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Postprint: Reflections and Research on Enhancing Digital Reading Literacy in K-12 Education

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Abstract

【目的】 To conduct an in-depth analysis of the current state of digital reading in primary and secondary schools, understand the needs and pain points of teachers, students, and parents; to explore effective pathways for cultivating digital reading literacy, provide theoretical support for practice in primary and secondary schools, and propose recommendations for improving the digital reading ecosystem and directions for product development.

【方法】 Through theoretical research, practical research, empirical research, case analysis, literature review, and other methods to comprehensively analyze the impact and value of digital reading in primary and secondary schools.

【结果 / 结论】 With the development of technology, an increasing number of technological means are being applied to the reading domain, including intelligent recommendation systems, virtual reality reading, and audiobooks, all of which bring readers entirely new reading experiences. Creating a favorable reading atmosphere and delivering high-quality content constitute the core competitiveness of reading platforms. Fully utilizing technological means to create more convenient, efficient, and personalized reading environments for readers also represents a future development trend. Developing products that help parents accompany their children in digital reading, either remotely or in person, will help meet parents' needs, enhance children's digital reading abilities, create favorable reading environments for children, and cultivate good reading habits.

Full Text

Preamble

Reflections and Research on Enhancing Digital Reading Capabilities Among Primary and Secondary School Students

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Abstract

[Objective] This study aims to comprehensively analyze the current state of digital reading among primary and secondary school students, understand the needs and pain points of teachers, students, and parents, explore effective pathways for cultivating digital reading capabilities, provide theoretical support for practical implementation in schools, and propose recommendations for improving the digital reading ecosystem and product development directions. **[Methods]** Through theoretical research, practical investigation, empirical studies, case analysis, and literature review, this paper examines the impact and value of digital reading in primary and secondary education. **[Results/Conclusion]** With technological advancement, an increasing array of technological tools—including intelligent recommendation systems, virtual reality reading, and audiobooks—are being applied to the reading domain, offering readers entirely new experiences. Creating a favorable reading atmosphere and delivering high-quality content constitute the core competitiveness of reading platforms. Leveraging technology to create more convenient, efficient, and personalized reading environments represents a key future trend. Developing products that help parents accompany their children in digital reading, either remotely or in person, will effectively meet parental needs, enhance children's digital reading capabilities, foster a positive reading environment, and cultivate healthy reading habits.

Keywords: digital reading; reading capability; reading literacy; capability enhancement; children's reading products

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Reading plays a crucial role in cultivating the comprehensive qualities of primary and secondary school students. Through reading, students learn to understand others, perceive the world, and reflect on themselves, thereby enhancing their personal development. Reading also serves as an important vehicle for teaching practice, helping students deepen their understanding of knowledge content. Currently, with rapid social development and widespread application of digital information technology, digital reading has become a primary means for students to acquire knowledge. The emergence of various digital reading platforms not only provides teachers and students with abundant digital resources but also brings entirely new reading experiences and learning models. However, how to effectively cultivate students' digital reading capabilities and construct a scien-

tifically sound digital reading ecosystem remains a significant challenge facing primary and secondary education.

The 2024 Government Work Report emphasized deepening nationwide reading activities, with “national reading” having been included in the Government Work Report for eleven consecutive years [1]. The Publicity Department of the CPC Central Committee’s “Opinions on Promoting Nationwide Reading Work” proposes strengthening guidance on reading content, organizing key reading activities, enhancing the supply of high-quality reading materials, improving nationwide reading infrastructure and service systems, and actively promoting reading among young people and family parent-child reading [2].

1.1 Research Objectives

This research aims to: (1) Conduct an in-depth analysis of the current state of digital reading in primary and secondary schools, understanding the needs and pain points of teachers, students, and parents; (2) Explore effective pathways for cultivating digital reading capabilities, providing theoretical support for school practice; and (3) Propose recommendations for improving the digital reading ecosystem in primary and secondary schools and identify product development directions.

1.2 Research Significance

This study will: (1) Accelerate the digital transformation of primary and secondary education and enhance students’ digital learning capabilities; (2) Provide replicable and scalable practical experience for cultivating digital reading capabilities in primary and secondary schools; and (3) Offer references for policy formulation and product development, promoting the healthy development of the digital reading ecosystem for primary and secondary schools.

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2.1 Digital Reading Research Literature

Globally, the cultivation of digital reading capabilities among primary and secondary school students has become an important topic in educational technology. Research focus has gradually shifted from simple digital tool usage to effectively integrating these tools to promote reading comprehension and critical thinking development. Advanced education systems in the United States, Europe, and Asia have incorporated digital reading capabilities as part of foundational education, emphasizing media literacy cultivation [3]. Studies have shown that effective digital reading teaching strategies can significantly improve students’

reading comprehension, including multimedia-assisted instruction, interactive reading tasks, and personalized learning path design. Additionally, students' self-regulation abilities, motivation, and prior reading habits are important factors affecting digital reading effectiveness. With the development of AI and machine learning technologies, intelligent reading tutoring tools and customized learning content generation tools have emerged, which can automatically adjust content difficulty and presentation methods based on students' reading behavior and comprehension abilities to better meet individual needs.

Domestic research on digital reading in primary and secondary schools primarily focuses on status surveys. These surveys can be categorized as follows: First, direct investigations of digital reading status. Some researchers have found that most students enjoy digital reading, with interest, academic performance, age, and gender being the main individual factors affecting digital reading [4]. Other scholars conducted questionnaire surveys across multiple provinces and cities, concluding that students' digital reading literacy, rather than mere digital reading behavior, is the key factor affecting academic performance [5]. Second, comparative studies examining urban-rural differences in digital reading status. Researchers surveyed students and parents separately, finding that student gender, age, and parental reading attitudes all influence digital reading behavior [6]. Third, research focusing on the digital reading status of primary and secondary school students in different regions [7]. Some scholars have investigated the digital reading status in specific provinces and proposed corresponding promotion strategies [8][9].

Domestic research emphasizes status surveys to identify problems in digital reading among primary and secondary school students and propose solutions. Additionally, domestic scholars have focused on comparative studies between digital and paper reading, though 分歧 remain regarding reading effectiveness. One view holds that there is no significant difference in text comprehension between digital and traditional paper reading, while another suggests that digital reading can significantly enhance reading capabilities and effects in certain dimensions, though it shows no obvious difference from traditional reading in proofreading, reading transfer, and overall comprehension [10]. Foreign research focuses more on exploring the effects of digital reading, including reading attitudes, capabilities, and literacy. The most attention has been given to how different media formats affect student reading outcomes. Some studies have found that paper reading yields better comprehension than screen reading, while others believe e-books can enhance student reading abilities [11]. Scholars have also explored how different digital text types affect reading comprehension, finding that hypertext is easier to understand than linear text [12]. A study on online reading programs showed that using online platforms improved students' reading comprehension scores, provided good reading experiences, and helped develop habits of online reading at home [13]. Foreign research also focuses on factors influencing student digital reading behavior, including individual characteristics, family environment, and reading media. Research has found that individual factors such as gender, age, and education level, environmental factors such as parental

reading attitudes and family atmosphere, and different types of reading materials all affect student digital reading behavior [14]. Studies have shown that effective online reading programs can significantly improve students' reading comprehension abilities [15].

Despite abundant research findings, existing studies have several limitations. First, most research focuses on technology application rather than deeply exploring how technology can improve education itself. Second, research on the long-term impact and sustained effects of digital reading remains insufficient. Additionally, research is concentrated in developed countries and regions, with limited verification of applicability in developing countries. Overall, research on digital reading capabilities in primary and secondary schools has made progress, providing theoretical and methodological support for educational practice. However, to more comprehensively enhance students' digital reading capabilities, future research needs to more systematically integrate educational theory, technology application, and practice, particularly for Chinese families, with strengthened research on different family situations to achieve both educational equity and quality improvement [15].

2.2 Digital Reading Products

Accompanying digital technology development and strong market demand growth, digital reading products continue to emerge, fundamentally changing reading behaviors among primary and secondary school students. Foreign educational reading products started earlier and are more mature, while domestic products have developed rapidly in recent years, showing diversified characteristics. This study selected foreign products such as Epic!, Reading IQ, and Khan Academy Kids, and domestic products including ABC Reading, KaDa Reading, Ximalaya Children, Yimi Reading, Youdao LeRead, and KaiShu Storytelling as research subjects. Through comparative analysis of these domestic and foreign reading products, this study summarizes their different characteristics to provide useful references for optimizing domestic primary and secondary school reading products.

Comparison of Foreign Reading Products

Foreign products primarily target children under 12, providing age-appropriate content. Epic! offers over 40,000 e-books covering different themes, collaborating with more than 400 publishers, supporting offline reading, personalized recommendations, reading progress tracking, and using a subscription model. Reading IQ targets children aged 2-12, providing leveled reading books with over 7,000 e-books categorized by reading level, supporting reading ability assessment, personalized recommendations, reading reports, and using a subscription model. Khan Academy Kids targets preschool and early elementary children aged 2-8, providing thousands of activities and books covering math, reading, writing, and logic content, featuring personalized learning paths, progress tracking, and parent resources, operating as a non-profit organization.

Comparison of Domestic Reading Products

Domestic products show several characteristics: ABC Reading targets children aged 3-12 for English leveled reading, offering over 2,000 original English picture books with AI evaluation, bilingual reading, oral reading follow-up, and family interaction features, using VIP membership and course sales models. KaDa Reading targets children aged 0-12 with online stories and audiobooks, featuring over 10,000 books, 4,000+ audiobooks, and 20,000+ audio programs, with smart recommendations, role-playing, parent monitoring, reading reports, and VIP membership. Ximalaya Children targets children under 12 with audio content services, offering 15,000+ knowledge light courses and 10,000+ audio programs covering stories and songs, with smart recommendations, offline listening, content download, AI voice changing, virtual companions, and parent management, using VIP membership. Yimi Reading serves as a Chinese language reading assistant for primary and secondary students, featuring reading treasure hunt games, reading journey tasks, whole-book challenge quizzes, reading circles, and reading badges, using VIP membership and course sales. Youdao LeRead targets children aged 3-12 with online libraries and systematic reading courses, offering 15,000+ books and 3,000+ character and word recognition content, with leveled reading, annual reading plans, interactive learning challenges, smart recommendations, parent-child management, reading reports, and screen casting, using VIP membership and course sales. KaiShu Storytelling targets children aged 0-12 with stories and audio programs, offering 30,000+ audio programs with wake-up and sleep-time stories, picture book story creation, virtual companion cultivation, reading accompaniment, and challenge games, using VIP membership.

In summary, both domestic and foreign products primarily use age 12 as a 分层标准. Foreign products collaborate with publishers and focus on 正版图书, while domestic products offer more diverse content formats, including rich audio content in addition to e-books. In functional design, foreign products emphasize personalized recommendations and reading ability assessment, while domestic products place greater importance on parent-child interaction and reading habit cultivation. Regarding business models, foreign products mainly use subscription models, while domestic products offer diversified monetization methods including course sales and individual purchases alongside subscriptions. Domestic and foreign children's reading products each have distinctive features in product positioning, content resources, functional design, and business models, with domestic products showing advantages in content diversity and functional innovation. However, functional differences among products are not significant, showing 同质化现象.

Based on user reviews from the App Store, these reading products currently have several typical shortcomings: game-guided reading modes can lead to children becoming addicted rather than focusing on content, with inadequate anti-addiction guidance; unreasonable pricing models with high costs that some parents find unacceptable, lacking free content; excessive advertisements in some

products; some picture book content deemed inappropriate for children, even frightening them; overly complex reading interfaces that distract children and make independent operation difficult; compatibility issues including crashes, lag, and high power consumption; and limited functions for parents to assist children with reading.

Based on these findings, we recommend that domestic children' s reading products: strengthen content development by introducing more high-quality copyrighted content; optimize functional design to provide focused reading experiences for students; refine business models by exploring diversified monetization methods for sustainable development; improve product compatibility by strengthening testing on low-end devices; and conduct deeper research on the actual needs and pain points of domestic families in primary and secondary school education, comprehensively understanding the difficulties and challenges parents face when assisting children with reading.

3.1 Research Subjects

This study targets: (1) Parents, to understand their expectations for cultivating their children' s digital reading capabilities; and (2) Industry experts and practitioners, to understand the current development status and trends of digital reading in primary and secondary schools.

3.2 Research Questionnaire

A questionnaire was designed for parents of school-age children, covering aspects such as digital reading needs, usage patterns, and pain points. The questionnaire includes the following items:

Family Digital Reading Survey Questionnaire

The questionnaire covers: child' s age stage, parent' s age group, geographic location, education level, overseas study experience, child' s digital reading frequency, perceived helpfulness of digital reading for learning and growth, primary concerns about digital reading effects, preferred types of digital reading content, willingness to participate in school-organized parent-child digital reading activities, desired forms of digital reading family guidance from schools, weekly time spent accompanying children in digital reading, main obstacles to implementing digital parent-child reading at home, perceived helpfulness of remote parent-child reading guidance, and suggestions for school-home collaboration in digital reading.

3.3 Interview Outline

Interview outlines were designed for digital reading practitioners and content providers to deeply understand the practical implementation of digital reading in primary and secondary schools. The outlines cover technology, content resources, commercialization, and implementation effectiveness.

Topics and Questions for Communication with Reading Application Providers

Key topics include: technologies supporting student reading activities (personalized recommendations, voice reading, note-taking), innovative features beyond traditional reading and their effectiveness, mechanisms for ensuring child-friendliness and age-appropriateness, future plans for AI, big data analytics, and VR/AR applications, privacy and data security protection, social interaction features, cooperation with schools for teaching management functions, and future operational plans.

Topics and Questions for Communication with Reading Content Providers

Key topics include: experience and advantages in creating content for primary and secondary students, consideration of different age groups' needs in topic planning, balancing ideological, knowledge, and entertainment value, innovations in digital content formats, scale and coverage of digital reading content resources, experiences and challenges in digitizing print publications, future plans for sustainable content supply, current cooperation with digital reading platforms, industry consensus and practices in digital copyright licensing, and interest in joint development of customized content.

3.4 Research Results Statistics

During the questionnaire survey, approximately 800 valid samples were collected. Key statistical findings include:

- (1) Child' s age distribution: preschool (35.56%), grades 1-2 (11.10%), grades 3-4 (26.67%), grades 5-6 (8.89%), and junior high (17.78%).
- (2) Parent age distribution: under 25 (2.25%), 25-35 (42.45%), 36-45 (48.61%), 46-55 (6.69%), and over 55 (0%).
- (3) Education level: high school and below (4.13%), associate degree (24.60%), bachelor' s degree (62.38%), master' s degree (8.89%), and doctoral degree (0%).
- (4) Overseas study experience: yes (2.22%), no (97.78%).
- (5) Child' s digital reading frequency: never (31.41%), occasionally (46.82%), frequently (21.77%), always (0%).
- (6) Perceived helpfulness of digital reading: no help (5.05%), some help (64.74%), considerable help (20%), very helpful (10.21%).
- (7) Primary concerns about digital reading effects (multiple choice): vision decline (42.53%), learning distraction (17.24%), electronic device addiction (40.23%), other (0%).
- (8) Preferred digital reading content types: educational (11.35%), story (37.79%), popular science (45.58%), other (5.28%).

- (9) Willingness to participate in school-organized parent-child digital reading activities: no interest (2.81%), not very interested (32.55%), somewhat interested (62.18%), very interested (2.46%).
- (10) Desired forms of digital reading family guidance from schools: reading resource 推送 (64.29%), online lectures (16.07%), parent classes (19.64%), other (0%).
- (11) Weekly time spent accompanying children in digital reading: 0-1 hour (55.56%), 1-3 hours (26.37%), 3-5 hours (15.81%), over 5 hours (2.26%).
- (12) Main obstacles to implementing digital parent-child reading at home: insufficient time (48.15%), lack of methods (29.63%), child non-cooperation (18.52%), other (3.7%).
- (13) Perceived helpfulness of remote parent-child reading guidance: no help (20%), some help (66.67%), considerable help (8.89%), very helpful (4.44%).

4.1.3 Parent Digital Reading Needs and Expectations

Survey results reveal several key findings about parent needs and expectations:

- (1) Most parents (55.56%) spend less than one hour per week accompanying children in digital reading, indicating limited parental involvement.
- (2) The primary obstacle to digital parent-child reading is “insufficient time” (48.15%), suggesting parents lack effective time and methods to guide children’s digital reading.
- (3) 66.67% of parents believe remote parent-child reading guidance offers “some help,” indicating demand for remote guidance.
- (4) Parents prefer “popular science” (45.58%) and “story” (37.79%) content for their children.
- (5) 62.18% of parents are “somewhat interested” in participating in school-organized parent-child digital reading activities.
- (6) Parents most hope schools provide “reading resource 推送” (64.29%) as a form of digital reading family guidance.

4.1.4 Profit Model and Advantages

Regarding profit models, digital reading platforms primarily adopt diversified revenue streams [16]. The foremost is content payment models, including single purchase and membership subscriptions, allowing students to choose appropriate payment methods based on their needs. Second is the value-added service model, generating revenue through personalized learning plan customization, reading ability assessment, and professional teacher guidance. Additionally, platforms actively develop B2B cooperation, establishing partnerships with

schools, institutions, and publishers to create a complete educational service ecosystem.

From the perspective of platform advantages, digital reading platforms possess multiple competitive strengths. In educational effectiveness, platforms utilize big data technology to achieve efficient and precise educational governance, support heuristic and inquiry-based learning, and effectively cultivate students' deep thinking abilities. At the technical level, platforms accurately track student learning progress through data analysis, achieve personalized content recommendation, and integrate multimedia formats to enhance learning experiences. In market development, complete industrial chain layout, continuously growing market demand, and national policy support all provide favorable conditions for platform development.

Operational advantages are crucial for sustainable development. The easy-to-replicate nature of digital content enables low-cost expansion, with marginal costs decreasing as user scale grows. Meanwhile, massive educational data holds important research value for continuously optimizing educational service quality.

4.1.5 Content and Platform Cooperation Models and Effects

As the digital reading market continues to develop, content cooperation has become a core strategy for sustainable development. Major platforms continuously improve their content ecosystems through diversified cooperation models, driving industry innovation and development. Current market practice shows that digital reading platforms primarily adopt three core cooperation models: deep strategic cooperation with traditional publishing institutions, interconnectivity among diverse content platforms, and innovative value co-creation models.

In publishing institution cooperation, platforms establish strategic partnerships with renowned publishers to promote deep integration between print and digital media. This cooperation not only ensures platforms access to high-quality copyrighted book resources but also facilitates the digital transformation of traditional publishing.

In content platform linkage, digital reading platforms actively conduct cross-border cooperation, integrating diverse content resources including books, picture books, and magazines. Some platforms have innovatively launched cross-platform joint membership models, such as strategic cooperation with audio and video platforms, to build a comprehensive content service ecosystem. This diversified cooperation model not only enriches platform content supply but also effectively expands user coverage and enhances market competitiveness.

Through these deep cooperations, digital reading platforms have achieved significant development results. First is substantial enrichment of content resources, enabling platforms to provide more specialized and differentiated content services. Second is comprehensive improvement of user experience, meeting diverse

reading needs through technological innovation and personalized recommendation. Finally, there is effective enhancement of commercial value, with the “paid + free” integrated development model generating considerable economic benefits.

4.1.6 Consensus and Practices on Digital Copyright

In the era of booming digital reading, digital copyright protection and cooperation have become unavoidable issues. Regarding copyright protection, the industry and platforms have established corresponding protection measures. On one hand, by establishing digital copyright as a new form of intellectual property, institutional guarantees are provided for digital content development. On the other hand, at the technical level, platforms widely adopt digital watermarking, encryption, and other technical means to establish copyright content tracking and monitoring systems, effectively preventing infringement. This legal-technical combined protection system provides strong guarantees for the secure dissemination of digital content [17].

Regarding cooperation models, digital reading platforms and copyright owners have formed flexible and diverse cooperation methods. The copyright sharing mechanism is the primary cooperation form, generally using a basic sharing ratio with dynamic adjustments based on content quality and market performance. Authorization methods also show diversification trends, including exclusive authorization, non-exclusive authorization, and customized authorization to meet operational needs of different work types. Meanwhile, transparent revenue accounting mechanisms and diversified monetization channels ensure mutual benefit and win-win outcomes for copyright owners and platforms.

In specific practice, many platforms have established professional copyright management teams implementing strict content review and quality control. Through copyright registration certification, piracy monitoring, and rights protection assistance services, they comprehensively protect the legitimate rights and interests of authors and platforms [18].

4.2 Interview Results Analysis

Ages 0-12 represent the golden period for cultivating reading habits and accumulating knowledge. During this stage, children’s nervous systems develop most rapidly, with brain capacity for absorbing and processing external information gradually strengthening. Reading, as an input method, exposes children to rich and diverse knowledge, stimulating their curiosity and thirst for knowledge. Through reading picture books, fairy tales, and popular science books, children can initially understand the world and form their worldviews and values. During ages 0-12, children’s interests and hobbies are forming. Through reading, they can access different types of books to find their preferred fields and topics. Once interested in a particular field, children will actively seek knowledge, creating a virtuous cycle. Such reading habits will accompany them throughout life, becoming an important part of their lives.

During ages 0-12, children are full of curiosity about the external world. Through reading, they can learn about cultures, histories, and customs worldwide, broadening their horizons. Such reading experiences not only help cultivate children's global thinking but also make them more competitive in future learning and work. During ages 0-12, parent-child shared reading is a highly beneficial interactive method. Through shared reading, parents can share the joy of reading with children and enhance parent-child relationships. Simultaneously, parents can guide children to think and ask questions during reading, helping them better understand book content and cultivate critical thinking abilities.

Creating a favorable reading atmosphere and delivering high-quality content to provide good reading experiences constitutes the core competitiveness of reading platforms. Only by continuously focusing on readers' needs and feedback and emphasizing content quality and format can platforms stand out in fierce market competition and win readers' favor. Good reading habits are important support for creating a favorable reading atmosphere. Families, schools, and society should work together to guide young people to develop reading habits from an early age. Meanwhile, through reading promotion activities and reading incentive mechanisms, they can stimulate nationwide reading enthusiasm and improve national reading literacy.

With technological development, an increasing number of technological tools are being applied to the reading domain. Intelligent recommendation systems, virtual reality reading, and audiobooks all bring new reading experiences to readers. In the process of creating a favorable reading atmosphere, we should fully utilize technological means to create more convenient, efficient, and personalized reading environments for readers.

4.3 Enhancing Digital Reading Capabilities of Primary and Secondary School Students

Enhancing the digital reading capabilities of primary and secondary school students is crucial for them to adapt to learning needs in the information age.

4.3.1 Specific Strategies and Systems for Enhancing Digital Reading Capabilities

(1) Teacher Level

Utilizing digital teaching resources: Teachers can use digital teaching resources during instruction, relying on digital teaching media and convenient digital means to enhance student interest and reading capabilities, thereby improving comprehensive literacy. For example, in English classes, teachers can use online English reading platforms to provide rich English reading materials while utilizing interactive features such as online questioning and discussion to stimulate student interest and participation.

Guiding proper use of digital reading tools: Primary school Chinese teachers should combine current teaching situations, use the internet as a platform, and employ diverse digital reading models to generate student interest in reading. On this basis, they can expand reading horizons through online resources to cultivate reading capabilities. Teachers can introduce quality digital reading platforms such as online libraries and e-book platforms and guide students to effectively use these platforms for reading. Simultaneously, teachers can guide students to learn how to filter quality reading resources and avoid negative information.

Cultivating digital reading literacy: School teachers should emphasize digital reading education and optimize digital reading management and guidance. Through classroom teaching and reading activities, teachers can cultivate students' digital reading literacy, including information filtering ability, reading strategy application ability, and critical thinking ability. For example, in reading instruction, teachers can guide students to analyze and evaluate reading materials to cultivate critical thinking. Teachers can also teach effective reading strategies such as speed reading, intensive reading, and skimming to improve reading efficiency.

Digitalization of classic literature reading: Combining the cultivation requirements of Chinese core literacy and trends in middle school entrance examination classic literature reading comprehensive questions, this study analyzes the inevitable trend of digitalizing classic literature reading and preliminarily explores implementation plans for the junior high school stage. Centered on reading closed loops and question chains, it constructs the content structure of digital classic literature reading products and builds a corresponding reading ability evaluation system based on authoritative reading ability assessment standards.

In summary, enhancing primary and secondary school students' digital reading capabilities requires joint efforts from teachers, schools, society, and students themselves. Through collaborative cooperation among all parties, we can provide better digital reading environments and resources for primary and secondary school students, cultivate digital reading literacy, and improve their digital reading capabilities.

4.3.2 Effect Differences of Different Strategy Types

Strategy Introduction: Applying information technology in junior high school English reading instruction can enrich teaching resources, enhance teaching effectiveness, cultivate good reading habits, and improve communication skills through online interaction. Teachers can utilize diverse digital resources and convenient digital means, relying on digital models and platforms to stimulate student interest in reading, improve English reading skills, enrich reading experiences, and enhance English core literacy. In primary school Chinese reading instruction, using the internet as a platform and employing diverse digital reading models can generate student interest and expand reading

horizons to cultivate reading capabilities.

Effects on Primary and Secondary School Students: For primary and secondary school students, information technology strategies can broaden reading channels and enrich reading resources. Students can access various reading materials through online platforms, e-books, and learning software. Information technology can also provide interactive reading experiences such as online discussions and reading games to stimulate interest. Additionally, information technology can help students conduct personalized reading learning, selecting suitable content and learning methods based on their reading levels and interests.

Effect Difference Analysis: Different subjects may have different focuses and effects when utilizing information technology strategies. For example, in English reading instruction, information technology can provide more language learning resources and interactive exercises to help improve comprehensive English listening, speaking, reading, and writing abilities. In Chinese reading instruction, information technology can display more literary works and cultural backgrounds, enriching students' emotional experiences and cultural literacy. Additionally, information technology infrastructure and teaching levels in different regions and schools also affect the effectiveness of these strategies.

4.3.3 How to Further Enhance Digital Reading Capabilities

In today's digital age, optimizing digital reading strategies for primary and secondary school students is crucial for improving their reading capabilities. The following explores how to further optimize these strategies from multiple perspectives:

- (1) **Utilize digital teaching resources to stimulate reading interest.** Teachers can fully leverage digital teaching resources such as rich online books, audiobooks, and animated videos to present diverse reading materials to students. For example, in English classes, teachers can use digital English reading platforms to recommend suitable English reading materials for students' levels, stimulating interest through vivid and engaging content and formats to increase active participation in reading.
- (2) **Build personalized reading models.** Digital leveled reading platforms are effective tools that can assess students' reading levels and precisely recommend suitable books. This ensures reading content is appropriately challenging without being too difficult, meeting individual student needs. For upper primary grades, inquiry-based reading instruction can be adopted, where teachers guide students to actively ask questions and explore answers during reading, cultivating independent thinking and reading comprehension abilities.
- (3) **Introduce innovative reading methods.** Gamified reading is worth exploring, integrating game elements into reading to create a relaxed and en-

joyable learning atmosphere. Research shows gamification helps students learn and understand vocabulary more easily, improves English reading skills, and enhances engagement. Smartphone strategies can also improve reading skills through reading workshops introducing various strategies for using smartphones in reading, such as reading apps and online libraries. This approach is both interesting and engaging, while parental participation ensures effective implementation at home.

- (4) **Strengthen reading process management.** In classrooms, teachers can monitor and manage students' digital reading. For example, when using digital leveled reading platforms, teachers can track student reading progress and time in real-time, providing timely feedback and evaluation. Multiple feedback methods such as online discussions, reading reflection sharing, and reading quizzes can help students understand their reading outcomes, identify shortcomings, and further improve reading capabilities and self-awareness.
- (5) **Cultivate good reading habits.** Family reading can be promoted through parent-child digital reading, where parents and children share the joy of reading. For example, using parent-child reading features on digital platforms, parents and children can read the same book together and then discuss it. Students should also be encouraged to develop habits of digital reading during their free time through reading reminders and recommendations of excellent reading resources.

4.3.4 What Kind of Platform Facilitates Digital Reading

Digital reading platforms can provide various functions to help learners absorb and understand content more effectively. The following are functions that help improve reading comprehension:

- (1) **Vocabulary Annotation and Translation:** Instant dictionary lookup allows readers to click or select unfamiliar words to immediately see definitions, synonyms, or antonyms. Multi-language translation can greatly reduce language barriers for non-native readers.
- (2) **Interactive Learning Tools:** Note-taking and annotation functions allow readers to mark and comment in e-books for review and memory enhancement. Highlighting important sentences or paragraphs helps readers quickly grasp key points.
- (3) **Reading Progress Tracking:** Reading time statistics record user reading time and progress to help establish stable reading habits. Reading achievement systems motivate continued reading through goal-setting and rewards.
- (4) **Content Customization and Recommendation:** Personalized recommendation algorithms suggest similar or related content based on reading

history and preferences. Difficulty leveling provides suitable reading materials for different ages and reading levels.

- (5) **Practice and Assessment:** Reading comprehension exercises such as multiple-choice and fill-in-the-blank questions help consolidate knowledge. Immediate feedback and analysis after exercises help readers understand mistakes and improve learning methods.
- (6) **Multimedia Support:** Audio reading helps improve listening comprehension and pronunciation accuracy. Video explanations or animations make abstract content more intuitive and understandable.
- (7) **Community and Discussion:** Comment sections allow readers to share insights and questions. Discussion groups enable exploration and learning with like-minded individuals.
- (8) **Data Visualization:** Detailed reading and learning reports include reading volume, comprehension rates, and common errors for self-assessment. Progress charts visually display reading progress and learning outcomes.
- (9) **Auxiliary Learning Tools:** Mind mapping tools help organize article structure and clearly display logical relationships. Knowledge cards facilitate memory and review of key points.
- (10) **Personalized Learning Paths:** Adaptive learning systems dynamically adjust learning content and difficulty based on user performance to ensure optimal learning for each individual.

5. Research Conclusions

Ages 0-12 represent the golden period for cultivating reading habits and accumulating knowledge. During this stage, children's nervous systems develop rapidly, with brain capacity for absorbing and processing external information continuously strengthening. Reading can stimulate their curiosity and thirst for knowledge, helping form good values and worldviews.

Survey results show that most parents believe digital reading is somewhat helpful for children's learning and growth, but they are also concerned about negative effects on vision and attention. Parents prefer popular science and story-based digital reading content for their children.

Parents generally face insufficient time for accompanying children in digital reading and lack specific methods. Interview results also emphasize the importance of parent-child shared reading during ages 0-12 for enhancing parent-child relationships and cultivating critical thinking. Most industry companies believe that creating a favorable reading atmosphere and delivering high-quality content constitute the core competitiveness of reading platforms. Simultaneously, fully utilizing technology to create more convenient, efficient, and personalized reading environments represents a future development trend.

Comprehensive analysis indicates that developing a product to help parents accompany their children in digital reading, either remotely or in person, will effectively meet parental needs, enhance children's digital reading capabilities, foster a positive reading environment, and cultivate healthy reading habits. This represents a key research direction for this project.

This study provides theoretical support and practical pathways for cultivating digital reading capabilities in primary and secondary schools, offering certain innovation and application value.

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Note: Figure translations are in progress. See original paper for figures.

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