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What Are the Limitations of Digital Learning Resources in Primary School English Reading? Insights from Teachers and Students in China

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Abstract

Although digital learning resources are widely promoted in primary education, empirical evidence explaining how and why they function unevenly in English reading instruction remains limited, particularly from the combined perspectives of teachers and students. This qualitative study investigates the use of digital learning resources in primary school English reading classrooms in Jiangsu Province, China, drawing on semi-structured interviews with 10 English teachers and 15 Grade 5 and Grade 6 students. Thematic analysis reveals a persistent gap between generally positive attitudes toward digital resources and their limited pedagogical impact on reading development. Teachers demonstrate divergent instructional orientations ranging from deep pedagogical integration to basic adaptive use, while students' preferences vary by grade level between situational engagement and exam-oriented support. The effective enactment of digital resources is further constrained by contextual factors, including disparities in infrastructure, unstable platforms, and uneven family access. Although most digital resources are well aligned with textbook content, their limited adaptability and fragmented functionality increase instructional and cognitive burdens, resulting in strong support for surface-level learning outcomes but restricted contributions to higher-order reading comprehension. This study extends understandings of technology-enhanced reading instruction and highlights conditions where digital resources can effectively support primary English literacy development.

Keywords

Primary English Reading, Digital Learning Resources, Technology-Enhanced Learning, Teacher and Student Perspectives, Qualitative Study

1. Introduction

Digital transformation has emerged as a pivotal aspect of contemporary educational reform on a global scale, with a growing focus on utilizing technology to address challenges related to educational equity, instructional quality, and learning effectiveness (Amiri, 2025; Joseph et al., 2024; Matsieli & Mutula, 2024). In recent years, digital learning resources have been extensively advocated as a crucial means of enhancing instructional content, broadening learning opportunities, and facilitating personalized learning, particularly within the context of language education (Leshchenko et al., 2021; Liu et al., 2025). However, growing international evidence suggests that the mere availability of digital resources does not guarantee meaningful learning gains, particularly in reading instruction, where deeper comprehension and higher-order literacy skills remain difficult to foster in technology-mediated environments.

In China, the digitalization of education has been positioned as a national strategic priority, with policy initiatives advocating the systematic integration of digital technologies into teaching and learning across compulsory education (Hou, 2025). The English Curriculum Standards for Compulsory Education (2022 Edition) explicitly encourage the development and use of digital learning resources to enhance the authenticity, openness, and effectiveness of English instruction. Within this policy context, primary school English reading instruction has become a key site for digital innovation, as reading competence is foundational to students' long-term language development. Nevertheless, policy aspirations ultimately depend on how digital resources are enacted in everyday classroom practices and how they support students' actual reading processes.

Despite widespread policy consensus regarding the benefits of digital learning resources, practical challenges in their classroom implementation persist. As the primary facilitators of instructional integration, teachers are tasked with selecting, adapting, and orchestrating digital resources in a manner that aligns with curricular objectives and students' learning needs. While previous research grounded in technology adoption and integration frameworks suggests that teachers' instructional use of digital resources is shaped by perceived usefulness, ease of use, and contextual support (Inan & Lowther, 2010), empirical studies and classroom observations indicate that many teachers continue to face constraints such as uneven resource quality, limited time for resource screening, technical complexity, and misalignment between digital content and textbook-based instruction (Xie et al., 2025). These challenges frequently result in superficial or fragmented utilization of resources rather than comprehensive pedagogical integration.

At the same time, students' experiences and perceptions further shape the educational value of digital learning resources in reading instruction. International research highlights the importance of students' digital competencies, engagement, and well-being in technology-mediated learning environments (Hidayat-Ur-Rehman, 2024). Large-scale studies on digital reading further suggest that while digital texts may enhance access and motivation, they do not automatically lead to deeper

comprehension and may even hinder higher-order reading comprehension, defined in this study as the ability to engage in inference, integration of ideas across texts, and critical evaluation of content, when instructional support is insufficient (Moje et al., 2020). Similarly, the Chinese curriculum standards stress that digital resources should provide authentic language input and intelligent feedback to support students' individualized reading development (Shang & Wang, 2025). However, from the learner perspective, problems such as cognitive overload (Sweller et al., 2011), inadequate alignment with learning objectives, unequal access to devices, and excessive emphasis on entertainment have been widely reported, potentially limiting the contribution of digital learning resources to the development of higher-order reading skills (Delgado et al., 2018; Hoque, 2025; Surbakti et al., 2024). Current research indicates that the educational efficacy of digital learning resources is contingent not solely on their technological attributes but also on the manner in which educators and students interpret and implement them within particular instructional settings.

Despite the growing body of research on digital learning resources in English education, existing studies provide limited explanatory insight into why their pedagogical potential remains underutilized in primary school reading instruction. First, much of the literature adopts a single-perspective approach, focusing either on teachers' instructional practices or on technological features, while insufficiently incorporating students' lived learning experiences. Second, prior research has tended to emphasize surface-level outcomes such as motivation and vocabulary acquisition, with relatively little attention to how digital resources support higher-order reading comprehension (i.e., inference, integration, and critical evaluation) in authentic classroom contexts. Third, studies that simultaneously consider curriculum alignment, contextual conditions, and differential learner needs within compulsory education settings remain scarce.

To address these gaps, this study examines the application of digital learning resources in primary school English reading instruction from both teacher and student perspectives. Drawing on qualitative interviews with Grade 5 and Grade 6 teachers and students in Jiangsu Province, China, and focusing on classrooms using the Yilin Edition English textbooks, the study proposes a four-dimensional analytical framework encompassing application attitudes, environmental conditions, resource applicability, and learning outcomes. By adopting a dual-perspective and context-sensitive approach, this research seeks to explain how digital learning resources are enacted in primary English reading classrooms and to illuminate the pedagogical and contextual conditions under which they can more effectively support reading development.

Accordingly, this study is guided by the following research questions:

RQ1: How do primary school English teachers and students perceive and use digital learning resources in English reading instruction?

RQ2: What contextual and resource-related factors shape the classroom enactment of digital learning resources in primary English reading?

RQ3: How do digital learning resources influence students' reading learning outcomes, particularly with respect to surface-level learning and higher-order reading comprehension?

2. Literature Review

Conceptualization of Digital Learning Resources in Technology-Enhanced Learning

In the field of technology-enhanced learning, digital learning resources are generally understood as digital media materials that support instruction in formal educational settings. Existing research generally agrees that such resources are characterized by digital format, ease of access, shareability, and adaptability (Adeshina, 2024; Alphonce & Mwantimwa, 2019; Menon, 2022). However, scholars increasingly emphasize that the educational value of digital learning resources depends not only on their technical features, but also on how they are pedagogically integrated into learning processes (Bitar & Davidovich, 2024).

From a pedagogical and systemic perspective, digital learning resources are conceptualized as components of broader learning ecosystems, embedded in specific instructional contexts and enacted through teachers' pedagogical reasoning and learners' engagement with tasks and content (Anvari et al., 2024; Sinaga, 2025). This perspective shifts the analytical focus from the technical properties of resources to how they mediate teaching and learning processes in classroom settings.

International research has placed greater emphasis on the systemic and functional expansiveness of digital learning resources. Adeshina (2024) conceptualized them as complex systems stored and managed through digital tools and accessed by multiple educational stakeholders (Adeshina, 2024). Matsieli & Mutula (2024) focused on the technological carriers of access, defining digital learning resources as electronic materials retrievable through computers or networked devices. Rather than emphasizing format or storage alone, scholars argue that the effectiveness of digital resources depends on the alignment between technological affordances, pedagogical strategies, and subject matter knowledge, as articulated in the technological pedagogical content knowledge (TPACK) framework (Petko et al., 2025; Smiling & Hollebrands, 2025). Similarly, frameworks on educators' digital competence stress that digital resources acquire instructional value only when they are purposefully selected and orchestrated to support learning goals (Levenberg et al., 2025; McGarr, 2024; Zou et al., 2024).

While definitions vary in emphasis, existing studies converge on the view that digital learning resources are not merely technical artifacts but pedagogical mediators whose educational value emerges through classroom enactment. This understanding provides an important conceptual foundation for examining how digital learning resources function within technology-enhanced learning environments, particularly in subject-specific contexts such as primary school English reading.

Digital Learning Resources and Learning Processes in English Reading

A substantial body of research has investigated the instructional value of digital learning resources in English education, with findings consistently indicating their potential to enhance student engagement and support language learning. From a technology-enhanced learning perspective, the instructional value of digital learning resources lies not only in increasing engagement but also in shaping learners' cognitive and strategic reading processes through multimodal input, interactive tasks, and scaffolded support.

Studies have shown that digital learning resources can increase learners' engagement and provide multimodal input that supports vocabulary learning and basic language skills (Hoque, 2025; Rohi & Nurhayati, 2024). At the same time, research grounded in technology-enhanced learning cautions that increased engagement does not automatically lead to deeper reading comprehension or improved higher-order literacy skills (Urunbaeva, 2025).

Meta-analytic and systematic review studies comparing digital and print reading have reported that comprehension outcomes may be lower in digital environments, particularly when tasks require higher-order cognitive processing, such as making inferences, integrating information across multiple sources, and critically evaluating content (Delgado et al., 2018; Salmerón et al., 2024). Salmerón et al. (2024) further argue that digital reading often places additional demands on learners' self-regulation, navigation, and evaluation of information, which can constrain comprehension if adequate instructional scaffolding is not provided (Salmerón et al., 2024).

From a learning-process perspective, effective digital reading requires strategic navigation, evaluation of multimodal information, and self-regulation, which are not inherently supported by digital resources unless deliberately designed (Mekuria et al., 2024; Ortega-Ruipérez et al., 2024). These findings suggest that the instructional value of digital learning resources in English reading lies not merely in their ability to motivate learners, but in how they are pedagogically designed to support comprehension processes and reading strategies, particularly those involved in higher-order reading comprehension, including inference, integration, and critical evaluation, which are essential for deep text understanding.

By contrast, some research has increasingly explored the conditions under which digital learning resources support reading development. Noori (2025) demonstrated that digital learning resources can significantly improve student engagement and reading comprehension outcomes (Noori, 2025). Drawing on the Technology Acceptance Model (TAM), some scholars revealed that teachers' perceived usefulness and ease of use of digital resources strongly influence their instructional integration (Wohlfart & Wagner, 2025; Yang & Lou, 2024). Precious studies further emphasized the mediating role of infrastructure, showing that hardware availability and network stability amplify or constrain the educational impact of digital resources (Derder et al., 2024; Purnamasari et al., 2025). More recent studies have also explored issues such as balancing digital resources with traditional instruc-

tion (Astri et al., 2024) and addressing learner diversity in digital environments (Wong et al., 2025), thereby extending the scope of inquiry to learner differences and instructional design considerations.

Conditions Shaping the Enactment of Digital Learning Resources in the Classroom

Research on the classroom enactment of digital learning resources highlights the joint influence of teacher-related, environmental, and resource-related conditions. From the teacher's perspective, attitudes toward technology, pedagogical beliefs, and perceived instructional value significantly shape whether digital resources are used in superficial or pedagogically meaningful ways (Inan & Lowther, 2010; Stringer et al., 2025). Teachers' pedagogical beliefs and professional judgment further mediate how digital resources are incorporated into classroom instruction, often determining whether technology use remains superficial or supports deeper learning (Abedi, 2024; Liao, 2024).

Environmental conditions, including hardware availability, network stability, and institutional support, further mediate instructional implementation. Empirical studies consistently report that infrastructural disparities disrupt instructional continuity and limit the depth of digital resource use, particularly in compulsory education contexts (Christanti et al., 2024; Marimothu et al., 2024; Miah, 2024). At the family level, unequal access to devices and parental support contribute to divergent learning experiences beyond the classroom (Templeton & Korchagin, 2025).

Resource-related factors, such as curriculum alignment, adaptability, and functional integration, have received comparatively less systematic attention. Existing research points to challenges including excessive entertainment-oriented design, limited flexibility to instructional goals, and fragmented platform functions, which increase cognitive and instructional burdens for both teachers and students (Fasinro et al., 2024; Laurillard, 2024; Pratiwi et al., 2024). From a technology-enhanced learning perspective, these challenges underscore the importance of instructional design and system-level coherence in supporting meaningful learning with digital resources.

Limitations of Existing Research and Research Gap

Although existing studies provide valuable insights into the use of digital learning resources in English education, several limitations remain. First, research perspectives are often fragmented, with most studies focusing either on teachers' instructional practices or on technological features, while rarely integrating teacher and student perspectives within a single analytical framework. Second, much of the literature emphasizes surface-level outcomes such as engagement and vocabulary acquisition, offering limited explanatory insight into how digital learning resources support higher-order reading comprehension in authentic classroom contexts. Third, studies that simultaneously consider curriculum alignment, contextual conditions, and learner diversity in primary education settings remain scarce.

In response to these gaps, the present study adopts a dual-perspective qualita-

tive approach to examine how digital learning resources are enacted in primary school English reading instruction and why their instructional effectiveness varies across contexts.

3. Methods

Research Design

This study adopts a qualitative research design to explore how digital learning resources are used and experienced in primary school English reading instruction. A qualitative approach is particularly appropriate because it allows for an in-depth examination of teachers' and students' perceptions, instructional decision-making, and context-dependent learning experiences, which are not readily captured through quantitative measures.

Specifically, semi-structured interviews were employed to address the research questions by eliciting rich, descriptive accounts of how digital learning resources are perceived, enacted, and evaluated in authentic classroom contexts. Rather than aiming for statistical generalization, this study seeks analytical generalization by identifying recurring patterns and mechanisms that explain variations in the pedagogical use and learning outcomes of digital learning resources.

In this study, digital learning resources refer to the technology-based materials used by teachers and students in English reading instruction, including multimedia courseware aligned with the Yilin Edition textbooks, online practice platforms, educational apps (e.g., ABC Reading, Jinjin Reading/Oxford Reading Tree, Shanbei Reading), instructional videos, and interactive whiteboard resources, all of which were frequently mentioned by participants during interviews.

Theoretical Basis and Design of the Interview Framework

To capture contextual influences on classroom enactment, the application environment dimension was informed by studies emphasizing the mediating role of infrastructural conditions, institutional support, and family-level access. Questions in this dimension focused on hardware availability, network stability, platform usability, and external learning support.

To ensure the content validity and theoretical grounding of the interview protocol, the semi-structured interview outline was developed through a comprehensive review of both domestic and international literature on digital learning resource adoption and instructional effectiveness. The interview questions were structured around four analytical dimensions: application attitudes, application outcomes, application environment, and the applicability of digital learning resources.

Specifically, questions addressing application attitude were informed by studies grounded in the Technology Acceptance Model and its extensions, which emphasize perceived usefulness, perceived ease of use, and intention to adopt digital learning resources (Nawi et al., 2020). The application outcomes dimension drew on recent empirical research examining the effects of digital learning environments on instructional effectiveness and learning outcomes (Weinhandl et al.,

2025). The application environment dimension was designed with reference to studies highlighting the role of infrastructural conditions, institutional support, and contextual constraints in shaping teachers' technology use (Marimothu et al., 2024).

Finally, questions focusing on applicability were adapted from questionnaire-based investigations of digital learning resource use in secondary and higher education, ensuring attention to curriculum alignment, usability, and functional integration. All interview questions were adapted to the context of primary school English reading instruction and refined to align with the Yilin Edition textbooks. Prior to formal data collection, the interview outline was reviewed and piloted to ensure clarity, relevance, and appropriateness for both teacher and student participants.

Participants and Background Information

Participants included 10 primary school English teachers and 15 students from Grades 5 and 6 in Jiangsu Province, China. A purposive sampling strategy was employed to capture diverse instructional contexts and learning experiences. Schools were selected through stratified sampling based on school location (urban vs. rural) to ensure representation across varying levels of digital infrastructure and educational resources. Teacher participants were recruited through a combination of teaching research group recommendations and voluntary participation, ensuring variation in teaching experience and grade levels taught. Student participants were recruited from the classes of participating teachers, with efforts to include a range of English proficiency levels and frequencies of digital resource use. To characterize student participants, English proficiency levels (beginner, elementary, intermediate, proficient, advanced) were initially assessed by their English teachers based on classroom performance, academic records, and formative assessments. Frequency of digital learning resource use (ranging from "almost never use" to "almost daily use") was determined through teacher reports and subsequently cross-validated with students' self-reported usage patterns during interviews. This dual-source approach helped ensure consistency and reliability in participant classification.

Table 1. Demographic characteristics of teacher participants.

Code	Gender	School Location	Teaching Experience (Years)	Grade Taught
T1	Female	Urban	0 - 5	Grade 5
T2	Male	Urban	6 - 10	Grade 6
T3	Female	Rural	10 - 15	Grade 5
T4	Male	Urban	Over 15	Grade 6
T5	Female	Urban	6 - 10	Grade 5
T6	Male	Rural	0 - 5	Grade 6
T7	Female	Urban	6 - 10	Grade 6
T8	Female	Urban	Over 15	Grade 5
T9	Male	Urban	0 - 5	Grade 6
T10	Female	Rural	11 - 15	Grade 6

Table 2. Demographic characteristics of student participants.

Code	Gender	Grade	School Location	English Proficiency Level	Frequency of Digital Learning Resource Use
S1	Girl	Grade 5	Urban	Beginner	Almost Never Use
S2	Boy	Grade 5	Rural	Elementary	Frequently Use
S3	Girl	Grade 5	Rural	Beginner	Seldom Use
S4	Girl	Grade 6	Urban	Elementary	Moderate Use
S5	Girl	Grade 6	Urban	Elementary	Frequently Use
S6	Boy	Grade 6	Urban	Intermediate	Moderate Use
S7	Girl	Grade 5	Rural	Intermediate	Frequently Use
S8	Boy	Grade 5	Urban	Elementary	Frequently Use
S9	Girl	Grade 6	Rural	Proficient	Moderate Use
S10	Boy	Grade 5	Urban	Advanced	Almost Daily Use
S11	Girl	Grade 6	Rural	Beginner	Moderate Use
S12	Girl	Grade 5	Urban	Proficient	Frequently Use
S13	Boy	Grade 5	Urban	Advanced	Almost Daily Use
S14	Girl	Grade 6	Rural	Elementary	Frequently Use
S15	Girl	Grade 6	Urban	Proficient	Almost Daily Use

Teachers were recruited from both urban and rural primary schools, with teaching experience ranging from novice to highly experienced educators. Student participants represented varying levels of English proficiency and differing frequencies of digital learning resource use. All participants were anonymized using coded identifiers to protect confidentiality. Basic background information is summarized in Table 1 and Table 2.

Data Collection Procedures

Data were collected through semi-structured interviews conducted on a voluntary basis. Informed consent was obtained from all participating teachers, students, and students' guardians prior to data collection. Interviews with teachers lasted approximately 30 - 45 minutes, while student interviews ranged from 20 - 30 minutes. All interviews were audio-recorded with participants' permission.

The recordings were transcribed verbatim, and the transcripts were carefully reviewed to ensure accuracy and completeness prior to analysis. All data were stored securely and used exclusively for research purposes in accordance with ethical guidelines.

Data Analysis

Qualitative data analysis was conducted using MAXQDA 24 to facilitate systematic coding, data organization, and analytical transparency. The analysis followed a three-stage coding process informed by a theory-informed thematic analysis approach: open coding, axial coding, and selective coding. Within this approach, a four-dimensional analytical framework derived from the literature re-

view guided the initial coding structure, while inductive coding strategies allowed emergent themes to surface from the data.

During open coding, interview transcripts were examined line by line to identify meaningful units and generate initial codes closely reflecting participants' expressions. In the axial coding stage, related codes were grouped into higher-order categories corresponding to the four analytical dimensions. Selective coding was then employed to refine core themes and integrate them into a coherent explanatory framework.

Throughout the analysis, a constant comparative method was applied across teacher and student data as well as across different school contexts to identify similarities, contrasts, and recurring patterns.

Trustworthiness and Data Saturation

Data collection continued until thematic saturation was reached, as indicated by the absence of new themes or substantial variations in subsequent interviews. Saturation was observed across all four analytical dimensions.

To enhance the trustworthiness of the study, several strategies were employed. Credibility was strengthened through triangulation of teacher and student perspectives across different school contexts. Dependability and confirmability were supported by systematic documentation of coding decisions and analytical procedures within MAXQDA 24. Representative quotations were retained to ensure transparency and to establish clear links between empirical data and analytical interpretations.

4. Results

The thematic analysis of interview data identified four interconnected themes regarding the use of digital learning resources in primary school English reading instruction: 1) differentiated application attitudes, 2) environmental constraints influencing instructional practices, 3) partial alignment and limited adaptability of digital resources, and 4) varied learning outcomes across cognitive levels. These themes consistently emerged across both teacher and student interviews.

Differentiated Application Attitudes toward Digital Learning Resources

Interview data indicated that both teachers and students generally held favorable attitudes toward the use of digital learning resources in English reading instruction. However, variations were observed in how these resources were applied across instructional contexts and learner groups.

Teachers' instructional orientations

Among the 10 teacher participants, differing approaches to the use of digital learning resources in reading lessons were reported. Approximately half of the teachers emphasized deeper integration, describing the use of digital materials to enhance contextual understanding and support reading comprehension beyond literal meaning. These teachers reported selecting resources that aligned closely with textbook narratives and instructional objectives.

"*If the animation sticks to the textbook story, students can really get into it. It's*

not just reading anymore, they understand why the characters behave that way..." (T2)

Other teachers described a more basic application of digital resources, particularly in classrooms where students experienced difficulties with English reading. In these cases, digital tools were primarily used to support sentence-level comprehension and reduce learning difficulty.

"*My students have trouble with long sentences. I use digital tools to break them down visually. Otherwise, they can't understand the text.*" (T6)

Students' grade-specific preferences

Students also reported positive attitudes toward digital learning resources, particularly their visual and interactive features. Among the 15 student participants, differences were observed between Grade 5 and Grade 6 students in terms of preferred resource types and learning focus. The majority of Grade 5 students reported a preference for story-based and situational resources.

"*I like it when the story turns into a cartoon. I remember the words better because I understand what is happening.*" (S3)

In contrast, Grade 6 students reported greater attention to efficiency and assessment-related practice.

"*I don't care if it's interesting. I want exercises like the test, so I know what mistakes I make.*" (S12)

Application Environment as a Structural Constraint

Across interviews, both teachers and students identified environmental conditions as factors shaping the use of digital learning resources in reading instruction.

Disparities in hardware and infrastructure

All three teachers from rural schools reported limited access to digital devices, which restricted opportunities for interactive reading activities. In contrast, teachers from urban schools generally reported adequate hardware availability but noted other constraints such as platform instability.

"*Sometimes only the teacher's computer works. Students just watch, so it's not very different from traditional teaching.*" (T5)

Students also reported unequal access to digital learning resources outside school settings.

"*The internet is slow at home, so I stop using those apps.*" (S9)

Network stability and platform limitations

Even in schools with better equipment, teachers reported that unstable networks and platform lag disrupted lesson flow and affected instructional planning.

"*When the platform stops working, the lesson is disrupted. After that, I am reluctant to plan activities that rely heavily on technology.*" (T1)

Applicability of Digital Learning Resources: Alignment without Adaptability

Teachers reported that many digital learning resources were aligned with the Yilin Edition English textbooks in terms of content structure and vocabulary coverage, which facilitated classroom integration.

"*The units are the same as the textbook, so I don't have to start over.*" (T7)

At the same time, both teachers and students identified limitations related to adaptability and functional integration. Some students reported that certain resources lacked relevance to their everyday experiences.

"*The story is about kids from other countries doing things we don't do, so it seems distant.*" (S6)

Teachers also reported using multiple platforms for different instructional functions, such as video presentation, practice, and feedback.

"*I need separate platforms for videos, exercises, and feedback. This takes a lot of time.*" (T4)

Application Outcomes: Strong Support for Surface Learning, Limited Impact on Higher-Order Skills

Participants reported that digital learning resources were effective in supporting surface-level learning outcomes, such as vocabulary acquisition and basic sentence comprehension.

"*After watching the animation, students remember the words faster.*" (T8)

In contrast, both teachers and students reported limited perceived support for higher-order reading skills, including overall text interpretation and inferential understanding.

"*We mostly answer multiple-choice questions. There is not much help in understanding the whole text.*" (S14)

Some students also reported that game-like features sometimes drew attention away from reading content.

"*Sometimes I just want to earn points without thinking about the story.*" (S2)

5. Discussion

The present study investigated the utilization of digital learning resources in primary school English reading instruction from the perspectives of both teachers and students. Through thematic analysis of semi-structured interviews, four principal dimensions were identified: differentiated attitudes toward application, environmental constraints, limited adaptability despite curricular alignment, and uneven instructional outcomes. These findings reveal both consistencies and divergences with recent literature on digital technologies in reading education and offer nuanced insights into the mechanisms that influence the classroom use of digital resources.

Differential Attitudes and Pedagogical Orientations

In alignment with previous research, it is evident that positive attitudes toward digital learning resources do not inherently lead to their profound pedagogical integration. Educators who possess a stronger conviction in the instructional value of technology are more likely to integrate these resources in a meaningful manner, whereas others tend to employ them primarily as supplementary tools, often to alleviate cognitive load or to support foundational comprehension. This observation is consistent with international findings, which indicate that teachers' per-

ceptions of usefulness and ease of use are critical predictors of technology adoption in literacy instruction contexts (Inan & Lowther, 2010). Although much of this evidence predates the last decade, contemporary studies continue to underscore the significance of teacher beliefs and digital literacy as mediators of effective technology use (Zhang, 2023).

Students' differentiated preferences, situational engagement for younger learners and performance-oriented use for older learners, echo recent findings on how learner goals shape engagement with digital reading tools. For example, meta-analytic research on digital reading platforms suggests that interactive and multimodal features may enhance engagement and vocabulary acquisition, but the effects vary with students' cognitive and motivational orientations (Oakley, 2024). Students' perceptions toward digital reading platforms generally trend positive, especially regarding multimedia support for vocabulary and motivation (Noni, 2025).

Contextual Constraints on Implementation

Environmental constraints identified in this study, including hardware shortages, unstable networks, and platform usability issues, are supported by broader empirical evidence that structural barriers significantly restrict the educational impact of digital technologies. For instance, research on teacher experiences with remote literacy instruction shows that time, access to quality tools, and integration support critically influence implementation quality (Keane et al., 2024).

Moreover, large-scale research on reading performance across paper and digital modalities indicates that technology-related variables, such as access and self-efficacy with devices, significantly correlate with reading outcomes. This suggests that environmental factors do not merely hinder logistical implementation but may also mediate cognitive and metacognitive engagement with digital texts (Mirazchiyski & Gershteyn, 2024). Good practices from PIRLS countries highlight how digital reading instruction can be structured to support comprehension development when paired with pedagogical strategies (Bruggink et al., 2025)

Limited Adaptability Amid Curricular Alignment

Although many digital resources were perceived as well synchronized with curriculum content, both teachers and students noted limitations in adaptability and functional integration. This highlights a persistent gap identified in recent scoping reviews on digital technologies for reading fluency: much of the research to date focuses on discrete interventions or program features rather than on flexible, context-responsive resources that can adapt to diverse learner needs and instructional designs (Oakley, 2024).

Such limitations suggest that curricular alignment alone is insufficient to ensure pedagogical effectiveness. Instead, the integration of adaptive features, multimodal support, and real-time feedback may be necessary to support higher-order literacy processes. This conclusion resonates with broader educational technology research advocating for intelligent and adaptive learning systems that tailor instruction to individual learner profiles.

Uneven Outcomes: Surface Support but Limited Deep Learning

The finding that participants perceived digital learning resources as supporting surface-level comprehension yet contributing less to higher-order reading skills aligns with empirical work showing mixed effects of digital reading on comprehension. For instance, recent research on primary school students' digital reading habits found that frequent academic digital reading was negatively correlated with comprehension outcomes, suggesting that not all digital engagement is equally beneficial (Vargas et al., 2024).

This pattern may reflect the nature of many digital tools, which excel at scaffolding vocabulary acquisition and basic practice but offer fewer opportunities for sustained critical interpretation, inference, and metacognitive strategy use, core components of deep reading. Such insights are consistent with arguments in the broader literacy literature that digital reading environments require intentional design and pedagogical scaffolding to support complex cognitive processes.

Theoretical and Practical Implications

This study contributes to ongoing efforts to refine theoretical models of technology adoption and instructional integration in literacy education. The evidence supports a nuanced understanding of the Technology Acceptance Model (TAM) within classroom settings, emphasizing that perceived usefulness and ease of use interact with contextual enablers and constraints to shape actual practice. Moreover, the four-dimensional framework developed here extends existing conceptualizations by foregrounding the interplay between attitudes, environment, resource characteristics, and outcomes, offering a comprehensive lens for future research. The Technology Acceptance Model remains useful for understanding students' adoption of digital reading tools, although contextual factors clearly influence actual use behavior (Lin & Yu, 2023).

For policymakers and educational leaders, the findings underscore the necessity of investing not only in digital hardware and network infrastructure but also in platform usability, teacher professional development, and resource design that prioritizes adaptability to diverse learner needs. For teachers, professional development should extend beyond tool familiarity to include strategies for integrating digital resources into higher-order reading instruction.

6. Conclusion

Through qualitative interviews with primary school English teachers and students, this study systematically examined the key characteristics, underlying causes, and practical consequences of digital learning resource application in English reading instruction. By integrating teacher and student perspectives within a four-dimensional analytical framework, the study provides a nuanced account of how digital resources are currently used and why their instructional effectiveness remains uneven.

The findings indicate that overall attitudes toward digital learning resources are positive but differentiated. Teachers tend to develop two distinct orientations,

deep integration and basic adaptation, largely shaped by regional teaching conditions and students' learning foundations. Students' preferences also vary by grade level, with younger learners favoring situational and experiential support and older learners prioritizing exam-oriented relevance. These differences reflect not only participants' roles and instructional objectives but also their subjective assessments of how well digital resource provision aligns with concrete teaching and learning needs, particularly in relation to the Yilin Edition textbooks.

The application environment emerged as a persistent structural constraint. Across regions, participants reported insufficient hardware provision, unstable networks and platforms, and limited instructional guidance. While rural and county-level schools primarily face shortages in equipment and access, urban schools are more affected by low usage efficiency and platform instability. At the family level, economic disparities further exacerbate inconsistencies in students' access to and continuity of resource use. Collectively, these issues point to imbalances in regional resource allocation, limited contextualized optimization strategies, and insufficient support for teachers' digital instructional capacity, all of which restrict effective textbook-resource integration.

In terms of applicability, participants' accounts revealed a clear tension between high curriculum synchronization and limited adaptability, with this pattern evident across the majority of teacher and student interviews. Although many digital resources are closely aligned with textbook units and core vocabulary, thereby lowering basic application costs, problems such as weak connections to students' lived experiences in Jiangsu, fragmented platform functions, and uneven resource quality increase the cognitive and operational burden on both teachers and students. These challenges are largely attributable to resource design that overlooks regional characteristics, a lack of functional integration mechanisms, and insufficient quality control processes.

Regarding perceived learning outcomes, teachers and students reported that digital learning resources provided strong support for surface-level learning, particularly in consolidating vocabulary and basic comprehension, but provided limited assistance for the development of higher-order reading abilities and core literacy. This results in a threefold imbalance between interest and effectiveness, foundational and advanced skills, and across regions and learner groups. Factors contributing to this imbalance include an overemphasis on entertainment-oriented design, insufficient depth of integration with textbook learning goals, and environmental constraints related to infrastructure and instructional guidance, which together hinder the implementation of cognitively demanding and interactive learning activities.

Our findings suggest that improving the educational value of digital learning resources requires closer alignment between resource design and differentiated instructional needs. Rather than pursuing uniform or technology-driven solutions, resource development should be sensitive to variations in students' cognitive stages, learning goals, and regional contexts. At the instructional level, teach-

ers would benefit from targeted professional support that emphasizes not only technical proficiency but also pedagogical strategies for integrating digital resources into reading comprehension instruction. At the system level, greater attention to platform integration, resource quality assurance, and equitable access conditions is essential for narrowing regional and family-based disparities.

Despite its contributions, this study has several limitations. First, it relies primarily on qualitative interview data and does not incorporate quantitative measures that could further validate the relative influence of different factors. Future studies could adopt mixed-methods designs, combining surveys or experimental approaches to examine causal relationships more systematically. Second, the research focuses on primary school English reading instruction in Jiangsu Province, which limits the generalizability of the findings. Subsequent research could extend the scope to other regions, educational stages, and subject areas to explore both common patterns and contextual differences in digital learning resource application. Such efforts would contribute to a more comprehensive understanding of how digital resources can effectively support literacy development across diverse educational settings.

Ethics Approval

All procedures conducted in studies involving human participants adhered to the ethical standards set forth by the institutional and/or national research committee, as well as the 1964 Helsinki Declaration and its subsequent amendments or equivalent ethical standards. This study received approval from the Medical Ethics Committee of Jiangsu University, with the approval number: JSDX20250416001. Informed consent was obtained electronically from all participants. Participants were explicitly informed that their involvement was anonymous and that their personal information would remain confidential. The data collected will be utilized solely for scientific research purposes.

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Data Availability

The datasets generated and analyzed during the current study are available from the corresponding author on reasonable request.

Conflicts of Interest

No potential conflict of interest was reported by the authors.

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