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Research Article

Enhancing Phonics and Phonological Metacognitive Awareness for Efficacy in Reading Comprehension Among Students with Learning Difficulties

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ABSTRACT

This study investigates the impact of a phonics and phonology-based intervention that emphasizes metacognitive awareness on reading comprehension in students with learning difficulties. By incorporating these key aspects of language learning with strategies that are designed to encourage reflecting consciously on thought processes, the intervention aims to enhance both the academic and the non-academic reading comprehension.

The participants of the study were students of Grade 3, 4 & 5, identified by the parents and teachers as facing difficulty with reading and comprehension, but without a formal diagnosis due to hesitation from parents. The intervention included a variety of activities, such as word search, word pair practice, exercises on articulation, syllabification rules, creating fun nonsense words, and tasks on segmentation. Metacognitive strategies, such as self-questioning and goal-setting, can be quite challenging for students with learning difficulties, especially in their early elementary grades. To enhance metacognitive awareness in these students, engaging activities and repetitive self-aware style sentences that promote reflection on their thinking processes were incorporated. By introducing these strategies at an early stage, students can build a stronger foundation for future learning and enhance their overall reading comprehension.

A quasi-experimental design with pre- and post-test assessments was employed to measure the reading comprehension and metacognitive awareness. The results exhibited significant improvements in both the areas among students with learning difficulties which suggests that a combined approach of focusing on phonics, phonology, and metacognitive awareness can efficiently improve reading comprehension in this population.

Keywords: phonics, phonology, metacognitive awareness, reading comprehension, learning difficulties, early elementary grades, self-questioning, goal-setting, repetitive sentences, intervention, quasi-experimental design, pre-test, post-test, significant improvements

Introduction

Reading comprehension is a core ability that supports both academic and non-academic success and plays a significant role in the holistic development of children in primary-grade. In addition to academic success, reading nurtures a lasting passion for learning, enriches vocabulary, and improves critical thinking in the children. Interacting with a variety of texts enables the children to discover different cultures, point of views, and experiences, expanding their perspective globally. Furthermore, reading improves cognitive abilities such as attention, memory, and creativity.

Phonics and Phonological skills, such as the skill to identify and manipulate words' individual sounds, are very important for a successful reading development. Children who face difficulty with these skills often encounter challenges in decoding words and this may lead to frustration and decreased engagement from the reading activities. Early diagnosis and intervention from specialists can be critical in addressing these issues faced by the children before their academic progress is affected. However, in spite of the significance of the timely

support, many parents are hesitant to assess the possibility of learning disabilities in their children. Research shows that this hesitation originates from mixed feelings. Some parents are afraid of the negative consequences like social stigma or lowered teacher expectations, while others are resistant towards labeling their child as "different." As Kabuto (2020) observed, these conflicting views of the parents can make it hard for them to address their children's learning needs.

This article focuses on students in the Grades 3, 4, and 5 who are facing phonological difficulties that obstruct their ability of word decoding and decrease their interest in reading various types of texts. The study utilizes a targeted intervention that integrates both phonics and phonological instruction with the metacognitive strategies. By integrating these two approaches, which involve strengthening phonics and phonological skills alongside improving self-monitoring and reflection, the intervention seeks to holistically enhance reading abilities.

Metacognitive strategies help the students to become more aware of their phonics and phonological processing, which enables them to manage their decoding challenges in a better way, monitor their overall reading progress, and implement effective reading strategies. This approach encourages a more significant understanding of their reading processes and also improves their ability to manage complex texts, ultimately supporting the children's overall literacy development.

Encouraging metacognitive awareness in children with learning difficulties belonging to primary-grade is therefore very important to improve their reading skills. The population selected for this particular study comprises students identified by parents and teachers as having learning difficulties, though they have not been formally diagnosed due to parental reluctance. As Kabuto (2020) and Ray and Ghanta (2022) emphasize, despite India's dedication to inclusive education through programs such as the Sarva Shiksha Abhiyan (SSA), challenges in implementation remain, partly due to opposition from parents and schools. These obstacles can have a considerable effect on children with learning difficulties, especially in reading comprehension.

This study focuses on exploring the effectiveness of a phonics and phonology-based interventions, incorporating explicit metacognitive strategies through activity-based learning, to improve reading comprehension among students with learning difficulties. Mokhtari and Reichard (2002) suggest that metacognitive strategies can actually enable the learners to comprehend reading material in a better way and help them overcome challenges and think about how they learn.

Methodology

Participants for the pilot study were five elementary school students, 2 from grade 3, 1 from grade 4 and 2 from grade 5, assessed by their class teachers and parents as having learning difficulties based on their performance at school and at home. The parents of these students were reluctant for professional assessment of their child insisted by recommendations from school.

Rationale for Targeting Grades 3, 4, and 5 are by introducing metacognitive strategies at this age group is advantageous for several reasons. As students' progress through their education, they will encounter increasingly complex texts that incorporate intricate linguistic features such as idioms, metaphors, and nuanced authorial inferences. Building a robust foundation in metacognitive skills early on is crucial, as it equips students with the strategies needed to navigate these sophisticated reading challenges. According to Piaget's theory of cognitive development, students in Grades 3 to 5 are in the concrete operational stage, which allows them to easily grasp and apply concrete concepts as well as strategies effectively (Piaget & Inhelder, 1969). While developing metacognitive skills can be challenging, they can be taught and reinforced through hands-on examples and focused activities. Recent research by Harris and Graham (2023) highlights that the early metacognitive instructions significantly enhances the students' reading comprehension and problem-solving skills. Early intervention not only addresses these challenges in a proactive manner but also helps prevent the deterioration of reading difficulties and related frustrations. This approach ensures a more positive and engaged attitude toward learning and lays the foundation for continued academic achievement.

Metacognitive strategies include techniques such as self-questioning, goal-setting, monitoring comprehension, visualization, and prediction. These techniques provide assistance to the students in engaging more deeply with texts and reflecting on their understanding. According to Baker and Brown (2020), self-questioning helps the students to actively interact with the material, identify gaps in their comprehension, and seek further information on it. Zimmerman (2021) emphasizes that goal-setting establishes clear objectives and tracks progress, which possibly boosts motivation and focus.

Students with learning difficulties frequently face challenges in applying these metacognitive strategies due to the cognitive and learning barriers. A study by Graham and Harris (2022) suggests that these students struggle with self-regulation and reflection, but targeted interventions can significantly improve the effectiveness of these metacognitive strategies. Schellings and Leijten (2023) show that integrating engaging, repetitive activities into metacognitive instructions aids the students with their learning difficulties in practicing these strategies more effectively. Their study indicates that fun, interactive approaches are important for reinforcing metacognitive skills.

Early intervention in teaching the metacognitive strategies is crucial for establishing a strong foundation for the students' future learning. Harris and Graham (2023) present an argument that introducing these strategies during the early stages allows students to develop important skills that support their reading comprehension

and their overall academic success. Their research demonstrates that early exposure to metacognitive strategies helps students in gaining a better understanding of their learning processes, enhancing their ability to navigate more complex texts as they progress in their education.

Fun Activities

- Phonics and Phonological-Based Word Search Worksheets: Students search for words that connect to the phonics and phonology concepts, reinforcing their comprehension of letter-sound correspondences and sound patterns.
- Pencil Exercises to Articulate Words and Word Families: Students trace the shapes of letters and words with pencils, aiding in the development of accurate pronunciation and recognition of word families.
- Creating Playful Nonsense Words: Students generate nonsense words using linguistic processes like assimilation, deletion, substitution, and epenthesis, helping them grasp word structure and enhance their phonological awareness.
- Arm Tapping Segmenting Activity : In this kinesthetic segmenting activity, the speech therapist taps different parts of her arm to represent each phoneme in a word (e.g., shoulder for /k/, elbow for /æ/, and wrist for /t/ in "cat"). After segmenting, she blends the sounds together by sliding her hand down the arm, helping students visually and physically connect sounds to form words.
- Detective Says Game: After each activity, students are invited to describe how they solved the problem or completed the task. This reflection helps them analyze their thinking processes and identify the metacognitive strategies they employed.

Metacognitive Questions

- Sound-letter match: I matched sounds with letters.
- Read new words: I used sounds to read new words.
- Join sounds: I put sounds together.
- Split words: I break words into sounds.
- Word families: I see patterns in words with the same endings.
- I understood the meaning: I understood what the words meant.
- I checked my work: I looked back to make sure my answers were correct.
- I asked for help: I asked the teacher or a classmate for help when I needed it.

The facilitator can share these questions with the students on a sheet with yes or no options. As students become more familiar with the questions, the facilitator can gradually reduce their use, encouraging the students to ask themselves these questions internally.

Data Analysis for the study-

A study involving students with learning difficulties from five elementary schools was conducted to evaluate the effectiveness of this approach. The students participated in the weekly sessions which were conducted over a period of eight weeks. They were engaged in phonics and phonological-based activities and metacognitive exercises.

Results:

- Improved Metacognitive Awareness: Students showed increased ability to reflect upon their own thinking processes and identify the strategies that they were using.
- Enhanced Phonological Awareness: Students demonstrated increased ability in identifying and manipulating the sounds in words.
- Improved Reading Comprehension: Students experienced very noticeable improvements in their ability to read fluently and comprehend text.

Conclusion:

The pilot study suggests that this approach of combining phonics and phonological activities with explicit instruction in metacognitive strategies, can be very effective in helping the students with learning difficulties to develop their reading skills and become more independent learners.

Descriptive Statistics

Variable	Mean (Pre-test)	Standard Deviation (Pre-test)	Mean (Post-test)	Standard Deviation (Post-test)
Reading Comprehension Score	75	10	82	8
Metacognitive Awareness Score	60	12	70	10

Inferential Statistics
Paired t-test:
- **Reading Comprehension:** $t(4) = 2.5$, $p = .05$
- **Metacognitive Awareness:** $t(4) = 3.0$, $p = .03$

Interpretation
- **Reading Comprehension:** The paired t-test revealed a significant improvement in reading comprehension scores from the pretest to the post-test ($t(4) = 2.5$, $p = .05$). This suggests that the intervention was in fact effective in improving the students' reading abilities.
- **Metacognitive Awareness:** Similarly, the paired t-test indicated a significant increase in metacognitive awareness scores ($t(4) = 3.0$, $p = .03$). This suggests that the students developed stronger metacognitive skills as a result of the intervention.

Additional Considerations:
- While the statistical significance of the findings is promising, it is vital to evaluate the effect size to determine their relevance practically. Furthermore, gathering qualitative data through interviews or observations with parents and teachers provides valuable insights into students' experiences and perceptions, offering a more comprehensive understanding of their experiences and the impact of the intervention.

Implications for Future Research
To improve the generalizability and the relevance of the findings of this study, future research should focus on several key areas. Conducting studies with a larger sample size will enhance the representativeness of the results established. Evaluating the effects of long-term interventions is essential for examining the sustainability of the improvements. Replicating the study in a diverse educational setting can help assess the applicability of the findings in various different contexts. Additionally, exploring the effectiveness of individualized instruction customized to the unique needs of students with learning difficulties could provide valuable insights. Finally, qualitative research will provide a more deeper understanding of students' experiences and their perspectives on the intervention.

Results

The pilot study, conducted with a small group of elementary schools' students identified by their parents and teachers as struggling with reading and comprehension, produced promising results as shown. Although these students were not formally diagnosed with any learning disabilities, they showed notable improvements in both reading comprehension and metacognitive awareness after the intervention. Thus, the results suggest that combining phonics and phonological instruction with explicit metacognitive strategies development could be an effective approach for supporting students facing challenges in these areas.
While additional research is necessary to verify these findings with larger sample sizes and in varied educational settings, the pilot study establishes solid groundwork for implementing similar metacognitive interventions to help the students struggling with reading and comprehension.

Discussion

The findings of this study validate the hypothesis that phonics and phonology-based intervention focused on enhancing metacognitive awareness can significantly improve reading comprehension in students with learning difficulties. The results indicate that teaching students to recognize and manage their own thinking processes while utilizing strategies to monitor and regulate their understanding can effectively strengthen their reading skills.

Conclusion

This study highlights the importance of combining metacognitive instructions with phonics and phonology based intervention to meet the needs of students with learning difficulties. The results indicate that such an integrated approach can substantially improve reading comprehension and overall literacy skills. Future research should examine the sustained impact of this intervention and assess its effectiveness across diverse educational environments.

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