IMPLEMENTATION OF ABACUS MEDIA TO IMPROVE BASIC MATHEMATICS LEARNING OUTCOMES IN VII GRADE BLIND ABK STUDENTS AT SLB A YAKETUNIS

Firmawati [a], Syariful Fahmi [b]
Program Studi Pendidikan Matematika Universitas Ahmad Dahlan
Jalan Ring Road Selatan, Tamanan, Banguntapan, Bantul Yogyakarta
[a]firmawati1500006105@webmail.uad.ac.id, [b]syariful.fahmi@pmat.uad.ac.id

ABSTRACT

Mathematics is an abstract science, and it makes the students difficulties in completing a matter of mathematics, one of the materials about addition and subtraction operations. The research aims to test abacus media's use to improve basic mathematics learning outcomes for blind exceptional children. This research used the SSR (Single Subject Research) method. The subject of this research is Class VII blind. Data collection techniques used learning outcomes tests, interviews, and student responses during the treatment implementation. The data obtained were analyzed through descriptive statistics and displayed in graphical form. Technical analysis of the data used the analysis of conditions and analysis between conditions using AB research design. The results showed that the Baseline phase had a length of conditions for three days and the Intervention phase had a length of conditions for five days. The ability addition and subtraction operations results are shown by increasing the score at the mean level. Students' mean level increased from before being given treatment from 48,33 to 88 after being given treatment. Based on the research and discussion results, Abacus media can improve student learning outcomes and subtraction operations material in the seventh-grade class VIIA blind Exceptional Children in A Yaketunis.

Keywords: Single Subject Research, Abacus Media, Learning Outcomes, Blind Exceptional Children, Addition, and subtraction.

INTRODUCTION

Education in Law of the Republic of Indonesia Number 20 of 2003 is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have religious-spiritual strength, personality, intelligence, noble morals and skills needed by themselves, the community, nation, and state.

Mathematics is an essential ability of students that must be mastered by every student, including students who need special services, one of which is students who have vision problems or are commonly known as blind students. (Herwanto, S., 2014: 10). Mathematics learning is sometimes less effective for children with special needs (ABK) with visual impairments because the objects studied are abstract (Sari, N.A. 2014: 111). Counting is an abstract subject and is still considered a difficult activity. Difficulty learning to count is a type of learning activity in schools besides reading and writing activities (Insani, M.T., and Hartono, W. 2017: 2).

According to Herwanto S. (2017: 2), the ability to operate counting blind children is very low, including (1) lack of practice in arithmetic operations; (2) the delivery is monotonous and less varied; and (3) less than optimal use of learning media. Based on this, Usman in Insani, M.T., and Hartono, W. (2017: 2) stated that learning media has a vital role in helping to create effective and efficient learning. In line with that, Herman in Sari, N.A (2014: 111) explains that learning media includes tools that are physically used to convey learning material content.

Based on the results of observations made by researchers at SLB A Yaketunis with Mr. Warno as a class VII Mathematics teacher at SLB A YAKETUNIS, information was obtained that learning mathematics is difficult to learn and difficult to teach children with special needs (ABK) with visual impairments because the objects studied are abstract, one of which is arithmetic operation material. The student's mathematics learning outcomes are still below the Minimum Completeness Criteria (MCC). The

MCC value that students must achieve is ≥70, especially in the material of addition and subtraction arithmetic operations. So the researchers used the Single Subject Research (SSR) type of research to know the ability of addition and subtraction operations to blind students with special needs. This is supported by research by Nuari, LF et al. (2019: 140) using a single subject or Single-Subject Research (SSR) with the results of the research that learning division operations in students with mental retardation using GASING can improve learning outcomes and have a good effect. To students. This is reinforced by Sari, N. A. (2014). It can be concluded that the abacus media is more effective in improving the subjects' mathematics skills than Blokjes media. Furthermore, research conducted by Insani, M. T. and Hartono, W. (2017: 2) can be concluded that abacus media is effective in improving mathematics learning outcomes for blind grade IV students at SLB Negeri Praya.

METHODS

This type of research is a Single Subject Research (SSR) study to determine students' development with visual impairments Yaketunis in improving mathematics learning outcomes and subtraction operations. Sunanto, J., Takeuchi, K., & Nakata, H. (2005: 55) explained that research with a single subject is an experimental study carried out to determine how much influence the treatment or treatments given to the subject.

In the single-subject design, the measurement of the dependent variable or target behavior is carried out repeatedly for a certain period. Comparisons are not made between individuals or groups but are compared to the same subject under different conditions (Sunanto, J., Takeuchi, K., & Nakata, H. 2005: 54). Single-subject research or SSR refers to a research strategy developed to document changes in individual subjects' behavior. Here is a baseline condition, a condition where target behavior measurement is carried out in a natural state before any intervention is given (Sunanto, J., Takeuchi, K., & Nakata, H. 2005: 54).

The design used in this research is the A-B design. The A-B design is no replication (repetition) of measurements. The baseline phase (A) is a phase where the target behavior is measured periodically until it appears stable before a particular treatment is given. The intervention phase (B) is when the target behavior is measured during a particular treatment until it is stable. Each is done only once for the same student, therefore, with this design, it cannot be concluded, or there is no guarantee that changes in the target behavior are caused solely by independent variables (intervention) (Sunanto, J., Takeuchi, K., & Nakata, H. 2005: 56). What is measured in this study is the learning outcomes of addition and subtraction operations using abacus media.

RESULTS AND DISCUSSION

This research was conducted at SLB A YAKETUNIS during learning hours and broke at school. The results of the Single Subject Research (SSR) study used designs A (baseline) and B (intervention), then the data obtained were analyzed using visual analysis of graphic data. This study aimed to obtain data on the effectiveness of abacus media in improving essential mathematics learning outcomes. This research was conducted for eight days, divided into three days (one-day session for 35 minutes), called the baseline, while the intervention was carried out for five days (one day for 35 minutes).

Based on the explanation of the process during the baseline and intervention, all data can be accumulated in tables and graphs as follows:

Table 1. The Accumulation of Scores Obtained by Students During the Baseline and Intervention

Target behavior to be studied	Fase	Meeting to-	Score obtained
Upgrade Basic mathematics learning outcomes	Baseline	1	40
		2	50
		3	55
	Intervensi	1	80
		2	85
		3	90
		4	90
		5	95

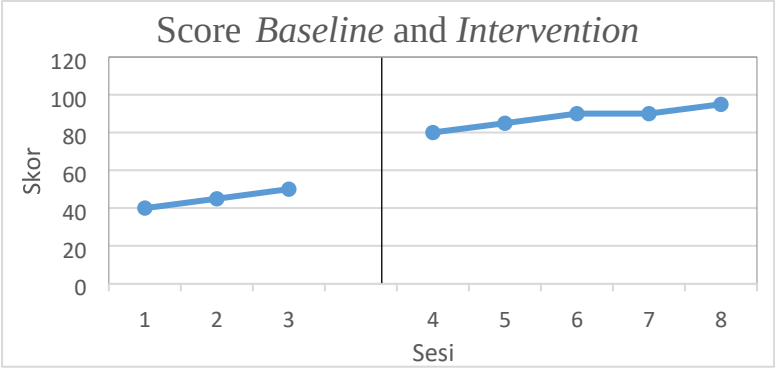

Figure 1. Graph of the Accumulation of Students' Score Acquisition During Baseline and Intervention

Data analysis in this study was carried out using descriptive statistics with graphical analysis. The components in this study were analyzed using analysis in conditions and analysis between conditions. The components to be analyzed are the baseline phase and the intervention phase. Analysis in conditions, namely analysis carried out in one condition in one phase, namely in the baseline phase.

In this study, it can be seen that the length of the conditions in the baseline phase (A) = 3, the intervention phase (B) = 5. The estimation of the direction in the baseline phase (A) is increasing, the intervention phase (B) increases. The data in the baseline phase (A) tend to unstable or variable stability, and intervention (B) tends towards stable data stability. The rate of change in data in the baseline phase (A) and the intervention phase (B) increases. At baseline (A), the change level is 55 - 40 = (+) 15. At the intervention stage, the change level is 95 - 80 = (+) 15, the trace data on the baseline phase (A) and the intervention phase increased.

The explanation above can be arranged in more detail through the following table:

Table 2. Summary of Data Analysis Results in Conditions

No.	Condition	Student mathematics learning outcomes in the phase-	
		Baseline (A)	Intervention (B)
1	Long Condition	3	5
2	Estimation of Directional Trend	/	/
3	Trend of Stability	Variable (66,67%)	stable (100%)
4	Data trail	/ (+)	/ (+)

5	Stability level and range	variable 52,455 − 44,205	stable 80,875 − 85,125
6	Change level	55 − 40 = (+)15	95 − 80 = (+)15

After obtaining the results of the analysis in conditions, the subsequent analysis is the analysis between conditions. Analysis between conditions is an analysis that involves all phases, namely the analysis of the baseline phase and the intervention phase. In this analysis, the components under study are the changed variables, trend direction and effects, changes in stability trends and their effects, data level changes, and overlapping or overlapping data. The five components were analyzed by comparing the two phases, namely the baseline phase (A) and the intervention phase (B).

The stability trend determines the homogeneity of the data under a condition. In addition to the trend of stability, it also depends on the conditions of level change and the overlap between the two conditions on the target behavior to see whether there is an effect of the intervention on the dependent variable. The smaller the overlap percentage, the better the intervention's effect on the target analysis results between conditions summarized in Table 3.

Table 3. Summary of Analysis Results Between Conditions

Condition	B/A
Number of variables changed	1
Change in direction and effects	(+) (+) Positif
Change in trend stability	Stabil ke stabil
Level change	80-55=35
Overlapping percentage	(0:5) x (100%) = (0%)

Based on the table data above, it can be explained that the number of variables changed is one, namely the baseline condition (A) to the intervention (B). Changes in the trend of direction between baseline conditions (A) and intervention (B), namely increasing to increasing, which means that in the baseline phase there was an increase in mathematics learning outcomes in the ability of students to add and subtract operations, then with improved or favorable conditions after the intervention. Done.

This research was conducted at SLB A, Islamic Blind Keseelfare Foundation (YAKETUNIS), which is addressed at Jalan Parangtritis No. 46, Mantrijeron, Yogyakarta City, Yogyakarta Special Region. Location of SLB A Yaketunis is located ± 200 meters from the main road. High walls surround the outside of SLB A Yaketunis, and two gates are facing south and facing north as the main gate, on the north side of the main gate is used as a parking lot for motorbikes.

This research was conducted by taking a classroom setting with a description of the class's physical conditions consisting of approximately four tables for students and teachers, two student chairs, one teacher's chair, relaxation tools, and brille pictures and writing walls in the classroom. The classroom environment is relatively clean; air circulation and lighting and lighting are quite good.

The limitations experienced by blind children in understanding abstract concepts require students to use the media to understand abstract concepts, including the addition and subtraction operations material. Students also have other characteristics, such as easy to forget and lose counts, so that not all media can be applied in the learning process. The reason for the use of instructional media in the learning process According to Max A. Sobel and Evan M. Maletsky (2004: 67), the strategy of using teaching aids can make the situation real for students so that it helps motivate students and can arouse students' interest in problems that occur. Faced.

In improving mathematics learning outcomes, addition and subtraction operations require students to be able to think abstractly. Facts in the field show that class VII blind children at SLB A Yaketunis still have problems related to the operation of addition and subtraction materials.

One of the media uses in visual form is abacus media, which can be used in the teaching and learning process for blind children in improving mathematics learning outcomes. This is because the abacus media can provide attraction and generate interest in learning. The obstacles experienced by blind children in learning addition and subtraction arithmetic operations can be overcome.

The baseline test results showed that students tended to be anxious in doing this baseline test and seemed confused about some of the questions asked, but the students still worked on the readout questions. Students also seem to occasionally ask researchers about abacus media that are still common to students related to calculating addition operations. Based on the analysis of student work results, the student's error lies in counting, which is still confused between doubting or not remembering the amount that has been calculated, so sometimes it must be provoked first. Several question commands must be subtracted, but the question commands are added, and vice versa.

Figure 1. Baseline process phase

In the first intervention, students showed more concern for abacus media. Students also feel good about the movable rings. Students also seem to be active in answering various teacher questions, even though they are sometimes still wrong. Students forget quickly, and to restore memories about students' answers must be provoked first.

In the next intervention, students were again enthusiastic about participating in the lesson and diligently listening to the researchers' explanations. Students seem to enjoy the intervention process and can carry out the researchers' orders correctly. Students begin to get used to and begin to understand the addition and subtraction operations of 2 numbers. Students actively answer questions and have started independently to operate addition and subtraction numbers well.

Figure 2. The first intervention phase process

During the intervention process, students were very enthusiastic about moving the rings according to the questions ordered. Students look more excited when counting the remaining rings on the

right side more calmly without worrying about making mistakes. Overall, students do not experience difficulties in using abacus media; students can also use media well.

The use of abacus media during the study showed a change in student learning outcomes. These changes can be seen from the students' scores during the test in the baseline and intervention phases. Data processing and analysis in the baseline and intervention phases above show that abacus media can improve fundamental mathematics learning outcomes and subtract operations material for the students studied. According to the opinion expressed by Azhar Arsyad (2016: 11), the more sensitive devices used to receive and process information, the more likely it is that the information will be understood and retained in memory. One of the benefits of learning media in the student learning process was also stated by Sudjana and Rivai (1992) in Azhar Arsyad (2016: 28) is that students can do more learning activities because they do not only listen to teacher descriptions but also other activities such as observing, doing, demonstrate, act out and more. Hamalik in Azhar Arsyad (2016: 19) also suggests the benefits of learning media: it can generate new desires and interests, generate motivation and stimulation of learning activities, and even bring psychological influences on students.

Based on these opinions, it can be concluded that the benefits of using learning media in the field of mathematics, namely learning media can make it easier for students to think faster, generate motivation, learning methods will be more varied, not merely verbal communication from the teacher so that students do not get bored quickly during mathematics lessons. Take place.

In addition to the benefits of learning media mentioned, the use of unix or abacus media, according to Daryanto (2016: 35), is to understand decimal place values, especially units, tens, hundreds, and thousands. In a limited way, it can also be used for basic arithmetic operations of natural numbers. In this study, the most prominent function of abacus media for students is to motivate interest and action. Students are always enthusiastic in following every direction and do not feel burdened by working on addition and subtraction questions because this media's presence assists them.

Based on the explanation above, the researcher has obtained all the standard criteria for the effectiveness of the media with the comparison of the results of the study, that the abacus media is proven to be able to improve basic mathematics learning outcomes of the addition and subtraction arithmetic operations material for children with special needs class VII. This has been proven by fulfilling the following criteria:

a. There is a change in student mathematics learning outcomes about addition and subtraction, marked by a positive change (increasing) during the students' baseline test and intervention.
b. Improved scores both qualitatively and quantitatively on the results of the baseline and intervention tests.
c. There is an increase in the student's ability to perform addition and subtraction arithmetic operations, which has been proven by increasing the percentage of students' ability to answer each test question.
d. Overlapping data during the study 0%.

Classification of the level of media effectiveness is taken from the results of overlapping data in the study. The reality in question is the number of percentages that overlap the results of the analysis between conditions. Sunanto, J., Takeuchi, K., & Nakata, H. (2006: 116) stated that the smaller the percentage of overlap data, the greater the intervention's influence on the desired goal.

This study aimed to test the use of abacus media to improve learning outcomes of fundamental mathematics and subtraction operation materials for blind children in grade VII. By examining the results of data analysis and processing, it can be seen that overall, the use of abacus media can improve mathematics learning outcomes for blind children in matters related to addition and subtraction operations.

CONCLUSION

Based on the research and discussion results, it can be concluded that abacus media can effectively improve mathematics learning achievement regarding addition and subtraction operations in class VII blind children at SLB A Yaketunis. Abacus media is a numeracy learning tool that can explain

the concept or meaning of the place value of a number (units, tens, hundreds) and basic calculation operations. The abacus media is made of a wooden frame, inside which there are rings attached to a grate. The parts that exist in the abacus media consist of frames, rings, separation poles (bars). The functions of the parts on the abacus media, the frame to assemble or unite all the parts, the rings represent the symbol of the number 1 (one), the pole and the dividing line (bar) of each pole to showplace values such as units, tens, and so on.

The study results were based on observing students' abilities in answering addition and subtraction operation questions. Students were able to operate the addition and subtraction of two numbers, addition and subtraction of 3 numbers, and mixed counts with a maximum of 100. The behavior showed this during treatment. Namely, students were active during the process. Treatment such as enthusiastically listening to the teacher's explanation, responding by following the teacher's instructions when practicing abacus media during the learning treatment.

In terms of the addition and subtraction operations obtained by students with increasing scores at the mean level. The mean level of students increased from 48.33 at baseline to 88 at the time of intervention. Based on the research and discussion results, it is known that abacus media can improve learning outcomes of fundamental mathematics and subtraction operation material in blind children grade VII at SLB Yaketunis.

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