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APPLICATION OF DIRECT INSTRUCTION WITH LABORATORY ACTIVITY TO IMPROVE STUDENTS' PARTICIPATION AND LEARNING ACHIEVEMENT

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Abstract

This research aimed to improve students' achievement and participation. To achieve the goals, researchers applied direct instruction model with laboratory activity during teaching and learning process. A qualitative methods was applied in this study in a classroom action research (CAR) framework. Subject of this study were 7th grade students of Stanislaus I Surabaya junior high school. The data were collected by test, observations rubric and questionnaires before and after treatment.

The classroom action research was completed in two cycles. Based on the statistical analysis, there was a significant improvement in teaching and learning goals before and after treatment.

This result affirm that the use of direct instruction model with laboratory activity in science learning process can improve students learning achievement and participation.

Keywords

Classroom Action Research, Direct Instruction, Teaching-Learning in Physics, Students' Achievement, Students' Participation

1. Introduction

Physics is considered as difficult subject by many students. It has been included as one of the subjects in the National examination for junior high school students, yet the students seemed not to be interested to pay more attention to physics class. Based on observations held on 3rd October 2012 at the class 7A of Stanislaus I Surabaya junior high school, during the physics class took place, many students were less enthusiastic. In the beginning students seriously listened to the teacher's explanation, but a moment later they started to lose focus. There were some students busy chatting, causing some noise, some students asked for permission to the bathroom, the other were also busy with their own activities such as drawing and daydreaming. This condition caused the learning process ineffective. It was found that the students' participation in class was about 69.9%. Based on the documented data from previous test, the average score of physics test was unsatisfactory. It was 66.8 and only 20 students out of 36 students (55.6%) met the minimum passing score (MPS) which was set at 70.

In the context of National examination, the unsatisfactory results of the students' learning achievement in physics should be addressed properly. The Direct Instruction method equipped with Laboratory Activity was applied in the implementation of the CAR. This choice of teaching method was taken from a long experience and consideration while one of the researchers ran an internship program in this school. Based on the experience in guiding experiments, she found that this kind of method was effective to be implemented in the learning process, because students worked in groups and each of them was responsible for the group's success. In addition, this method could also reduce noisy problem. But, she also noticed that there was some flaw in applying this model. In laboratory, students were not guided well by teachers so that there was a tendency that the diligent students with a good skill of laboratory performance would finish quicker. Therefore, we decided to apply this method while paying attention to the shortcomings above. This laboratory activity combined with direct instruction method could make physics

learning more interactive, convenient and fun so it could enhance student's activity and learning achievement.

2. Literature Review

2.1 Direct Instruction

The Direct Instruction Model is one of teaching approaches designed specifically to support students' learning processes related to declarative and procedural knowledge that can be taught gradually (Arends in Trianto, 2007). These are some characteristics of direct instruction; it includes learning objectives and the effect of models application on students including the assessment process. It also has a syntax which shown the flow of learning activities. Direct instruction also includes management systems of learning environment so that learning activities can be done successfully (Kardi & Nur, 2000).

2.2 Learning Achievement

Achievement is defined as the ability, skills and attitude of a person in completing the task (Arifin, 1991). Student achievement is shown through the assessment and the evaluation process done by the teacher towards student's tasks and examination. These are the main function of learning achievement

- As an indicator of the quality of educational institutions
- As a feedback for educators in teaching
- As the indicators of students curiosity
- As an information content in educational innovation
- As an indicators to measure students learning outcomes (Arifin, 1991).

3. Method

3.1 Research Design

A qualitative approach was used in this study in classroom action research (CAR) framework (Kemmis & McTaggart 1988). Due to the goals of the research involved students' participation and learning achievement in science teaching, an appropriate models should be applied. It was direct instruction models combining with laboratory activity (Kim & Axelrod, 2005). CAR assumes cyclic continuous improvement and each cycle consist of four consecutive

stages: planning, action, observation and evaluation, and reflection (Zuber-Skerritt & Perry, 2002).

Prior the CAR implementation, the successful indicators of the CAR implementation were set to be:

- The average score of physics test should not less than 75 with at least 75% of the students met the minimum passing score (MPS)
- The students' participation in the physics class should not less than 80%.

3.2 Participants

A total of 36 junior high school students consisting of 15 female students and 21 male students in class 7A of SMPK St. Stanislaus I in Surabaya, Indonesia, participated in the study. The students were informed that the data gathered in this study would be used only for research purposes and their names would not be mentioned in any part of the study.

3.3 Procedure

The study was conducted in October to November 2012 after a six-week intervention involving three hours of instruction per week. One cycle of CAR was defined as three meetings of teaching-learning activities (including the evaluation). Each cycle was started with planning, followed by action, observations and evaluations, and reflection. The whole procedures is shown in the following figure.

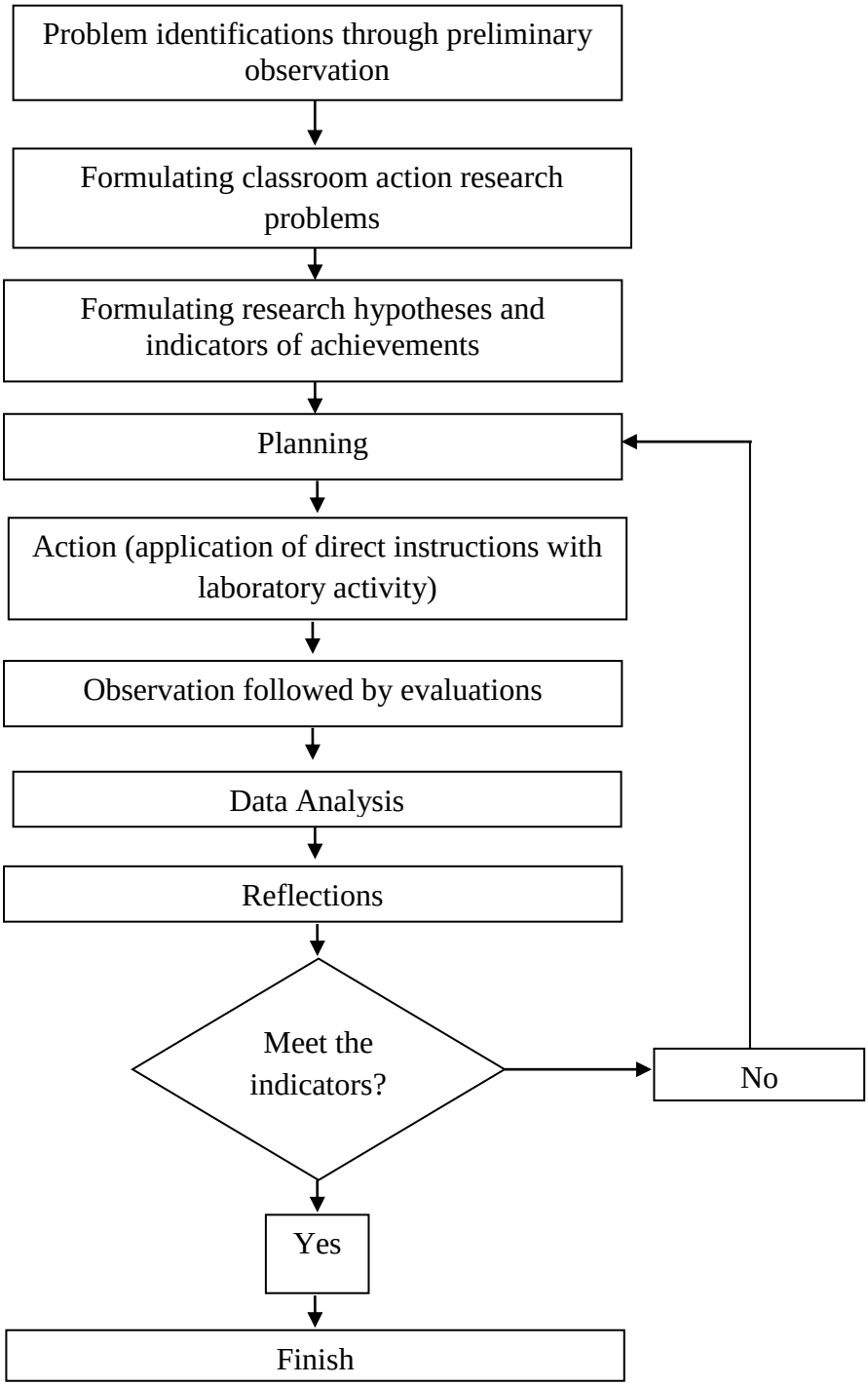

Figure 3.1: *Research Procedures*

3.4 Data Collection Tool

An essay test consisted of five questions used to measure student's learning achievement while student's participation measured by giving questionnaire and observation sheets.

3.5 Data Analysis

The data were analyzed using descriptive methods. Simple statistical measurement was done for the data collected from the test; the raw data from questionnaire and observation sheets data were coded and interpreted.

4. Results and Discussion

Referring to the successful CAR indicators, this classroom action research (CAR) held in two cycles. First cycle consisted of four stages mentioned above and it was done in three meetings. In the first meeting, one of the researchers conducted teaching and learning materials using power point media and animations. During the class students were asked to answer some questions randomly. This unconsciously demanded them paying attention to the class. When they solved some problems using complicated formulas, the researcher guided them and gave a lengthy explanation for those who did not understand yet. At the end of the class, students were informed that in the next meeting, they would have experiment class in groups.

They did a laboratory activity related to the previous teaching materials, particularly the process of ice melting. They were given the worksheet to explore their skills. The researcher gave a demonstration first, step by step and it is followed by the students directly. After that, they were given the chance to conduct their own experiments. At the same time, the data about student's participations was taken using student observation sheets. After finishing that activity, students were asked presenting their works. In the end, the researcher gave the conclusion to strengthen student's understanding about today's lesson. The test for measuring the students' learning achievement would be given a week later, and after that students were asked to fill the questionnaire about their participations in class.

By the end of the first cycle, it was found that the average of the physics test score was 71. The percentage of students met the minimum passing score was only 63.9% and the percentage of students' participation in physics class was 90%. The summary of the first cycle results is shown in Table 1.

Table 4.1 *Results of First Cycle*

Indicators of achievement	Goals	Results
Average of physics test score	75	71
The percentage of students met the minimum passing score	75%	63,9%
The percentage of students participations	80%	90%

The summary results of the first cycle showed that both average of the physics test score and the percentage of students met the MPS were all below the required successful indicators. Therefore the CAR should proceed to the next cycle (second cycle). During the reflection it was found out that the main cause of the unsuccessfulness of the CAR implementation in the first cycle was the number of students in the group was too big, making the group interaction was not effective. It was also noticed that the classroom management was inefficient leading to chaotic situation during the direct interaction method classroom activities.

The reflection from previous cycle were used to make some improvement in cutting down the numbers of group members and managing the class well. Upon revising the number of groups and classroom management according to the reflection process and after implementing the CAR in the second cycle we noticed, there were significant improvement. It is shown in the following table.

Table 4.2: *Results of Second Cycle*

Indicators of achievement	Goals	Results
Average of physics test score	75	80.6
The percentage of students met the minimum passing score	75%	80,5%
The percentage of students participations	80%	95.7%

The overall improvement during the research can be seen in the following figure.

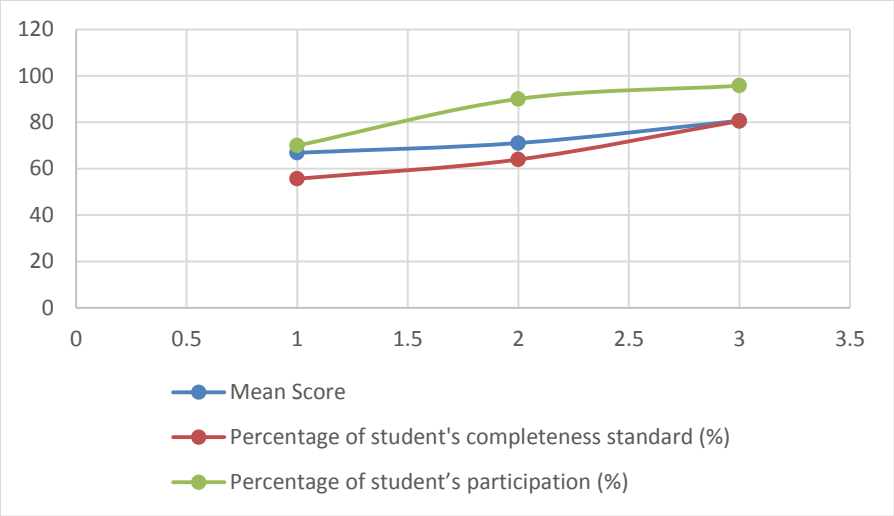

Figure 4.1: *Overall Improvement during the Research*

The results obtained from this study was similar to Ristia (2011) and Bere (2012) found that student's learning achievement can be increased by using direct instruction methods. Likewise, Feby (2012) also found that implementation of direct instruction based on computer media can improve student's learning achievement. Accordingly, the combining of these methods can be regarded as mutual complementary in science education with regard to the lack of study to avoid teacher centered.

5. Conclusion

Upon completing the CAR implementation applying the direct instruction method equipped with laboratory activity in two cycles we can conclude that the CAR implementation has been successfully achieved the research goals. There were gain of 13,8 point in the average score of physics test; gain of 25% in the percentage of students met the minimum passing score; and gain of 25,8% in the percentage of the students' participations in physics class. Therefore, the application of direct instruction with laboratory activity in a CAR setting at the specified class can improve student's learning achievement and participation.

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