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Early Screening and Instructional Application for Reading Difficulties in Lower-Grade Primary School Students

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Abstract: In the early primary school years, failure to promptly identify and address reading difficulties can have a significant impact on students' academic development and learning confidence. However, at present, some schools and families have a poor understanding of reading difficulties, and the screening methods are not standardized. Additionally, the teaching strategies lack systematicity and fail to meet the individual needs of students. This study aims to establish a systematic early screening and instructional application framework. By integrating standardized assessment tools with collaborative screening mechanisms between schools and families, this study seeks to accurately identify reading difficulties. Combined with teacher professional empowerment strategies and family co-reading support plans, this study provides personalized instructional support for students with different types of reading difficulties. Ultimately, the goal is to achieve early screening and intervention for reading difficulties in the early primary school years, helping students overcome reading challenges and laying a solid foundation for their long-term academic success.

Keywords: early screening, personalized instruction, home-school collaboration, reading difficulty intervention, lower-grade educational support

1. Introduction

In the lower-grade primary school stage, reading is an essential ability for students to unlock the door to knowledge and establish a cognitive framework. However, reading difficulties, as a potential learning disorder, often go undetected due to their inconspicuous early manifestations. As a result, some students remain trapped in a predicament of "difficulty in comprehension, slow reading speed, and lack of interest," which may even lead to academic frustration and self-denial. Research has shown that early screening and targeted interventions can effectively enhance the academic achievements and developmental trajectories of children with reading difficulties. Therefore, how to accurately identify the types of difficulties through standardized screening techniques and implement effective interventions through differentiated teaching plans and home-school collaborative support systems has become an important issue that urgently needs to be studied in the field of basic education at this stage.

2. Early Screening of Reading Difficulties in Lower-Grade Primary School

2.1 Screening principles

The early screening of reading difficulties for lower-grade primary school students (grades 1 - 3) should follow the principles of scientificity, operability, and dynamic adaptability. It is essential to ensure diagnostic accuracy based on the principles of neurocognitive science while ensuring the operability of screening in line with the cognitive development characteristics of young children.

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Continuous monitoring of individual development is also necessary to minimize misjudgments. The principle of scientificity requires that screening tools be closely aligned with the brain development patterns of lower-grade primary school students. For example, situational assessment tools with a duration of less than 5 minutes (such as dynamic graphic rapid naming tasks and character structure similarity matching tasks) should replace traditional paper - and - pencil tests to avoid data distortion caused by short attention spans (approximately 10 - 15 minutes). Additionally, a multi - dimensional evaluation system should be established, combining phonemic awareness (such as distinguishing the pronunciation differences between "d" and "t"), character decoding (such as recognizing the component changes between "木" and "本"), and reading fluency (such as the number of words read correctly per minute) to prevent the omission of potential risks due to single testing. The principle of operability emphasizes the deep integration of screening with daily teaching scenarios. Basic data can be collected through classroom reading behavior observation forms for teachers (such as recording visual tracking deviations, word omissions, and repeated reading behaviors during classroom reading) and parent questionnaires (such as asking whether the child resists reading or often complains of "tired eyes" or "moving words"). This approach reduces the reliance on specialized equipment. A modular teacher training system should also be designed (such as a 1-hour micro-course plus case practice) to enable teachers to master basic skills such as "observation of the implementation effect of finger-reading strategies" and "testing vocabulary recognition speed with flashcard games." Home-school collaborative assessment tasks (such as collecting voice samples during parent-child reading and using voice analysis software to check pronunciation accuracy) can also be used to share the screening burden (Cao, 2023).

2.2 Screening tools and methods

The early screening of reading difficulties in lower-grade primary school students should be adapted to the cognitive development patterns of young children, using situational, multi-channel, and ecologically valid assessment tools and paradigms to achieve a balance between accurate identification and manageable assessment load. Screening tools should cover core areas such as phonemic awareness, character decoding, and rapid naming. Phonemic awareness can be assessed through tasks such as "syllable segmentation operations" (e.g., having students clap to separate the syllables of "流-liu") or "minimal phoneme difference discrimination tasks" (e.g., distinguishing the initial consonant differences between "b ā " and "p ā "), enhanced by dynamic audio-visual feedback mechanisms to increase interest. Character decoding ability can be evaluated using "dynamic character component combination tasks" (e.g., combining "氵" and "工" to form "江") or "digital tools for dynamic differentiation of visually similar characters" (e.g., using drag - and - drop animations to demonstrate the stroke length differences between "未" and "末"), with multi - touch interaction interfaces to reduce operational difficulty. Rapid naming ability can be assessed through "standardized rapid visual naming tests" (e.g., quickly naming the numbers/letters/graphics on 50 colored cards within 1 minute) or "simulated supermarket shopping games" (e.g., quickly recognizing product labels in a simulated scenario), considering both speed and accuracy.

Screening methods should integrate standardized tests with ecological observations. On the one hand, standardized tests such as the "Children's Reading Difficulty Screening Scale" (e.g., the domestic revised version of CBCL) should be used for quantitative assessment, which includes sub-dimensions such as "text reading fluency" and "vocabulary semantic understanding ability," with reliability and validity verified by large-scale samples. On the other hand, qualitative data should be collected through teacher classroom observation records (e.g., whether students frequently rub their eyes, tilt their heads, or use their fingers to track words while reading) and parent diaries (e.g., recording reading avoidance behaviors and word skipping phenomena during family reading), forming

a complementary evidence chain of "quantitative assessment and qualitative analysis"(Liu et al., 2023).

2.3 Screening process

The early screening of reading difficulties in lower-grade primary school students requires the construction of a standardized and executable process framework to achieve accurate identification and early intervention. First, initial screening should be conducted using standardized tools, such as rapid reading tests, phoneme recognition tasks, or parent/teacher assessment scales, focusing on capturing typical manifestations such as word recognition difficulties, low reading fluency, and phonetic confusion to quickly identify high-risk groups. Second, for those who test positive in the initial screening, a secondary evaluation should be conducted by professionals using dynamic assessment tools (such as eye - tracking technology to analyze visual attention patterns during reading) in combination with cognitive function tests (such as short - term memory and rapid reading tasks) to distinguish reading difficulties from other learning difficulties (such as attention deficit or hyperactivity tendencies). Finally, a comprehensive evaluation report should be formed by integrating diverse data, clearly classifying the type of difficulty (such as phonological, surface, or mixed) and the degree of difficulty to provide a professional basis for subsequent differentiated teaching. The entire process should balance efficiency and accuracy, avoiding missed or misdiagnoses through a three-tier mechanism of "screening - assessment - diagnosis," while establishing continuous tracking files for regular assessment to optimize intervention plans (Li & Wu, 2025).

3. Instructional Application Strategies for Reading Difficulties in Lower-Grade Primary School

3.1 Classroom teaching intervention

The classroom teaching intervention for lower-grade primary school students with reading difficulties should focus on "optimizing the allocation of cognitive resources, promoting cross-sensory channel integration, and creating an ecologically supportive system." Through modular reorganization and personalized adaptation, these strategies help students overcome decoding bottlenecks in real - reading scenarios. First, teaching content should be concretely represented and designed in situational game formats: Transform character decoding into dynamic operational tasks. For example, use magnetic letter boards to arrange "日 + 月 = 明," strengthening component representation through multimodal encoding. Design a "Chinese Character Treasure Hunt" game, where students find specific radicals in picture books (e.g., characters with the "氵" radical), combined with a multidimensional clue-hint system to convert abstract symbols into interactive visual clues. Meanwhile, adopt the "rhythmic chunking reading strategy," breaking long sentences into rhythm blocks of 3 - 5 words (e.g., "The little rabbit/hops and jumps / to pick mushrooms"), accompanied by clapping or tapping rhythm instruments, to help students build a synchronous correspondence between phonology and character shape. Second, the teaching process should embed instant feedback and error-tolerance mechanisms: Use intelligent reading pens to identify students' reading errors in real time, replacing immediate corrective interventions with guided metacognitive prompts (e.g., "The initial consonant of this character is 'h', try again?") to maintain self-efficacy. In collaborative reading task groups, set up a "peer support mentor" role, where more capable students provide a fluent reading model, and students with reading difficulties participate in structured supportive tasks, maintaining learning motivation through a sense of participation (Li, 2023).

3.2 Individualized support programs

Individualized support programs for lower-grade primary school students with reading difficulties should be based on the unique learning difficulty profiles of students. Through precise matching, dynamic adjustment, and collaborative intervention design, these programs build a growth ladder for students from cognitive enhancement to

emotional support. First, the program is based on screening data, in - depth analysis of students' phonological decoding difficulties (such as whether they can distinguish between "zh/ch"), character recognition errors (such as often confusing "未" and "末"), and visual attention characteristics (such as the frequency of eye - ball jumping during reading). Based on this analysis, a "skill-enhancement toolkit" is customized. For those with weak phonological skills, a "phoneme-splicing game" is designed. Students can strengthen the correspondence between sound and shape by combining magnetic letter tiles to form words. For those who are visually sensitive, a "visual interference - shielding strip" is provided. A semi-transparent colored strip can be used to cover irrelevant text to reduce visual interference. At the same time, "step-by-step challenge tasks" are developed, such as progressing from listening and reading to independent reading, and from short-sentence decoding to paragraph comprehension. Each stage sets 3 - 5 quantifiable small goals (such as "this week, correctly read 20 characters with '氵'") to let students continuously experience the sense of achievement that "effort can reach." Dynamic adjustment is the core part of the program. Teachers need to record students' reading progress weekly (such as the evolution of error types and fluctuations in concentration duration), combined with quantitative data from eye-tracking instruments or voice-analysis software, to flexibly adjust the level of support. When students' accuracy in recognizing visually similar characters increases by 20% for two consecutive weeks, the visual support for character shape is gradually weakened. If it is found that their reading fluency is affected by long sentences, the "rhythm stick-assisted method" is immediately introduced. Colorful wooden sticks are used to divide the rhythm of sentence clusters to reduce cognitive load (Wang et al., 2023).

3.3 Home - School collaboration strategies

The home - school collaboration for lower - grade primary school students with reading difficulties needs to build a multi - dimensional support system of "information inter - communication - resource integration - action coordination." This system integrates professional support into the family environment to form a continuous and increasing effect of educational collaboration. First, establishing a two - way information inter - communication mechanism is the basis of collaboration. Schools regularly provide parents with feedback on students' assessment data (such as phonological awareness test scores, visual heat maps in eye-tracking) and classroom learning performance (such as types of reading errors, emotional states) through "reading development files." Parents, on the other hand, record their children's reading behavior at home (such as avoiding long-sentence reading, frequent eye-rubbing) and progress details (such as actively identifying familiar characters on billboards) in a "home reading observation record." Both parties hold a 10 - minute cloud - based meeting every month, focusing on "the primary difficulty to break through this week" (such as "distinguishing the pronunciation of 'b/d'"). This ensures the consistency of intervention goals. Second, developing home-school shared collaborative tools and resource packages can simplify the family implementation process. Schools provide parents with a "step - by - step reading resource library," which contains interesting reading materials synchronized with the classroom (such as picture books designed with a gradient of character - shape difficulty like "Chinese Character Adventure Island"), accompanying audio (including slow reading and repetition of key words and characters), and interactive games (such as "Chinese Character Puzzle APP"). Parents can choose "basic version" (single-character recognition) or "advanced version" (short-sentence comprehension) according to their children's abilities. At the same time, "positive - guidance communication cards" are distributed, using specific examples to guide parents on how to correct errors positively (for example, when a child misreads "苹果(ping guo)" as "平果(ping guo)", you can say: "The left side of this character is '艹', which

is related to plants. Let's think again?"). This avoids reading frustration caused by scolding (Li et al., 2021).

4. Pathways for Early Screening and Instructional Application of Reading Difficulties in Lower-Grade Primary School Students

4.1 Screening standardization, building a solid early-stage defense

The early screening of reading difficulties in lower-grade primary school students should be centered on standardized procedures. By integrating "comprehensive assessment tools + home-school collaborative screening," an early-stage barrier can be established to ensure that students with potential reading difficulties are identified and intervened at an early stage. Take the case of student Z, a second-grade student at a primary school in Beijing. After entering school, Z exhibited issues such as low reading fluency, frequent addition or omission of words, and misreading of visually similar characters. For example, Z would read "yī huìr" (a while) as "yī huì / er." Z's Chinese language scores consistently ranked at the bottom of the class. The school conducted a comprehensive assessment using the "Primary School Students' Chinese Reading Ability Test" and the "Visual Perception Development Test." It was found that Z's character recognition, rapid reading of word lists, and quick recognition of numbers were all significantly below the average level of peers. Z's visual perception development was also significantly lagging behind, leading to a diagnosis of reading difficulties. This case highlights the necessity of standardized screening. First, the selection of tools must be scientifically matched. Domestic scholars have developed the "Chinese Children's Reading Difficulties Scale" (DCCC) and the "Parent Questionnaire for Screening Reading Difficulties in Primary School Students," which cover key areas such as audio-visual perception, phonological awareness, and character decoding. Combined with the "Children's Reading Fluency Test" (CRFT) to quantitatively assess reading speed and accuracy, the limitations of a single tool can be avoided. Second, the process design must be progressively implemented. In the initial stage, a general screening is conducted through class-wide, fun-oriented tasks (such as a 1-minute rapid recognition test for numbers and letters). For students who need attention, a personalized assessment is initiated, including standardized scale evaluation, teacher classroom behavior observation records (such as whether students frequently rub their eyes or tilt their heads while reading), and parent diaries (such as reading - avoidance behaviors in family reading), forming a "multi - dimensional evidence chain"(Du & Zhou, 2021).

4.2 Empowering teachers with precision tools

The early screening and instructional application for reading difficulties in lower-grade primary school students hinge on equipping teachers with scientifically empowered tools and methods, enabling them to shift from "subjective judgment" to "data-supported" scientific intervention. As the direct implementers of screening and teaching, teachers need to master an empowerment system that integrates "instant recognition tools + real-time analysis platforms + customized resource libraries" to accurately identify the types of students' difficulties and provide tiered support.

Take the practice of a first-grade teacher at a primary school in Hangzhou as an example. Students in the teacher's class frequently confused "b/d" and "p/q" during pinyin recognition and had serious problems with skipping lines and omitting words while reading short passages. The teacher used a "phonological awareness assessment software" to conduct a 3-minute quick test on the students and found that their phoneme deletion skill scores were 2 standard deviations below the grade-level benchmark. Meanwhile, an "eye-tracking reading device" was used to record the students' gaze trajectories. The data showed that the students' fixation counts on "left - right - structured Chinese characters" were twice that of their peers, with a large number of repeated regressions. Based on these data, the teacher determined that the students' core difficulties were "phonological processing difficulties + visual

attention dispersion." Immediately, the teacher retrieved targeted tools from the "customized resource library": for phonological difficulties, "phoneme combination magnets" were used to conduct game-based training. The teacher broke down "m - a - t" into operable magnetic blocks and strengthened the correspondence between sound and shape through combination exercises. For visual dispersion, the teacher provided students with "reading occlusion strips" (semi - transparent colored strips to cover irrelevant text) and "gaze - guiding sticks" (colored wooden sticks to assist gaze focusing) and activated the "line - by - line focus display" function in electronic textbooks. Two weeks later, the teacher retested the students' reading error rates through the "real-time analysis platform" and found that their phoneme deletion accuracy had increased from 40% to 75%, and their reading fluency (the number of effectively read characters per minute) had improved by 30%.

4.3 Family co - reading, unleashing growth potential

In the early intervention of reading difficulties in lower-grade primary school students, family co-reading is the core scenario for tapping into growth potential. The family, as the first place where children are exposed to language, has a unique emotional bond and a high-frequency interaction mode. It can provide children with reading difficulties with a "low-stress, high-acceptance" practice environment. However, scientific guidance is needed to transform "parent - child co - reading" into "precision support." Research shows that if parents can master the three major strategies of "multi-sensory stimulation, error acceptance, and fun-oriented interaction," they can significantly enhance their children's reading enthusiasm and reading ability.

Take a second-grade student at a primary school in Guangzhou as an example. The student was diagnosed with reading difficulties after entering school due to confusion between the sounds "f/h" and reluctance to read textbooks. The school's psychology teacher, in collaboration with the headteacher, customized a "family co-reading enhancement plan" for the parents. First, they provided parents with a "multi-sensory reading aid package," which included pinyin cards with tactile raised patterns (e.g., the vertical stroke of "f" has a sandpaper-like texture) and color-coded radical stickers (e.g., words with the "氵" radical are shaped like "drops of water"). They also guided parents to lead students through a four - step process of "listening - touching - looking - speaking" to recognize characters (e.g., first listen to the audio pronunciation, then touch the raised patterns of the character, next use stickers to form words, and finally create phrases and sentences). Second, they established an "error-friendly feedback mechanism," asking parents to replace direct correction with "descriptive affirmation" (e.g., when a student reads "花朵(huā duǒ)" as "火朵(huǒ duǒ)", the parent responds: "The left side of this character looks like three drops of water, and the right side is '匕(bǐ)' and '木(mù)'. What do you think its connection with water is?"). Parents were also required to keep a "daily growth record" (e.g., "Today, the child actively identified three characters with the '艹' radical"). Finally, they designed fun-oriented interactive tasks, such as a "Chinese character treasure hunt game" (finding characters with the "木(wood)" radical on supermarket shelves) and a "pinyin chain activity" (the parent says "b-ā," and the child responds with "bà" and creates a phrase). These activities integrate reading into daily life scenarios. After three months, the student's pronunciation confusion rate dropped from 65% to 28%, and their enthusiasm for classroom reading increased from once a week to actively raising their hand twice a day (Jin & Liu, 2022).

5. Conclusion

The early screening and teaching of reading difficulties in lower-grade primary school students requires a collaborative effort. Standardized screening should be used to build a barrier and accurately identify the types of difficulties with professional tools. Teachers' capabilities should be

enhanced to implement differentiated teaching supported by data. Family co-reading should be deepened to tap into potential through emotional bonds and fun-oriented interactions. The tripartite collaboration constructs a "screening - teaching - family" cycle system to help children with reading difficulties overcome obstacles and continuously improve their reading level with professional support and warm companionship.

Conflict of interest

The author declares that they have no conflicts of interest in this work.

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