



Effectiveness of Student's Critical Thinking Skill with Problem-Based Learning (PBL), Osborn Model and Integration of PBL-Osborn.

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Abstract

This research aims to analyze the effectiveness of the application of the Problem Based Learning (PBL), Osborn and PBL-Osborn Integration on students' critical thinking skill. This research used posttest only comparison group design with a total sampling technique of 3 classes. Class VIII A using the PBL, class VIII B using the Osborn model and class VIII C using integration of PBL-Osborn models. The data analysis technique used the One Way Analysis of Variance (ANOVA) test to determine differences between the experimental classes. The results of the ANOVA test showed significant differences among the three learning models towards students' critical thinking skill in the human digestive system. To find out the class pairs that are significantly different using the Least Significant Difference (LSD) test. The LSD Test results show that class VIII B-VIII C pairs have a significant difference. The class VIII A-VIII B pairs and VIII A-VIII C pairs have no significant differences. Based on the results of the LSD analysis, the conclusion of this research is the integration of PBL-Osborn learning model is more effective than the osborn model

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INTRODUCTION

The development of science and technology in the 21st century requires students to compete globally. Therefore we need a learning method that can prepare students to reach their potential optimally. Students must think critically and communicate effectively (Alismail & McGuire, 2015; Kahlke & White, 2013; Weissblueth et al., 2014). The skills of the science education process must help students achieve their goals of developing creative and critical thinking skills (Asrul et al., 2018; Tasiwan, 2014). 21st Century Learning and skills that must be taken by students are (a) creativity and innovation, (b) critical thinking and problem solving, (c) communication skills and (d) cooperation skills (Piiro, 2011).

In Indonesia, high level thinking skills in science lessons is still low. This can be seen from the results of the study of the Trends in Mathematics and Science Study (TIMSS) and the Program for International Student Assessment (PISA) at the junior high school level. The results of the 2011 TIMSS study which was piloted in grade VIII students of junior high school level showed that the dimensions of knowing, applying, and reasoning in science learning ranked 40th out of 42 countries (Martin et al., 2012). In 2015 TIMSS, Indonesia was ranked 43rd out of 47 countries with 397 points. The results of the 2012 PISA study in the science ranked 64th out of 65 countries and 2015 ranked 69th out of 72 countries (OECD, 2014).

Based on the results of science teacher interviews and science learning observations on MTs. Tahfidz Yanbu'ul Qur'an shows that students' critical thinking skills are still low. This can be seen from the students' still have difficulties to solve cognitive questions C3, C4, and C5. One of the reason is unavailability of assessment models and instruments that accommodate critical thinking. The low level of critical thinking skills of students occurs because due to lack of mastery of concepts and the level of complexity of learning material (Sundari et al., 2018). Learning media used are

still in the form of textbooks and power points, which causes students not to have many opportunities to construct knowledge and solve contextual problems. Scientific literacy can be developed through well-structure learning activity (Afifah et al., 2016). This is a concern because science learning is not only focused on concepts and procedures, but also studies contextual material in daily life (Muhfaroyin, 2009). Students make connections between their knowledge and their application in their daily lives (Barros et al., 2013; Varma, 2014). Based on the observation and interview studies, learning models are needed that are effective in accommodating contextual material and improving students' critical thinking skills.

Problem Based Learning Model is one of the learning oriented to the development of critical thinking skills. This learning model aims to stimulate students to learn through various real problems in daily life associated with knowledge that has been or will be learned (Armitage et al., 2015). Problem-based learning can make student initiative in work, internal motivation to learn and oriented towards achieving high-level thinking skills (Ngalimun, 2016). Learning using problems is very good used in learning activities, because students get experience how to solve problems that arise later in the real world.

The development of critical thinking skills is not only implemented with problem-based learning. One alternative that can be applied is the Osborn learning model. The osborn model gives students the opportunity to build their knowledge through ideas given during discussions in class with critical and creative attitudes (Dugosh & Paulus, 2005). Participate students in discussion activities that can express their ideas critically and creatively (Zhao & Hou, 2010; Ariana & Mirabela, 2013). These research show the application of the Osborn Model is able to improve students' critical thinking skills.

The application of the learning model is have the lack of each model. The existence of a blend of models is expected to cover the lack and complete one model to another. This

research is comparative study of the application of problem-based learning models, osborn and integration of PBL-osborn models. This comparison is expected to give information on the best results from the three learning models that more effective in improving students' critical thinking skills

METHODS

The type of research used is comparative research that uses the experimental method. The study design used posttest comparison group design. The population of this study was the eighth grade students of MTs. Tahfidz Yanbu'ul Qur'an as many as three classes consisting of 118 students. The independent variables in this study are problem-based learning model, osborn model and osborn problem-based learning model. The dependent variable is students' critical thinking skills in human digestive material.

The preliminary written data analysis technique of critical thinking skills was tested using the validity, reliability, difficulty level and question differentiation test. Then the final data analysis technique with learning outcomes completeness test, N-gain test, ANOVA test and LSD Advanced test. Comparative analysis of critical thinking skills with PBL, Osborn and integration PBL-Osborn used the One Way Analysis of Variance (ANOVA) test with IBM Statistics SPSS 25 program. One Way Test of Variance (ANOVA) was conducted to compare more than two independent variables on one dependent variable. For a more in-depth test a further test (Post hoc test) is conducted. In this research, the further test used was the Least Significant Difference (LSD) test.

RESULTS AND DISCUSSION

Comparative Test of Learning Models on Critical Thinking Skill

After completing the learning test and improving critical thinking skills, the next analysis of variance was conducted to determine differences in the average test scores

of students' conceptual comprehension. Based on the research results completeness criteria where $t_{count} = 4.82, > t_{table} = 1.689$, then all experimental classes in general have achieved the completeness of learning outcomes. KKM in class VIII at MTs Tahfidz Yanbu'ul Qur'an is 70. Based on the results of N-gain improvement in critical thinking skills, it can be concluded that the class that gets the highest N-gain value is class VIII-C that using the learning model PBL-Osborn with an N-gain value of 0.60. The PBL-Osborn model puts forward collaboration from two characteristics of the learning model to solve problems. Through this problem solving students are able to develop critical thinking skills. This is in accordance with Sumarni (2015), that critical thinking is a mental process for analyzing or evaluating information obtained from observations, common sense experiences or communication.

Test the comparison of learning models among the 3 classes using one-way ANOVA, because it examines more than two independent variables with one dependent variable. The results of the ANOVA test showed Fcount test of 4.230 and the Ftable value of 3.08, with a significance value of 0.017. Because $F_{count} > F_{table}$ and value of 0.017 are smaller than alpha 0.05 in the SPSS program, if the hypothesis is rejected. This means that there are significant differences between the experimental classes. The ANOVA test results showed that of the 3 classes, at least one of the class pairs was significantly different, so to find out the different experimental class pairs needed further testing Advanced Test Least Significant Difference (LSD).

The ANOVA test only showed that there were significant differences between the experimental classes. If the hypothesis test shows a difference, then post hoc tests should be continued as a follow-up test of ANOVA. Further testing uses the Least Significant Difference (LSD) Test. The LSD Test results are presented in Table 1.

Tabel 1. Result of LSD test.

Pairs	Sig.	Criteria	Conclusion
VIIIA-VIIIB	0,067	Ho accepted	No significantly different
VIIIB-VIIIC	0,05	Ho rejected	Significantly different
VIIIC-VIIIA	0,294	Ho accepted	No significantly different

The LSD test results showed that there was a significant difference between class VIII-B using the Osborn and class VIII-C using the PBL-Osborn learning model. This is shown in the sig value. <0.05 in the IBM SPSS Statistics 25 program. However, there was no significant difference in the critical thinking skills of class VIII-A with PBL models and class VIII-C with PBL-Osborn models. Likewise class VIII-A with PBL models and class VIII B with osborn models there was no significant difference in the critical thinking skills.

From the research that has been done it is proven that learning uses PBL, Osborn and integration PBL-Osborn models can improve students' critical thinking skills. This is because the characteristics of the learning model are almost the same, the discussion process that makes students active in solving problems. Students who learn to solve a problem will then apply their knowledge (Sulistiyoningsih et al., 2015). Learning that involves students actively contributes greatly to the success of learning activities (Wasiso & Hartono, 2013). It is hoped that through the PBL, Osborn and PBL-Osborn learning models students will have the provision to solve problems, not only in classroom learning, but also in the future in the work and social world. Critical thinking skills not only play a role in student success during education, but also when occupying the world of work and social context (Birjani & Bagherkazemi, 2010; Sola et al., 2017).

The application integration of PBL-Osborn is able to help students build their knowledge. Through a series of questions, the teacher helps students build their knowledge. Constructivism learning provides a great opportunity to form student knowledge

independently and make learning meaningful (Karsidi et al., 2013). So that from these questions students are expected to be able to find conclusions from the problems being studied. Constructivist learning has a positive effect because it is able to express many ideas original as own thoughts, able to solve and reformulate the material that has been learned (Fadholi et al., 2015).

Regarding the existence of a significant difference between the Osborn class and PBL-Osborn because basically the application of the Osborn model has the characteristics of providing free opportunities for students to argue their ideas, so that sometimes the results of the discussion are not appropriate in finding solutions to problems. This shows the role of the teacher remains important as a facilitator and evaluator in the learning process. The attitude of teachers in the classroom is very important in improving student learning outcomes (Fitriani, 2017; Steins & Behravan, 2017).

During the research conducted, researchers still faced several obstacles. In terms of preparation, because PBL, Osborn and integration of PBL-osborn learning models have never been done, researchers spend a lot of time being used for preparation. Each experimental class has a different learning model so that it has different learning steps. In terms of students, because students are familiar with the lecture model, there are some students who are still passive when learning. This is not in accordance with the learning expected by the researcher. The researcher suggests that an effective learning, the teacher needs to do some careful preparation in learning. In addition, teachers need to train themselves to apply the desired learning model.

CONCLUSION

Based on the research that has been done, it can be concluded that (1) The application of the problem-based learning model, osborn and integration PBL-Osborn model are effective on students' critical thinking

skills in the digestive system material, (2) Critical thinking skill of integration model of PBL-Osborn is better than the osborn model.

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