



Development of Animated Video Teaching Materials for Numbers 1-10 for Students with Intellectual Barriers at SLB Dr. Idayu 1

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Abstract

Children with intellectual disabilities are children whose general intellectual function is significantly below the average in general, along with deficiencies in behavior. Children with intellectual disabilities have difficulty in following learning because the abilities possessed by children with intellectual disabilities are not the same as other regular children. Children with intellectual disabilities have difficulty receiving learning when there are no concrete examples available, to receive learning materials children must use media that are easy for children to understand. Therefore, the purpose of this study is to create animated video teaching materials for numbers 1-10 to help students with intellectual disabilities in understanding mathematical material for numbers 1-10. The method used is qualitative with 5th grade students who have intellectual disabilities at SDLB Dr. Idayu 1. Data collection uses interview and observation techniques. The results of this study are animated video teaching materials about mathematical material for numbers 1-10 that have been validated.

Keywords: intellectual disability, teaching materials, animated videos

1. Introduction

Ideal learning is a learning process that achieves educational goals in accordance with the abilities and characteristics of students. To achieve ideal learning, teaching materials are needed that can effectively accommodate students' needs and potential. The systematic use of teaching materials plays a crucial role in influencing the learning process. Developing effective teaching materials requires a comprehensive approach that encompasses material development, the use of teaching aids, and the application of ideas and other innovations.

Mentally retarded children are children with low cognitive abilities (Komalasari et al., 2021). Based on the theory put forward by Efendi (2006), mental retardation can be divided into three groups: debil, imbecil, and idiot. The grouping is based on the IQ classification of children with mental retardation. Debil is a category of mild mental retardation or can be trained with an IQ of 50-75. Imbec is a category of moderate mental retardation or can be trained with an IQ of 25-50. Meanwhile, idiots are a category of severe mental retardation or can be treated with an IQ of 0-50. The characteristics of students with moderate mental retardation are almost incapable of learning academic subjects, if learning to read their language development is limited, but they have the potential to be trained in self-control and some jobs that require mechanical training (Lisinius and Sembiring, 2020). The limited thinking abilities of students with moderate mental retardation cause them to have difficulty in abstract thinking, which results in children experiencing difficulties in various academic

subjects that require abstract concepts. One example of a subject that demands conceptual understanding and thinking skills is mathematics. Mathematics is a science that plays a crucial role in everyday life. It teaches logical, coherent thinking, problem-solving, and understanding the interrelationships between concepts.

Based on the results of an interview conducted in August 2024, with one of the teachers at Dr. Idayu 1 Special Needs School, mathematics learning for children with intellectual disabilities, especially students with the initials L, E, and D who are in grades 5 and 6 of the SDLB level, the author identified significant problems faced by students with intellectual disabilities in learning mathematics, especially related to number recognition. In the aspect of counting, students L and D are only able to say the numbers 1-10 without understanding the form or concept of numbers, and student E is not yet able to say the numbers 1-10 and can only imitate speech with repeated repetition. In the skill of writing numbers, students L and D require direct examples in the form of writing on paper, because they have difficulty imitating writing examples on the board. Meanwhile, student E is only able to bold the writing if given an example in the form of dots, but cannot write independently. Learning by teachers in class is usually done using the lecture method and using learning media such as using learning videos. Because of this, it is necessary to have materials teaching that can support the learning of mentally retarded children so that they can understand the concept of counting numbers 1-10 in an interesting and interactive way. Teaching children with intellectual disabilities requires effective, creative, engaging, and repetitive instruction, using simple language tailored to their needs. One strategy is to provide children with learning materials using appropriate media. Appropriate learning media will facilitate learning and engage them.

According to Sadiman et al. (2014), educational media generally has various uses. The use of appropriate and varied educational media can reduce students' passive attitudes. This media is useful for increasing enthusiasm for learning, creating more realistic interactions, and enabling students to learn independently according to their abilities and interests (Khoriyah, 2017). In addition, according to Asmawati (2014), the use of learning media provides various benefits, including: 1) students more easily understand the material and achieve learning objectives better; 2) teaching methods become more varied; 3) student activities can be more comprehensive by involving observation, practice, and demonstrations that involve all the senses; and 4) learning materials become more interesting and concrete.

Therefore, the purpose of this study is to develop and test the effectiveness of animated video teaching materials for numbers 1-10 to improve students' understanding of the concept of numbers 1-10, in students with moderate intellectual disabilities at SLB Dr. Idayu 1. It is hoped that the development of this teaching material can also provide alternative teaching materials for the learning needs provided by teachers at school.

CASE STUDY

A. Definition of Mental Retardation

Mental retardation is a term used to identify a condition of limited intellectual function experienced by an individual. According to the AAMD (American Association on Mental Deficiency) in (Indriati, 2022; Hakim, 2018; Widiastuti, 2019) mental retardation is a disorder with below-average intellectual abilities, characterized by an IQ below 84 based on tests that have been conducted and are apparent before the age of 16. AFMR (Asian Federation for the

Mentally Retarded) states that individuals who categorized as mentally retarded if the individual shows a level of intelligence significantly below average and experiences difficulty in adjusting when interacting socially with the environment (Vivian in Widiastuti, 2019). Meanwhile, according to Efendi (2006), mentally retarded is a child who has a level of intelligence below average, so that they need special assistance or services to support their developmental tasks, including educational programs and guidance that are appropriate to their needs. Rochyadi and Alimin (2005) define mentally retarded as a condition characterized by limited intellectual abilities. This is in line with the statement "Mental retarded is not a disease but a condition" (Kirk in Efendi, 2006). So, mentally retarded is a condition and cannot be cured using any medication.

Mental retardation is characterized by functional limitations in three or more aspects of daily living activities, such as receptive and expressive language, learning ability, mobility, selfcare, and the ability to learn independently (Developmental Disabilities Assistance and Bill of Rights Act, 2000). According to the AAIDD (American Association on Intellectual and Developmental Disabilities, 2013), children with mental retardation before the age of 18 have shown significant limitations in cognitive functions such as learning, reasoning, and problemsolving. Children with mental retardation often have difficulty processing and conveying information, both through verbal and non-verbal language. Cognitive limitations in children with mental retardation also impact the ability to adapt in social interactions, both in conceptual understanding and interpersonal skills (Prelock, 2018).

Based on the various definitions above, it can be concluded that intellectual disability is a condition that typically appears before the age of 18, characterized by limited intellectual functioning (below average IQ) and difficulties in learning, reasoning, communication, and social adaptation. This condition cannot be cured because it is not a disease, and educational programs and services can be provided according to each individual's needs.

In the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association [APA]), intellectual disability is defined similarly to the AAIDD definition, but expanded to include levels of severity, namely mild, moderate, severe, and profound. Pitaloka (2022) classifies intellectual disability based on intelligence level into four levels, namely: 1) Mild intellectual disability, with an IQ between 55-70, 2) Moderate intellectual disability, with an IQ between 40-55, 3) severe mental retardation, with an IQ between 25-40, 4) very severe mental retardation, with an IQ below 25. Explanation of the classification of mental retardation according to AAMD (Moh, 1995) namely 1) mild mental retardation (educable) has an IQ between 50-70, mentally retarded children in this classification can develop in the academic field, are able to adapt to the social environment, and can do simple jobs. 2) Moderate mental retardation (trainable) has an IQ between 30-50, mentally retarded children in this classification can learn functional school skills, are able to do self-care skills, are able to carry out routine jobs that require supervision. 3) Severe and very severe mental retardation (able to care) with an IQ of less than 30, mentally retarded children with this classification will need help and care from others throughout their lives, but can still be trained to communicate and care for themselves simply. This classification is also supported by the opinion of Hallahan and Kauffman (1991) who classify mentally retarded children based on their capabilities which can be referred to as the basis for developing the potential of mentally retarded children, including: 1) mentally retarded children who are capable of being taught (IQ 50-75), 2) mentally retarded children who have the ability to be

trained (IQ 25-50), 3) mentally retarded children who are capable of being cared for (IQ 25 and below).

B. Mathematics Learning for Children with Mental Retardation

Mathematics is the science that studies quantity, structure, space, and change. One definition of mathematics put forward by Johnson & Rising (Tombokan Runtukahu, 1972:15) explains as follows:

- a) Mathematics is a structured knowledge in which properties and theories are created deductively based on defined elements and based on axioms, properties, or theories that have been proven to be true.
- b) Mathematics is a symbolic language about various ideas using terms that are defined carefully, clearly and accurately.
- c) Mathematics is an art where its beauty lies in order and harmony.

Mumpuniarti (2016:183) states that mathematics is fundamental to solving problems in various aspects of life. Understanding basic mathematics is essential to help people navigate everyday life, including children with intellectual disabilities. One of the initial concepts in learning mathematics is number recognition. To understand addition, subtraction, time, and currency, which are deeply embedded in everyday life, it is crucial for children with intellectual disabilities to understand numbers well. Children with intellectual disabilities who have a below-average intellectual level will have difficulty understanding numbers compared to children their age. Kuswandi (2017) stated that "for children with intellectual disabilities, extra guidance and assistance are needed for them to truly understand numbers and be able to count independently."

C. Mathematics Material for Numbers 1-10

The development of animated video teaching materials for numbers 1-10 to improve the understanding of number concepts in children with moderate intellectual disabilities has a learning objective, namely to understand the concept of numbers 1-10 so that it can be applied in children's daily lives. The specific learning objectives to be achieved are 1) reading numbers 1-10, both sequentially and randomly, 2) counting numbers 1-10, and 3) writing numbers 1-10.

This math lesson on numbers 1-10 is packaged in teaching materials with animated videos to help children with intellectual disabilities understand the concepts of numbers 1-10 in an engaging and enjoyable way. The teaching materials are divided into two chapters:

Chapter 1: Counting Numbers 1-5

1. Reading numbers 1-5: Reading numbers is done by recognizing and saying the numbers in the teaching materials.
2. Counting numbers 1-5: Counting numbers is done by using pictures of everyday objects that are close to children, such as bags, blackboards, pencils, for counting practice.

3. Writing numbers 1-5: Writing numbers is done by practicing writing with the help of lines in sequence and with continuous repetition, so that children get used to writing.
4. Evaluation: evaluation is aimed at ensuring that the child has understood and mastered the material on counting numbers 1-5, and identifying what needs to be added, reduced, or strengthened in the child's abilities.

Chapter 2: Counting Numbers 6-10

1. Reading numbers 6-10: Reading numbers is done by recognizing and saying the numbers in the teaching materials.
2. Counting numbers 6-10: Counting numbers is done by using pictures of everyday objects that are close to children, such as erasers, chairs, pencil sharpeners, for counting practice.
3. Writing numbers 6-10: Writing numbers is done by practicing writing with the help of lines in sequence and with continuous repetition, so that children get used to writing.
4. Evaluation: evaluation is aimed at ensuring that the child has understood and mastered the material on counting numbers 6-10, and identifying what needs to be added, reduced, or strengthened in the child's abilities.

2. Method

This study uses a research and development method known as Research and Development (RnD). The Research and Development (RnD) research method aims to produce a specific product and test the effectiveness of the product (Susanto in Sati, 2003). By using the ADDIE model development by Dick and Carry. Angel Learning (in Sis wardani, 2015) states that the ADDIE model is a model that is easy to apply in the process used is systematic with a clear framework resulting in effective, creative and efficient products. This research design produces product outputs based on the theory developed, namely animated video teaching materials for numbers 1-10 for students with intellectual disabilities at SLB Dr. Idayu 1. The following are the complications that are carried out:

a. Analyze stage

Collecting data from both the literature and conducting identification and assessment. Literature data is used as initial reference for media development. Identification and assessment data are used to assess the abilities of students with intellectual disabilities.

b. Design stage

Researchers design teaching materials based on data on problems and solutions that have been studied.

c. Development stage

Researchers design, develop, and test the validity of teaching materials.

d. Implementation Stage

Researchers carry out implementation to get positive impacts from the media and see its effectiveness.

e. Lastly, at the evaluation stage

Conduct an evaluation of the media that has been developed based on user responses.

3. Results and Discussion

Result

The result of this development is a teaching material that contains material and evaluation in addition to being equipped with a barcode that can be scanned to attract and facilitate students in learning. Through the use of this teaching material, it is hoped that understanding the numbers 1-10 can be more easily understood and enjoyable for students.

This teaching material is to introduce numbers 1-10 which has been developed over a period of 1 month. The development of teaching materials requires a smartphone or laptop and an internet network in its creation. The stages of developing teaching materials are (1) analyzing children's needs and determining the material to be presented, (2) making a design of teaching materials to be presented, (3) collecting materials and evaluations needed in teaching materials, (4) making a project for compiling teaching materials, (5) adding a barcode used to scan videos directly connected to YouTube, (6) testing teaching materials, (7) finishing by downloading teaching materials.



Figure 1. Initial View of Teaching Materials

The use of teaching materials to introduce numbers 1-10 that were developed was by (1) the initial step of inviting students to find out what will be learned, (2) after that inviting students to look at pictures and read the numbers 1-5 that are in the teaching materials, (3) then inviting students to practice reading numbers 1-5, (4) inviting students to count the pictures in the teaching materials, (5) scanning the barcode in the teaching materials to watch the video, (6) asking students to practice counting and singing, (7) inviting students to write numbers 1-5 starting from tracing, coloring and writing independently, (8) doing the evaluation that has been provided in the teaching materials.



Figure 2. Display of Teaching Materials

MEDIA VALIDATION

From the results of the data analysis that has been carried out, the results of the validation of the learning media "Mathematics teaching materials phase C class V and VI SDLB material numbers 1-10" which have been validated by students. There are two general aspects assessed, namely the construction aspect and the material aspect, then from these two aspects there are more specific aspects including the construction aspect, namely the aspect of the discussion sequence in making the book is very logical and easy to follow, the introductory chapter aspect provides a clear picture of the entire contents of the book, the aspect of the discussion flow between chapters is well connected and forms a complete unit, the language aspect used in this book is very clear, easy to understand, and in accordance with good and correct language rules, the examples and cases provided are very concrete and help readers understand the concept. Furthermore, in the material aspect there are aspects of material truth, aspects of relevance to the title and subtitle, aspects of actuality, aspects of material completeness, aspects of uniqueness of perspective, aspects of conceptual clarity, aspects of relevance to the target reader, aspects of interchapter relationships, aspects of added value.

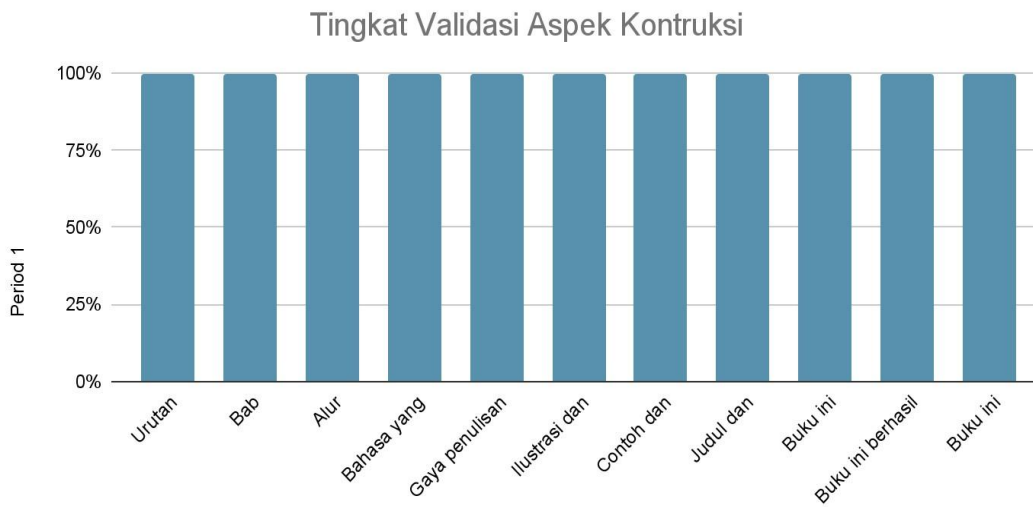


Figure 3. Construction Aspect Validation Diagram

Based on the validation diagram of the construction aspect, it can be seen that the average assessment on the construction aspect is high, which means that most validators gave an assessment of 'strongly agree' and 'agree' on the construction aspects assessed. In terms of the order of discussion in making the book, it is very logical and easy to follow, the introductory chapter aspect provides a clear picture of the entire contents of the book, the flow of discussion between chapters is well connected and forms a complete unit, the language aspect used in this book is very clear, easy to understand, and in accordance with good and correct language rules, the examples and cases provided are very concrete and help readers understand the concept, this book provides significant added value for readers in the field of mathematics, has a high rating because the teaching materials made the content and language in it are easy to understand by readers.

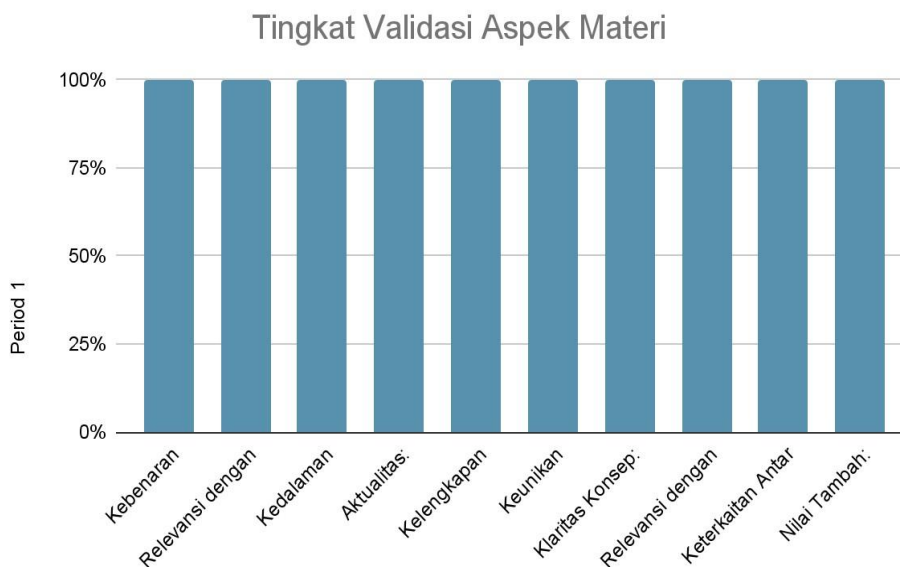


Figure 4. Material Aspect Validation Diagram

Based on the validation diagram of the material aspects, it can be seen that the average assessment on the material aspect is high, which means that most validators also gave an assessment of 'strongly agree' and 'agree' on the aspects of the material being assessed. With this, respondents provided validation according to the material presented and contained in the teaching materials, the material presented is presented in a coherent manner, namely the material is explained starting from the explanation of numbers 1-10 which is explained in detail and uses examples that can be easily understood by students.

DISCUSSION

Mathematics learning can be completed by teaching mathematics while playing, learning and teaching, according to the child's age, by paying attention to initial abilities, methods, strategies, and appropriate learning skills [Fitria, 2013]. In mathematics learning for children with intellectual disabilities, the use of animated video teaching materials can improve children's understanding of learning numbers 1-10. Through responsive learning experiences, children with intellectual disabilities can understand and learn learning, namely by sequencing, reading, counting, and writing numbers 1-10.

The results of the assessment by the validator show that the development of mathematics teaching materials for phase C of grades V and VI SDLB on the material of numbers 1-10 for children's learning with intellectual barriers. This media is considered easy for students to understand in mathematics, including numbers 1-10. However, to maximize and improve children's learning, they still need a companion to help them master the material.

4. Conclusion

CONCLUSION

In mathematics learning for children with intellectual disabilities in grade 5 of SDLB, at SLB Dr. Idayu 1, there needs to be media that supports learning for children who have difficulty in learning mathematics, especially recognizing numbers. Development of animated video teaching materials to attract interest and make it easier for children with intellectual disabilities to understand mathematics learning more easily. By using the ADDIE model development by Dick and Carry. Angel Learning (in Sis Wardani, 2015) states that the ADDIE model is a model that is easy to apply in the process used is systematic with a clear framework producing effective, creative and efficient products. This research design produces product outputs based on the theory developed, namely animated video teaching materials for numbers 1-10 for students with intellectual disabilities at SLB Dr. Idayu 1.

CLOSING

The author's statement that this article was written as a final assignment for the Mathematics Learning for Special Needs Students course, under the guidance of Ediyanto, M.Pd., Ph.D, Department of Special Education, Faculty of Education, State University of Malang, in December 2024.

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