
Academia Open



By Universitas Muhammadiyah Sidoarjo

Table Of Contents

Journal Cover	1
Author[s] Statement.....	3
Editorial Team	4
Article information	5
Check this article update (crossmark)	5
Check this article impact	5
Cite this article.....	5
Title page.....	6
Article Title	6
Author information	6
Abstract	6
Article content	8

Originality Statement

The author[s] declare that this article is their own work and to the best of their knowledge it contains no materials previously published or written by another person, or substantial proportions of material which have been accepted for the published of any other published materials, except where due acknowledgement is made in the article. Any contribution made to the research by others, with whom author[s] have work, is explicitly acknowledged in the article.

Conflict of Interest Statement

The author[s] declare that this article was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Copyright Statement

Copyright © Author(s). This article is published under the Creative Commons Attribution (CC BY 4.0) licence. Anyone may reproduce, distribute, translate and create derivative works of this article (for both commercial and non-commercial purposes), subject to full attribution to the original publication and authors. The full terms of this licence may be seen at <http://creativecommons.org/licences/by/4.0/legalcode>

Academia Open

Vol. 11 No. 2 (2026): December
DOI: 10.21070/acopen.11.2026.14938

EDITORIAL TEAM

Editor in Chief

Mochammad Tanzil Multazam, Universitas Muhammadiyah Sidoarjo, Indonesia

Managing Editor

Bobur Sobirov, Samarkand Institute of Economics and Service, Uzbekistan

Editors

Fika Megawati, Universitas Muhammadiyah Sidoarjo, Indonesia

Mahardika Darmawan Kusuma Wardana, Universitas Muhammadiyah Sidoarjo, Indonesia

Wiwit Wahyu Wijayanti, Universitas Muhammadiyah Sidoarjo, Indonesia

Farkhod Abdurakhmonov, Silk Road International Tourism University, Uzbekistan

Dr. Hindarto, Universitas Muhammadiyah Sidoarjo, Indonesia

Evi Rinata, Universitas Muhammadiyah Sidoarjo, Indonesia

M Faisal Amir, Universitas Muhammadiyah Sidoarjo, Indonesia

Dr. Hana Catur Wahyuni, Universitas Muhammadiyah Sidoarjo, Indonesia

Complete list of editorial team ([link](#))

Complete list of indexing services for this journal ([link](#))

How to submit to this journal ([link](#))

Article information

Check this article update (crossmark)



Check this article impact (*)



Save this article to Mendeley



(*) Time for indexing process is various, depends on indexing database platform

Interactive Digital Media Application For Early Reading Skills Among Slow Learners: Aplikasi Media Digital Interaktif untuk Keterampilan Membaca Awal pada Anak-Anak yang Lambat Belajar

Jumiati Aris, jumiatiaris.2025@student.uny.ac.id (*)

Program Studi Magister Pendidikan Luar Biasa, Fakultas Ilmu Pendidikan, Universitas Negeri Yogyakarta, Indonesia

Ikhlasul Ardi Nugroho, ikhlasul@uny.ac.id

Program Studi Magister Pendidikan Luar Biasa, Fakultas Ilmu Pendidikan, Universitas Negeri Yogyakarta, Indonesia

(*) Corresponding author

Abstract

General Background Basic literacy development remains a pressing priority within national education systems, demanding inclusive pedagogical adaptations to accommodate diverse learner capabilities. **Specific Background** Slow learners in inclusive elementary schools, such as Grade II students at SDN 001 Sangatta Utara, struggle with foundational phoneme recognition and syllable decoding due to reliance on text-heavy, non-adaptive teaching methods. **Knowledge Gap** While current literature highlights multimedia utility for general reading comprehension, empirical studies investigating application-based visual and auditory interventions specifically for early reading progress among slow learners remain sparse. **Aims** This study investigates how the Qreatif.id application facilitates letter identification, phoneme pronunciation, and syllable decoding for an elementary slow learner through a two-cycle Classroom Action Research. **Results** Quantitative and qualitative analysis reveals that consistent use of the digital application, coupled with structured scaffolding, successfully elevated the student's early reading test scores from a pre-action baseline of 37.50% to 78.75% by the end of Cycle II. Furthermore, classroom observations demonstrated a steady progression in active participation and focus, culminating in an 88.63% engagement rate. **Novelty** This research provides empirical evidence on how combining customized visual-auditory digital feedback with tactile practice effectively resolves foundational literacy barriers for children with intellectual delays. **Implications** Elementary educators should actively integrate multisensory digital tools into inclusive classrooms, requiring institutional support for appropriate technology provisions and continuous professional pedagogical development.

Highlights

- Visual and auditory application features significantly increase phoneme recognition and syllable decoding capabilities.
- Structured scaffolding within digital interventions steadily improves learning concentration and independent classroom participation.
- Adaptive educational technology actively mitigates foundational literacy barriers for students with intellectual delays.

Keywords Early Reading Skills; Inclusive Education; Interactive Digital Media; Slow Learner; Classroom Action Research

Published date: 2026-07-21

INTRODUCTION

Literacy skills are among the primary indicators of a country's educational quality. Reading literacy is not only the ability to identify written symbols, but also the ability to understand, use, evaluate and reflect on written information in order to achieve lifelong learning, according to the Programme for International Student Assessment (PISA) (OECD, 2023). However, reading literacy among students in Indonesia is still a big challenge. The latest PISA results show that the reading performance of Indonesian students is still below the average of the member countries of the Organization for Economic Co-operation and Development (OECD), making the improvement of early reading skills in the primary school level a national educational priority (OECD, 2023). This condition has encouraged the Indonesian government to intensify the implementation of inclusive education for all learners, including children with special educational needs, to have equal opportunities to develop literacy skills (Ministry of Education, Culture, Research, and Technology, 2023).

Inclusive education is a way of teaching which ensures all students, regardless of their individual characteristics, needs and potential, have access to quality learning without any discrimination. The implementation of inclusive education is not sufficient to provide access to school, but also the existence of adaptive learning strategies, instructional media, and learning environments that can accommodate the diversity of students' abilities (UNESCO, 2021; Ministry of Education, Culture, Research, and Technology, 2023). One group of students who need adaptive educational services is slow learners. Usually, slow learners have intellectual abilities that are slightly below the average range, so they need a longer time to learn, more repetition, and more concrete instructional media than their peers (American Psychiatric Association, 2022; Okterina et al., 2025). Without suitable instructional accommodations, slow learners are more prone to encounter academic problems, especially in the development of early reading skills. Early reading skills are the building blocks of literacy development during a student's educational career. These include letter recognition, knowledge of grapheme-phoneme correspondence, reading of syllables, and fluent reading of simple words. Proficiency in early grade reading is a prerequisite for reading comprehension, critical thinking, and successful learning in all academic subjects (Ehri, 2020; Castles et al., 2024). However, slow learners are generally slow in learning reading skills in comparison with their normally developing peers as a result of deficits in attention, working memory, information processing speed and visual discrimination of symbols (Okterina et al., 2025; Sonya & Muthi, 2025). Hence teaching slow learners to read needs to be multi-sensory, employing visual, auditory and kinaesthetic learning experiences.

The rapid development of digital technology has offered great opportunities to improve reading instruction through interactive digital media. Interactive digital media provide more attractive learning experiences tailored to students' learning characteristics by combining images, animations, sound, videos, educational games, structured exercises and instant feedback. The Cognitive Theory of Multimedia Learning states that learning occurs better when information is presented through both visual and verbal channels, as learners can process information better through dual cognitive channels (Mayer, 2021). Similarly, Cognitive Load Theory argues that multimedia presentations that are segmented into manageable pieces can reduce cognitive load and thus facilitate students' understanding of instructional content (Sweller et al., 2023). The nature of interactive digital media, unlimited practice opportunities, sequential learning activities and immediate feedback provide instructional accommodations that fit the learning needs of slow learners.

Previous research has shown positive effects of digital media on reading ability in primary school children. According to Hanako et al. (2024), the picture-story media increased the reading mastery of second grade students by 93.2%. Assistive Technology Application Tools (ATAT) significantly improved students' reading skills (Ocon, Ruby, May, T., 2024). Likewise, Puluhalawa et al. (2025) mentioned that the Magic Box instructional media was able to improve the decoding and reading fluency of elementary school students. Okterina et al. (2025) also found that Digital Busy Books were effective in enhancing the cognitive skills of slow learners. Furthermore, earlier research has also confirmed the positive effect of interactive digital media, digital game-based learning media, and other digital learning media on reading skills, learning motivation, and students' involvement in classroom learning activities (Aguilar-Salazar et al., 2023; Grajales & Sabogal, 2023; Monalisa et al., 2024; Castro et al., 2024; Chango et al., 2025). Much of the previous research has focused on digital learning media for typically developing students or on improving reading comprehension rather than early reading skills, although there are some exceptions (e.g. Few studies have been conducted on the effectiveness of application-based interactive digital media in improving the early reading skills of slow learners in inclusive primary schools. In addition, the existing literature has mainly used research and development or quasi-experimental designs, and only a few classroom action research studies have examined the incremental development of reading skills during the intervention process. This indicates a significant research gap in empirical evidence of the effectiveness of interactive digital media to improve early reading skills of slow learners in inclusive elementary school setting in Indonesia.

The first observation in class II of SDN 001 Sangatta Utara showed that the slow learner students had difficulty in recognising letters, distinguishing between similar letters, associating letters with sounds, reading syllables and reading simple words. The reading teaching was mainly based on printed textbooks and teacher's explanation. It resulted in limited attention, low motivation of learning and insufficient learning experiences according to the student's individual learning characteristics. The results show that the main problem is not only related to the cognitive limitations of students but also the limited use of instructional media that can accommodate individual learning needs.

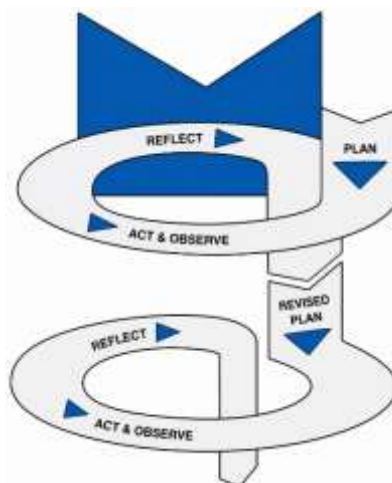
Based on these considerations, this study proposes the use of **Qreatif.id**, an application-based interactive digital learning medium, as an alternative in teaching early reading skills to a slow learner student. The novelty of this study is the use of application-based interactive digital media to support individualised early reading instruction in an inclusive elementary school setting. The application incorporates visual, auditory, animation, structured practice and immediate feedback features that are expected to enhance letter recognition, syllable reading, simple word reading and student engagement

during learning activities. Therefore, this research is aimed to investigate the improvement of the early reading skills of students who are slow learners through the implementation of interactive digital media in Grade II of SDN 001 Sangatta Utara.

METHOD

The research is classroom action research based on model Kemmis and McTaggart which consists of 4 stages, namely: planning, action, observation and reflection. The research was conducted at SDN 001 Sangatta Utara Grade II in the second semester of the academic year 2025/2026. The study was conducted on one slow learner student named NM, aged 7 years 10 months. NM was selected on the basis of the results of the psychological assessment and the records of the classroom teacher. The research problem identified was the low early reading ability of the student specifically in the areas of letter recognition, differentiating visually similar letters, reading syllables and reading simple words. The intervention was conducted in two cycles using Qreatif.id as an interactive digital learning medium. Each cycle contained planning, instruction, observation and reflection. The student was guided in the action stage to identify letters, pronounce letter sounds, trace letters, pair letters, read syllables and read easy words with the use of visual displays, audio features, animations, repetitive practices and immediate feedback. In addition, physical learning media in the form of letter cards and word cards were also used to help the student connect the digital reading activities with real reading experiences. Data were collected through observation and early reading tests. The observation was used to measure the students' participation, attention, activeness, interest and implementation of learning process. The tests were used as pre-tests and post-tests in each cycle in order to find out the improvement of the early reading skills. The research instruments were validated by a supervisor and a classroom teacher as experts. The data were analysed by using descriptive quantitative analysis by comparing the results before and after the intervention. The student was said to be successful in the study if he/she got a minimum score of 70 with the achievement percentage of 85% with the classification of very good.

Figure 1. *Kemmis and McTaggart Classroom Action Research Model*



RESULT AND DISCUSSION

Initial Condition (Pre-Cycle)

The pre-cycle stage was conducted to find out the early reading skills of the student before the implementation of the interactive digital media intervention. Data were collected through classroom observation, initial assessment and early reading performance test. The results of the observation showed that the participant had problems in letter shape recognition and recall, visual discrimination of similar letters, pronunciation of letter sounds, reading of CV syllables, and blending of syllables into meaningful simple words. In addition, the student paid little attention during classroom instruction and sometimes lost focus during reading activities. The first test was done to assess letter identification, letter reading, syllable reading, and simple word reading. The participant scored 30 out of a maximum score of 80, which is 37.5%, and this score is poor. This finding suggests that the student's early reading skills were well below the established success criterion of 85%. The poor achievement indicated that the student had not mastered the basic elements of early reading, especially in letter recognition, phoneme production and syllable decoding. From these preliminary results, it is concluded that the slow learner student needed a more flexible and engaging instructional intervention to accommodate individual learning characteristics. The student's slow early reading progress, limited engagement in the classroom, and little focus indicate that previous instruction did not sufficiently meet the student's learning needs. Therefore, this study used Qreatif.id as an interactive digital learning medium that can provide a more concrete, multi-sensory, and attractive learning experience. The student's early reading skills were expected to improve progressively with each cycle of the classroom action research as a result of this intervention.

Cycle I

Cycle I was introduced to follow-up on the pre-cycle findings, which showed that the slow learner student was a low early reader. The intervention was performed in three meetings on May 4, 6 and 8, 2026 using Qreatif.id as the interactive digital

learning medium. Prior to the intervention, the researcher prepared lesson plans, observation and assessment instruments, and instructional media including the Qreatif.id application, tactile letters, magnetic boards, and letter cards. The learning material was developed based on the results of needs analysis which was designed to recognise the letter of vowel, identify the vowel and consonant, read the syllable of consonant-vowel (CV), and read the words that are simple by integrating interactive digital media and concrete learning media according to the learning characteristics of slow learner students. The instructional activities were divided into three stages : introduction , main activities and closing . In the main activities, the student actively participated in the Qreatif.id application such as recognising letters, listening to the sounds of letters, tracing letters on an interactive screen, matching letters and syllables, and reading simple words gradually. To support learning, tactile letters and a magnetic board were used alongside the digital activities to provide visual, auditory and kinaesthetic learning experiences. The teacher offered constant scaffolding, repetitive practice (drilling), verbal reinforcement and immediate feedback during the learning process that helped the student learn how to recognise letter forms, relate letters to their sounds, read syllables and read simple words. Simultaneously, a collaborating teacher acted as an observer, documenting the learning activities of the student and the implementation of the instructional process by using structured observation sheets.

The third meeting was about introducing the vowel phoneme /e/ by using the word meja (“table”). The learning activities follow the same sequence as the previous sessions, including letter recognition with the help of the Qreatif.id application, tracing of letters, syllable reading drills, educational games and word building with tactile letters and a magnetic board. These repetitive learning activities were designed to enhance the student’s capacity to recognise letter forms, link letters to their sounds, read syllables, and decode simple words. At the end of the meeting, the teacher evaluated the student by having him/her unscramble letters to form meaningful words and provided reinforcement and reflection on the learning process. Post-intervention assessment was done after all the instructional sessions in Cycle I were completed by means of oral and performance-based tests to evaluate the improvements in phoneme recognition, letter identification, syllable reading, and simple word reading by using the Qreatif.id interactive digital learning media.

The implementation of Cycle I had positive changes in the student’s involvement in the learning process. The student was more active in reading activities and actively interacted with the learning media. The student was able to recognise and pronounce several vowel letters, read simple syllables, and read familiar words, but needed guidance to do some activities. The findings from the observations and assessments at the end of Cycle I were used as a basis for reflection, to identify weaknesses in the implementation and to design improvements for Cycle II to further enhance the student’s early reading skills.

Table 1. Student Participation Observation Results in Cycle I

Meeting	Maximum Score	Obtained Score	Percentage (%)	Category
I	44	27	61.36	Good
II	44	30	68.18	Good
III	44	31	70.45	Good

The observation data indicated that the student’s participation increased gradually during the implementation of Cycle I. The percentage of participation went up from the first meeting of 61.36% to the second meeting of 68.18% and the third meeting of 70.45%. The results show that the student slowly adapted to the use of the Qreatif.id interactive digital learning media and more actively participated in the learning activities. This progress was demonstrated through the student’s increased focus on the teacher’s directions and active participation in activities such as letter tracing, educational games, and reading practice for syllables and basic words.

The level of participation was in the good range throughout the entire Cycle I. However, the results show that the interactive digital media had a positive impact on the student’s learning motivation and classroom participation. The student was more enthusiastic and more actively involved in each stage of the instructional process than in the pre-intervention condition due to the combination of visual, auditory, and kinaesthetic learning experiences. However, the student still needed some teacher guidance in some activities, particularly in reading syllables and in concentration during the lesson.

Table 2. Early Reading Skills Test Results

Subject	Pre-Intervention		Cycle I		Improvement
	Score	Percentage	Score	Percentage	
NM	30	37.50%	50	62.50%	25%

The results of the test indicated that the students’ early reading skills increased after the implementation of Cycle I. The student’s score increased by 25% from 30 (37.50%) on the pre-intervention assessment to 50 (62.50%) at the end of Cycle I. Although this achievement has not yet met the planned success criteria, the results show that the application of interactive digital learning media has a positive effect on the development of early reading on slow learner students. The improvement was observed in several areas of early reading including letter recognition, phoneme pronunciation, reading of syllables and reading of simple words. The student could identify some vowel and consonant letters by himself and began to read simple words such as baju (shirt), buku (book), topi (hat), dasi (tie) and meja (table). However, the student still required some scaffolding through verbal prompts, visual cues and repeated practice to differentiate some more difficult phonemes especially /i/, /e/, /t/ and /d/. The results indicated that the interactive digital learning media were effective in improving students’ early reading skills, but instructional help was still needed to reach the expected mastery level.

The results of the test indicated that the students’ early reading skills increased after the implementation of Cycle I. The student’s score increased by 25% from 30 (37.50%) on the pre-intervention assessment to 50 (62.50%) at the end of Cycle I. Although this achievement has not yet met the planned success criteria, the results show that the application of interactive digital learning media has a positive effect on the development of early reading on slow learner students. The improvement

was observed in several areas of early reading including letter recognition, phoneme pronunciation, reading of syllables and reading of simple words. The student could identify some vowel and consonant letters by himself and began to read simple words such as baju (shirt), buku (book), topi (hat), dasi (tie) and meja (table). However, the student still required some scaffolding through verbal prompts, visual cues and repeated practice to differentiate some more difficult phonemes especially /i/, /e/, /t/ and /d/. The results indicated that the interactive digital learning media were effective in improving students' early reading skills, but instructional help was still needed to reach the expected mastery level.

Cycle II

Cycle II was carried out as a follow up to the reflection results obtained in Cycle I to improve the early reading skills of the slow learner student. The intervention was carried out in three learning sessions on 11 May, 14 May, and 3 June 2026. The Qreatif.id interactive digital learning media was still used. Cycle II improvements centred around increasing the repetitive reading practice (drilling), facilitating the application features used during instruction, providing more opportunities for independent reading, and incorporating the digital media with concrete instructional materials (e.g., the whiteboard and real objects). These changes were implemented to address the shortcomings of Cycle I, including the student's low level of focus, reliance on assistance from the teacher, and struggles in mastering letters and syllables.

The instructional process in Cycle II was the same as in Cycle I, there were introductory activities, core activities, and closing activities. In the core activities, the student practiced reading letters, syllables and simple words using the Qreatif.id application which includes visual displays, audio support, educational games and sequential reading exercises. The teacher gave more structured scaffolding by giving more opportunities for the student to be able to read independently through repeated practice with familiar words such as dasi (tie), meja (table), topi (hat) and buku (book). The digital application was reinforced with reading exercises on the whiteboard, without picture cues, to improve the student's decoding skills and encourage more independence in reading. At the end of all the instructional activities of Cycle II, observations of the student's participation in the classroom and a post-intervention assessment were carried out to determine the development of early reading skills. The observation data was used to examine the changes in student's attention, participation, interest and engagement during the learning process, while the post-test was given to measure the improvement of letter recognition, syllable reading and simple word reading after instruction using the Qreatif.id interactive digital learning media.

Cycle II observations were carried out to assess the changes in the student's participation as a result of the pedagogical improvements made based on the reflective findings of Cycle I. The observed aspects were the attitude, attention, activeness, and interest in learning in early reading instruction by using the Qreatif.id interactive digital learning media of the students. Cycle II employed the same observation instrument as Cycle I to objectively compare the student's participation between cycles. The observation results were used to evaluate how well the modified instructional strategies helped to foster increased student engagement during the learning process.

Table 3. Student Participation Observation Results in Cycle II

Meeting	Maximum Score	Obtained Score	Percentage (%)	Category
I	44	34	77.27	Good
II	44	36	81.81	Good
III	44	39	88.63	Very Good

The results of the observations revealed a constant increase in the student's participation in Cycle II. The percentage of participation went up from 77.27% in the first meeting to 81.81% in the second meeting, and then to 88.63% in the third meeting. The findings show that the implementation of the instructional improvements in Cycle II had an effect on the student's development of attention, activeness, and interest in early reading instruction. The student became more confident in using the digital learning media, paid more attention to the teacher's instructions and participated more actively in each learning activity. The increase in participation shows that the implementation of Qreatif.id interactive digital learning media with repeated practice (drilling), structured scaffolding, and easy learning activities has made a more interesting learning experience for the slow learner student. At the end of Cycle II the student's participation was placed in the category "very good". This shows that the intervention had not only improved academic performance, but also had driven a greater engagement throughout the instructional process.

At the end of all instructional activities in Cycle II, a post-intervention assessment was conducted to determine the student's progress in early reading skills. The assessment was to measure students' ability to recognize letters, pronounce phonemes, read syllables, and read simple words using Qreatif.id interactive digital learning media. The results were then compared to the results of Cycle I to determine the effectiveness of the revised instructional strategies.

Table 4. Comparison of Early Reading Skills Test Results Between Cycle I and Cycle II

Subject	Cycle I		Cycle II		Improvement (%)
	Score	Percentage (%)	Score	Percentage (%)	
NA	50	62.50	63	78.75	16.25

The result of the assessment showed that the improvement of the student's early reading skills after the revised intervention was conducted in cycle II. The student's score in Cycle I was 50 (62.50%) and Cycle II was 63 (78.75%). It increased by 16.25%. This accomplishment exceeded the school's Minimum Mastery Criterion (MMC) of 70, indicating that the goals of the intervention were achieved. The result showed that the Qreatif.id interactive digital learning media can improve students' ability to identify letters, pronounce phonemes, read syllables, and read simple words. Qualitative changes were also observed in the student's reading performance, along with an increase in test scores. In Cycle II, the students were able to read more simple words more independently, to identify the relationship between letters and sounds faster, and needed

substantially less teacher assistance than in Cycle I. The results revealed that the modified intervention with more reading practice, simplified application features and more structured scaffolding successfully optimized the early reading instruction. The Qreatif.id interactive digital learning media proved to be effective to improve the student's early reading skills and learning independence.

The results of the reflection show that the success criteria that were set for this classroom action research were successfully achieved. The early reading skills of the students showed a gradual increase from 37.50% in the pre-cycle stage and 62.50% in Cycle I and finally reached 78.75% in Cycle II. Besides, the student's classroom participation also increased to 88.63%, which is classified as very good. These results indicate that the application of the interactive digital learning media Qreatif.id can improve the early reading skills of students and can also increase the attention, motivation, and active participation of students in the learning process. Thus, the classroom action research was stopped at the end of Cycle II, because all the success indicators that had been predetermined had been achieved.

Discussion

The results of this study show that the use of interactive digital learning media Qreatif.id can improve early reading skills of Grade II slow learners. The improvement was seen from the increasing number of the student's early reading test scores from 37.50% at the pre-intervention stage, to 62.50% in Cycle I, and to 78.75% in Cycle II. The last achievement was above the school's Minimum Mastery Criterion (MMC) of 70, which means the intervention effectively achieved the research objectives. These results suggest that interactive digital media supports the early reading development by providing the learning materials in a structured, engaging, and learner-centered way to fit the characteristics of slow learners as they generally need repeated practice and multisensory stimulation (Mayer, 2021; Sweller et al., 2023). The student showed growth in early reading skills in identifying letters, phonemes, reading syllables, and decoding simple words. At the beginning of the study the student had extreme difficulty in visually discriminating between similar letters and in consistently associating letter symbols with their sounds. The implementation of Qreatif.id shows visible progress in letter recognition and phoneme pronunciation. The results are consistent with the Cognitive Theory of Multimedia Learning that states that information presented through visual and auditory channels improves information processing by activating dual cognitive pathways (Mayer, 2021). Moreover, Cognitive Load Theory suggests that the sequential presentation of learning materials and repeated practice can reduce cognitive load and facilitate the learning of new knowledge (Sweller et al., 2023). Such characteristics of teaching are particularly suitable for the slow learner who learns best through concrete, sequential and repetitive experiences.

The results also showed that early reading skill gains were associated with more classroom participation throughout the intervention. The results of student participation increased from 61.36% at the beginning of Cycle I to 88.63% at the end of Cycle II or reached the very good category. The student's improvement was reflected in his increased attention to the teacher's instructions, increased participation in class activities, increased confidence in reading independently, and increased interest in participating in each stage of the learning process. These results imply that interactive digital learning media can increase students' motivation and engagement in instruction besides academic achievement. Self-Determination Theory suggests that learning environments that offer meaningful experiences, immediate feedback, and opportunities for success can promote intrinsic motivation and active engagement in learning (Ryan & Deci, 2020). Cycle II has been successfully implemented because of the improvement of instruction after reflecting on Cycle I. The improvements included increasing the intensity of reading practice, simplifying the application features to fit better the student's learning needs, providing structured scaffolding, and integrating digital media with concrete instructional materials. Such changes provided the student with more opportunities to make meaningful connections among the letter symbols, phonemes, syllables, and words. Moreover, repeated practice improved the memorizing effect, and the student could read more independently with less help from the teacher. These findings support the previous assertion that adaptive learning media, personalized assistance, and continuous practice should be included in reading instruction for slow learners to improve reading development (UNESCO, 2021; Ministry of Education, Culture, Research, and Technology, 2023).

The present findings are in agreement with prior studies which show the usefulness of digital learning materials in improving reading ability. Hanako et al. (2024) found that picture-story media significantly enhanced reading performance among elementary students. Likewise, Ocon Ruby May T. (2024) found that the Use of Assistive Technology Application Tools (ATAT) greatly enhanced the students' reading skills. The instructional media Magic Box can improve decoding and reading fluency (Puluhulawa et al., 2025). The Digital Busy Book can improve the cognitive abilities of slow learners (Okterina et al., 2025). Aguiar-Salazar et al. (2023), Grajales and Sabogal (2023), Castro et al. (2024), Monalisa et al. (2024) and Chango et al. (2025) reported similar findings, stating that interactive digital media enhance reading achievement, learning motivation and classroom engagement by offering more interactive and engaging learning experiences. However, the current study differs from previous studies in important ways. Most of the previous studies have been on the development and evaluation of digital learning media for normally developing students. This study was conducted using the Classroom Action Research design with the implementation of interactive digital learning media Qreatif.id involving one slow learner student in an inclusive elementary school. Hence, this study provides empirical evidence that the combination of interactive digital media with consistent practice, structured scaffolding and individualized instruction can be effective in improving early reading skills and classroom participation of slow learners.

In summary, the results show that the Qreatif.id interactive digital learning media is an effective learning alternative to improve the early reading skills of slow learner students. The success of the intervention can not only be seen in the improvement of reading achievement beyond the Minimum Mastery Criterion, but also in the increased attention, motivation, active participation, and engagement during the learning process. The results indicate that interactive digital media, designed based on the learning characteristics of students with special educational needs, can be an effective instructional strategy to support inclusive education and to reinforce basic literacy development in primary schools.

CONCLUSION

The results of this classroom action research indicate that the use of interactive digital learning media of Qreatif.id is effective in improving the early reading ability and learning concentration of the slow learner student in Grade II at SDN 001 Sangatta Utara. The student's initial reading ability showed a gradual increase from 37.50% in the pre-intervention stage to 62.50% at Cycle I and 78.75% in Cycle II which was above the Minimum Mastery Criterion (MMC) established by the school. In addition, classroom participation was better at 88.63% in the category of very good, observed in the increased attention, active participation, interest in learning and autonomy in the process of instruction. The findings indicated that the interactive digital learning media integrating visual, audio, animation, repeated practice and instant feedback offered an engaging and adaptive learning environment that could assist slow learner students in developing their basic literacy skills. The findings suggest that teachers should consider interactive digital learning media as an alternative teaching strategy to teach early reading, especially in inclusive classrooms where students have different learning styles. Schools should encourage the use of educational technology by providing sufficient learning facilities and providing professional development for teachers. Parents are encouraged to help students to use digital learning media at home to improve reading practice. Future research should use larger samples, longer intervention periods or interactive digital media combined with other instructional approaches to provide more extensive evidence on the effectiveness of early reading instruction for students with special educational needs.

References

1. Matondang, Bintang Mahrani Abdullah, Friska Widia, Novia Ramadani, & Windi Melisa. (2023). Analisis Kesulitan Membaca di Kelas Rendah. *Bhinneka: Jurnal Bintang Pendidikan Dan Bahasa*, 1, 82–91. <https://doi.org/10.59024/bhinneka.v1i3.184>
2. Alamsyah, A., & Purwanta, E. (2025). Enhancing Reading Word Abilities in Slow Learner Students Through Global Contextual Method. *Journal of Innovation and Research in Primary Education*, 4, 1561–1571. <https://doi.org/10.56916/jirpe.v4i3.1751>
3. Anggraeni, A. (2022). Rancangan Program Pengembangan Pendidikan Individual untuk Siswa Lambat Belajar (Slow Learner). *Nathiqiyah*, 5, 48–55. <https://doi.org/10.46781/nathiqiyah.v5i2.423>
4. Ariska Dwi Aprilia, Yuris Indria Persada, Elvia Ardianti Ningrum, Revi Belva Armilda, & Siti Romelah. (2025). Analisis Kesulitan Literasi Dasar Siswa Kelas 2 Sekolah Dasar melalui Kajian Fonem-Grafem dan Teori Belajar. *Tarunateach: Journal of Elementary School*, 3, 1–10. <https://doi.org/10.54298/tarunateach.v3i1.444>
5. Auza-Santiviáñez, J. C., Díaz, J. A. C., Cruz, O. A. V., Robles-Nina, S. M., Escalante, C. S., & Huanca, B. A. (2023). Interactive formats: considerations for scientific publications. In *Seminars in Medical Writing and Education* (Vol. 2). AG Editor (Argentina). <https://doi.org/10.56294/mw202327>
6. Aziza, F. amalia. (2023). Analysis Of Beginning Reading Ability And Difficulties Faced 4th Grade Elementary Students At MI Tarbiyatul Falah. *LADU: Journal of Languages and Education*, 3, 161–170. <https://doi.org/10.56724/ladu.v3i4.220>
7. Azzahra, R., Ferdino, M. F., Putri, N. I., Harto, K., & Pratama, I. P. (2025). Implikasi Teori Belajar Kognitivistik Pada Pembelajaran Pendidikan Agama Islam di Jenjang Sekolah Menengah Pertama. *Ulumuddin: Jurnal Ilmu-Ilmu Keislaman*, 15, 229–252. <https://doi.org/10.47200/ulumuddin.v15i1.2830>
8. Azzahrah, A. A., & Rustini, T. (2023). Upaya Meningkatkan Kemampuan Membaca dan Menulis melalui Media Pembelajaran Interaktif Digital melalui Aplikasi Gemar (Game Membaca Lancar) pada Peserta Didik Kelas 2 SDN Cinunuk 01. *Journal on Education*, 6, 1806–1811. <https://doi.org/10.31004/joe.v6i1.3159>
9. Benuciglo Romero, S. V., Neira Suqui, S. H., & Chiriguayo Miranda, G. E. (2025). Eficacia del Método Montessori en la Inclusión de Estudiantes con Necesidades Educativas Específicas. *SAGA: Revista Científica Multidisciplinar*, 2, 30–41. <https://doi.org/10.63415/saga.v2i1.28>
10. Berliani, R., Felisha, M., Antika, R. T., Sisca Ayu Damayanti, Cah yanti, K. S., Isnaini, N., Lestari, A., Lestari, A., Rani, R., Aulia Dewi, A., Andika, W. D., & Ayu Pagarwati, L. D. (2024). Analisis Kemampuan Membaca Anak Usia Dini melalui Berbagai Macam Media. *Murhum : Jurnal Pendidikan Anak Usia Dini*, 5, 918–927. <https://doi.org/10.37985/murhum.v5i1.413>
11. Changoluisa Gutiérrez, D. P., Guamán Guamán, L. G., & Lozano Valverde, M. R. (2025). Aprendizaje multisensorial en el desarrollo de la lectoescritura en estudiantes de educación básica. *DISCE. Revista Científica Educativa y Social*, 2, 56–72. <https://doi.org/10.69821/disce.v2i1.35>
12. Chen, W. (2024). The Application of Constructivist Learning Theory to English Reading Teaching of Senior High School. *Journal of Education and Educational Research*, 8, 276–279. <https://doi.org/10.54097/8ffqna55>
13. Chusna, N. L. U., Khasanah, U., & Najikhah, F. (2024). Interactive Digital Media for Learning in Primary Schools. *Asian Pendidikan*, 72–78. <https://doi.org/10.53797/aspn.v4i2.10.2024>
14. Cueva Lema, E. M., Huarz Ramos, C. Á., Santacruz Morocho, C. M., Minchala Lliguizaca, W. G., & Arévalo Apúparo, M. E. (2025). Impacto de la Estimulación Cognitiva en el Desarrollo de Habilidades Lectoras en Niños. *Ciencia Latina Revista Científica Multidisciplinar*, 9, 2258–2272. https://doi.org/10.37811/cl_rcm.v9i3.17846
15. Damayanti, N. F., Bella, A. S., Darmiyati, D., & Ridhaningtyas, L. P. (2025). Peran Perkembangan Kognitif Dalam Kemampuan Belajar Anak Sekolah Dasar. *Journal of Character and Elementary Education*, 4, 74–84. <https://doi.org/10.35508/jocee.v4i3.23063>
16. Daniel, J., Barth, A., & Ankrum, E. (2024). Multicomponent Reading Intervention: A Practitioner's Guide. In *Reading Teacher* (Vol. 77, pp. 473–484). John Wiley and Sons Inc. <https://doi.org/10.1002/trtr.2265>
17. Deva Yanti Siregar, Khairani Khairani, & Yani Lubis. (2023). The Influence Of Phonological Awareness On Early Literacy Development. *Guruku: Jurnal Pendidikan Dan Sosial Humaniora*, 1, 01–14. <https://doi.org/10.59061/guruku.v1i3.185>
18. Draper, I. T. (1979). Dyslexia: An Appraisal of Current Knowledge. *Journal of Neurology, Neurosurgery & Psychiatry*, 42, 1170–1170. <https://doi.org/10.1136/jnnp.42.12.1170-a>
19. Durroh, L., Raharjo, T. J., Harianingsih, H., Sumbali, B., & Widiarti, N. (2025). Classroom Environment and Metacognitive Strategies to Support Beginning Reading Skills: A Systematic Literature Review. *Journal of Innovation and*

- Research in Primary Education, 4, 485–496. <https://doi.org/10.56916/jirpe.v4i3.1360>
20. Faruq, F., & Pratisti, W. D. (2022). Model Pembelajaran Multisensori bagi Anak Disleksia, Efektif?: Tinjauan Sistematis. *Ideguru: Jurnal Karya Ilmiah Guru*, 7, 243–248. <https://doi.org/10.51169/ideguru.v7i3.392>
21. Fauziya, S. N., & Aziz, T. A. (2022). Kaitan Pandangan Aliran Filsafat Progresivisme terhadap Siswa Slow Learners dalam Proses Pembelajaran. *Griya Journal of Mathematics Education and Application*, 2, 70–79. <https://doi.org/10.29303/griya.v2i1.128>
22. García Avilés, J. A. (2011). Dimensiones y tipología de las actividades de participación de la audiencia en la televisión pública. *Ámbitos. Revista Internacional de Comunicación*, 175–195. <https://doi.org/10.12795/ambitos.2011.i20.09>
23. Hapsari, E. D., Rizaldy, D. R., Setiawan, K. E. P., & Herawati, A. (2024). Analysis of Beginning Reading Ability in Lower Grade Elementary School Students. *Lingeduca: Journal of Language and Education Studies*, 3, 154–162. <https://doi.org/10.70177/lingeduca.v3i3.1297>
24. Hartati, T., Nurjanah, Hilda Kurnia Fitri, Nilah Karnilah, & Asep Simbolon. (2024). Bibliometric Analysis: Interactive Multimedia For Mathematics Learning. *EDUTEC : Journal of Education And Technology*, 8. <https://doi.org/10.29062/edu.v8i1.901>
25. Hartman, D. K. (1995). Eight Readers Reading: The Intertextual Links of Proficient Readers Reading Multiple Passages. *Reading Research Quarterly*, 30, 520. <https://doi.org/10.2307/747631>
26. Huang, Y. (2023). The Development and Application of Digital Media Interaction in Artistic Experience. *SHS Web of Conferences*, 155, 01009. <https://doi.org/10.1051/shsconf/202315501009>
27. Jin, M., Kil, H., Kang, Y.-M., Kim, M.-S., Pang, D., & Son, S.-H. (2022). Analysis of Learning Disability Related Target Group and Identification Criteria in Prominent International LD Journals. *The Korea Learning Disabilities Association*, 19, 1–39. <https://doi.org/10.47635/kjld.2022.19.3.1>
28. Leny Apriyanti, N. M., & Ketut Herya Darma Utami. (2025). Digital Interactive Picture Card Media to Improve Beginning Reading of Second Grade Students in Elementary School. *Jurnal Edutech Undiksha*, 13, 120–126. <https://doi.org/10.23887/jeu.v13i1.94922>
29. Livia Yulvani Akmal, Rifanny Anjelina, Nur Azmi Alwi, & Inggria Kharisma. (2025). Pengaruh Penggunaan Media Pembelajaran Interaktif Terhadap Pembelajaran Siswa Sekolah Dasar. *Jurnal Nakula : Pusat Ilmu Pendidikan, Bahasa Dan Ilmu Sosial*, 3, 265–272. <https://doi.org/10.61132/nakula.v3i4.1938>
30. Mahalingam, G. R., Samah, N. A., Ravihchandran, B. K., Rahman, K. A. A., Ali, D. F., Abdullah, A. H., Ashari, Z. M., & Jumaat, N. F. (2019). Need-analysis of interactive games of reading literacy for slow learners. *Universal Journal of Educational Research*, 7, 101–108. <https://doi.org/10.13189/ujer.2019.071913>
31. McMillan, S. J. (2019). Interactive Advertising. In *Advertising Theory* (pp. 469–488). Routledge. <https://doi.org/10.4324/9781351208314-28>
32. Mei Lina Wati, & Wiwin Hendriani. (2024). Strategi Mengajar Siswa Lamban Belajar (Slow Learners): a Narrative Review. *EduInovasi: Journal of Basic Educational Studies*, 4. <https://doi.org/10.47467/edu.v4i2.2314>
33. Montero Alvarado, A. J. (2025). El constructivismo epistemológico para el desarrollo de competencia lectoras en estudiantes de educación primaria. *Revista Dialogus*, 46–72. <https://doi.org/10.37594/dialogus.v1i15.1667>
34. Murnan, R., & Bequette, S. (2025). Sound Foundations. *Kansas English*, 106, 9–18. <https://doi.org/10.62704/ke25s>
35. Nata, D. P., Budiyo, B., Wirdiarti, N., & Yuwono, A. (2025). Systematic Literature Review (SLR): Analisis Strategi Pembelajaran Untuk Meningkatkan Kemampuan Membaca Permulaan. *Al-Madrasah Jurnal Pendidikan Madrasah Ibtidaiyah*, 9, 1224. <https://doi.org/10.35931/am.v9i3.5063>
36. Nazri, S. N. B., Kadir, T. A. B. A., & Ihsan, S. N. B. (2023). Review on Serious-Education Games for Slow Learners. *8th International Conference on Software Engineering and Computer Systems, ICSECS 2023*, 441–446. <https://doi.org/10.1109/ICSECS58457.2023.10256376>
37. Okterina, E., Farah, D. N., Zila'aidah, N., Widajati, W., Pamuji, P., & Fauzan, R. A. (2025). Pengembangan Busy Book Digital untuk Mengoptimalkan Kemampuan Kognitif Anak Slow Learner. *Kalam Cendekia: Jurnal Ilmiah Kependidikan*, 13. <https://doi.org/10.20961/jkc.v13i2.101894>
38. Oliveira, K. L. de, Lúcio, P. S., & Miguel, F. K. (2016). Considerações Sobre a Habilidade de Compreensão em Leitura e Formas de sua Avaliação. *Psicologia Escolar e Educacional*, 20, 69–77. <https://doi.org/10.1590/2175-353920150201930>
39. Potaša, A. (2024). DEVELOPMENT OF READING SKILLS IN THE 1ST GRADE. *Education Reform: Education Content Research and Implementation Problems*, 2, 33–49. <https://doi.org/10.17770/er2024.2.8274>
40. Prameswari, S. C., & Subayani, N. W. (2024). Analisis Faktor Kesulitan Membaca Sekolah Dasar. *JiIP - Jurnal Ilmiah Ilmu Pendidikan*, 7, 12425–12430. <https://doi.org/10.54371/jiip.v7i10.6271>
41. Purnama, R., Farmansyah, D., Yuniarti, E., Aminah, N., & Asnawati, S. (2024). A Systematic Review : Interactive Media in Mathematics learning, What do we get? *International Journal Of Humanities Education and Social Sciences (IJHESS)*, 3. <https://doi.org/10.55227/ijhess.v3i6.1043>
42. Qiang, H. (2023). Influencing Factors of Reading Effect of College Students' Red Classics in Intelligent Media Environment. *International Journal of Education and Humanities*, 11, 24–27. <https://doi.org/10.54097/ijeh.v11i2.13524>
43. Raghavendra, A., & S, D. (2025). Enhancing English Language Learning among Slow Learners at the Undergraduate Level: A Study on the Effectiveness of Multimedia-Based Remedial Teaching in Indian Colleges. *International Journal of Academic Excellence and Research*, 01, 23–32. <https://doi.org/10.62823/mgm/ijaer/01.03.95>
44. Rahmawati, E., & Andriani, F. (2024). The Effectiveness of Multisensory Method for Improving Prereading Skills in Preschooler with Visual Perception Problem. *Psikoborneo: Jurnal Ilmiah Psikologi*, 12, 219. <https://doi.org/10.30872/psikoborneo.v12i2.14702>
45. Rashid, N., & Azid, N. (2020). The Effect of Using Look, Spell and Read (LSR) Interactive Application towards Reading (CV+CVC) Skills among Slow Learner Students. *Universal Journal of Educational Research*, 8, 7905–7914. <https://doi.org/10.13189/ujer.2020.082579>
46. Raudatul Saumi, & Ari Suriani. (2025). Transformasi Pembelajaran Dasar Melalui Media Interaktif: Sebuah Telaah Literatur Terhadap Dampaknya pada Hasil Belajar. *Jurnal Yudistira : Publikasi Riset Ilmu Pendidikan Dan Bahasa*, 3,

216–222. <https://doi.org/10.61132/yudistira.v3i3.2006>

47. Ribi Gulindari, & Ari Suriani. (2025). Strategi Guru dalam Menghadapi Siswa yang Lambat dalam Menangkap Pelajaran di Sekolah Dasar. *Jurnal Nakula : Pusat Ilmu Pendidikan, Bahasa Dan Ilmu Sosial*, 3, 313–321.

<https://doi.org/10.61132/nakula.v3i4.2009>

48. Rieben, L., & Perfetti, C. A. (2013). Learning to read: Basic research and its implications. In *Learning To Read: Basic Research and Its Implications*. Taylor and Francis. <https://doi.org/10.4324/9781315044453>

49. Samsidar, S. (2025). Implementation of Digital Learning Media in Increasing Elementary School Students' Interest in Learning: A Literature Review. *Ludi Litterarri*, 1, 22–31. <https://doi.org/10.62872/dz6bmx33>

50. Saragih, D. E., Fitriani, Y., & Rochyadi, E. (2024). Asesmen Pendidikan pada Anak dengan Slow Learner. *Jurnal Inovasi, Evaluasi Dan Pengembangan Pembelajaran (JIEPP)*, 4, 363–370. <https://doi.org/10.54371/jiepp.v4i3.528>

51. Sele, Y., Tekliu, R. A. A., Sila, R. U. R., & Hanoë, E. M. Y. (2024). Analisis Faktor yang Mempengaruhi Literasi Membaca dan Menulis Siswa. *Indonesian Research Journal on Education*, 4. <https://doi.org/10.31004/irje.v4i1.446>

52. Slavin, R. E., Lake, C., Chambers, B., Cheung, A., & Davis, S. (2009). Effective reading programs for the elementary grades: A best-evidence synthesis. *Review of Educational Research*, 79, 1391–1466.

<https://doi.org/10.3102/0034654309341374>

53. Sonya Sonya, & Ibnu Muthi. (2025). Efektivitas Pemanfaatan Cerita Anak Interaktif untuk Meningkatkan Kemampuan Literasi Membaca Siswa SD Kelas Rendah. *Nian Tana Sikka : Jurnal Ilmiah Mahasiswa*, 3, 106–119.

<https://doi.org/10.59603/niantanasikka.v3i4.964>

54. Sulfiati, Akib, I., & Muzaini, M. (2025). Critical Thinking Skills of Slow Learners in Mathematical Problem-Solving: A Systematic Literature Review. *Journal of Mathematics Instruction, Social Research and Opinion*, 4, 319–332.

<https://doi.org/10.58421/misro.v4i2.412>

55. Tintin Susilowati, Nugroho, P. W., Rianto, & Anis Rahmadhani. (2025). Pengembangan The Thing Puzzle Interactive Media untuk Mengasah Keterampilan Verbal bagi Slow Learner. *G-Couns: Jurnal Bimbingan Dan Konseling*, 9, 2504–2517. <https://doi.org/10.31316/g-couns.v9i3.7161>

56. Zakariyah, M. F., Yulianingsih, W., Hidayah, L. N., & Anisa, A. (2024). Implementation of Universal Design For Learning (UDL) in Digital Learning Media: A Systematic Review. *JPPM (Jurnal Pendidikan Dan Pemberdayaan Masyarakat)*, 11, 175–188. <https://doi.org/10.21831/jppm.v11i2.83253>

57. Zapata Lascano, W. A., Cruz Freire, D. A., Pantoja Mera, V. A., Coronel Albán, M. D. R., & Villacís Suárez, C. D. R. (2024). Factores que afectan el hábito de la lectura. Un problema de la sociedad actual. *LATAM Revista Latinoamericana de Ciencias Sociales y Humanidades*, 5. <https://doi.org/10.56712/latam.v5i5.2651>

58. Zhang, M., Hu, H., Zhang, Z., Li, X., Wang, Q., Bai, X., & Zang, C. (2023). The effect of lexical predictability on word processing in fast and slow readers during Chinese reading. *Acta Psychologica Sinica*, 55, 79–93.

<https://doi.org/10.3724/SP.J.1041.2023.00079>

59. Zhou, L. (2024). Reading Ability Development in Children: Key Factors and the Role of the Teachers' Reading Instruction Competence. *Science Insights Education Frontiers*, 25, 4091–4093. <https://doi.org/10.15354/sief.24.co371>