

THE EFFECT OF PROBLEM BASED LEARNING AND INQUIRY LEARNING LEARNING MODELS ON ECOSYSTEM CONCEP TO IMPROVE CRITICAL THINKING, AND CREATIVE THINKING, ABILITY OF STUDENTS SMA NEGERI 11 AMBON, SMA NEGERI 13 AMBON AND MADRASAH ALIYAH NEGERI AMBON.

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ABSTRACT

Many abilities that students must have, namely the ability to think critically, think creatively, construct knowledge, solve problems and master learning material well. One of the efforts to improve students' critical thinking and creative thinking skills is to change the old learning model used with the problem-based learning model and inquiry learning model. Students think more critically and think creatively and encourage students to be able to connect between the knowledge they have and its application in their daily lives. This study aims to determine the effect of two learning models, namely problem-based learning and inquiry learning to improve critical thinking skills and creative thinking on ecosystem material in class X SMAN 11, SMAN 13, and Madrasah Aliyah. The type of research is Quasi Experiment using 3 experimental classes using the problem based learning model and 3 experimental classes using the inquiry learning model. The statistical analysis used was multiple linear regression using SPSS 22. The results obtained from multiple linear regression analysis both had significant values <0.05 using both problem based learning and inquiry learning models at SMA N 11, SMA N 13 and Madrasah Aliyah Negeri Ambon. Conclusion. There is an influence of the use of problem-based learning models and inquiry learning models to improve the ability to think in class X SMAN 11, SMAN 13 and Ambon Madrasah Aliyah.

Keywords: *models, inquiry, thinking, creative.*

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INTRODUCTION

Advances in science and technology are now developing very rapidly, improving teaching and learning activities must be maximized so that the quality of education increases, this is done because the advancement of education has broad implications for human thinking in various fields, so that every young generation must learn a lot to become an educated human being in accordance with the demands of the times (Anita E, 1995). There are many abilities that students learning, namely the ability to think critically, think creatively, construct knowledge, solve problems and master learning material well (Syahputra, 2018). The learning process based on the 2013 curriculum is directed at scientific learning which includes asking, observing, gathering information, associating and communicating. Curriculum 2013 emphasizes students to be more active in the learning process, the teacher is only a facilitator so that the learning process can take place in two directions. However, in the process of achieving a good goal, there must be obstacles that hinder the achievement of that goal, as is the case in the field of education, problems that arise in the learning process, for example, the lack of interest and participation of students in participating in learning and the lack of teacher creativity in applying learning models so that student learning outcomes are relatively lower.

Based on the results of the 2018 Program for International Student Assessment (PISA), Indonesia's science ability score was 396 with a rank of 71 out of 79 countries. PISA questions require problem-solving skills and reasoning abilities which consist of 6 levels (the lowest level is 1 and the highest level is 6). Students in Indonesia are only able to answer at level 1 and level 2 (Lestari et al, 2020). The acquisition of these scores indicates that students' ability to answer questions that refer to critical thinking skills is still low. The low quality of education can be seen from the teacher's teaching style. In general, the learning process at the senior high school level still uses conventional learning such as textbooks and is teacher-oriented which results in passive learning and does not cooperate with real life. The result students' critical thinking skills do not develop properly so that they affect learning outcomes. The low ability of critical thinking can be observed from a study conducted by Muhlisin (2012) which revealed that 80.9% of the critical thinking ability of biology students is included in the low category. Fuad et al. (2017) showed that the average critical thinking ability of biology students only reached 21.89 and was categorized as low. One effort to improve students' critical thinking and creative thinking skills is to change the old learning model used, with the Problem based learning model and the Inquiry learning model. So that students think more critically and think creatively and encourage students to be able to connect between the knowledge they have and its application in their daily lives.

The learning model, other factors that need to be considered in the process of achieving better learning outcomes are students' critical thinking skills. Critical thinking according to Mustaji (2012) means everything that has reasons related to conveying a focus on making decisions about what to believe or not. The ability to think creatively is a very important ability and is classified as a high-level ability because it applies aspects of cognitive, effective, and metacognitive skills. In other words, students' creative thinking is able to produce a unique concept of discovery, a new art. As for the characteristics of the ability of creative thinking, according to Susanto Ahmad (2013) the characteristics of creative children can be viewed from two aspects, namely cognitive and effective aspects.

METHOD

This study used a quasi-experimental method with a factorial design. It consists of 3 experimental classes using the problem-based learning model and 3 experimental classes using the inquiry learning model which aims to see the effect of the two learning models to improve critical thinking skills and creative thinking. Each class is given a pretest and posttest using the same test items related to students' critical thinking skills and creative thinking in biology subjects on ecosystem material. The sampling technique used purposive sampling technique. The data collection instrument was in the form of test questions. Essay test questions related to indicators of the ability to think critically and think creatively. The data were analyzed descriptively based on the average score, then an inferential statistical test was performed using multiple linear regression analysis.

DISCUSSION RESULT

The results describe the value of students' critical thinking skills before being treated using the problem based learning learning model and inquiry learning learning model on Ecosystem material for Class X SMAN 11, SMAN13 and Madrasah Aliyah in the table below.

Table 1. Results of experimental class

	Mean	Std. Deviation	N
Model Pbl SMA11			
Post-test critical thinking	83.1	1.048	30
Post-test creative thinking	85.96	10.562	30
Model Inquiry SMA 11			
Post-test critical thinking	82.13	8.029	30
Post-test creative thinking	80.4	6.933	30
Model Pbl SMA 13			
Post-test critical thinking	82.13	8.029	30
Post-test creative thinking	80.4	6.933	30
Model Inquiry SMA 13			
Post-test critical thinking	80.96	9.228	30
Post-test creative thinking	83.5	7.64	30
Model Pbl MAN Ambon			
Post-test critical thinking	84.26	10.464	30
Post-test creative thinking	81.43	5.632	30
Model Inquiry MAN Ambon			
Post-test critical thinking	82.73	8.905	30

The results of the study show that the problem-based learning model gives students the freedom to think about solving problems, while inquiry learning emphasizes the learning process, meaning that students play an active role in finding information about this according to the understanding of the two learning models, this is reinforced by Arends' statement in Trianto (2007) Problem-based teaching is a learning model in which students work on authentic problems with the intention of compiling their own knowledge, developing inquiry and high-level skills, developing independence and self-confidence. Meanwhile, the inquiry learning model according to Hamruni (2012) can be defined as a series of learning activities that emphasize critical and analytical thinking processes to seek and find answers to a problem in question.

Statistical analysis of students' critical thinking skills in the experimental class using the Problem based learning model and the experimental class using the Inquiry learning model with hypothesis testing using the t-test each of which has a value that meets significance. Class X Madrasah Aliah 1 and Madrasah Aliah 2 have significance values for critical and creative thinking skills of 0.001, 0.004 and 0.002, 0.000 respectively, for classes X-1 and X-2 each have a significance value of 0.002, 0.004 and 0.013, 0.007. Whereas for class X-IPA1 and X-IPA2 0.004, 0.001 and 0.002, 0.000 <probability 0.05. This shows that each school that uses the Problem based learning model and Inquiry learning model has a partial effect on improving critical thinking skills and creative thinking. The coefficient value shows that the t-count value for critical thinking and creative thinking using the PBL model has a t-count value of 2.301, 2.134 > t-table 2.052, the t-count value for critical thinking and creative thinking using the inquiry model t-count 2.134, 2.053 > t table 2.052.

CONCLUSION

1. There is a significant effect of using the problem based learning model on ecosystem concept to improve critical and creative thinking skills.
2. There is a significant effect of using the inquiry learning model on ecosystem concept to improve critical and creative thinking skills.

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REFERENCES

- Abidin, Y. 2018. Learning System Design in the Context of the 2013 Curriculum. Bandung: PT Refika Aditama.
- Arnyana, I. B. P. 2006. The effect of applying innovative learning strategies in biology lessons on high school students' creative thinking abilities. *Journal of Education and Teaching IKIP Negeri Singaraja*, 3(6).
- Hamruni. 2012. Learning Strategies. Yogyakarta. Madani people.
- Khoiron, A.M., Sutadji, E. 2016. Contribution of the Implementation of Character Education and the School Environment on Creative Thinking and Its Impact on Vocational Competence. *Journal of Education and Learning* .22 (2): 103-116.
- Fakhrizal, T., & Hasanah. U. 2020. Efforts to improve students' critical thinking skills in biology subjects through the application of project based learning learning models in class X SMA Negeri 1 Kluet Jawa Tengah. *Journal of Biotics*. 8 (2): 200-2017.
- Fatmawati, B. 2013. Assessing students' science process skills through direct observation learning methods. *Proceedings of the Biology Education Conference*. 10 (1). Biology Study Program-STKIP Hamzanwari. Selong.
- Hamidah, I., & Citra, Y. S. 2021. The effectiveness of the project based learning (pjb) learning model on student interests and learning outcomes. *Journal of Biology and Science Education*. 4 (2): 20-27.
- Jagatara, W.M.I., Adnyana, B.P., Widiyanti, M.P.L.N. 2014. Influence project-based learning model (project based learning) on biology learning outcomes in terms of learning styles of high school students. *Science Study Program*. 4 (2): 3540.
- Murni, E. 2016. Application of the project based learning method in learning. *Indonesian Christian University*.
- Norhasanah. 2018. Critical thinking ability of high school students in learning biology. *Journal of Biology Learning*. 5 (1): 23-29.
- Palennari, M. 2016. The influence of problem based learning and cooperative jigsaw integration learning on critical thinking skills. *Journal of Educational Sciences (JIP) State University of Malang*. 22 (1): 32-29.

- Prasetyo, E., Widyawati, S., Masyikur, R., Putra, G. F. 2018. The effect of picture and picture learning (pap) on mathematics learning outcomes in terms of spatial intelligence. *Beta Journal of Tadris Mathematics*.11 (1): 50-61.
- Riyadi, S. A. 2019. Implementation of the project based learning model in biology learning on communicative, collaborative, critical thinking, and creative skills of high school students. *Science Education Study Program*. Indonesia.
- Rosyida, F., Zubaidah, S., Mahanal, S. 2016. Empowering critical thinking skills with the remap tmps (reading concept map timed pair share) learning model. *Proceedings of Biology Education Conference*. 13 (1): 209-214. XIII National Seminar on Biology Education FKIP State University of Malang.
- Sainab. 2022. The effect of picture and picture learning models on learning motivation and biology retention of Students Class X at SMA Negeri 2 Majene. *Oryza Journal of Biology Education*. 11 (1):12-19.
- Santiawati, S. 2021. Integration of jigsaw type inquiry and cooperative learning models for increasing student understanding and participation. *Pedagogia Scientific Journal of Education*. 13 (1): 23-28.
- Sukmawijaya, Y., Suhendar., Juhanda, A. 2019. The effect of the steam-pjbl learning model on students' creative thinking ability in environmental pollution material. *Journal of BioEdUIN*. 9 (2):12-19.
- Susantini E. 2021. Biology learning ideas that can train higher order thinking skills (HOTS). *Proceedings (National Seminar on Biology and Science Education)*. Department of Biology. Surabaya