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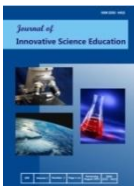

Improving Conceptual Understanding of Eleventh Grade Students on Colloid Topic Using Multimedia - Assisted Probing - Prompting

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Abstract

This study aims to determine the effect of interactive multimedia-assisted probing - prompting learning model on conceptual understanding of students. Population in this study was the students of class XI of State SHS 11 Semarang academic year 2017/2018. Sampling was done by purposive sampling technique and obtained three classes as the samples namely class XI-Science 1 and class XI-Science 4 as the experiment classes, and class XI-Science 3 as the control class. The study method used was mix methods with Sequential Transformative Strategy model. The study data were obtained by test and observation methods. The results showed that Interactive multimedia-assisted probing-prompting learning model had an effect on students' conceptual understanding with percentage improvement in two experimental classes of 24.15% and 15.12%, respectivelly.

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INTRODUCTION

Education is an effort to grow the potential of human resources through learning activities. Education is not a static activity but a dynamic activity so it can change over time. The current learning trends in Indonesia have shifted from teacher centered learning to student centered learning, where learners of both groups and individuals may actively discover, explore, find concepts and principles holistically and authentically in accordance with the nature of science learning. This learning change encourages the learners have ability to solve problema, have critical thinking, being able to communicate orally and in writing and have expertise in the field of technology (Lutfianasari et al., 2018). But in reality, there were still many educators who apply Teacher Centered Learning (TCL) learning where many teachers dominated the learning process in the classroom. As a result students became less creative in solving problems, showed low participation, inoptimal teamwork, teaching and learning activities became inefficient and ultimately the learning outcomes also became low (Fajri et al., 2012).

The learning process in 2013 Curriculum for high school is implemented using a scientific approach that which is in the learning approach encourages learners to think better in doing observation, inquiring, reasoning, and accommodating with the learning directly objects such as natural, social, art, and culture phenomenon. The 2013 Curriculum Implementation expects student centered learning where the desired learning process is learning that emphasizes personal experience through observation, association, inquiring, concluding, and communicating (Fatmawati & Rewetty, 2015; Wiyanto et al., 2017).

Colloid learning material in chemistry tends not to involve mathematical calculations like other material in chemistry (Gazali, 2015). Colloid system learning material is an important material because the subject is very close to everyday life (Damanik & Yanny, 2016).). In colloid system learning material, the students are usually required to memorize only (Rohma et al., 2013). For this kind of subject matter the students need a learning model that can maitain their concentration. The probing-prompting learning model is one of many cooperative learning models that are considered capable of improving students' conceptual understanding skills (Ulya, 2012). Probing-prompting learning model implements learning where the teacher presents a series of guiding questions and explore the student's way of thinking to create student's thinking process to the new knowledge being studied (Diasputri et al., 2012).

In addition, the use of less-varied learning media, low student learning spirit and less active students in learning might caused the students to not interested in chemistry lessons (Wibisono & Yulianto, 2010). The use of multimedia in learning could improve learning outcomes of 56%, better consistency in learning of 50-60% and stronger memory of 25-50% (Sidhu et al., 2010). In line with it (Aji, 2011) menyatakan dengan penerapan media pembelajaran menggunakan Macromedia stated that the application of learning media using Macromedia Flash affected the motivation and interest of students and improved students achievement. The use of interactive learning media is expected to increase students' chemistry conceptual understanding on colloid material. According to a study concudcted by (Isna et al., 2014) the use of power point-assisted probing-prompting learning model could assist the students in understanding and mastering learning materials more effectively. (Darmawan et al., 2013) also stated that think pair share learning model with learning CDs assisted probing-prompting learning could facilitate the students in answering any questions asked by the teacher because the students did not only imagine colloid particles but they could see it through interactive images displayed.

This study aims determine the effect of interactive multimedia-assisted probing-prompting learning model about colloid material on sudents' conceptual understanding.

METHODS

The study was designed by using a study design that combined two forms of qualitative and quantitative approach namely Mix Methods with Sequential Transformative Strategy model. Population Population in this study was the students of class XI of State SHS 11 Semarang academic year 2017/2018. The students consisted of 3 classes with a total of 108 students with an average of 36 students in each class. The samples in this study were collected by purposive sampling, with class XI-Science 1 and class XI-Science 4 as the experiment classes that received treatment of interactive multimedia assisted probing-prompting learning model, and class XI-Science 3 as the control class that received conventional learning model assisted by student worksheet.

Variables in this study were independent variable of interactive multimedia-assisted probing-prompting learning model and dependent variable included students' conceptual understanding. Data collection methods used in the study were test and observation methods. Design study used here was Pretest-Posttest Control Group Design.

Analysis of data used here was divided into two stages, namely the initial stage and the final stage. The first stage of analysis was the tests on question items included validity, level of difficulty, discrimination power, and reliability, reliability test was performed to determine the feasibility of the questions used in pretest and posttest. The final stage of analysis in this study was hypothesis test which includef the tests of normality, the mean difference of two paired samples, homogeneity test, difference of two means, and correlation test.

RESULTS AND DISCUSSION

Test of the Effect of Interactive Multimedia-Assisted Probing-Prompting Learning Model on Students' Conceptual Understanding

The result on the mean difference analysis of conceptual understanding between the experiment class and the control class can be seen in Figure 1.

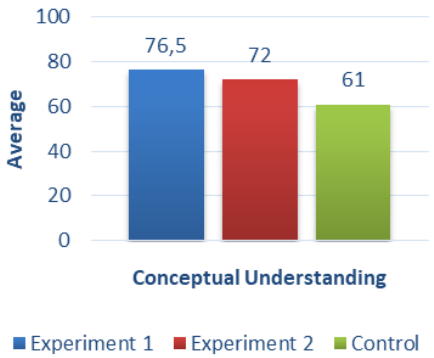

Figure 1. Result on students' conceptual understanding analysis

Analysis of final data test was performed to determine whether there was an effect of interactive multimedia-assisted probing-prompting learning model on students' conceptual understanding. The normality test on the data of experimental and control classes obtained that both data were normally distributed. Homogeneity test results in both data showed that the variance of both groups was homogeneous. The hypothesis test showed Sig (2-tailed) value 0.000 < 0,05, so H1 hypothesis was accepted and H0 was rejected. This meant that there was an effect of interactive multimedia-assisted probing-prompting learning model on students' conceptual understanding. The effect size of interactive multimedia-assisted probing prompting learning model on students' understanding in the experiment class 1 to the control class was 24,15%, while in experiment class 2 to control class was 15,12%. Thus, based on the results of data analysis it can be concluded that the application of interactive multimedia-assisted probing prompting learning model could improve the students' conceptual understanding on colloid material in chemistry subject.

Hakim & Kadarohman (2012) divides conceptual understanding into 3 namely: understand the concept, misconception, do not understand the concept. The results of the students' conceptual understanding test in the

experimental class and control class in the form two-tier multiple choice question type can be seen in Figure 2.

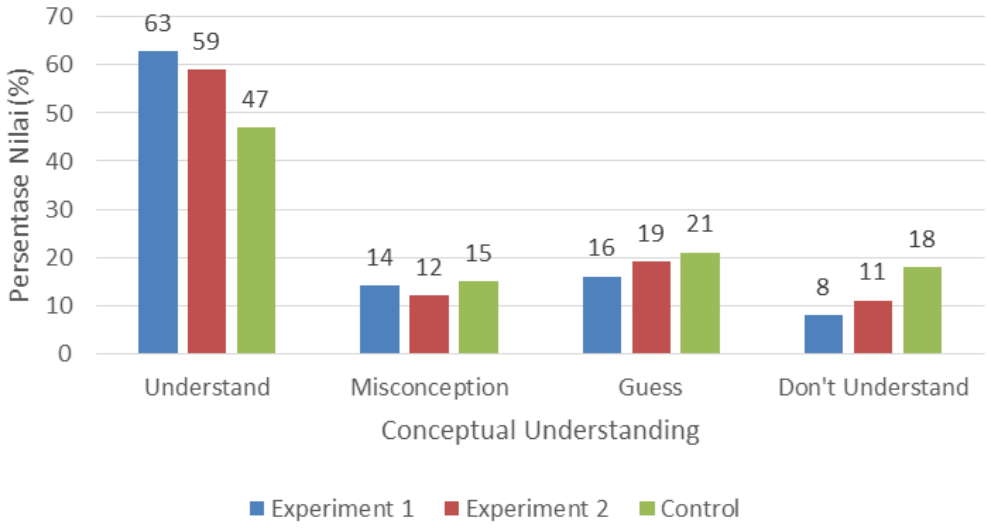

Figure 2. Precentage of the result on students' conceptual understanding analysis

In Figure 2 it can be seen that there was a difference in the level of students' conceptual understanding in the experimental class and control class. Students can be stated as understand the concept when they are able to understand what they were learning and reiterate in their own language (Hermawanto et al., 2013). One of the factors that influence the improvement of students' conceptual understanding is because the implementation of probing-prompting learning model in accordance with its stages. To help students understand about colloid definition using probing-prompting technique, the teacher designated a number questions to the students.

During the learning process with the probing-prompting model the number of learners involved in the lesson increased as the teacher distributed questions equally for all learners. The attention of learners to the lessons being learned tended to be more encouraged because the learners always prepared answers since they must be ready if suddenly appointed by the teacher (Ulya, 2012). Students are accustomed to be active in answering questions given by the teacher. The questions given by the teacher were different from the questions given to classes with conventional learning. In the classroom with conventional learning the students were only given regular questions that were not related to questions that explored students' knowledge and guided students' answers towards a more appropriate answer (Mayasari et al., 2014).

CONCLUSION

Interactive multimedia-assisted probing-prompting learning model had an effect on students' conceptual understanding with percentage improvement in experimental class 1 of 24.15% and experimental class 2 of 15.12%, respectivelly.

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