

Development Mathematic Assessment to Increase Mathematical Prerequisite Ability on The Student with Learning Disabilities in Inclusive Elementary School

Robiansyah S T U^{1*}, Nanang F² and Hidayat³

¹Prodi Pendidikan Khusus, Pascasarjana, Universitas Pendidikan Indonesia, Jl. Dr. Setiabudi no 229, Bandung 40154, Jawa Barat, Indonesia

²Departemen Manajemen, Universitas Pendidikan Indonesia, Jl. Dr. Setiabudi no 229, Bandung 40154, Jawa Barat, Indonesia

³Departemen Pendidikan Khusus, Universitas Pendidikan Indonesia, Jl. Dr. Setiabudi no 229, Bandung 40154, Jawa Barat, Indonesia

*uchiharobiansyah999@gmail.com

Abstract. The purpose of this study was to introduce about mathematic assessment is a process of obtaining data or information about the mastery of a student's mathematical skills as an ingredient in preparing a learning program. With this mathematics assessment can be known obstacles, difficulties and needs of students especially in the field of mathematic, so that the learning program will be in accordance with the potential students because it is tailored to what is required of students. This research study was conducted at elementary school of inclusive precisely at SDN Sukagalih I Bandung City based learning in setting of inclusive education. This research study is motivated by the existence of a first-grade student who has disabilities learning in mathematics, the ability of the mathematical prerequisite mastery of the classification of objects by color. The results of the research can provide a profile picture of student data information, the data obtained from the results of the development of systematic and formal mathematical assessment. After doing the development of mathematics assessment then the teacher gets important related information: 1. process the analysis of students' learning needs, especially in the field of mathematics, 2. preparing the learning program planning according to student learning needs, 3. Designing procedural of method remedial program.

1. Introduction

Learning done in schools is a process of delivering teacher information to students that take place dynamically. The learning process requires teachers and pupils to interact when learning, with the aim that the information conveyed can be received by students well. The role of the teacher in addition to conveying information, he is also tasked with diagnosing students' learning difficulties, selecting teaching materials, using instructional media, developing and using learning strategies and methods. One of the subjects in school is the subject of mathematics. Mathematics is a symbolic language whose practical function is to express quantitative and spatial relationships while its theoretical function is to facilitate thinking. Many students in schools think mathematics is the most difficult subject [1]. Everyone should learn mathematics because it is a means to solve problems in everyday life, as well as in language,



reading, and writing [2]. In addition, the methods used in the learning process to understand the ability of prerequisite mathematics is a medium of learning that has been frequently used so that children appear often feel bored in the process of learning mathematics. This research was conducted in elementary school of inclusion precisely at SDN Sukagalih I Bandung City based on learning in class with setting of inclusive education. This research is motivated by the existence of two students of class I who have difficulty learning on mathematics subject in the ability of mathematics prerequisite that is mastery of object classification based on color. The ability of classification based on the color in question consists of the ability of grouping the same colored objects and grouping objects of different colors. This is caused by the lack of students' understanding of the concepts, skills and problem solving, then what is likely to happen is that the teacher needs to know the difficulties and provide special handling for the students who have difficulty in learning especially mathematics. According to Hallahan and Kauffman explains that special learning difficulties are a disturbance in one or more psychological processes that include understanding and use of speech language, writing and concepts of arithmetic [3].

Then the need for the development of assessment of learning mathematics, Assessment is the process of collecting data and information that aims to determine the abilities and difficulties experienced by students in solving problems in mathematics lessons. The data is obtained from the information and formal assessment. After the assessment we get information, do analysis and learning program plan. The main purpose of the assessment is to improve the quality of student learning, not just for the determination of the score (grading). Assessment is therefore intended as a strategy in solving learning problems through various means of collecting and analyzing information for decision making (action) relating to all aspects of learning [4]. Information like this helps the teacher to identify the problems that the student faces before he decides what action will be taken to help the student. Mathematics assessment is a process of obtaining data or information about the mastery of a student's mathematical skills as an ingredient in preparing a learning program. With the development of this mathematics assessment can be known obstacles, difficulties and needs of students especially in the field of mathematics, so that the learning program will be in accordance with the potential students because it is tailored to what is required of students.

The results of this study can provide a profile picture of students' data about the learning disabilities of mathematics about the ability of mathematics prerequisite in class I in elementary school inclusion, the data obtained from the development of systematic and formal mathematical assessment. After the development of the mathematics assessment, the teacher obtains important information in order to carry out the related learning process: 1. to process the analysis of students' learning needs especially in the field of mathematics, 2. to arrange the learning program planning according to the students' learning needs, 3. Designing the procedural of method remedial program.

2. Literature review

2.1. *Difficulty of learning mathematics*

The difficulty of arithmetic/mathematics is the difficulty in using symbolic language to think, record, and communicate ideas relating to quantity or quantity. The ability to calculate itself consists of a multilevel ability from basic ability to, advanced ability. Therefore, calculation difficulties can be grouped according to the level of basic numeracy, the ability to determine place value, the ability to perform addition operations with or without storing and subtraction techniques with or without borrowing techniques, the ability to understand the concept of multiplication and division according to Muhammad [5] explained that the qualification of the difficulty of numeracy / mathematics can be seen in the description below. Basic numeracy skills, consisting of:

- a. Classifying (classification), namely the ability to group objects according to color, shape, and size. Similar objects are grouped in a set. In children who have difficulty classifying, the child has difficulty determining odd and even numbers, cache numbers, native numbers, fractions, and so on.
- b. Comparison, namely the ability to compare the size or quantity of two objects.

- c. Sorting (seriation), ie the ability to compare the size or quantity of more than two objects the pattern of self-sorting can start from the most minimal to the maximum or vice versa.
- d. Symbolizing, that is, the ability to make symbols of quantities in numbers or symbols of operation signals of a counting process such as a sign (sum), (subtraction), (multiplication), or (division), (less than), (more of), and (equal to) and others. The mastery of these symbols will be useful when the child performs the count operation.
- e. Conservation, ie the ability to understand, remember, and use a similar rule in the process/operation of the count that has in common. The concrete form of conservation is the use of the formula or rule of a counting operation. If this mastery is not owned before then, the child will have difficulty when translating the sentence of the language into a mathematical sentence on the story.

2.2. *Identify of learning disabilities*

Understanding of Identification. Identification can be interpreted as identifying. Identification is interpreted as the process of crawling while the assessment is interpreted filtering. Identification is carried out by parents, teachers, and other education personnel in an attempt to screen the child with an abnormality (physical, intellectual, social, emotional / behavioral) in order to provide appropriate educational services. Identification purposes for five purposes: screening, referral, classification, learning planning, and monitoring of learning progress. How to Identify can be done based on the symptoms that can be observed such as: Symptoms of learning outcomes. Example: Low learning achievement which resulted in not going up grade. One way to identify is to collect learners' data with some data collection techniques. Observation of attitudes and behaviors can be done by filling out a check list that contains behaviors to be observed in accordance with suspected deviant behavior. One example of a checklist form that can be developed is the following: The Behaviors Observed by Teachers, and educators need to develop creative forms of observation sheets. Observation. done every day in the classroom or outside the class at rest. In addition to the observation sheets, data collection can be done by interviewing the students concerned, parents, teachers, and friends. Document analysis is also done for the data collection of learners. The document contains a list of the value of the assignment, the test he has ever taken is also used as a source of information.

2.3. *Inclusive education*

Inclusive education is a new development of an integrated education system or integration, in inclusive education, each child is tailored to the needs in particular, all cultivated can be served optimally by making various modifications and/or adjustments. Although the definition of inclusive education is progressive and constantly changing, it is necessary to clarify the concepts contained therein, since many regard inclusive education as another version of Special Education or Special Education, the concept underlying inclusive education is very different with the underlying concept of special education. Inclusion or inclusive education is not another term for special education. The concept of inclusive education has much in common with the concept of education for all and the concept of school improvement, inclusion education is an innovative and strategic educational approach to expand access to education for all children with special needs, including children with learning disabilities.

3. **Methods**

The method used in this research is a single subject experimental method (single subject experiment). With A-B design. The design of A-B indicates a causal relationship between the dependent variable and the independent variable [6]. At first the target behavior is measured continuously at baseline condition (A) with a certain period of time then under intervention condition (B). The single subject experimental method in this study is used because the number of subjects under study of a single subject. This method is known as a measure of the treatment given to behavioral changes of the subject that need to be observed in detail and carefully. At first the target behavior is measured continuously at baseline condition (A) with a certain period of time then under intervention condition (B). At the Baseline (A)

stage, students with learning difficulties are asked to classify objects by color using 15 pieces of objects consisting of the same and different color groups in four days for an hour. At the intervention stage, the subjects were given intervention in the form of treasure game media for eight sessions until there was an improvement in the mathematics preparatory ability of grade I elementary school students.

3.1. Subject research

The purpose of this study is the development of mathematics assessment with the treasure media to improve the ability of mathematical prerequisite two students who have learning disabilities of mathematics in class I at Primary school level that initials D and J 6 years old, and the treatment using game media treasure, especially in the mastery of the classification of objects Based on color. The classification capability based on the color in question consists of the ability of grouping the same colored objects and grouping different treasure media colors.

3.2. Research location

This research was conducted in elementary school of inclusion precisely at SDN Sukagalih I Bandung City based on learning in class with setting of inclusive education. This research is motivated by the existence of two students with learning disabilities of class I who have difficulty on mathematics object or symbolic in the ability of studying mathematics

3.3. Data collection technique

This research uses the technique of collecting test data and non-test. The test used in this study is a test of action because this test is very useful, especially to determine the ability of mathematics pre-requirement, the stimulation is given in the objects of 15 pieces that have different colors. In the evaluation process students are asked to group objects by color. Instrument used in this research is instrument of action test and oral test. Non-test data collection using observation method. Observations are directed to obtain data about the ability and type of difficulty in the subject's mathematical preparatory abilities especially in the classification of objects by color.

3.4. Research process

Implementation of the study is tailored to the schedule of mathematics courses in schools conditioned in playful classroom situations. Before it begins, the teacher collects objects that want to be hidden in the sand to be found by the child. The teacher made sure there was more than one item for each color and shape. Before the children came, the teacher hid the objects in a sandy sack. Upon arrival, the students are asked to sit facing the sandy sack. Then it was explained that every student would get a turn digging the sand and seeing the hidden objects inside the sack. After that the children classify the same colored and different colors. The treasure game media does not use win and lose methods so that students are not penalized if lost, students will only have logical consequences when students do not follow the rules and wait their turn to play.

3.5. Data analyzed

Data obtained from the results of the research on Baseline (A) and Intervention (B) were processed and analyzed using descriptive statistics in order to obtain a clear picture of the outcome of the intervention on improving the mathematics preparatory ability of grade I students of elementary school after being given intervention within a certain time period Using the treasure game and presented in graphical form. The graph used in presenting the results of this study is the child's early ability to get the intervention and the process during the intervention is seen easily and in detail. Visual analysis of charts is an analytical method used in single subject research [6].

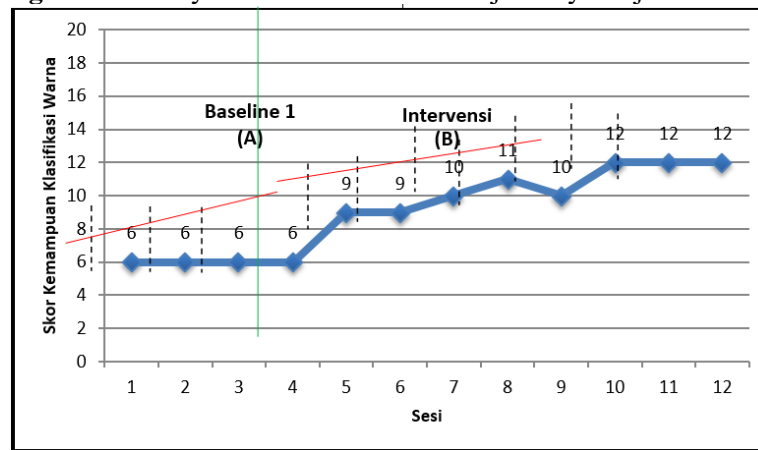
4. Results and discussion

4.1. Results

Table 1. Baseline Data (A) and Intervention (B) Use of Treasure Games to Improve Mathematical Prerequisite Ability

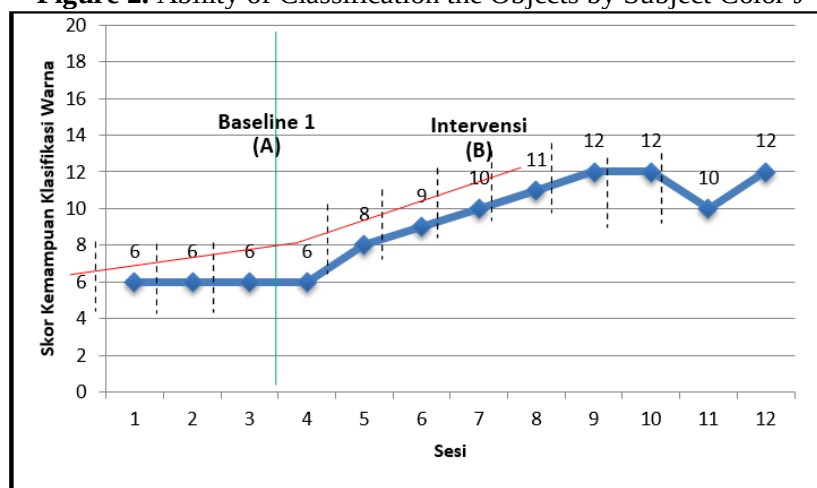
Siswa	Baseline (A)						Intervensi (B)					
	1	2	3	4	5	6	7	8	9	10	11	12
D	6	6	6	6	9	9	10	11	10	12	12	12
J	6	6	6	6	8	9	10	11	12	12	10	12

Figure 1. Ability of Classification the Objects by Subject Color D



Comparison of the baseline phases (A) and intervention (B) on figure 1 based on the rate score has increased. The chart illustrates clearly in accordance with the enhancement of mathematical prerequisite abilities. Increased mean score of baseline phase (A) and intervention (B) (figure 1) is 6 to 10.62. Each phase does not change with an overlap score (A / B) of 0% meaning subject D does not experience overlap between baseline score (A) and intervention (B).

Figure 2. Ability of Classification the Objects by Subject Color J



Comparison of baseline phases (A) and intervention (B) on chart 2 based on increased rate scores. The chart illustrates clearly in accordance with the enhancement of mathematical prerequisite abilities. The increase in mean baseline (A) and intervention (B) (chart 2) is 6 to 10.5. Each phase does not change with an overlap score (A / B) of 0% meaning subject J does not experience overlap between the baseline score (A) and intervention (B).

4.2. Discussion

Learning difficulties are various forms of real difficulty in listening, conversing, reading, writing, reasoning, and / or numeracy [7]. The disorder is an intrinsic disorder suspected due to central nervous system dysfunction. Learning difficulties can occur simultaneously with other disorders (eg sensory disorders, social barriers, and emotional). These external disturbances are not a factor in the condition of learning difficulties, although they are a factor that aggravates existing learning difficulties. Therefore, the subjects of this study experience obstacles when performing object classification, such as grouping objects of similar color and different.

1. After observing and analyzing the problems that occur in children during the 4 baseline sessions, the student is given intervention according to the needs and interests of children's learning. The ability of classification of objects by color in the subjects of research has increased. Intervention given in the form of demonstration and practice using game media of treasure. The intervention session begins by getting the child to know a group of objects that have the same and different colors. After that the child is invited to also mention the name of the existing object color.
2. When subject D is given the intervention of grouping objects of the same color, different, and mentioning the name of the color of a child object can already do so in the third session. During the intervention session, the child only needs to be reminded without the need to be assisted during the process grouping. However, in the fourth session until eight children have been able to classify the object independently. During the intervention process the child also looks very happy, focused, and can more easily understand the concept of color being taught. In the first session of subject J only given an explanation how to group objects by the same color, different, and mention the name of the object color. In the second session, the child is only reminded without being given full assistance. In the third session and so on the student can already do it independently. When the child's play process looks very happy even when the intervention session is felt enough children continue to want to repeat the play activities and more quickly classify objects based on color.
3. Based on the results of processing and analysis of data and graph line A-B above, the value obtained from the test results indicate that the use of game Treasure has given an increase to the ability of mathematics prerequisite, especially in terms of classification of objects by color. The results of data processing and analysis show improvement of D and J subject capability in the ability of classification of objects by color.
4. The empirical can be seen from the comparison of the mean level in the baseline (A) subject D chart of 6 and intervention (B) of 10.62 with the stability of the development of the target behavior up to 100% with stable condition. On the subject graph A between the baseline (A) of 6 and intervention (B) of 10.5 with the stability of the development of the target behavior increases to 100% with stable conditions.
5. Based on the results of the above research shows the development of mathematics assessment by using game media Treasure can be used in the process of learning mathematics prerequisite of learning disabilities student learn as a subject. Treasure game media can also be used to provide mathematical precision learning on other aspects, such as the introduction of shape and size of objects for primary school students in general as well as other mathematically challenged students. In addition, the game media of treasure also has game values such as fun, interactive, simple, and informative.
6. Based on the explanations that have been disclosed in this research has been answered the development of assessments conducted to give effect with the improvement of the mathematics pronunciation ability of subject D and J in the ability of classification of objects based on color using game media Treasure.

5. Conclusion

The one impacts of cognitive impediments of students learning difficulties in the mathematical aspects of learning is the error of children in recognition of numbers, in understanding space or place, looking at various objects in relation to groups, counting objects in sequence, paying attention to certain objects or objects in relatively long time, and understand the symbols, the difficulty in reading, understanding the value of the place, the process of counting operations [8]. Observations in the classroom conducted by the researcher showed that during the learning process and the pursuit of students experiencing learning difficulties experienced some barriers in receiving information and lessons related to mathematics subjects, so that the ability of teachers in ensuring the obstacles/learning difficulties can be obtained through the process of assessment development [9]. Development can provide students with an overview of the difficulty, initial ability, and learning needs. One example that appears on the observations made is the use of media that is less precise is a problem in learning mathematics because during the learning process researchers see the media used by teachers less interesting and tend to boring. Then the development of mathematical assessment is done by utilizing media that can be used for children with learning abilities in understanding the concept of mathematics prerequisite on the ability of classification based on the color consisting of the ability to group objects of the same color and classify different treasure media colors [10].

Development of assessment by using the treasure game media is one of the learning media that is expected to improve the ability of prerequisites of mathematics class I in elementary inclusive school namely SDN Sukagalih I Bandung. Treasure game media is one type of brain power game that can optimize the ability to understand the color of objects around students. The concept of treasure used in this learning media is a geometry-shaped object that can facilitate the child to master the ability of classification in a concrete manner. The implementation stages include, the children grouping geometric objects of the same color and different colors. Assessment development using this treasure game media can also lead to learning motivation for student because this game has a fun learning content. Therefore, the game media Treasure can be used as a learning medium that appeals to children and can improve the ability of mathematical prerequisites.

After the development of mathematical assessment with the treasure game media as the ability of mathematical prerequisites. Then the teacher can obtain important information related: 1. process the analysis of student learning needs, especially in the field of mathematics, 2. develop learning program planning according to student learning needs, 3. Designing procedural of method remedial program.

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