *Prosiding Seminar Nasional IPA IV dengan tema Peran Penelitian Bidang IPA dan Pembelajarannya dalam Konteks Kurikulum 2013 Serta Pendidikan Karakter 27 April 2013 di UNNES, 337-382*

Wahyuningsih, V. (2014). Pembelajaran berbasis sains budaya lokal obat tradisional pada konsep plantae untuk meningkatkan keterampilan berpikir kritis siswa kelas X di SMA Negeri 1 Sumber. *skripsi). IAIN Syekh Nurjati Cirebon*. Tidak diterbitkan

Widayanti, E. (2020). Potensi pembelajaran saintifik bernuansa etnosains untuk memberdayakan kemampuan berpikir kritis siswa. *Wahana Didaktika: Jurnal Ilmu Kependidikan*, *18*(1), 82-94. http://dx.doi.org/10.31851/wahanadidaktika.v18i1.4352