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THE EFFECTIVENESS OF CTL MODEL GUIDED INQUIRI-BASED IN THE TOPIC OF CHEMICALS IN DAILY LIFE TO IMPROVE STUDENTS' LEARNING OUTCOMES AND ACTIVENESS

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ABSTRACT

Science learning in school can be applied by connecting the material in the learning with real life. However in fact science learning process in SMP Negeri 10 Magelang has not emphasized students' activity to relate science to real life. Learning science using CTL guided inquiry-based model implement the learning in where teacher provides initial questions related issues or events in everyday life, then students do experiments to prove concepts of science guided by teacher.The purpose of this research is to determine the effectiveness the model in topic of learning of chemicals in life to improve students' learning outcomes and activity. This research was a quasi-experimental research. The research was conducted in SMP Negeri 10 Magelang with 8th grade students as research subjects. The sample in this study was taken using purposive sampling technique then resulting VIIIA as experiment group and VIIIC as control group. The result shows that experiment group's learning outcomes increased with N-gain value of 0.62 in the medium criteria. Experiment group's average of learning outcomes is higher than control group based on the calculation t test with tcount ≥ ttable (5.42 ≥ 1.67). Experiment group's activity also increased every meeting, first meeting was 36.9% in less active criteria, the second meeting increased to be quite active of 60.5%, the third meeting was in the active criteria of 78.2%, and the fourth meeting was 81.4% in very active criteria. It can be concluded that the CTL guided inquiry-based model is effective to improve students' learning outcomes and activity.

Keywords: Make a match, guided inquiry

INTRODUCTION

Well ordered education system can create intelligent, adaptive, and civilized generation. To achieve those objectives, the government implements education unit level curriculum (SBC). This curriculum refers to a student-centered learning where students do not only treat as objects but they tend to play an active role in learning process. They play some active roles in constructing knowledge instead of only memorizing the knowledge. To optimize the role of students, it was develoed developed the instructional strategies, methods, and media related to student centered learning system (Rahardiana et al, 2015).

Science learning process in SMP Negeri 10 Magelang has not applied student centered learning meaning that students has not been trained to actively seek out their own knowledge of science closely related to daily life and but rather to get their acquisition of knowledge from science textbooks. The process of learning strategy is still dominated by memorizing the course material with the direct instruction, question-answer and discussion.

Science learning at school is also not pre-

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sented integratedly but separatedly for example physics and biology. Based on the principle elaboration of curriculum development in SBC, science learning process in junior high school has been suggested to be presented integratedly. Presenting science content integratedly is interpreted as an effort to integrate the various studies that can create integrated learning (Parmin & Sudarmin, 2013).

In Indonesia, the science content taught integratedly is physics, biology, chemistry and astronomy. Science education students are expected to teach integratedly science in junior high school level. Students should be able to combine these integrated sciences into a single topic or theme (Widiyatmoko & Nurmasitah, 2014).

Students feel difficult to understand the material because they do not experience for themselves what is learned, so the learning outcomes and students' activity is in the unpotimized level. This is proven by the final test score in odd semester that shows around 85% of eighth graders score is still below the minimum completeness criteria of 75 and the average is about 63. The material delivery should use the fun method to help students to comprehend the material, one of them is using contextual learning model.

Khusniati (2012) states that the example of using a contextual approach in science learning is by doing experiment frequently used and performed in daily life. Selection of topics is closely related to student life, it will make students enthusiastic to the learning process.

Learning in school should emphasize to involve the learning experience related to the actual problems that occur in the environment rather than only focusing on theoretical knowledge, so that the contextual learning model is needed. Contextual teaching learning (CTL) is a strategy to connect material or topic of learning with real life. Thus, the learning process will be more interesting and is needed by students because they directly perceived benefits of what they have learned (Rusman, 2012).

Contextual learning has seven principles to be developed by teachers, they are: (1) constructivism, it is a knowledge built by a person step by step and the result is shared through a limited context. Knowledge is not a set of facts, concepts or rules that are ready to take and remember, (2) discovering, it is an activity that will provide confirmation that the knowledge and skills and other abilities needed is not the result of a given set of facts, but is the result of discovering independently, (3) questioning is a main key strategy in the CTL. Its implementation in the CTL should be facilitated by teacher, the students' habit to ask or teachers' ability to use good questions will lead the increasing of quality and productivity of learning, (4) learning community will familiarize students to cooperate and use learning resources from their partner, (5) modeling is to develop the learning process in order to meet whole expectations of students and help to overcome the limitations of teachers, (6) reflection is a way of thinking about what has happened or have just learned, and (7) assesment is actually the process of collecting a variety of data and information that could provide clues to the student learning experience.

Science learning process in SMP Negeri 10 Magelang does not actively emphasize material and real life. Teachers always encourage students to gather and provide information by applying the direct or explanation method. The process of learning science was limited to delivery of material contained in the book so students simply memorize material. Thus, the CTL model is expected to make students being able to understand the meaning of the material taught by the teacher, so that students have the knowledge that can be applied in real life. They do experiments to prove abstract concept and material that is difficult to be theoretically taught by the teacher, so that learning science should use guided inquiry approach.

Guided inquiry learning requires teachers to design learning process that involves students actively. At the beginning of teachers give a lot of guidance then regularly reduce its frequency in order to result a good investigator and their scientific knowledge can be improved. The advantages of guided inquiry-based learning for students emphasize in presenting their experiment results. Students will be actively involved in discussions based on their learning style (Jonah et al, 2013).

Brunner quoted by Setiani and Priansa (2015) states that the stages in the implementation of learning guided inquiry are: (1) the stimulus is asking questions or encouraging students to observe the pictures and read books about the material, (2) the problem statement is associated with providing opportunities for students to identify as many issues that are relevant to learning materials, then select and formulate a hypothesis, (3) data collection is related to the giving opportunities for students to gather information, (4) processing of data is related to data processing which has been obtained by the students, (4) verification is a careful examination to prove the truth of the hypothesis, and (5) generalization is drawing conclusions from the learning process that has been done.

Dewi et al (2013) shows that results for students' learning outcomes who learn with guided inquiry model is better than students learning with conventional learning models. This is because the guided inquiry learning model can provide opportunities for students to participate actively in the learning process. Students and find concepts that are studied independently based on the problems that exist in the environment. Students will gain more meaningful experience and keep it in their minds then it will certainly have an impact on the acquisition of students' learning outcomes. It is also in line with research from Pamelasari & Khusniati (2014), which states that Schoolyard inquiry is proven as effective method to improve the understanding of science vocabulary. Giving variations on learning activities can enhance learning motivation, achievement in understanding the material and the motivation.

Learning science through CTL model guided inquiry-based in this study used the topic of learning of chemicals in life. It consists of materials frequently encountered and its effect occurs in everyday life. The topic is appropriate to combine with CTL model by doing experiment based on guided inquiry. CTL model guided inquiry-based aims to make students to be more active in the classroom and is expected to improve students' learning outcomes.

The purposes of this research are to determine the effectiveness of CTL model guided inquiry -based with the topic of chemicals in life to improve students' learning outcomes and activeness.

METHOD

The research is an experimental research conducted at SMP Negeri 10 Magelang in second semester of the academic year 2015/2016. The sampling technique used in this study is purposive sampling, it was obtained class VIII A and VIII C as samples. The methods used in this study are (1) the test is used to get the data of students' learning outcomes consisting of pretest and posttest, (2) the observation isused to obtain data on students' activity, and (3) the questionnaire is used to determine the students' response to the effectiveness of CTL model guided inquiry -based

RESULT AND DISCUSSION

This study aims to determine the effectiveness of CTL model guided inquiry -based with the topic of chemicals in life to improve students' learning outcomes and activeness. Both of experiment and control groups were given the same material in 7 hours of lessons. However, models and teaching materials are used differently, experiment group used CTL model guided inquiry-based with students' worksheet (LKS) CTL model guided inquiry-based which was validated by expert and judged to be feasible to be used, while the control group used direct instruction and with LKS verification.

The data in the research consist of the pretest and posttest scores and the observation of students' in both groups. The analysis was performed by t test to find out the differences of their averages, mastery test, and students' activity that is descriptively analyzed in every meeting.

Learning outcomes data were obtained from posttest score then analyzed by using two average difference, of one sided t test. It was used to determine differences in learning outcomes of both groups. The data can be seen in Table 1.

Table 1. Posttest Score

	Experiment Group	Control Group
Number of students	31	32
Highest score	95	90
Lowest score	55	40
Average	77,7	65,3

Table 1 shows that the average score of posttest in experiment group is higher than the control group. Posttest data were analyzed using the 5% significance level and cl = 31 + 32-2 = 61. Based on the analysis of the t test, it was obtained tcount = 5.42 and ttable = 1.67, because tcount ≥ ttable, then it can be said that there is a significant difference between the posttest of both groups. Thus, the hypothesis is proven that the application of the model-based guided inquiry CTL can improve students' learning outcomes significantly. Improvement of students' learning outcomes was analyzed using N-gain, which is used to determine the improvement of their achievement by comparing pretest and posttest between both groups. The improvement of learning outcomes is presented in Table 2.

Table 2 shows that the experiment group gains higher scores than the control group, with the moderate category. Thus, the hypothesis is proven that the application of the model can improve students' learning outcomes.

Based on the N-gain test, the gain score of experiment group is 0.62 higher than the control group of 0.42 in the criteria of moderate. This is in line with Ciptasari, et al (2015) research that

states science learning using CTL model fulfills successful indicator with gain score of more than 0.3 and said to be effective in terms of cognitive learning outcomes of students.

Table 2. The Improvement of the Learning Outcomes

Score	Average		Gain Score	Category
	Pretest	Posttest		
Experiment group	41,3	77,7	0,62	moderate
Control group	37	65,3	0,42	moderate

CTL guided inquiry-based learning with the experiment will encourage students to build knowledge through discovering facts independently instead of memorizing. This is in line with the CTL component of constructivism. The discovery is done through experiment activities undertaken by group discussion. Learning community in the classroom encourages students in a group that have a higher ability to teach other members who do not comprehend the material. After doing the experiment, every student is preparing to present answers from LKS and presenting it in front of the class. They must have a responsibility to themselves and to the group. The other groups paid attention to and required then ask what is not clear and students can learn and understand the material in the group.

Suryawati et al (2010) states that solving problems in the experiment activities done in groups on contextual strategy will encourage students to learn from the environment, work in groups, cooperate with friends, and apply learning material through real experience. Contextual learning is succesful to improve students' skills in problem solving because students do not memorize their lessons but find their own knowledge in the material.

Science learning by involving students to discover themselves and connect with real-life material results learning experience to be more meaningful and powerfully kept in the minds of students. It is affected on improving students' learning outcomes. This is consistent with Rahayu & Herman (2015) research that states the experiment activity can encourage students to find their own information on the material taught in guided inquiry guided by the teacher, then the students can relate the information obtained with life. The experiment is designed to be concrete and easily found in everyday life so that students understand the material and easily involved in learning process

The improvement of students' activeness obtained from description of every meeting is presented in Figure 1.

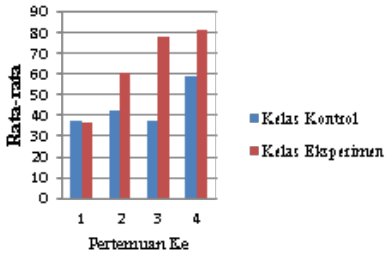

Figure 1. The improvement of students' activeness

The students' activeness indicators are 1) participating in carrying out the task, 2) engaging in problem solving, 3) asking, 4) conducting group discussions, and 5) training themselves in solving problems or issues.

Implementation of the research at the first meeting in the experiment group by applying the model resulted the gain of 36.9% in the criteria of less active. This is due to students do not get used to do the experiment based on the instructions on the LKS. Students difficultly understand and do the experiment based on the problems provided in the LKS, so it runs slowly and requires a long time.

In the second meeting of the percentage of student activity increased from 36.9% to 60.48% with the criteria moderately active. Students have started to understand the activities that should be done. The teacher asks them to observe the instruction as in the first meeting and give the opportunity to express their opinions in a discussion with their friends of the group about activities that should be conducted in the LKS. Students are beginning to understand and getting used to do the activities.

Implementation of the research in the third meeting obtained a percentage of student activity increased from the second meeting of 60.48% to 78.2% in the active criteria. Students are beginning to understand and getting used to do the experiment. The teacher gives students the opportunity to discuss with friends in the group activity that must be carried out. Students performed experiment properly so they could explain the results obtained in a presentation to the class confidently.

In the fourth meeting, students obtained a percentage of 78.2% to 81.4% in the very active criteria. It can be seen from a very enjoyable

learning process, students are able to write the title, formulate the problem and the purpose of the existing problems. They already actively involved in discussing, composing and performing work steps in the experiment activities. Students worked together in conducting experiment and writing the results and discussion on LKS. Students were also not awkward to express their opinion in summing up the results of the activities. The presentation was fluent and they did not feel shy to deliver the experiment results and afraid to be wrong. Other groups paid attention and did not reluctant to question and refute the results from other groups. The teacher guided them to summarize the conclusions delivered from each group and encourage students to be able to provide answers to questions that are difficult to be answered in the presentation.

Control group used direct instruction with experiment, in the first meeting students' activeness percentage obtained 37.5% with less active criteria. The process consisted of giving an explanation on the material made students tend to get bored and did not pay attention, then did an experiment. The experiment was done ineffective because students simply wrote the results, answered questions, and did not encourage students to conduct their own activity but did the steps based on the LKS. The presentation was performed ineffectively because students tended to be passive and did not willing to express opinions.

In the second meeting, students gained from 37.5% to 43.1%, but still in the same criteria of less active, it is because the experiment did not encourage students to conduct a discussion about formulating the problems, objectives, how to work for doing experiment, so students tended to do practicum and wrote the result individually in answering the questions and concluding the experiment.

The students' activeness decreased from 43.1% to 37.5% in the third meeting, this was because they felt bored and reluctant to do experiment. It was only done by a few students in one group, the other students simply watched and waited to write p the results of the experiment.

Students' activeness increased from 37.5% to 58.9% in the fourth meeting, but in the same criteria of moderately active. Control group has been quite active in doing experiment with friends in the group, they presented and expressed their idea on the results of experiment and ask the group to discuss in front of the class.

Students' activeness in the experiment group improves every meeting compared to control group, this is because the application of CTL model requires students to participate actively in discussing with the members of their group and they are required to find the concept of the material independently. Khusniati (2014) states science learning model leads students to do observation or direct observation in their environment. It is very suitable to deepen the concepts of science. Students will learn related to what has been known to either the activities or events occurring around them, and real-world application is an effective strategy for teaching science as a process, so students will easily understand the material when he was doing an activity to learn it, it will make them enjoy the learning process

Science learning with CTL model guided inquiry-based can help students to interpret the material that is learned with the appropriate learning style. Because learning is not just always about learning outcomes, so this research analyzes the process of change. The process of change is students do not only learn but find the concept independently. Thus, students can learn to understand the material according to their learning styles or fun learning so they can be actively engaged in learning process. This is consistent with the results of Neka et al (2015) research that states guided inquiry learning model can provide opportunities for students in the learning process to find the concepts independently through surrounding environment. Student involvement will lead to highly motivated feeling and actively learning.

Students' activeness improves every meeting. In the experiment group, students were initially less active, then improved to be moderately active, active, and in the fourth meeting they were very active.

Students' feedback through a questionnaire distributed in the experiment group was performed to find out their response of the model. The questionnaire is also used as a reflection of the research that has been carried out. Questionnaire responses have levels ranging from strongly agree, agree, disagree, and strongly disagree. The questionnaire was given in the last meeting after posttest.

The result of students' response on the application of CTL model guided inquiry -based shows that students stated strongly agree learning with the model to be exciting and fun, this is proved by the reason that are expressing excited with practice and discussion and not to be boring lesson. Students feel highly motivated by doing the experiment because they can try out the tools in the laboratory and discuss during those activities. Students also agree with CTL model to make them more understand and memorize the

material. Students prove the theory through practice, so they can interpret their learning result in everyday life and store the information in their mind. Students found learning science through experiment can facilitate the material to be remembered, not just memorize by doing the right practice. It makes students to be more active in the learning process because through experiment activity students become more curious to try and also performing question and answer in the learning process.

CONCLUSION

Based on the research, it can be concluded that the CTL model guided inquiry -based with the topic of chemicals in daily life is effective to improve learning outcomes and students' activeness with the following results:

The results of the experiment group learning outcomes has increased by 0.62 with the moderate category and different significantly between posttest score of experiment and control group found out through t test, with t count (5.42)> t table (1.67).

Students' activeness in the experiment group increases every meeting, 36.9% of the less category, 60.5% of moderately active, 78.2% of active and 81.4% of very active

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