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The Effectiveness Of Direct Instruction Model In Mathematics Subjects: A Classroom Action Research In Elementary School

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Abstract: Direct instruction is a teaching model that consists of the teacher's explanation of students' concepts or skills followed by asking students to test their understanding by doing exercises under the guidance of the teacher and encouraging them to continue to practice under the guidance of a teacher. There is a current paucity, of empirical research in the field of direct instruction in mathematics learning outcomes, especially second-grade elementary school students on multiplication material. The purpose of this classroom action research will be to describe the instructional teaching model for second-grade elementary school students in a school in South Jakarta, Indonesia. This class action research uses the R&H class action research model. Participants in this study were second-grade students in one of the Elementary Schools in South Tangerang, Banten, Indonesia. Data has been collected through tests, observations, and documents. Data were analyzed using text analysis and descriptive statistics. This paper has argued that the use of the demonstration model is able to transfer better knowledge to students, especially in multiplication material as a recurrent addition to elementary school mathematics subjects. The results of this study indicate that the use of direct teaching models is proven to improve student mathematics learning outcomes.

Index Terms: Mathematics, learning outcomes, direct instruction model, elementary school.

1 INTRODUCTION

The answer to the question in which teaching methods are suitable for schools, which teaching methods are used in individual subjects and how teaching methods support the learning process, presents challenges for general education and education in individual subjects [1]. So, to support the learning process to be more efficient when each student is driven by increasing learning outcomes because learning outcomes are one of the teacher's success in learning, researchers use a direct teaching model. The direct instruction model is suitable for teaching the concept of measurement, specifically the skill of using measurement tools [2]. [3] states that there are many factors that influence learning outcomes, both internal and external factors of students, internal factors including learning motivation, level of intelligence, and learning style. While external factors consist of the learning model used by teachers, learning strategies, learning approaches, learning methods and the ability of teachers to manage to learn in class. The [4] compared three instructional methods: direct directions to memory (following a series of steps); direct instruction and indirect instruction on basic math skills. However, there is a current paucity, of empirical research in the field of direct instruction in mathematics learning outcomes, especially second-grade elementary school students on multiplication material. The purpose of this classroom action research will be to describe the instructional teaching model for second-grade elementary school students in a school in South Jakarta, Indonesia.

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The contribution of this study is obvious as the results can be capitalized as guidelines to improve teacher performance and student learning outcomes in mathematics.

2 LITERATURE REVIEW

2.1 Direct Instruction Model

Direct instruction is a teaching model that consists of the teacher's explanation of students' concepts or skills followed by asking students to test their understanding by doing exercises under the guidance of the teacher (controlled practice) and encouraging them to continue to practice under the guidance of a teacher [5]. Direct instruction usually focuses on achieving teaching targets by providing skills training that is closely related to the target [6]. According to [7] in this learning model, the teacher provides a combination of facts and concepts in a matrix or other form of arrangements such as a detailed map or hierarchy. As a teaching strategy, direct instruction usually focuses on achieving learning targets by providing skills training that is closely related to the target. The training provided usually revolves around small modules where the teacher directs the teaching process depending on the skills acquired, provides a set of procedures that are in line with the teaching targets and sets the appropriate environment. The main objective of a direct instruction strategy is to reach with students to a level of mastery before learning new skills [8]. The direct instruction strategy relies on a behavioral approach where instruction is given explicitly and sequentially when skills will be learned, or instructional models are presented without interruption. Special education literature has found explicit and direct instruction to be more effective for students with learning disabilities. [9] conducted research on direct teaching models that showed that after guiding, students made significant gains in their basic mathematical skills. So, applying a direct teaching model can improve students' mathematical abilities in elementary school. [10], said the direct learning model was developed specifically to improve student learning processes, especially in terms of understanding something (knowledge) and explaining it as a whole in procedural and declarative knowledge. Knowledge is

taught in stages. The advantage of direct teaching is that it can be applied effectively in large and small classes, which can be used to emphasize the difficulties students might face. The direct learning model depends on the teacher's reflection ability so the teacher can continue to evaluate and improve it.

2.2 Mathematics Learning Outcome

Mathematics is basically a subject where doing is more prominent than reading, and is one of the important subjects at the secondary school level [11]. Mathematics material should be systematically from low school level to high school level, from low to high-grade classes. Therefore, the initial competence of students is one of the prerequisites to master the next learning in order to obtain better results. The initial competence of students is needed for teachers to determine the appropriate entry behavior line so that appropriate steps can be taken in the next lesson. The learning environment has a significant effect on student learning assessment [12].

3 METHODS

This action research uses the R&H Classroom Action Research Model which consists of 4 stages, namely the exploration, planning, action and observation, and discussion stages.

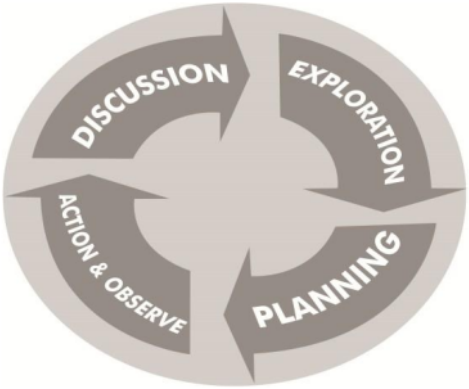

***Fig. 1**. The R&H Classroom Action Research Model*[©]

The participants of this research involved second-grade students in one of the elementary schools in South Jakarta, Indonesia. Of the thirty-two students, consisting of sixteen male students and sixteen female students were involved throughout the research process.

3.1 Data Analysis

Data analysis techniques that researchers use in improving mathematics learning on the subject of simple fraction learning to improve the ability of second-grade students in one school in South Tangerang are qualitative and quantitative data analysis. Quantitative data analysis was performed using descriptive statistics using percentages, calculating the average based on the minimum value of the minimum completeness criteria (MC) of students in mathematics at the end of each cycle to find out the improvement in student learning outcomes. While the analysis of qualitative data through text analysis.

3.2 Data Analysis

Interpretation of tests (scores about concepts or constructs assumed to be measured by tests) [13]. The test used for the measuring instrument of the student's ability, both initial ability, development and improvement of the student's ability during research, as well as ability at the end of the research cycle. Tests are done in writing and orally.

3.3 Observation

Behavioral observation is done by selecting an instrument that is a behavioral protocol for recording behavior, observing individuals for that behavior, and checking points on a scale that reflects behavior (checklist of behavior) [13]. This observation is a direct observation made by researchers in the learning process in second-grade on mathematics. Observations in the form of observation sheets that have been detailed show aspects of the observed process.

3.4 Documentation

Observation of individual behavior is made by selecting an instrument (or using a behavioral protocol) on which to record behavior, observing individuals for that behavior, and checking points on a scale that reflect the behavior (behavioral checklists) [13]. In this activity, the author observes the results or the impact of actions carried out or imposed on students in learning mathematics.

3.5 Triangulation

To validate the accuracy of the findings data, the authors used triangulation. Triangulation is the process of corroborating evidence from different individuals (e.g., a principal and a student), types of data (e.g., observational fieldnotes and interviews), or methods of data collection (e.g., documents and interviews) in descriptions and themes in qualitative research [13].

4 RESULTS AND DISCUSSION

4.1 Pre-Cycle

Based on pre-cycle data, out of 32 students, only eight students received a minimum mathematical completeness score (MCC) = 65, or 25.0%. While 24 students have not yet received an MCC. The data shows that student learning outcomes have not been fulfilled, namely, at least 85% of all students in the class get an MCC score of mathematics = 65. Based on these reflections, researchers must take corrective action in cycle 1 through the adoption of a direct teaching model. Student mathematics learning outcomes data illustrated in graph 1.

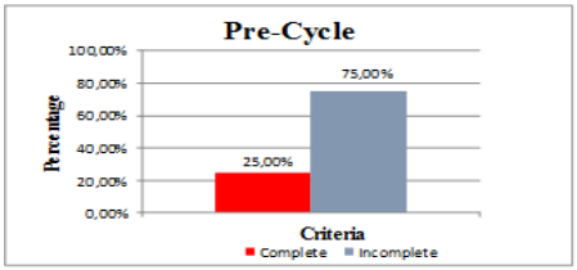

***Fig. 2.** Percentage of student learning outcomes in pre-cycle*

4.2 Cycle 1

Cycle 1 research data shows 27 of 32 students have obtained a minimum completeness criteria score (MCC) = 65, or 84.38%, the remaining five students have not yet received an MCC score. Even so, the percentage of success that was expected to be achieved = 85% of students who obtained the MCC. While observations on teacher performance show 85% of the teacher's actions from the direct teaching model have been carried out. Therefore, researchers continue to improve student mathematics learning outcomes in cycle 2.

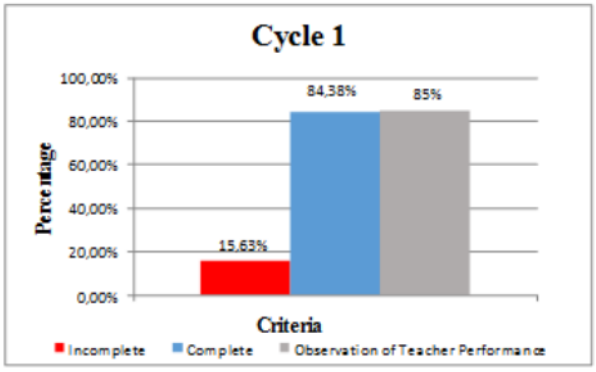

Fig. 3. Percentage of student learning outcomes and teacher observations in cycle 1

4.3 Cycle 2

Cycle 2 data showed that 30 students had obtained MCC scores or 93.75%, only two students had not received MCC scores. While observations on teacher performance show 100% of the teacher's actions from the direct teaching model have been carried out. These results can explain that the use of direct teaching models is proven to improve student mathematics learning outcomes.

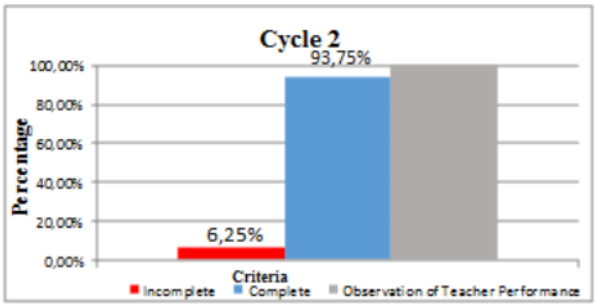

Fig. 4. Percentage of student learning outcomes and teacher observations in cycle 2

Comparison of student mathematics learning outcomes data in pre-cycle, cycle 1, and cycle 2 is presented in table 1.

TABLE 1

STUDENT MATHEMATICS LEARNING OUTCOMES IN PRE-CYCLE, CYCLE 1, AND CYCLE 2

Percentage	Pre-Cycle	Cycle 1	Cycle 2
Students methematics learning outcomes	25%	84.38%	93.75%
Observation of teacher performance	0%	85%	100%

Table 1 shows that in pre-cycle learning activities, students received a percentage of Minimum Mastery Criteria (MMC) of 25%. In cycle 1 it increased by 84.38%. In cycle 2 it increased again to 93.75%. While the teacher observation data in cycle 1 reached 85% completeness of the teaching demonstration model implementation by the teacher. In cycle 2 it increased to 100%. Figure 3 shows a comparison of pre-cycle learning outcomes data, cycle 1 and cycle 2, as well as observational data on teacher teaching in cycle 1 and cycle 2.

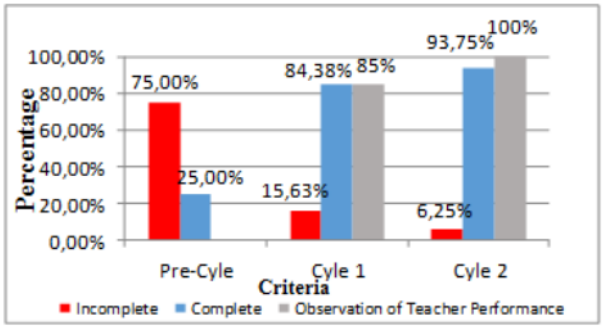

Fig. 5. Percentage of student learning outcomes pre-cycle, cycle 1, cycle 2, and observations of teacher teaching in cycle 1 and cycle 2

This study indicates that the demonstration model can improve the learning outcomes of second-grade students in mathematics about simple multiplication learning principles in elementary school.

5 CONCLUSION

Based on pre-cycle scores, the average student score is 58.03 from the minimum completeness criteria score (MCC) = 65, or eight students (25%), while students who have not reached MCC are 24 children (75%).In cycle 1, the average score of students was 77.65, or 27 children (84.38%) who received an MCC score, while students who had not yet achieved MCC were five children (15.63%). Because less than 85% of students still haven't got an MCC score of 65, cycle 2 action needs to be continued. In cycle 2 there was an increase, of which 32 students, 30 of whom had obtained an MCC math score = 65 or (93.75%). Because learning success has exceeded 85%, for that the study is considered successful, research actions are sufficient and conclusions are drawn. This paper has argued that the use of the demonstration model is able to transfer better knowledge to students, especially in multiplication material as a recurrent addition to elementary school mathematics subjects. The results of this study indicate that the use of direct teaching models is proven

to improve student mathematics learning outcomes.

6 ACKNOWLEDGMENT

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