**Journal of Chemical Learning Innovation**
Vol. 1, No. 1, June 2024, pp. 20~25
ISSN: 3063-0886, DOI: 10.37251/jocli.v1i1.1029


# Application of the Cooperative Integrated Learning Model Reading and Composition to Improve Chemistry Learning Outcomes

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**Article Info**

***Article history:***

Received Mar 14, 2024
Revised Apr 14, 2024
Accepted May 18, 2024
Online First Jun 25, 2024

***Keywords:***

Chemistry
Composition
Cooperative
Learning Model
Learning Outcomes

**ABSTRACT**

**Purpose of the study:** The aim of this research is to improve the chemistry learning outcomes of class X students at Public High School 5 Bandar Lampung through the implementation of the Cooperative Integrated Reading and Composition (CIRC) cooperative learning model.

**Methodology:** The subjects in this research were 18 class X Public High School 5 Bandar Lampung students. Meanwhile, the object of this research is the application of the Cooperative type cooperative learning model Integrated Reading and Composition (CIRC) to improve chemistry learning outcomes for class X Public High School 5 Bandar Lampung.

**Main Findings:** Based on research results, the application of cooperative learning strategies of the Cooperative Integrated Reading and type Composition (CIRC) in the learning process in class X Public High School 5 Bandar Lampung improves student learning outcomes.

**Novelty/Originality of this study:** The novelty of this research is to determine the effectiveness of implementing the cooperative integrated reading and composition (CIRC) type cooperative learning model to improve chemistry learning outcomes. In addition, this research also contributes to the educational literature by presenting empirical data regarding the effectiveness of CIRC in improving understanding and retention of chemistry material.



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## 1. INTRODUCTION

Students' ability to accept and practice the learning results obtained is a key factor in achieving success in the teaching and learning process [1], [2]. Teachers as direct implementers in the field have a central role in determining educational success. The essence of all this is the process of interaction between teachers and students in an activity called the learning process [3], [4]. Therefore, teaching is a series of activities in delivering learning materials to students so that they can receive, respond, master and develop the learning materials [5], [6].

One of the goals of education is to prepare students who are faithful, devout, creative and innovative and have a scientific insight and are also prepared to continue their education to a higher level of education [7]. Efforts to prepare students to achieve these goals require a set of lessons given to students, including chemistry subjects [8], [9]. There are many benefits to learning chemistry [10], [11]. A further benefit from studying chemistry is to change natural materials into products that are more useful to meet our needs, for example making soap from palm oil [12]. The modern world is a world where humans have become accustomed to the conveniences obtained from chemistry. Think about soap, toothpaste, textiles, cosmetics, plastics, medicines,

fertilizers, pesticides, fuel, paint, cooking spices, and various types of processed foods. All of this is the result of the application of chemistry [13]. Almost all the materials we need, to a greater or lesser extent, either directly or indirectly, experience chemical contact [14]. Not only daily necessities, chemistry also plays a big role in various types of technological products such as television sets, cooling machines and airplanes.

From the description above, it can be explained how important chemistry lessons are for students. In this regard, at Public High School 5 Bandar Lampung, Chemistry lessons have been taught to students and are trying to improve students' Chemistry learning outcomes to the maximum. Based on a preliminary study conducted by the author, the author found symptoms in the chemistry learning process, namely as follows: (1) Only 2 (two) students were able to answer the teacher's questions correctly when evaluating with question and answer, (2) Lack of student mastery regarding the material taught, this can be seen from the results of daily tests carried out as well as the mid-semester grades of the majority of students which are below the Minimum Completeness Criteria value, namely 6.5, (3) Lack of students' desire to ask questions to the teacher or collaborate with other students [15]. The facts above show that science learning outcomes, especially in chemistry lessons, are generally low. One effort that teachers can make is to implement learning strategies that aim to activate students, namely so that students want to ask their group friends about the material they are studying first, are enthusiastic about doing the exercises and have a sense of responsibility for their assignments and groups [16], [17]. So it is necessary to use cooperative learning. Currently, cooperative learning is increasingly developing. One type of cooperative learning is the Cooperative Integrated Reading and Composition (CIRC) type.

Cooperative learning methods contributed to the idea that students who work together in learning are responsible towards his teammates being able to make themselves learn just as well. Wrong One cooperative learning model that can be used is learning Cooperative Integrated Reading and Composition (CIRC) [18]. Students in Cooperative Integrated Reading and Composition (CIRC) accepts direct instruction regarding lessons such as metacognitive strategies [19]. This integrated teaching is specifically develop materials that are different from the materials used related basic teaching [20], [21]. Based on the explanation above, it can be concluded that Cooperative Integrated Reading and Composition (CIRC) is a learning model Cooperative (group work) is effective for teaching skills, then it is hoped that through cooperative learning students will be able to work together and work together help each other, besides that before students learn more deeply about the material what students are taught first students read the material, thus students find it easier to understand the subject matter, which in turn results in learning students can be achieved optimally [22]. Observing the above situation, the author is interested in conducting research improvement action with the title "Application of the Type Cooperative Learning Model Cooperative Integrated Reading And Composition (CIRC) To Improve Chemistry Learning Outcomes".

## 2. RESEARCH METHOD

### 2.1 Type of Research

This classroom action research was carried out in class X Public High School 5 Bandar Lampung. Classroom action research is carried out by teachers in their own classes to identify and solve existing problems, as well as to improve teaching effectiveness and student learning outcomes. Classroom Action Research allows teachers to become researchers in their own educational context, providing opportunities for ongoing professional development and direct improvement in the quality of education [23]. The results of Classroom Action Research not only have an impact on improving the learning process in the class studied, but also provide a valuable contribution to the wider educational community. The subject studied is a chemistry lesson on the subject of the Periodic System of Elements. This research was carried out in two cycles and each cycle was carried out in two meetings.

### 2.2 Population and Sample

The subjects in this research were class Reading and Composition (CIRC) can improve Chemistry learning outcomes on the subject of the Periodic System of Elements for Class X with a total of 18 students consisting of 8 female students and 10 male students Public High School 5 Bandar Lampung.

### 2.3 Data Collection Technique

The data collection techniques used are tests and observations. The test was carried out to determine student learning outcomes in cycle I and in the second cycle II. Observations were carried out to observe teacher activities and student activities cycles 1, 2 and subsequent cycles. Each cycle is carried out 2 times meeting. This is intended so that students and teachers can adapt the learning model studied. Observations are carried out collaboratively, assisted by colleagues.

### 2.4 Data Analysis Technique

The types of data in this research are qualitative data and quantitative data. Qualitative data, namely data that is described using words or sentences such as teacher activities and student activities in implementing learning, is obtained through observation sheets. Quantitative data, namely data in the form of numbers, namely data about students' ability to absorb lesson material after learning using the cooperative learning model of the Cooperative Integrated Reading and Composition (CIRC) type. Data collection in this research used tests and observations. This research is said to be successful if students who have achieved the Minimum Completeness Criteria score of 65 are determined to reach 75% of all students.

### 2.5 Research Procedure

This research procedure begins by distributing questionnaires to a sample of students who have been determined randomly or through systematic selection. During the process of filling out the questionnaire, students are asked to answer questions related to the mathematical process skills they wish to measure. The collected data is then analyzed using statistical methods, such as descriptive analysis to get a general picture, and inferential analysis to determine the relationship or differences between the variables studied.

## 3. RESULTS AND DISCUSSION

To find out student activities through the application of the Cooperative Integrated Reading and Composition (CIRC) type cooperative learning model, observations were made of student activities during the learning process. Then the data obtained through the observation sheet is analyzed. From the results of observations based on the observation sheet and implementation carried out by researchers in cycle I, there were still deficiencies in what was done. Meanwhile, in cycle II, based on the results of observations guided by the observation sheet, the activities at each step were running well. On average, students follow learning according to procedures. Overall, the implementation of the Cooperative Integrated Reading and Composition (CIRC) type cooperative learning model ran smoothly because students followed the learning process well.

From the results of observation of student activities in cycle I, it was found that the average activity of students when forming their groups was quickly, correctly, orderly and according to the teacher's orders, which was obtained by 77.8% of students (14 people). When students paid serious attention to the outline of the material to be studied, 80.6% of students (15 people) obtained it. Then the activity of paying attention to the teacher's explanation seriously, and accepting the assignment given by the teacher well was obtained by 69.4% of students (13 people). The next student activity was reading the student worksheet in an orderly manner which contained discourse to be discussed, obtained by 77.8% of students (14 people). Furthermore, when working together in groups to complete the student worksheet according to the specified time, there were 80.6% of students (15 people), and when following the teacher's guidance well and orderly in working on the student worksheet there were 72.2% of students (13 people). Meanwhile, when presenting the results of group work to the front of the class well and according to the specified time, 80.6% of students (15 people) were obtained, and when assisting the teacher in making lesson conclusions, 75% of students (14 people) were obtained.

Furthermore, regarding the results of observations of student activities in cycle II, it is known that the average activity of students when forming their groups was quickly, correctly, orderly and according to teacher orders, obtained by 94.4% of students (17 people). When students paid serious attention to the outline of the material to be studied, 94.4% of students (17 people) obtained it. Then the activity of paying attention to the teacher's explanation seriously, and accepting the assignment given by the teacher well was achieved by 88.9 % of students (16 people). The next student activity was reading the student worksheet in an orderly manner which contained discourse to be discussed, obtained by 91.7% of students (17 people). Furthermore, when working together in groups to complete the student worksheet according to the specified time, there were 91.7% of students (17 people), and when following the teacher's guidance well and orderly in working on the student worksheet there were 86.1% of students (16 people). Meanwhile, when presenting the results of group work to the class well and in accordance with the specified time, 91.7% of students (17 people) were obtained, and when assisting the teacher in making lesson conclusions, 86.1% of students (16 people) were obtained.

The average percentage of student activity in cycle II was 90.6% or there were 16 students. This increase was obtained after improvements were made in the second cycle. Where the teacher provides explanations that can attract students' attention in learning. As well as providing motivation to students about the importance of the subject matter being studied, and increasing learning activities by correcting teacher weaknesses in implementing the CIRC learning model. So that through these improvements, learning activities increase.

The learning outcomes of class Then regarding the increase in student learning outcomes from before the action, cycle I, and cycle II, it is known that there were only 6 students who completed before the action, while in cycle I it increased to 10 students, and in cycle II there were all students or as many as 18 students. As can be seen in this research, there has been an increase in the number of students who achieved complete

learning in the first daily test and the second daily test. This is because students can master the material taught well. Apart from that, students' motivation and activity to participate in the chemistry learning process is getting better. This indicates that the application of the cooperative learning model of the Cooperative Integrated Reading and Composition (CIRC) type can improve the chemistry learning activities and outcomes of class X Public High School 5 Bandar Lampung. The frequency distribution of student learning outcomes is displayed in the form of a bar chart below:

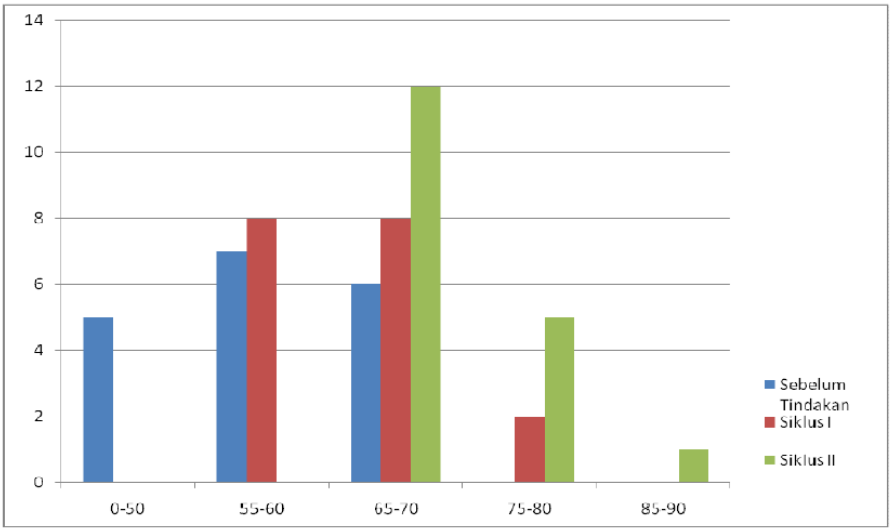


**Figure 1.** Histogram of student learning outcomes

The application of the Cooperative Integrated Reading and Composition (CIRC) type cooperative learning model in the learning process can improve the learning outcomes of class X Public High School 5 Bandar Lampung. From the analysis of data regarding the success of the action, it was found that there was an increase in the number of students who had a score above 65 after the action compared to the number of students who had a score above 65 before the action with the percentage of completion in the first daily test being 65.28%. There was an increase from daily test I to daily test II to 100%. The application of the cooperative learning model of the Cooperative Integrated Reading and Composition (CIRC) type can increase the activity and chemistry learning outcomes of class X Public High School 5 Bandar Lampung.

Cooperative Integrated Reading and Composition (CIRC) is a cooperative learning model designed to improve students' reading and writing skills through working together in small groups [24]. This model combines various learning activities, such as reading together, group discussions, writing, and presentations, which aim to develop literacy skills and a deep understanding of the subject matter. In CIRC, students work in heterogeneous teams to complete tasks that demand interaction and collaboration [25], so they can support and learn from each other. This approach not only improves academic abilities, but also students' social and emotional skills, such as the ability to communicate, think critically, and solve problems collectively.

This research presents novelty in the application of the Cooperative Integrated Reading and Composition (CIRC) Learning Model in Chemistry subjects, which was previously more commonly applied in language and literature subjects [26]. CIRC focuses on students working together in small groups to read and understand texts, as well as compose compositions based on the reading [27]. By adapting this model to chemistry learning, this research explores how critical and collaborative reading strategies can improve understanding of complex chemical concepts, as well as encourage improved student learning outcomes in the field of science.

CIRC model in chemistry learning has a significant impact on teaching methods in secondary schools. The results of this study indicate that students who learn through the CIRC method not only gain a deeper understanding of chemistry material, but also develop social and collaborative skills that are important for further learning [28], [29]. Using this model can inspire educators to integrate interdisciplinary approaches in the curriculum, combining critical reading skills with mastery of scientific material, thereby creating a more dynamic and effective learning environment.

Although this study shows promising results, there are several limitations that need to be noted. First, this study was limited to a sample of students at one high school, so the results may not be generalizable to a broader population. Second, the relatively short duration of the study may not be enough to see the long-term impact of implementing the CIRC model on Chemistry learning outcomes [30]. Apart from that, the success of this model also depends greatly on the teacher's competence in implementing cooperative learning strategies,

which can vary between individuals. Further research with a larger sample and longer duration is needed to confirm these findings and overcome existing limitations.

## 4. CONCLUSION

Based on the results of the research and discussion, it can be concluded that the application of the Cooperative Integrated Reading and Composition (CIRC) type cooperative learning model in chemistry learning can improve students' chemistry learning activities and outcomes on periodic system material in class X Public High School 5 Bandar Lampung. It is recommended that future research explore the effectiveness of this model in more diverse contexts, such as in schools with different demographic characteristics or at different levels of education. In addition, further research can examine the long-term effects of implementing this learning model on students' understanding of more complex chemical concepts and critical thinking skills. The use of mixed methods with qualitative and quantitative approaches can also provide deeper insight into the mechanisms of how this model improves chemistry learning outcomes, as well as providing student learning satisfaction and motivation. Analysis of differences in results between control and experimental groups over a longer period of time will help strengthen the validity of previous research findings.

## ACKNOWLEDGEMENTS

The researcher would like to thank all parties who have helped in this research.

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