Development of Decodable Books to Improve the Beginning Reading Skills of Reading Disabilities Students at Primary Schools in Malang

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Abstract: Reading disabilities are someone who experience obstacles in their phonological processes such as identifying letters, distinguishing letter sounds, and their pronunciation, thereby affecting academic development factors, especially aspects of reading. Decodable books can be deciphered and contain code-based phonics learning. This research aims to develop and validate the Decodable book according to the characteristics and needs of students with reading disabilities. This research uses the ADDIE RnD model (Analysis: analysis of needs and characteristics of the subject, Design: design according to initial analysis, Development: design development, Implementation: media application, and Evaluation: evaluation of the entire process). The subjects of this research were 4 students with reading disabilities criteria at elementary schools in Malang City. Data analysis of needs and subject characteristics was obtained through interviews with teachers and carrying out identification tests and assessments. The results of this research produced Decodable book (Decobo) which media experts and material experts have validated with an average score of 78.6% in the valid category with minor revisions. Decodable book (Decobo) was developed into an e-book packaged as an application with three levels of word pattern books (VC-V, CV-CV, CV-C). Decodable book (Decobo) has been applied to subjects with an overall score of 72.60%. The category is quite effective in improving the initial reading abilities of students with reading disabilities. This research still needs further development and testing on a wider scale.

Keywords: Decodable book; beginning reading; Reading disabilities.

INTRODUCTION

Based on data from the Every Student Succeeds Act, approximately 13% of students enrolled in public schools receive special education services, with 34% identified as experiencing learning disabilities and around 85% identified as having reading disabilities (DePaoli et al., 2015). In Indonesia, the estimated percentage of children with reading disabilities or dyslexia is 3-10% on an international scale (Dyslexia Center Indonesia, 2019), requiring intervention and instructional media. Reading is an activity of acquiring information or ideas conveyed by someone to the reader using written media (Nurani et al., 2021). Achieving success in academics, work, and social life requires reading, which is an essential skill (McGill, 2016; Niklas et al., 2016). However, in Indonesia, especially in Malang City, there are still elementary school students who have difficulty reading.

Reading disabilities, also known as dyslexia, involve difficulties in phonemic sensitivity, phonetic decoding, word recognition, decoding skills, and reading comprehension (Johnson, 2017). Researchers have identified three types of reading disabilities, which overlap but still have differences: phonological deficit, orthographic speed/process deficit, and comprehension deficit (Louisa Parit & Carol Tolman, 2023). It can be concluded that reading disabilities are barriers in recognizing letters, symbols, and punctuation in a sentence, thus affecting aspects of writing, spelling, and understanding the content. Children who have difficulty reading tend to face challenges in other subjects or experience academic difficulties (Fauzi, 2018).

Common methods for teaching children with reading disabilities include interventions such as Big Books and serialized picture books. Big Books are characterized by large texts and pictures, appealing to children, including those with reading difficulties (Ramdhani et al., 2021). Additionally, commonly used media for students with reading disabilities include letter cards, word cards, sentence cards, pop-up books, and gaming applications (Budhianto., 2023).

These media are still manually used in efforts to assist students with reading disabilities. There are also interventions using Gamification applications. The implementation of Gamification applications has been studied by Hafiz (2023) to improve early reading abilities, and this research shows that some features may cause distractions for students. There are two types of children with reading disabilities: visual and auditory (Loeziana, 2017). Auditory types find it difficult to distinguish sounds or parts of the same word or sentence (Haifa et al., 2020). Meanwhile, visual types rely more on their hearing to listen and understand what is being taught (Haifa et al., 2020). In teaching children with reading disabilities, it is necessary to adapt to their multisensory needs.

The learning of reading for children with reading disabilities is influenced by several factors, including the ability to decode, recognize sight words, and associate what is read with existing knowledge (Mather & Wendling, 2011). Decoding is the knowledge of the relationship between phonemes and graphemes. This knowledge must be automatic through mastery of recognizing sight words, allowing readers to process and understand the vocabulary they see. In other words, accuracy is a prerequisite for fluency in reading, and if a child reads accurately and fluently, they will easily understand what they have read.

Decodable books are carefully designed instructional texts arranged according to the sequence of phonics learning (Birch, 2022). focusing children through a code-based approach (Pogorzelski & Wheldall, 2018). Decodable books teach reading through the use of repeated and gradual sound-symbol patterns. When reading decodable books, students will find the relationship between graphemes and phonemes through words they recognize or are new to them. Decodables are useful for phonics teaching or sound-letter correspondence so that children can understand the sounds and meanings of letters.

Previous researchers have stated that decodable texts are beneficial for individuals still developing reading skills and decoding words (Cheatham dkk., 2014). It has also been stated that decodable instructional texts advance reading skills and benefit children in understanding words from reading texts (Price-Mohr & Price, 2018). Children with reading difficulties can learn using learn-to-read books and decodable books both at elementary school and at home (Atamian, 2021). However, none of the three previous researchers have specifically discussed the development of decodable books in Indonesia, making it important to develop media based on needs and existing literature studies.

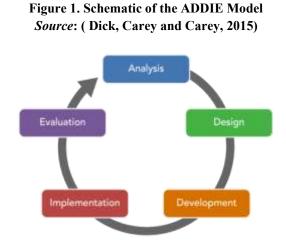
This research aims to produce a validated and applicable Decodable book (Decobo) to enhance early reading abilities in students with reading disabilities. With the Decodable book (Decobo), it is hoped to be a solution to help students with reading disabilities recognize letters and their sounds, and read syllables and word patterns. This Decodable book (Decobo) is an update that uses the Indonesian language, adapted from abroad where English is used. In Indonesia, the use of decodable books is still rare, and there is still a perception that decodable books are the same as spelling books. Decodable books (Decobo) differ from typical learn-toread books mainly in the selection of words used. In Decodable Book (Decobo), word selection considers the relationship between letter symbols and sounds, so the words used are meaningful. Whereas in typical learn-to-read books, the focus is more on spelling and may not consider meaningful word selection. This Decodable book (Decobo) is presented as an e-book linked to an application. This media will be an innovation that combines the needs of students with reading disabilities, both auditory and visual types, and the inclusion of attractive audio and visual features will support these factors. This research is necessary not only to produce more specific Decodable book (Decobo) suitable for the characteristics of children with reading disabilities but also to identify the needs and appropriate instructional media for improving early reading abilities in children with reading disabilities. Early reading involves focusing on letter recognition, letter identification, and assembling syllables into words and sentences (Yuliana, 2017). Early reading is typically introduced in the early grades; therefore, this research is conducted in elementary schools where basic skills and understanding are developed through reading activities.

METHOD

The method employed in this research is Research and Development (R&D). R&D is a method utilized to create a new product and is employed to determine the effectiveness of the product in addressing students' reading disabilities (Sugiyono, 2018). R&D is also suitable for producing or developing products for educational or learning activities (Latief, 2012).

Research Phases

The R&D method model used in this research is the ADDIE model, consist of five main stages: Analyze (analysis of issues related to students' reading disabilities), Design (identification and design of the media to be created), Development (media creation), Implementation (execution), and Evaluation (feedback) (Dick dkk., 2015; Morrison dkk., 2019). This method is chosen due to its systematically complex stages for instructional development.



The subjects of this research are students with reading disabilities in grades 2-4 at the Elementary School level who still face difficulties in early reading. The research is conducted in four Elementary Schools in the city of Malang, which have been selected from eight identified Elementary Schools. The selection of the research locations is based on the researcher's hometown, facilitating access to information related to the research

locations. The criteria for selecting schools include inclusive schools or regular schools with students meeting the research subject criteria.

The research stages are as follows: (1) Analyze: In this stage, an analysis is conducted related to the needs and characteristics of children with reading disabilities. The needs analysis is performed through a literature study on media previously used for students with reading disabilities, and an analysis of the required materials is conducted based on reference journals and Jeane Chall's theory discussing the reading development of children. The analysis of the characteristics of students with reading disabilities is carried out through identification tests and assessments. This stage is essentially for identifying the issues to be addressed in the next stage. (2) Design: In this stage, the design of the Decodable book (Decobo) is created, consist of the arrangement of materials that align with the results of the needs and characteristics analysis of students with reading disabilities. (3) Development: This stage involves the development of media, starting from finalizing illustrations, combining words into meaningful sentences, and developing three levels of books: Level 1 VCV (Vowel-Consonant-Vowel), Level 2 CV-CV (Consonant-Vowel-Consonant-Vowel), and Level 3 CVC (Consonant-Vowel-Consonant), each with 2 volumes. This stage includes the creation of e-books and application programming. Validation is conducted by experts in the material, media, and animation, resulting in an average total score of 78.6%, categorized as valid with minor revisions. (4) Implementation: This stage involves the application of the application to students, with 16 sessions implemented. The implementation includes an initial baseline test conducted four times to obtain stable results. Interventions are conducted eight times, followed by a second baseline test, which assesses the students' final abilities after the intervention using the Decodable book (Decobo) four times. (5) Evaluation: In this stage, evaluation is conducted at each phase to achieve improvements in media development.

FINDING AND DISCUSSION

Finding(s)

Analysis of Needs and Characteristics of Students with Reading Disabilities

The first analysis involves a needs analysis conducted through a literature study related to references to support media development. References for the Decodable book (Decobo) were obtained from the Halfkids website, serving as a reference for the development of the Decodable book (Decobo) media. Needs analysis is also carried out through interviews with school teachers regarding the media already used in the school. The results of this analysis will be the basis for the design stage.

The second analysis focuses on the characteristics of students with reading disabilities. The characteristics vary, including (1) Not fluent in reading (spells slowly) when reading a word; (2) Reading ability is still at the basic VCV pattern; (3) Difficulty in changing or removing syllables at the end or beginning of a word; (4) Reversal in recognizing letters ("b" read as "d"); (5) Omission of letters when reading a word; (6) Unfamiliarity with some consonant letters; (7) Difficulty recognizing some capital consonant letters; (8) Articulation errors in pronouncing letters; (9) Distracted concentration in learning to read.

Design of the Decodable Book (Decobo) Media

Based on the analysis results, the design of the Decodable book (Decobo) media is conducted. In the design stage, the first step is to combine syllables into words with the Vowel-Consonant-Vowel (VCV), Consonant-Vowel-Consonant-Vowel (CVCV), and

Consonant-Vowel-Consonant (CVC) patterns. The arrangement of the book content is designed to obtain meaningful words according to the initial decoding stage based on the stages of reading development outlined by Jeanne Chall. This design aims to address the characteristics of students with reading disabilities who struggle with reading word patterns and have difficulty recognizing vowel and consonant letters. The second design step involves creating sketches for illustrations in the Decodable Book (Decobo), which will assist students with reading disabilities in understanding word meanings.

The media is designed with three levels: Vowel-Consonant-Vowel (VCV), Consonant-Vowel-Consonant-Vowel (CVCV), and Consonant-Vowel-Consonant (CVC), each with two volumes. The development of these levels aims to implement a gradual and repetitive system, as students with reading disabilities are often associated with short-term memory impairments (Habib, 2021). Therefore, repeated learning will help improve reading tasks (Kimel et al., 2020).

Figure 2. Decodable book media



Development of the Decodable Book (Decobo)

In the media development stage, finishing and validation are carried out. The Decodable Book (Decobo) has been validated by three experts: a content expert, a media expert, and an animation expert. The content expert is utilized to assess the material content of the media. The content expert validator, in this case, is one of the Special Education lecturers specializing in specific reading for children with special needs. The content expert validation resulted in a score of 70% (valid category with minor revisions), with feedback suggesting a review of elementary school student books as consideration for the content of the book.

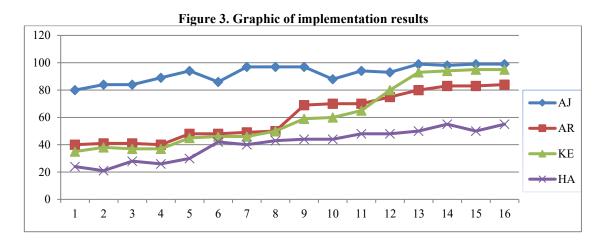
There is also a media expert used to evaluate the packaging of the media. The media expert validator, in this case, is one of the Educational Technology lecturers specializing in instructional media. The media expert validation yielded a score of 96% (with the category deemed valid by the experts), with feedback suggesting the addition of guidelines and enlarging the application's thumbnails.

Last, the animation expert used to assess the illustrations in the media to determine whether they are visually appealing and clear for children with reading difficulties. The animation expert validator, in this case, is one of the animation lecturers, who obtained a score of 70% (categorized as an expert, valid with minor revisions) and suggested feedback to reduce the size of letter images and choose 2-3 font types for use.

Based on the validation results for media, content, and animation, with a total average score of 78.6%, it can be considered valid with minor revisions. After completing the validation stage, the media as a whole has been improved and is ready for testing.

Implementation of the Decodable Book (Decobo) Media

The implementation of the Decodable Book (Decobo) was carried out over 16 sessions. Baseline-A consisted of four sessions with an accuracy of 20 minutes per session to measure the initial abilities of students, followed by eight sessions of media implementation. Four sessions were conducted at the end with an accuracy of 20 minutes each to assess the final abilities of students after using the media. The results of this implementation show an improvement experienced by the subjects, and the improvement can be seen in Figure 3.



Based on Figure 3, there is a quite significant improvement in the subjects' abilities throughout 16 sessions. The developmental scores after each session can be seen in Table 1. In Table 1, each child has different characteristics and experiences unique progress in each encounter. Each session also reveals fluctuations, both declines and improvements. The decline is attributed to the children's responses, which are crucial for generating valid data. Students' obstacles in their phonological processes, such as identifying letters, have shown progress, with three out of four students now able to identify letters. This achievement is attributed to the Decodable Book (Decobo) media, which introduces letters at the beginning, enabling children to identify them.

Table 1.	Progress	score	for	each	session

S	Baseline-1					Intervention						Baseline-2				
AJ	80	84	84	89	94	86	97	97	97	88	94	93	99	98	99	99
AR	40	41	41	40	48	48	49	50	69	70	70	75	80	83	83	84
KE	35	38	37	37	45	46	46	50	59	60	65	80	93	94	95	95
HA	24	21	28	26	30	42	40	43	44	44	48	48	50	55	50	55

Evaluation

Evaluation is conducted to obtain feedback regarding the results obtained. At the media implementation stage, it is deemed quite effective, necessitating an evaluation concerning media development and its application to subjects. This ensures that the developed media is effective for implementation. The current evaluation has revised the

media and returned to the analysis stage of student needs and characteristics to provide development that aligns with students' needs.

Discussion(s)

Our research findings indicate that students with reading disabilities struggle with recognizing letter symbols and sounds, which hinders their academic learning. It is also suggested that reading disabilities primarily involve issues with phonological awareness (Franceschini et al., 2017; Snowling et al., 2019). Moreover, mastery of phonological awareness is considered crucial and necessary for reading (Hulme et al., 2015; Lervåg et al., 2018). Several studies on students with reading disabilities or dyslexia have shown that effective teaching includes phonological awareness instruction, grapheme-phoneme correspondence teaching, phonemic decoding, and focusing on fluent reading of decodable books (Cheatham et al., 2014). During the implementation of instructional media, children's responses vary, with some becoming distracted, leading to disrupted reading due to environmental distractions. Reading is a visual and linguistic task, requiring the identification skills of letters with similar shapes but different meanings, thus demanding attention and concentration (Dehaene et al., 2015; Pegado et al., 2014; Perry & Long, 2022).

The significant achievements depicted in the graph indicate that the Decodable book (Decobo) contains material that facilitates easier letter and sound recognition, thus potentially enhancing specific letter and word processing skills (Cheatham et al., 2014). The Decodable book (Decobo) also shows improvement in letter sound pronunciation, as four students were able to identify letter sounds. This achievement is attributed to the Decodable book (Decobo)'s audio features and zoom features on words, allowing children to identify letter sounds and words. This aligns with the fact that the Decodable book (Decobo) contains many systematically arranged words phonetically, combining letters with sounds that have been taught (Bitney, 2021).

Overall, the research findings regarding the effectiveness of Decodable book (Decobo) media can be considered quite effective in enhancing the early reading abilities of students with reading disabilities, with an overall score of 72.60%. Decodable books serve as an initial stage for reading. Students must acquire and practice decoding skills and word recognition to develop fluent and accurate reading abilities (Othman & Tahar, 2017). The issue of delayed mastery of reading skills arises from a lack of proficiency in prerequisite reading skills; thus, if these foundational skills are lacking, both early and advanced reading abilities in subsequent learning stages will be affected. This is in line with several references indicating that phonological awareness is a prerequisite for reading skills because sound foundation is the key to understanding the relationship with written symbols (Misdayani dkk., 2024).

CONCLUSION

This research begins with an analysis of the needs and characteristics of students who have problems with academic decline as a result of obstacles to reading. Decodable book (Decobo) was developed as a medium to improve the initial reading of students with reading disabilities which has been validated by media, material and animation experts with total calculations78.6%, it can be declared valid with minor revisions. Decodable books (Decobo) are effective in improving the initial reading skills of students with reading disabilities with a quantity of 35% achieved as seen from the children's achievements before using the media and after using the media. This media will have a good impact on children with reading disabilities in improving their initial reading.

Decodable books can also help teachers and parents in teaching children to read, by being used repeatedly and gradually according to the level of word patterns that children need to master. The results of this research require further development of the Decodable Book (Decobo) media by adjusting the analysis of the needs of students with reading disabilities. This research is still being carried out on a limited scale, it is necessary to carry out media testing on subjects on a wider scale to get a more significant impact regarding the use of decodable books.

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