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The Effect of Contextual Teaching and Learning Combined with Peer Tutoring towards Learning Achievement on Human Digestive System Concept

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Abstract

This research aims to know the influence of contextual teaching and learning (CTL) combined with peer tutoring toward learning achievement on human digestive system concept. This research was conducted at one of State Senior High School in South Tangerang in the academic year of 2016/2017. The research method was quasi experiment with nonequivalent pretest-postest control group design. The sample was taken by simple random sampling. The total of the sampels were 86 students which consisted of 44 students as a controlled group and 42 students as an experimental group. The research instrument was objective test which consisted of 25 multiple choice items of each pretest and posttest. The research also used observation sheets for teacher and students activity. The result of data analysis using t-test on the two groups show that the value of t_{count} was 2.40 and t_{table} was 1.99 on significant level $\alpha = 0,05$, so that $t_{count} > t_{table}$.. This result indicated that there was influence of contextual teaching and learning (CTL) combined with peer tutoring toward learning achievement on human digestive system concept.

Keywords: Contextual Teaching and Learning, Peer Tutoring, Learning Achievement, Human Digestive System

INTRODUCTION

Education essentially is a vital element in life that works to develop intelligences of the individual emotionally and the ability to fully responsible to adapt in a society. The Indonesian Education System Law No. 20 year 2003 on the National Education Function states:

> National Education works to develop the skill and the character formation and civilization of a dignified nation in order to educate the society, for the growing potential of learners to become believers and to be devoted to God Almighty, noble character, healthy, knowledgeable, capable, creative, independent and become a democratic and responsible citizen (Depdiknas, 2003).

Education is also an important capital for the development of a nation and national educational objectives. Educational objectives which means the ultimate goals to be achieved by all educational institutions, including formal, non-formal, and informal in Indonesia. The important factors to achieving it, is through the learning process (Widoyoko, 2009).

The learning process involves two activities in one time with different actors. The learners are student while who teaches are teachers. Student and teachers activities takes place in the same process to achieve certain instructional goals. The learning process occurs when there is an interactive communication between teachers and students which tied by instructional goals. Thus, the success of the learning process is depend on teachers and students itself.

Teacher involvement in learning process gives a big influence on the process and learning achievement of students. However, teachers effort in the learning process sometimes can't improve student learning achievement optimally. Therefore, a teacher is to master the approaches and methods of teaching. The use of appropriate approaches and methods in teaching will make it easier for teachers to teach a material. The right approach and method depends on the characteristics of the material to be taught (Zulfiani, et al., 2009).

Biology as one fields of science provides a variety of learning experiences to understand the concepts and processes of science. These process skills include the ability to observe, propose hypotheses, use of tool and material properly and correctly by always considering security and safety. In addition, process skills also include the skills of asking questions, classifying and interpreting data, and

communicating the findings orally or in writing, exploring and selecting factual and relevant information to test ideas or solving everyday problems (BSNP, 2006). Therefore, teachers can not simply transfer knowledge to students in biology learning. However, students construct an understanding of biological concepts itself.

Observation results in one of the Public High School in South Tangerang, has applied several methods that are considered to be able to enable students in the process of biology learning. The methods applied such as question and answer, discussion, assignment and so on. However, when the learning process took place appears that some students busy with there own activities that are less related to the learning process. Students activities such as talking about and doing other things beyond the material being taught. During lessons teachers are less likely to develop biological material from textbooks into the context of the students daily environment. So that teachers less involving students potential in the learning process. Students couldn't be able to make the connection between the knowledge learned and its application in everyday life.

Contextual Teaching and Learning (CTL) is defined as a way to introduce content using a variety of active-learning techniques designed to help students connect what they already know to what they are expected to learn, and to construct new knowledge from the analysis and synthesis of this learning process (Hudson & Whisler, 2008). CTL involves seven major components of effective learning: constructivism, questioning, finding (inquiry), learning community, modeling, reflection, and authentic assessment (Sadia, 2014).

According to Blanchard quoted by Hudson & Whisler (2008), CTL strategies that may help to meet each learner's distinct needs include: (1) emphasize problem solving; (2) recognize the need for teaching and learning to occur in a variety of contexts such as home, community, and work sites; (3) teach students to monitor and direct their own learning so they become selfregulated learners; (4) anchor teaching in students' diverse life-contexts; (5) encourage students to learn from each other and together; and (6) employ authentic assessment.

CTL based on constructivist learning principle that is "the best way to learn is that learners construct their own understanding actively". Learners actively build their own knowledge through the experiencing process, not

being told by the teacher. Teachers act as facilitators, mediators and mentors of learning (Sadia, 2014). Thus, CTL is chosen as an alternatives so that learning becomes more meaningful. Learners will learn through the process of experiencing not memorizing (Sadia, 2014).

The learning process with CTL involves the various talents of learners in the process of discovery (inquiry). This involvement can be maximized by exploiting the potential of self-learners. Learners who are considered capable (complete learning) can be used as tutors for their friends who is a slow learners (unfinished learning). In addition, the application of community learning principles in CTL can be done by applying learning through study groups. Students learn each others in groups. Students who have a certain ability are encouraged to help slow learners.

Peer tutoring is characterised by specific role taking: at any point someone has the job of tutor while the other(s) are in role as tutee(s). Peer tutoring typically has high focus on curriculum content. Projects usually also outline quite specific procedures for interaction, in which the participants are likely to have training which is specific or generic or both. In addition, their interaction may be guided by the provision of structured materials, amongst which a degree of student choice may be available (Topping, 1996).

Learning process with peer tutoring is expected to be easier to understand the concept. Learners do not feel reluctant, inferior or embarrassed to ask for help. Learners will feel satisfied if they can solve the problems. Therefore, with peer tutoring learning objectives could achieved optimally. This active involvement can facilitate students to solve problems and learn the subject matter (Jusniar, 2009). Peer tutoring are able to create cooperation among learners. Thus, a positive learning environment is built without putting aside the teacher's duties as a facilitator in the learning process (Sumarli, 2015; Grubbs & Boes, 2009).

Previous research has shown that contextual learning with peer tutoring has a significant effect compared with direct learning on biology learning achievement of students (San, et al, 2013). Thus, the CTL approach combined with peer tutoring can be actively involve students better. Students are able to make the connection between knowledge possessed and its daily life application.

Learning materials are tools to achieve a learning objectives. One of the

learning materials in biology is the digestive system concept. This concept is an interesting material and closely related with daily life of students. Students can learn about dietary substances, digestive organs, nutritional intake, and the food digestion process that is closely related with dietary habit and the calorie needs. However, in its application this concept is considered quite difficult to understand by students. The difficulties felt by students is to remember the terms and explain the process of digestive system that occurs inside human body. However students need not only an ability to memorize, but also a high understanding (Sajerah, 2013). The purpose of this study is to determine the effect of CTL approach combined with peer tutoring toward learning achievement on the digestive system concept.

METHOD

The method used in this study is quasi experimental design with nonequivalent pretest-postest control group design. The sampling technique was done by using simple random sampling. The sample in this study is the students of class XI in one of the public high school in South Tangerang, odd semester of the year of teaching 2016/2017, two classes was taken, namely class XI-MIA 5 as the control class and XI-MIA 4 as the experimental class.

This study uses the learning achievement test instrument and observation sheet of the learning process. The test used is a 25 questions of multiple choice test. Observation sheets are used when the teaching-learning of digestive system concept using CTL approach combined with peer tutoring is in process. In addition, this observation sheet is used to determine the extent to which the application of learning approaches during the learning process takes place.

Hypothesis testing is done after the normality test using Lilifors Test, and homogeneity test using Fisher test. After the data is declared normal and homogeneous distribution, it is continued with t-test. The data observed tabulated then described.

RESULT AND DISCUSSION

Data from pretest of control and experiment class can be seen in Table 1.

Table 1 Pretest Data of Class Control and Experiment

Description	Pretest	
	Control	Experiment
Minimum value	32.00	24.00
Maximum value	68.00	68.00
Mean	48.55	46.10
Standard Deviation	10.16	11.39

The data from posttest of control and experiment class can be seen in Table 2.

Table 2 Posttest Data of Class Control and Experiment

Description	Posttest	
	Control	Experiment
Minimum value	64.00	68.00
Maximum value	92.00	96.00
Mean	79.18	83.14
Standard Deviation	6.71	7.47

The value of the student's work sheet of the control and experimental class can be seen in Table 3.

Tabel 3 Values of Student Work Sheet of Control and Experiment Class Aspect

Aspect	1st Meet		2nd Meet	
	C	E	C	E
Discussion question	90.00	90.00	79.17	85.00
Problem formulation, hypothesis, conclusion	60.91	65.45	75.45	80.00
Table observation	84.00	87.00	93.75	95.00
Average	78.30	80.82	82.79	86.67

Based on the assessment of the students work sheet that the value of the experimental class is higher than the control class. The value of students work sheet of control and experimental class at the first meeting is 78.30 and 80.82. At the second meeting, the value of students work sheet of control and experimental class is 82,79 and 86,67. The increasing value of students work sheet is possible because students have more understanding in formulating the problem, submitting hypotheses, collecting data, testing the hypothesis and make conclusions based on experiments performed.

Observation of learning activities intended to know the learning process with CTL learning approach combined with peer tutoring. The observation instruments of learning activities are arranged based on stages or syntax in the learning approach. This observation is applied to teachers and students during the learning process.

The observation result of teacher activity indicates that the teacher has carried out all stages of CTL learning combined with peer tutoring. Starting from explaining competence, providing motivation and apperception related to the material studied. The next stage, the teacher presents a model or phenomenon related to the human digestive system using images or video. The presentation of this model or phenomenon is associated with the daily life of the students. The third stage of the CTL approach is combined with peer tutoring, which is the teacher dividing the students into groups. Each group consists of 4-5 heterogeneous student assisted by a tutor. After all students in their group, the teacher distributes the worksheet. The teacher stimulates the curiosity of the students as well as

providing direction and guidance in formulating problems, proposing hypotheses, collecting data, testing hypotheses and making conclusions. Teachers encourage students to gather information from various sources from books or internet. In this fourth stage, students who have difficulty will be assisted by tutors in obtaining information.

The fifth phase of the CTL approach is combined with peer tutoring, the teacher asks representative of the group to present the results of the discussion of the worksheet answer as well as to give the students the opportunity to ask questions or to present different opinions to the presenter group. This is done so that students are actively involved in the learning process.

The sixth phase of the CTL approach combined with peer tutoring, the teacher gives reinforcement to the presentation result, give a feedback or explanation if there is misconception and guide the students to compile a summary. Then the teacher does the reflection by checking again if there is student which still not understand.

Observations result of student activities indicate the increasing of learning activities with CTL approach combined peer tutoring on several stages, namely constructivism stage, modeling, finding (inquiry) and authentic assessment. At the first meeting only about 50% of students who do these activities, then increased at the second meeting to more than 50%. Another increase also occurs in the questioning stage, but there is difference percentage of activities the students performs at this stage. At the stage of inquiring, students conducting activities at the first meeting were less than 50% and at the second meeting to 50%. The lower percentage of the first meeting compared with the second occurs because at the first meeting the students still find it difficult to carry out the CTL learning approach combined with peer tutoring.

Percentage of activities conducted by students with CTL approach combined with peer tutoring at learning community stage (learning community is very good). Students who perform activities at the learning community stage, both first and second meeting is more than 50% .This percentage is different from the activities that is done at the reflection stage.The students who perform reflection activities at both meetings are only about 50%.

Prerequisite testing analysis includes test of normality and homogeneity. The test results show that both groups are normally distributed and have homogeneous variance. Thus,

a t-test is used to test the research hypothesis. The t-test is performed to determine the initial knowledge of the students between the control class and the experiment.

The result of t-test for pretest-postest of control and experiment class can be seen in Table 4. Data in Table 4, for a pretest comparison between $t_{count} < t_{table}$ (1.13 < 1.99), then H_0 accepted. Thus, it can be concluded that there is no difference in the initial knowledge of students between control and experiments class. Posttest compared between $t_{count} > t_{table}$ (2.40 > 1.99), then H_0 rejected. Thus, it can be concluded that there is a significant difference between the learning achievement of the control class students using the scientific approach and the experimental class using the CTL approach combined with peer tutoring.

The results obtained by students in the form of data of posttest and student work sheet. Experiment class has higher average score than control. Learning achievement can be influenced by the learning approach applied in the learning process that is CTL combined with peer tutoring which improves the motivation to learn so that the impact on the learning achievement of students.

CTL combined with peer tutoring one of the learning approaches that are oriented towards students and able to help teachers relate material content to real life situations and motivate students to make connections between knowledge and application in the daily life of students. This learning approach can overcome difficulties and make students more active (San et al, 2013), thus through contextual learning, students have increased learning activities (Hasruddin et al., 2015).

Characteristics that differ CTL from other learning approaches are: 1) cooperation; 2) mutual support; 3) fun, and exciting; 4) not boring (joyfull, comfortable); 5) learn passionately; 6) integrated learning; and 7) using various sources of active learners (Trianto, 2014).

CTL approach combined with peer tutoring help teachers and students in biology learning. CTL has seven main components in the learning process: constructivism, inquiry, questioning, learning counseling, modeling, reflection, and authentic assessment (Trianto, 2014). This CTL learning can work more effectively if the teacher's role of "information giver" shifts to "facilitator and moderator" of learning. So this peer tutoring will be able to improve student learning achievement. With peer tutoring, learning will be more effective, communicative and efficient because the language of the

tutor is more easily understood. In addition, students serve as learning subjects that students are invited to become tutors or learning resources and a place to ask for peers (San et al, 2013).

Table 4 t-test result of Pretest-Postest Data Control and Experiment Class

Data	Class	N	$\overline{X}$	T_{count}	t_{table}	Conclusion
Pretest	Control	44	48,55	1,13	1,99	H_0 accepted ($t_{count} < t_{table}$)
	Experiment	42	46,10			
Pretest	Control	44	79,18	2,40	1,99	H_0 rejected ($t_{count} > t_{table}$)
	Experiment	42	83,14			

The experimental class treatment in this first phase, the teacher explores the student's knowledge by giving apperception associated with the human digestive system concept. The second phase, the teacher presents a model or phenomenon related to the material presented. At this phase, model presented by teacher is in the form of picture of food intake as well as video of food digestion process. Furthermore, in the third phase students discussion on work sheet which each group consisting of 4-5 people who are assisted by a tutor. Students who become tutors are students who have academic skills and good delivery, so that it can be easy to understand by other students.

The fourth phase which forms the core of the CTL combined with peer tutoring, the teacher directs the students to formulate the problem, propose the hypothesis, collect the data, test the hypothesis and make a conclusion. At this phase students seek information from various sources such as books, internet and others. Furthermore, at the fifth phase, the delivery of the results of discussion by representatives of each group. At this stage, students outside the presenter group are given the opportunity to ask different questions or opinions to the presenter group.

The sixth phase of the CTL combined with peer tutoring. The teacher helps students to make connections between prior knowledge and new knowledge. The knowledge possessed by these earlier learners is expanded gradually. So with this learning process knowledge will become more meaningful. The seventh phase which is the last stage, performed an authentic assessment to obtain a description of the material understanding of the human digestive system concept during the learning process.

CTL combined with peer tutoring is able to provide learning activities for students to find, process, and find concrete learning experiences (related to

real life situation) through the involvement of students trial activities, doing and experiencing themselves with the help of students who act as tutor. This research is in line with the results of previous research which found that the contextual approach through the learning community has an effect on the students' cognitive learning achievement in high school (Irwandi, 2013). In addition, peer tutoring can enhance the learning activities and learning achievement in biology (Mbatu et al., 2013). Thus, the results of this study showed that learning with CTL combined with peer tutoring positively affects the learning achievement of students.

CONCLUSION

The results showed that there was a significant difference between the learning achievement of control (79,18) and experiment class students (83,14). These results indicate that the learning achievement of students in the experimental class with CTL combined with peer tutoring higher than the control class that uses a scientific approach. Thus, it is evident that learning with CTL combined peer tutoring influence on the learning achievement on the human digestive system concept.

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