The efforts of learning outcomes and motivation improvement through collaborative learning based on e-learning with course review horay on basic chemistry subject

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Abstract. E-learning-based collaborative learning has proven to be an effective type of learning to improve student learning outcomes and motivation. However, the course review horay (CRH) is crucial to this learning as a supporter of learning. It is proved that E-learning-based collaborative learning with CRH not only improves learning outcomes and motivation but also shows the relationship between motivation and learning outcomes. The previous learning that did not use the CRH does not demonstrate the relationship between motivation and learning outcomes. This study applied 3 cycles which were conducted through lesson study. In Cycle I, the learning was performed by utilizing cooperative learning based on e-learning. After that, in Cycle II, the learning was performed by using collaborative learning based on e-learning. Furthermore, during Cycle III, the process of learning was conducted by utilizing a collaborative model based on e-learning with CRH. It was found that there was an improvement in learning outcomes before and after learning in each cycle. If it is compared, the motivation and learning outcomes in Cycle II were higher than those in Cycle I, and the motivation and learning outcomes in Cycle III were higher than they were in Cycle I and II.

1. Introduction
Entering the 21st century, education must have the ability to direct studentstosettle in newsituations that arise in themselves and their environment. The growth of science and technology, especially information technology, results in a number of positive impacts on the advance of education nowadays. The technology of computers and the internet, ranging from software and hardware devices, provides many offers and choices for the world of education to support students' learning process.

Some studies have revealed that the integration of technology to education can improve teaching and learning [1-4]. One of the advantages of technology in education is the design of e-learning media that can improve learning outcomes, learning motivation and learning activities. Technology provides programs that can assist teachers to make e-learning-based learning media such as eXe-learning programs, which can improve students' learning outcomes and motivation [5,6].
E-learning is a web-based learning ecosystem to disseminate information, communication, and knowledge in the field of education. E-learning provides satisfaction experienced by users, both students and instructors in terms of the quality of collaboration and the quality of information. Some of the advocates of the satisfaction are because e-learning is able to provide information quality, system quality and the interaction that students feel with others [7].

Creating a fun and quality learning process requires an excellent learning innovation. The learning is qualified if all objectives are achieved. To do so, teachers need a learning strategy that is closely related to achieving goals, including planning, implementing, and assessing processes, results, and effects of learning activities [8]. Many learning models demand students to be active during the learning process; one of them is a collaborative learning model. This model is almost the same as other learning models, which require students to be active in learning through discussion. However, in this model, students solve problems together so that there is an interaction among students during the discussion. Collaborative learning is a pedagogy explaining that humans always create shared meaning and the process always enriches and broadens their horizons [9]. The collaborative includes social skills and learning abilities. Collaborative learning combines three concepts namely individual responsibility, group benefits and the same achievement of success [10]. In this model, students are required to work together and take advantage of each other in a discussion group. Later, this discussion group will solve the problem regarding the learning material provided by the teacher. Although they work in a group, their individual ability still has to be developed because this model principally emphasizes collaboration among group members in which they admit when their opinion is wrong and try to find information actively from various sources. They optimize the mastery of concepts and accept the presence of others [11].

Mastering the learning materials is not the only learning goal. The learning process also becomes a benchmark for the success of teaching. A fun learning process can be obtained by using learning methods which include games during the process. Through games, students can master the concept of material in a fun way [12]. In this study, the learning method used is Course Review Horay. Course Review Horay learning method is a method that creates a festive and pleasant classroom atmosphere because every student who can answer correctly is obliged to shout ‘hooray!’ or other yells that are preferred by the students. This method aims to improve students' understanding of teaching material. It is proved by the practice of questions through the Horay quiz as a form of test in the learning process which is written on the card or paper provided.

The Course Review Horay learning method is based on the learning theory of Vygotsky’s Social Constructivism. In constructivism theory, knowledge is factum (what is made), et verum (what is known), convertuntur (convertible to one another). The knowledge is constructed (built), not directly perceived by the senses [13]. According to social constructivism, knowledge is built by students and cannot be transferred from teacher to student, except only with the students' own activeness to analyse [14]. Students are continuously active to construct the knowledge so that scientific changes always occur. The role of the teacher is only to help provide the suggestion and the situations to make the construction process run smoothly. In the Course Review Horay learning method, students are required to actively construct their own knowledge through observing and reasoning in the discussion.

2. Results and Discussion

This research was conducted in 3 learning cycles through lesson study [15]. In each cycle, the pre-test and post-test were given to the students and the learning motivation questionnaire was also distributed to students. The score of the pre-test and post-test were analyzed to reveal the students’ learning outcomes. Meanwhile, the motivation questionnaire was distributed to see the learning motivation of students. Figure 1 below displays the graph of the pre-test and post-test of each cycle.
From the graph, it can be observed that there is an improvement in learning outcomes before and after the learning process. To analyze the significance of differences in learning outcomes before and after learning, paired t-tests were applied for normal data and Wilcoxon analysis was applied for abnormal data. In this study cycle I and II had normal data, while cycle III got abnormal data.

### 2. 1. Cycle I

In the first cycle, the learning was performed by applying the STAD type of cooperative learning model on atomic structure material. The determination of the learning model was based on the plan made by the Lesson Study community. Before beginning the learning, the students were assigned to read the material and discuss it in each group through the e-module that was given. Then the students wrote a summary related to the material. At the beginning of the learning process, the students presented the results of group work while the other groups responded to the group presentations.

Students' learning outcomes in the first cycle increased significantly. This can be seen from the significant difference in learning outcomes before and after learning. Table 1 demonstrates that in the first cycle the value of sig (2-tailed) = 0.0, where Sig (2-tailed) 0.0 <α 0.05. Thus, it can be concluded that there were differences in learning outcomes before and after learning in cycle I. Moreover, In the first cycle the mean score before learning is 42.13 and it increased as many as 53.71 after the learning (Figure 1). The e-module helped students to learn the material. This is in line with the findings of Syahroni [16] that digital modules can increase students' independence to master learning material.

| Cycle | Correlation test | Note: |
|-------|------------------|-------|
|       | Sig (2-tailed)   | α (0.05) |         |
| Cycle I | 0.51            | 0.05   | Ho : accepted |
| Cycle II | 0.63            | 0.05   | Ho : accepted |
| Cycle III | 0.001          | 0.05   | Ho : rejected |
The is no relationship between motivation and learning outcomes in cycle I. Table 1 shows that sig (2-tailed) $0.51 > \alpha 0.05$. As a result, it can be interpreted that there is no relationship between motivation and learning outcomes in cycle I.

During the first cycle, it was observed that only high-ability students were motivated in learning while some other students only glimpsed and copied without giving responses and comments. This is in line with the findings from Graf [17] which states that students have different needs because these students have different abilities and different learning styles.

2.2. Cycle II

In the second cycle, the learning was conducted by using a collaborative learning model. It was chosen because not all students were enthusiastic in the learning process in the first cycle. High-ability students dominated the learning activities while others only listened without giving any argument about what was delivered by their friends. Therefore it was necessary to change the learning model to improve the learning process in which all students were active in learning. The collaboration model is one of the most efficient models to attract the students to be active in learning, not only high and medium ability students but also low ability students. The learning outcomes in the second cycle significantly increased before and after learning. In the second cycle, the mean score before learning was 37.5 and it increased after learning to 61.5 (Figure 1).

This is in line with the explanation of Hord who asserts that collaborative learning is different from cooperative learning. Collaborative learning offers more time to collaborate among members in the discussion group; they can exchange ideas and achieve the same results as well as mastery of the same material in groups [18].

2.3. Cycle III

The learning in cycle III occurred by implementing a collaborative learning model. The process was not much different from the second cycle, except that the learning implementation in cycle III applied Course Review Horay game. During this game, students answered questions that were provided in the e-module from the lecturer. Then students were given the opportunity to present the results of the answers. All group members must contribute to give the answer. In this cycle, high-ability students had to be able to guide other students in their group to master the learning material. The materials were presented in e-modules that can help students to answer questions.

Students’ motivation in the third cycle increased significantly if it was compared to cycles I and II. In the third cycle, the groups who could answer the questions the most were superior in that meeting. This finding is supported by the findings of Amin, M., Mujasam & Widyaningsih, S. W. [19], They found that
the existence of learning tournament methods can improve students' achievement and motivation. Furthermore, a research conducted by Putri [20] concluded that the Course Review Horay method was effectively used in learning so that the learning process would be more enjoyable and not boring. Students could master the lesson optimally.

In this cycle, all students in the groups actively participate to answer the questions without exception, not only high and medium but also low ability students. This finding is in line with the research of Hodges [21]; Rohwati [22], showing that games in education can support the learning process because through games students become active and motivated to follow the learning process as a whole. In this case, the learning objectives do not only start at mastering learning material but the process also greatly affects the mastery of the materials. One strategy that supports the fun learning process for students is game.

3. Conclusion
This research was conducted through a lesson study so that there is always a right-on-target improvement during the learning process. This research was conducted through 3 cycles, each of which consisted of a plan, do and see. In the first cycle, cooperative learning can improve learning outcomes and motivation. Unfortunately, students with high abilities were more dominant in the learning process. Besides, there is no relationship between learning outcomes and motivation in cycle I. The second cycle, in which e-learning-based collaborative learning was implemented, students’ learning outcomes and motivation were improved. The problem was that motivation has no relationship with learning outcomes.

During this learning, generally, students were active in learning. However, only students with high ability had the motivation to present the results of their group discussions. In e-learning-based collaborative learning with the Course Review Horay, students’ learning outcomes and motivation increase. There is a positive relationship between motivation and learning outcomes. If the motivation increases, learning outcomes also increase. Meanwhile, in the third cycle, students were all active during the learning process. All students with high, moderate and low-ability were all enthusiastic to present the results of their group discussions. All members of the group had the same goal that was to be able to solve the problem that the lecturer gave. As a consequence, there is an interaction among students with high, moderate and low ability to complete the exercises on the Course Review Horay.

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