Proceedings Series of Educational Studies

The 4th International Conference on Educational Management and Technology (ICEMT) 2025

Developing a Canva-Based Textbook to Improve Logical Thinking Skills in Children with Mental Retardation

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Abstract

This study aims to develop a Canva-based textbook. We test the validity, practicality and effectiveness of the Development of Canva-Based Teaching Materials to Improve Skills in understanding the concept of numbers 1-20 for third-grade students with intellectual disabilities at SLB Negeri Pembina Lawang. This type of research is Research and Development, the subjects of this study are third-grade students with intellectual disabilities at SLB Negeri Pembina Lawang. The techniques used in data collection use interviews and observation techniques.

Keywords: canva, numbers 1-20

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.

Mathematics is the science that studies numbers, structures, and patterns. In mathematics, the scope of study consists of:numbers, geometry and measurement, algebra, statistics and probability, trigonometry and calculusMathematics is not just about studying numbers. However, in this study, mathematics learning focuses on the subject of numbers. According to the KBBI (Big Indonesian Dictionary),A number is a symbol or emblem used to represent a number or numerical value. Numerals are used in various numerical systems, such as decimal, binary, or Roman numerals, to simplify calculations, measurements, or data recording. In mathematical and everyday contexts, numbers are used for counting, measuring, or indicating order.Number is a mathematical concept that represents quantity or order. Numbers can be integers, fractions, decimals, and so on. This research aims to explore various methods and strategies that can improve students' understanding of number concepts.

Children with mild intellectual disabilities in third-grade Special Elementary Schools (SDLB) often struggle to understand numbers 1-20. Interviews at three SDLB schools revealed that many students still struggle to understand basic numeracy, which serves as the foundation for other cognitive skills. According to Nurmalita and Utami (2021), children with mild intellectual disabilities face challenges in learning mathematics due to limited innate intelligence and inadequate educational facilities. These challenges make it difficult for them

to understand basic mathematical concepts, solve problems, and perform abstract reasoning, which are essential to learning mathematics. This inability to understand specific numeracy learning models often leads to repeated errors, highlighting the need for more effective and adaptive learning approaches.

Teachers in the field also face limitations in learning media, with most still relying on textbooks as the primary medium rather than more interactive visual aids. According to Rahmadani et al. (2024), these limitations can lead students to view numbers as merely meaningless collections of words and to perceive learning numbers as a monotonous activity. The impact is low student motivation and attention in learning numbers, which slows the development of their numeracy skills. Research by Muninggar (2022) shows that the use of concrete objects, such as dolls, can improve number recognition in first-grade students with intellectual disabilities at a special needs school. However, a major obstacle remains in the form of a limited variety of learning methods, especially those that integrate technology.

Case study

A. Mentally disabled

Children with intellectual disabilities are individuals who have below-average intelligence and are accompanied by an inability to adapt behavior that appears during the developmental period. The definition formulated by Grossman (1983) which is officially used by AAMD (American Association on Mental Deficiency) in IGAK Wardani (2007) states that Mental retardation refers to significantly subaverage general intellectual functioning resulting in adaptive behavior and manifested during the developmental period. This means that mental retardation refers to general intellectual functioning that is significantly below average (normal) along with deficiencies in adaptive behavior and all of this occurs (manifested) during the developmental period.

Children with mild intellectual disability are classified as having an intelligence quotient (IQ) ranging from 50-70. Their intellectual abilities are below average, their thinking skills are low, their attention span and memory are weak, they have difficulty thinking abstractly, and they are unable to think logically. They still have the possibility to receive education in the fields of reading, writing, and simple arithmetic to a certain level. Their vocabulary is limited, and they can learn skills. The attention span and memory of children with mild intellectual disability are weak, and they cannot pay attention to something seriously and for a long time. Even a moment's attention of children with mild intellectual disability will shift to other problems, especially when it comes to paying attention to lessons, children with intellectual disability quickly get bored. Somantri (2006) said that children with mild intellectual disability are also called morons or debils. Society generally knows intellectual disability as retarded or mentally retarded or idiots. Rachmayana (2016) stated that mental retardation means a condition characterized by a general intelligence function that is below average accompanied by a reduced ability to adapt (behave adaptively), which begins to appear before the age of 18. He also said that people who are mentally retarded have lower intelligence development (IQ) and experience difficulties in the learning process and social adaptation.

B. Mathematics learning for mentally retarded children

Mathematics can be taught to children with intellectual disabilities if it is used in everyday life. Efforts to improve the abilities of children with intellectual disabilities, particularly in mathematics, require teaching and learning strategies, media, or tools tailored to the needs and characteristics of the children to ensure the teaching and learning process is more effective and efficient, and educational goals for children with mild intellectual disabilities can be achieved. To achieve these goals, before beginning the lesson, the teacher, as an educator, learning resource, guide, and facilitator, must plan the lesson as well as possible. This can be done by considering all learning components. These learning components include preparing lesson plans (RPP), formulating learning objectives, presenting material, using methods, using media, and preparing evaluations.

C. Understanding the Concept of Numbers

Understanding number concepts is a fundamental aspect of mathematics education, especially for early childhood. This concept involves the ability to count, quantify, and connect concrete objects with number symbols. According to Hidayat (2008), number concepts are the foundation for mathematical development that prepares students for further education. The process of learning number concepts must begin early, where children are taught to group and classify objects, as well as recognize number symbols that represent the number of objects. The importance of understanding number concepts lies not only in the ability to count, but also in the development of more complex cognitive skills. Children who have a good understanding of number concepts will find it easier to understand other mathematical operations in the future, such as addition and subtraction.

2. Method

According to Sugiyono (2011:297), the Research and Development (R&D) method is a research method used to produce a specific product and test its effectiveness. To produce a specific product, research is used that is analytical in nature and to test the effectiveness of the product so that it can function in the wider community. Therefore, research is needed to test the effectiveness of the product so that the final result of this research will produce a product. In the context of textbook research and development, these steps will be explained as follows:

1. Potential and Problems

   Research can be based on potential and problems, including what problems are found in schools.

2. Data collection

   From the results of the interviews that have been conducted, several problems were found, namely, children still do not fully understand the concept of mathematical numbers conveyed by the teacher.

3. Product Design

This stage begins with a needs analysis based on data and information collected from end users, such as teachers, students, or related stakeholders. Based on this analysis, a framework or blueprint for the learning product is designed, including content structure, interactive features, visual design, and teaching strategies used.

4. Design Validation

   The initial design was theoretically tested by involving experts in education, learning technology, and design. Validation included evaluating content relevance, appropriateness to student needs, design presentation, and pedagogical suitability. The validation results were in the form of written feedback or discussions that served as the basis for design improvements.

5. Design Revision

   Based on feedback from the validation phase, the initial design is refined. These changes may include refining content, reorganizing materials, enhancing visual elements, or adjusting features to make them more user-friendly. This process aims to ensure that the product better aligns with user needs and learning objectives.

3. Results and Discussion

Result

Development of Teaching Materials, in this textbook we develop several points, namely:

1. Gradual Material

   In this textbook, the first material taught is about recognizing numbers 1-20. Students are not only introduced to the form of numbers 1-20 in the form of numbers. In this textbook, there are also various materials and number recognition that have many approaches, including through interesting pictures, then writing numbers in the form of words, and many others.

   Chapter 1 of this book discusses the topic of naming the number of objects. At the beginning of the lesson, students are introduced to pictures and words that describe the number of objects. This is intended to facilitate children's initial introduction to numbers. The reason why recognizing numbers is so important is because it is the foundation for more complex mathematical skills. By understanding numbers early on, children more easily learn concepts such as addition, subtraction, measurement, and problem-solving skills in the future. This is relevant because early mathematical abilities often correlate with later academic success (Jordan et al. 2009).

   Understanding numbers and teaching children to recognize patterns, cause-and-effect relationships, and how to solve problems. This helps improve overall cognitive function (Sarama J. Clements, DH 2009). In teaching mathematics, teachers must provide material gradually to students and slowly but surely, this aims to ensure students can understand mathematical concepts well, especially number recognition, and teachers must also

frequently repeat some of the same material with the aim of reinforcing the material in students, especially students with intellectual disabilities.

2. Number Cards

The media used to introduce numbers 1-20 is by using number cards that have been designed according to our design. It can be seen that this design can make it easier for students to understand the introduction of numbers from 1-20.

With number cards, it is hoped that students will be able to understand the form of numbers, their sequence, and the association of numbers with certain quantities. This process can accelerate the recognition of numbers and basic numerical concepts (Sarama J. 2009). Students who have begun to recognize number cards can also begin to learn to count objects on the number cards. This activity can also connect numbers with quantities in the form of real objects, with the aim of further strengthening counting skills. In addition to learning about numbers in sequence, students, especially students with special needs, can also play games with number cards that practice logic and understanding patterns. This is very helpful in improving children's cognitive abilities.

There are many functions and uses of these number cards, therefore we developed these number cards in our textbooks so that students have many benefits as written previously.

3. Variations in Learning Methods

Our textbooks include many learning methods for mathematics, including cooperative learning, where students work in small or large groups to help each other understand concepts or complete assignments given by the teacher. Strategies such as jigsaw puzzles, think-pair-share, or group investigation are often used to enhance collaboration. These activities benefit from developing social skills, enhancing conceptual understanding, and encouraging active participation by each student in class.

Both game-based learning methods are in accordance with the material, namely the concept of numbers. Students can be involved in games such as number cards, number boards and others. It is hoped that with this game, students can understand the concept and how to understand numbers in a more concrete and interesting way.

Realistic approach method, if this method is applied in the real world, students are expected to be able to count the number of concrete and real objects, this method is also more often used in everyday life to build conceptual understanding.

Validation

This research focuses on the development of a Canva-based textbook for third-grade students with intellectual disabilities at SLB Negeri Pembina Lawang. The main objective of this research is to test the validity, practicality, and effectiveness of the developed teaching materials in improving the skills of understanding the concept of numbers 1-20. In the Canva-based textbook discusses the understanding of the basic concepts of numbers 1-20 starting from the introduction of numbers 1-20 to various kinds of practice questions with various levels ranging from easy to difficult, of course this is adjusted to the abilities of students.

Based on the data analysis conducted, the validation results for the "Canva-Based Textbook" learning media were obtained for the material on understanding the concept of numbers 1-20, which was validated by lecturers and students. In terms of the appropriateness of the media content, it was found that 80% of respondents validated the suitability of the material with the media. This indicates that the developed media has met the needs of students, media requirements, increased student knowledge, material accuracy, and conformity with the applicable curriculum. The use of this learning media is adjusted to the content or learning material to be achieved.

Judging from the validation results of the media aspects, which include usability, storage, usage, packaging, language use, proportional font use, consistent font use, and overall media appearance, it was found that this media is categorized as suitable for use. This is due to the appearance of the Canva-Based Textbook media which is quite attractive, easy to use, easy to store, does not require special usage procedures, uses language that is easy for students to understand, and consistency in the use of fonts.

DISCUSSION

Children with mild intellectual disabilities in third grade at Special Elementary Schools (SDLB) often face significant challenges in understanding the numbers 1-20, which are crucial for the development of other cognitive skills. Research shows that the majority of students in this category are unable to recognize these basic numbers, a condition that emphasizes the need for more innovative and effective learning strategies. Nurmalita and Utami (2021) revealed that the main obstacle in learning mathematics for children with mild intellectual disabilities lies in their limited innate intelligence, which is exacerbated by a lack of adequate educational support. This combination of factors results in difficulties in understanding basic mathematical concepts, problem-solving skills, and abstract reasoning skills.

In response to this issue, a Canva-based textbook was developed specifically designed to help students recognize numbers 1-20 through more engaging and interactive approaches. The material in this textbook not only presents numbers visually but also enriches the learning experience with the use of illustrative images and verbal number recognition. Supporting media, such as number cards, are integrated into the learning process to provide concrete visualizations, helping students understand and internalize number concepts more deeply.

This textbook also adopts a variety of learning methods to improve students' basic number comprehension skills. The focus of this study was to evaluate the validity, practicality, and effectiveness of the materials in supporting learning. Based on the validation results, this textbook received a score of 80% for both construction and materials, indicating its suitability for use in the teaching process. Furthermore, field trials showed that this textbook had a positive impact on improving students' understanding of numbers 1-20.

By implementing an adaptive, interactive and enjoyable learning approach, it is hoped that students with mild intellectual disabilities can overcome the learning obstacles they face.(Magdalena et al., 2024),Furthermore, this approach aims to build a solid mathematical

foundation, so that students are able to continue learning to more complex levels with greater confidence.

4. Conclusion

Learning mathematics for children with mild intellectual disabilities, particularly the recognition of numbers 1-20, requires an adaptive, interactive, and engaging approach. Children with mild intellectual disabilities have limitations in cognitive abilities, memory, and abstract thinking, so effective learning methods must consider their unique characteristics and needs. The use of Canva-based learning media, equipped with number cards and interactive visualizations, has been shown to gradually improve students' understanding of number concepts.

Through a step-by-step and varied approach to number recognition, students not only recognize numbers from their symbolic form but also relate them to concrete objects and number sequences. Product validation demonstrates that this Canva-based learning material meets the criteria of validity, practicality, and effectiveness, with field trials demonstrating improved student understanding of the numbers 1-20. With a more engaging and varied approach, students are expected to develop a stronger foundation for number understanding, which will support higher-level mathematics learning in the future.

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