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IMPROVING MATHEMATIC LEARNING ACHIEVEMENT USING ABACUS COUNTING TOOL FOR DOWN SYNDROME CHILDREN IN THE 3RD GRADE OF SLBP PUTRA HARAPAN GONDANG SRAGEN, CENTRAL JAVA, INDONESIA IN THE SCHOOL YEAR OF 2015/2016

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Abstract:*This research aims to improve the learning achievement of mathematic arithmetic material for the 3rd Down syndrome graders in SLBP Putra Harapan Gondang Sragen in the school year of 2015/2016 using abacus tool. The research approach used was Classroom Action Research (CAR). The subject of research was the 3rd Down syndrome graders in SLBP Putra Harapan Gondang Sragen in school year of 2015/2016, consisting of 4 students. Techniques of collecting data used in this research were documentation, test, and observation result. Technique of analyzing data used was an interactive model of analysis, by comparing the original data before and after action through 2 cycles. The result of research showed that the mean learning outcome score of the 3rd graders was 45.00 in prior condition, 50.00 in cycle I, and 60 in cycle II. From this result, it could be said that there was an improvement of arithmetic ability in the children with Down syndrome with scores of 50.00 in cycle I and 60.00 in cycle Ii. The condition of the 3rd graders in prior condition before the research was conducted was because teacher had not used learning media optimally so that the mathematic learning outcome of the 3rd graders was low. Teacher delivered mathematic learning using abacus counting tool in the material of summing 1-10. The abacus counting media successfully improved the mathematic learning outcome from prior condition to cycle II. The result of research showed that there was an improvement of mathematic learning achievement in cycle I, but it had not fulfilled the target so that it was followed with cycle II; the result of research on cycle II showed that the mathematic learning achievement had met the intended target. Thus, it could be concluded that mathematic learning using abacus tool had successfully improve the learning achievement of the 3rd down syndrome graders in SLB Putra Harapan Gondang Sragen in the school year of 2015/2016.*

Keywords: Abacus, Learning Achievement, Down Syndrome

1. Introduction

Education is a very important to any aspects of human life, requiring human beings to think. Special education is the form of education service dealing with the children with special needs, including those with Down syndrome. Special Education consciously attempts to improve education as well as possible. One of education service given to children in academic area includes, among others, mathematic subject.

Gunarhadi (2005: 221) stated that the mild down-syndrome or educable children are those still having possibility to acquire education in reading, writing and arithmetic at a certain level in special school. Usually for that group, a certain level can be achieved, in parallel with the Elementary School grader or Special School (SLB), and can learn simple skills. The children with Down syndrome need special management in mathematic learning. It is because of abstract essence of mathematic, so that they find difficulty in learning it. To educate the students with Down syndrome, teacher should prepare any aspects supporting teaching-learning process. One aspect supporting the successful teaching-learning activity is the use of learning media.

To help the children with Down syndrome deal with their mathematic learning difficulty particularly in working on summing arithmetic operation, a learning media appropriate to the children condition can be used, so that the students can understand and conceive the learning delivered according to their own ability. One of Mathematic learning media is abacus. Abacus is the mathematic learning media used to explain the concept of a number's position value, addition and subtraction operation.

2. Research Methodology

2.1 Setting

a. Research Location

   This research was taken place in SLB Putra Harapan Gondang Sragen, Central Java, Indonesia

b. Research period

   This research was conducted in the school year of 2015/2016 from January to June 2016.

2.2 Research Type and Strategy

a. Type of research

This study was a Classroom Action Research (CAR). I. G. A. K Wardani, et al (2006: 1.3) stated that *penelitian kelas* is the translation of *classroom action research*, an action research conducted in the classroom. CAR is the research conducted by teacher alone or in collaboration involving author, teacher, students, and other employees of school aiming to improve the system and the performance of teacher in the attempt of improving the quality of students' learning process and outcome. This classroom action research used *abacus* tool to find out whether or not there is an improvement in the students' counting learning outcome for the material of numbers 1-10. In addition, this study also aimed to describe the use of abacus tool in learning arithmetic (counting) for the material of numbers 1-10. The learning implementation in this research was conducted in 4 stages: planning, acting, observing, and reflecting.

b. Research Strategy

The strategy used in this research was descriptive qualitative one. This strategy aimed to describe and to explain the reality in the field through observation. In this case, the object observed was arithmetic learning activities for the material of 1-10 number addition before and after the action was given using abacus tool.

2.3 Subject and object of research

a. Subject of research

The subject of research consisted of teachers and the 3rd graders of SMPLB Putra Harapan Gondang Sragen in the school year of 2015/2016 with Down syndrome. Meanwhile, the students studied consisted of 4: 3 boys and 1 girl.

b. Object of Research

The object of research was the multiplication counting learning activity for 1-10 numbers in mathematics/counting subject in the 3rd graders of SMPLB Putra Harapan Gondang Sragen in the school year of 2015/2016.

2.4 Technique of analyzing data

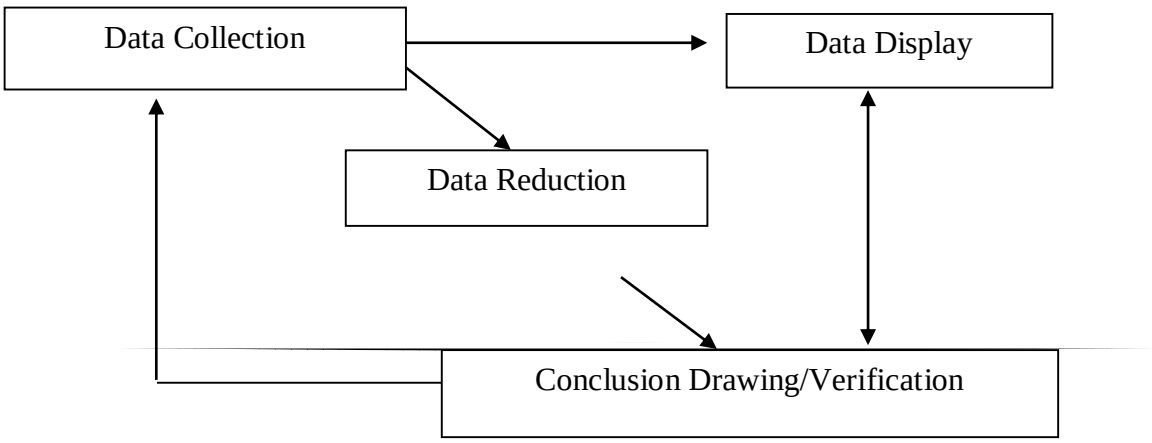

Figure 1. An Interactive Model of Analysis from Miles and Huberman (Iskandar,2009: 76)

2.5 Research Procedure

The Classroom Action Research (CAR) conducted can be illustrated in the figure below.

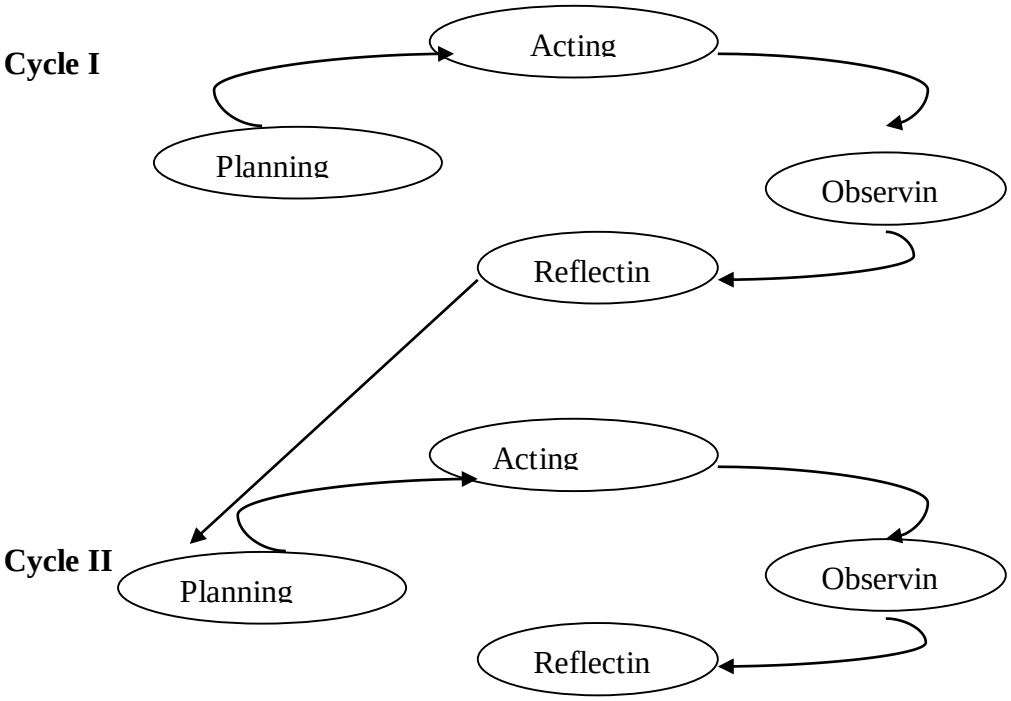

Figure 2. Research Procedure

2.6 Result And Discussion

a. Result

Table of the Comparison of 3rd Students' Score between cycles.

No	Name	Score		
		Prior Condition	Cycle I	Cycle II
1	Woro	50	60	70
2	Arga	40	40	50
3	Ningsih	30	40	50
4	Ajib	60	60	70
Total		180	200	240

Mean Class	45.00	50.00	60.00

For more detail, see the chart below.

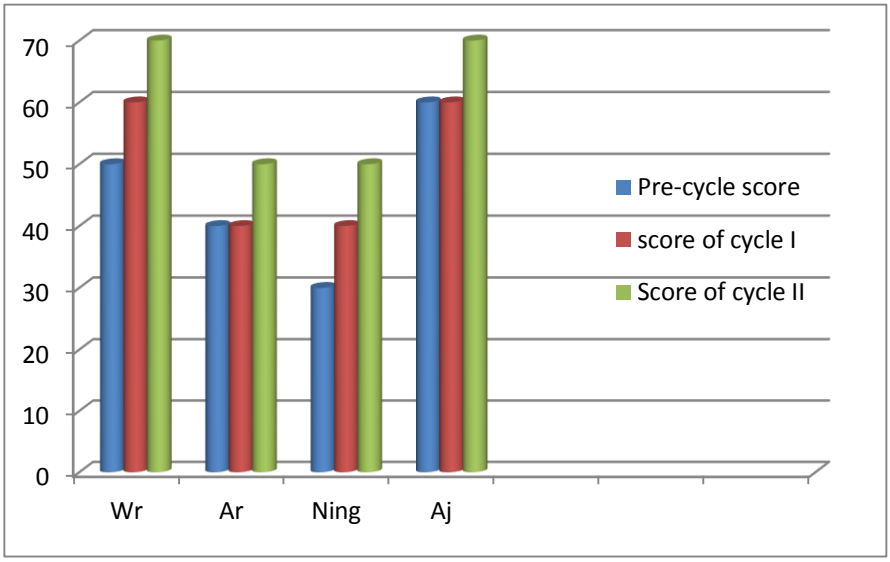

Figure 3. The chart of the comparison of the 3rd graders' mathematic score between cycles.

Considering the data of students' score before the improvement learning shows the mean score of 45.00, this figure increases to 50.00 in cycle I and to 60.00 in cycle II. It indicates that there is an improvement of students' learning activeness and learning outcome in the main material of number counting. Thus, the implementation of learning improvement up to cycle II had been considered as adequate, because the students' understanding to solve the problems shows some improvement. Considering the finding of research and reflection, and the result of implementation of action in cycle Ii before conducting the improvement of learning in 1-10 number addition material in the Down Syndrome 3rd graders of SLB Putra Harapan Gondang Sragen, it can be found that to improve the students' understanding and learning outcome in that material, some ways

can be taken, including abacus counting tool, number addition and increasing the number of exercises, and utilizing demonstration in learning activity.

b. Discussion

The learning outcome indicated in cycles I and II shows that the abacus tool can improve the students' concentration and memory concerning the number calculation so that the learning outcome of students can improve. The improvement of concentration and memory using abacus tool is in line with Wiratna (1999) stating that the main objective of this abacus learning is to stimulate the function of brain thereby developing and achieving the optimum function, and improving speed, appropriateness and precision in thinking, abacus method also practices concentration and memory. Meanwhile, the improvement of students' learning outcome is compensated with the improvement of students in the classroom.

The result of observation on the students' activities during learning process in cycles I and II also improves. The improvement of activity and learning outcome of the down syndrome 3rd graders in SLB Putra Harapan Gondang Sragen in mathematics can be seen in the elaboration above.

This improvement is affected by the use of abacus counting tool; in addition asking the older students to study something is very supporting the learning process. The improvement of affective aspect score of Down syndrome 3rd graders in cycle I and cycle II shows the high interest in mathematic learning using abacus counting tool. Hurlock (1990) said that interest in an individual's wish to pay attention to certain object joyfully to satisfy their need. Nevertheless every counting tool used has advantages and disadvantages as explained below.

1. The advantages of using abacus counting tool:
   a. Counting without smearing on the opaque paper
   b. Facilitating the students to understand the addition material
   c. Improving the students' learning activeness.
   d. Students tend to use the right brain more actively in the addition operation
2. The disadvantages of using abacus counting media
   a. The simple form of abacus lead to the reduced interest in learning among the students
   b. Not all students can use the abacus visual aid skillfully
   c. The students focus only on using the abacus and forget to work on their task.

d. The use of abacus is less practical compared with the use of calculator.

3. Conclusion and Implication

a. Conclusion

Considering the result of class action research conducted in two cycles by applying abacus tool in the Down syndrome 3rd graders of SLB Putra Harapan Gondang Sragen in the school year of 2015/2016, it can be concluded that the learning using abacus tool can improve the arithmetic ability of the Down syndrome 3rd grader of SLB Putra Harapan Gondang Sragen. It indicates that the mean score of students is 45.00 in pre cycle in prior condition, increasing to 50.00 in cycle I and 60.00 in cycle II. Thus, classically, the learning has passed successfully the learning.

This study is a Classroom Action Research (CAR) consisting of two cycles. The subject of research is all of Down syndrome 3rd graders of SLB Putra Harapan Gondang Sragen consisting of 4 students. The techniques of collecting data used are interview, observation, test, and documentation. Data validation is carried out using an interactive descriptive analysis.

b. Implication

The learning application and procedure in this research is based on the learning by using abacus counting tool in implementing Mathematic learning. The model used in this research is cyclic model, consisting of two cycles. Cycle I was conducted from April 11 to 13 and Cycle II was conducted on from April 25 to 27. The indicators are: (1) can recognize the addition as repeated addition, (2) can add the number up to 10 in many ways, and (3) can solve the problems containing addition. In each implementation of cycle there are four steps of activities: planning, acting, observing and reflecting. This activity was conducted cyclically; before the implementation of action in each cycle, there should be a planning by considering the previous cycle's success. The action in each cycle can improve the quality of learning. It can be seen from the analysis on process improvement progress in cycle I and cycle II. Considering the result of research above, it can be found that the abacus counting tool can improve the mathematic learning achievement. This research has the following implications.

a. Theoretical implication

Theoretical implication of research shows that the learning by using abacus tool can improve the Down syndrome students' counting ability in the material of numbers 1-10.

In presenting the learning material, teacher should choose the appropriate learning method to make the students mastering the learning material well. The learning using abacus counting tool can improve the counting ability in the material of number 1-10 because in this learning can experiment freely so that the students will understand easily and memorize by themselves without compulsion and pressure from parents and teachers.

b. Practical implication

This result of research can be used as the input for the teacher to improve the appropriate learning strategy and method thereby improving the quality of teaching-learning process in line with the objective to be achieved by the students. Therefore this research can be used and developed by the teachers dealing with the similar problems usually encountered by most students. The constraints in mathematic learning using abacus counting tool should be dealt with as maximally as possible. For that reason, activeness, creativity, motivation and ability highly support the successful learning, particularly mathematic learning.

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