Arab World English Journal
INTERNATIONAL PEER REVIEWED JOURNAL ISSN: 2229-9327

Arab World English Journal (AWEJ) Volume 17. Number 1, March 2026 Pp.413-436
DOI: https://dx.doi.org/10.24093/awej/vol17no1.26

Enriched eBooks in English Learning: A Systematic Review of Multimedia Features, Patterns, and Language Skill Development

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Received:12/30/2025 Accepted:02/28/2026 Published:03/15/2026

Abstract
The use of enriched eBooks in English language education has received increasing attention over the past decade, particularly in higher education and technology-mediated learning contexts. This study presents a systematic literature review of empirical research on enriched eBooks in English as a Foreign Language and English as a Second Language learning published between 2015 and 2025. The review aims to identify trends in participant profiles and language skill focus and to examine how eBook design types and embedded features are associated with language skill coverage. Guided by the PRISMA framework, 37 empirical studies were selected from six academic databases and analysed using descriptive and comparative approaches. Findings show that research has predominantly focused on tertiary-level learners, with reading as the most frequently examined skill. Interactive and enriched eBooks demonstrate broader skill coverage than static designs, although support for speaking and writing remains less consistent. Feature-level analysis indicates that multimedia input and comprehension supports are widely implemented, while feedback mechanisms and production-oriented tools are less frequently integrated. These findings highlight the need for clearer differentiation of eBook design types and stronger alignment between enriched features and language skill development.

Keywords: Digital learning resources, digital textbooks, electronic books, English language learning, enriched ebooks, ereaders, English as a Second Language, English as a Foreign Language, interactive ebooks, language skills, multimedia features, systematic literature review

How to cite: Mogammad, M., Na, K. S., Tee, L. T. & Kew, S. R. (2026). Enriched eBooks in English Learning: A Systematic Review of Multimedia Features, Patterns, and Language Skill Development. *Arab World English Journal, 17*(1): 413-436. https://dx.doi.org/10.24093/awej/vol17no1.26

Introduction

Digital technologies have reshaped how learners access and use educational materials, while textbooks remain core resources for organising content, guiding instruction, and supporting progression across classroom, institutional, and blended learning settings (Sung et al., 2016). In higher education contexts, digital delivery has expanded how learners interact with instructional materials, particularly through online and technology-mediated learning environments. Within the context of English in higher education, research indicates that students' online learning experiences are positively associated with digital skills, online learning activities, and the perceived usefulness of internet-based tools (Hidayat et al., 2022; Liew et al., 2022). As a result, textbooks increasingly appear as digital textbooks and eBooks that vary widely in how they structure learning support beyond content presentation (Connor et al., 2019).

In language education, this shift has produced eBook interventions that combine digital delivery with multimedia and task supports. Recent work in EFL contexts also reflects growing interest in AI-based tools, including chatbots and large language models, for language practice and feedback, aligning with broader trends toward interactive and learner-centred digital learning resources (Alhamam, 2025; Mohd Zainol et al., 2025; Shikun et al., 2024; Wang & Na, 2022). Enriched eBook environments may support listening, reading, speaking, and writing by bringing together multimodal input, structured practice, and feedback within a single learning space. For instance, audio narration and text-to-speech can enhance receptive processing through repeated exposure, while embedded quizzes, annotation functions, and guided writing tasks can promote comprehension monitoring and written production (Santos et al., 2014; Sung et al., 2016). Feedback-oriented supports, including writing feedback and speech-related functions, further extend practice toward productive and integrated language skill development (Alsalami & Mohammed, 2025; Elmotri et al., 2025; Santos et al., 2014).

Despite increasing reports of positive outcomes, the evidence remains difficult to synthesise in ways that inform design and pedagogical decisions. Many studies report overall learning benefits without explicitly linking outcomes to specific features, tools, or language skill domains, and eBook interventions are often discussed without consistent distinction among static, interactive, and enriched designs (Chuang & Jamiat, 2023; Zhang et al., 2020). As a result, it remains unclear which feature sets are most frequently associated with particular language skills, how features are combined within different eBook designs, and how these patterns vary across participant groups and learning contexts.

Prior reviews report increasing attention to eBooks and generally positive outcomes, particularly for engagement and reading-related learning (Bower et al., 2014; Zhang et al., 2020). However, many existing reviews do not systematically differentiate eBook design types or map feature configurations to skill-specific learning processes and outcomes. Two gaps therefore remain salient: (a) limited evidence comparing how static, interactive, and enriched eBook designs differ in language skill coverage, and (b) insufficient linkage between reported features and skill-specific learning processes and outcome measures (Chuang & Jamiat, 2023; Zhang et al., 2020).

To address these gaps, this systematic literature review synthesises 37 empirical studies published between 2015 and 2025 on enriched eBooks in English language learning across English as a Foreign Language (EFL) and English as a Second Language (ESL) contexts. The review aims to (1) identify publication trends, participant profiles, and language skill focus, and (2) examine how eBook design types and associated digital features are linked to listening, reading, speaking, and writing skills.

Literature Review

Evolution of Digital Textbooks and eBooks in Education

Textbooks have progressively moved from print to digital formats, including digital textbooks and eBooks. Early eBooks largely functioned as static replicas of printed texts, offering limited pedagogical affordances beyond portability and basic navigation (Sung et al., 2016). As educational technologies advanced, eBooks increasingly incorporated multimedia and interactive elements (e.g., audio, video, hyperlinks, embedded exercises), thereby expanding instructional affordances and supporting more flexible and autonomous learning practices (Connor et al., 2019; Zhang et al., 2020). In parallel, CALL research has expanded from multimedia delivery to more interactive and adaptive digital supports, including AI-based systems used for practice, feedback, and learner-centred activity design (Alhamam, 2025; Mohd Zainol et al., 2025; Shikun et al., 2024).

More recently, enriched or enhanced eBooks have been positioned as feature-rich learning resources that align with these developments by integrating tools and supports within a single learning environment and across devices. Chuang and Jamiat (2023) note that "Interactive reading apps often have multimedia features like voice-over, animation, animated graphics, background music, online dictionaries…" (p. 2). Similarly, Zhang et al. (2020) conceptualised enriched eBooks as multimodal learning environments that combine text with interactive and multimedia elements to support comprehension and learner engagement across digital platforms.

Types of eBooks: Static, Interactive, and Enriched or Enhanced

The literature commonly differentiates eBooks by design complexity and interactivity. Static eBooks typically present digitised text with limited multimedia and basic navigation, closely resembling printed textbooks in digital form. Interactive eBooks extend this baseline by incorporating features such as hyperlinks, embedded quizzes, annotation tools, and interactive navigation to promote active engagement with content, delivered through mobile and portable learning devices such as laptops, tablets, and eBook readers (Sung et al., 2016, p. 252). Enriched or enhanced eBooks represent a further development by combining multimedia and interactive supports, often including audio narration or text-to-speech, animations, gamified activities, feedback mechanisms, and, in some cases, adaptive elements (Chuang & Jamiat, 2023; Zhang et al., 2020).

Gamification is also frequently highlighted in broader mobile-assisted language learning research and is commonly linked with learner achievement and perceptions, supporting its relevance as a design component within enriched eBook environments (Okumuş Dağdeler, 2023). However, these design labels are not applied consistently across empirical studies, which complicates synthesis when interventions are compared without clear differentiation of underlying design characteristics (Lee & Lee, 2021; Zhang et al., 2020).

Enriched eBooks in Language Learning: Skills and Learning Contexts

In English language education, enriched eBooks have been implemented across ESL and EFL contexts in classroom based, blended, and self-directed learning environments (Sung et al., 2016; Zhang et al., 2020). Receptive skill support is commonly emphasised through multimedia input (e.g., audio narration, text-to-speech, and audio-visual explanations), which can strengthen listening and reading engagement through repeated exposure and multimodal reinforcement. Productive skill support is less consistently integrated, but is typically facilitated through

structured writing tasks, feedback systems, and speech related functions that allow learners to record, compare, or receive automated support for speaking (Santos et al., 2014; Sung et al., 2016).

Recent CALL and AI-related studies reinforce the importance of interaction and feedback for production-oriented learning, including voice-based intelligent agents and structured interaction that support speaking development (Katsarou et al., 2023; Zou et al., 2023). At the same time, GenAI-related work highlights both opportunities for enhanced learning support and concerns related to academic integrity and unequal access, which may influence adoption, learning equity, and instructional implementation in digital environments (Luo & Chen, 2025). Despite generally positive reports related to engagement, usability, or perceived learning benefits, language skill outcomes are often described in broad terms, and explicit distinctions among listening, reading, speaking, and writing are not consistently provided, limiting comparability across eBook designs, participant groups, and learning contexts (Chuang & Jamiat, 2023; Zhang et al., 2020).

Enriched eBook Features and Learning Affordances

Enriched eBooks are commonly characterised by clusters of multimedia input and learning support tools. Frequently reported features include audio narration or text-to-speech, video and animation, embedded exercises and quizzes, hyperlinks, and reading supports such as glossaries, dictionaries, and annotation functions (Sung et al., 2016; Zhang et al., 2020). Evidence from multimedia-based online English learning suggests that sustained engagement with audio-visual resources can also support productive outcomes such as writing fluency, reinforcing the importance of linking multimedia features to language production rather than comprehension alone (Alobaid, 2020).

In CALL contexts, platform based and AI supported formative assessment has been associated with gains in reading comprehension and learner enjoyment, indicating that feedback-rich task design can enhance both performance and learning experience (Alazemi, 2024). Related work also shows that usability and access conditions, including reliable internet connectivity, can shape uptake and satisfaction for mobile-assisted speaking tools, which is particularly relevant when enriched eBooks rely on external platforms or embedded links (Shoozan et al., 2025).

More recent studies highlight advanced affordances such as gamification systems, learning analytics, adaptive guidance, and chatbot supported self-regulated learning, reflecting broader developments in instructional technology and interactive support (Johar et al., 2023; Zhang et al., 2020). However, evidence from higher education cautions that AI tools may support surface-level language accuracy but do not replace structured instruction required for higher-order writing development (Aljuaid, 2024). Overall, studies frequently list features as indicators of design richness without clearly explaining how specific features align with instructional objectives or language skill outcomes, which limits feature-level interpretation and cross-study comparison (Chuang & Jamiat, 2023; Zhang et al., 2020).

Methods

Research Design

This study adopted a systematic literature review design, guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework to ensure transparent identification, screening, and synthesis of empirical research on enriched eBooks in English language learning (Moher et al., 2009; Page et al., 2021). The PRISMA framework provides a

structured approach for documenting search strategies, selection decisions, and synthesis procedures, enhancing methodological transparency and replicability. This approach is consistent with PRISMA-guided syntheses of technology-supported language learning, including recent reviews of AI-supported interventions in EFL contexts (Katsarou et al., 2023).

Inclusion and Exclusion Criteria

Clear inclusion and exclusion criteria were established in line with the research objectives (Table 1). Studies were included if they were empirical, published between 2015 and 2025, written in English, and conducted in English language learning contexts, including EFL and ESL. Eligible studies examined static, interactive, or enriched or enhanced eBooks, including digital textbooks, eReaders, tablet-based books, and instructional audiobooks used for language learning purposes. Studies were required to address at least one of the four skills (listening, reading, speaking, writing) and report language-related outcomes or evidence of learning improvement.

Studies were excluded if they were non-empirical (e.g., reviews, conceptual papers), did not include an explicit eBook component, focused solely on mobile-assisted or computer-assisted tools without an eBook element, or were unrelated to English language education. Studies centred on standalone AI tools or mobile platforms without an eBook as the primary learning material were excluded, even when language gains were reported (Azi, 2023; Kucuk, 2024; Shikun et al., 2024). Studies involving special needs populations, inaccessible full texts, or abstract-only reports were also excluded. Leisure or commercial eBooks were omitted unless their instructional use within formal English learning settings was clearly documented.

Table 1. *Inclusion and exclusion criteria*

Classification	Inclusion Criteria	Exclusion Criteria
Publication year	Published between 2015 and 2025	Published before 2015 or after 2025
Publication type	Empirical journal articles	Reviews, conceptual papers, books, reports
Language	English	Not English
Availability	Full-text accessible journal articles	Abstract-only or inaccessible full text
Learning context	English language learning contexts (English as a Foreign Language, English as a Second Language)	Non-English language learning contexts
Participants	Learners from early childhood to tertiary education	Special needs populations
Learning material	Static, interactive, or enriched eBooks (e.g., digital textbooks, electronic books, eReaders, audiobooks)	Mobile/MALL/CALL tools without an explicit eBook component
Language skills	Listening, reading, speaking, and/or writing	Studies not addressing language skills
Learning focus	English language learning outcomes	Leisure or commercial eBooks without documented instructional use

Literature Search and Study Selection

A systematic literature search was conducted across six academic databases: Web of Science, Scopus, ERIC, ProQuest (Education), Springer, and SAGE. Boolean operators combined eBook-related terms (e.g., enriched eBook, interactive eBook, multimedia eBook, digital textbook, electronic book, eReader) with English learning terms (e.g., EFL, ESL, language learning). Searches were applied to titles, abstracts, and keywords where available. To minimise retrieval of

broader AI-related studies not centred on eBooks, the search strategy prioritised eBook-specific terminology rather than generic AI, chatbot, or translation keywords (Aldawsari, 2024; Aljuaid, 2024).

The initial search yielded 244 records. After removing 61 duplicates, 183 records remained for title and abstract screening. Based on the predefined criteria, 137 records were excluded. Full texts were retrieved for 46 studies, of which 9 could not be accessed. The remaining 37 studies (see Appendix 1) met all eligibility requirements and were included in the final synthesis. The study selection process is summarised using a PRISMA flow diagram (Figure 1).

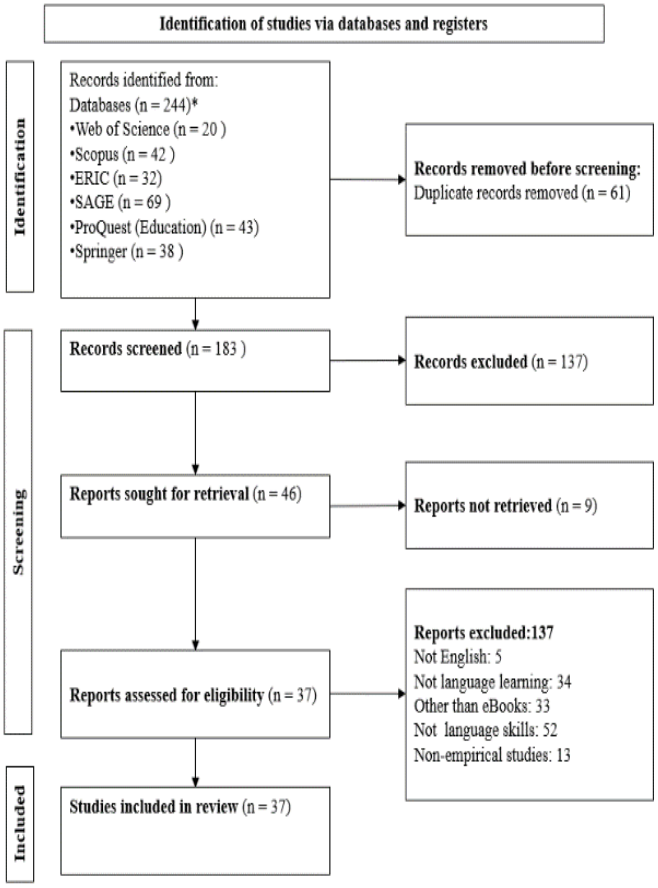


Figure 1. Flowchart outlining the protocol adopted in this study based on PRISMA.

Data Extraction and Analysis

Data were extracted from each included study, using a structured coding framework aligned with the research objectives. Extracted information included publication year, participant characteristics, learning context, eBook design type, digital features, and targeted language skills. Descriptive analysis was conducted to identify publication trends, participant profiles, and patterns of language skill focus, across studies. To address the second research objective, eBook design types and reported features were mapped to listening, reading, speaking, and writing to examine patterns of skill coverage and feature–skill alignment. The synthesis combined frequency-based summaries with comparative analysis across studies, allowing both trend identification and cross-study comparison.

Results

Research Question 1: Patterns and Trends in Enriched eBook Research in English Language Learning (EFL)

Geographical Distribution of Studies

The reviewed studies show a clear geographical concentration in Asia, particularly in China, Japan, South Korea, Malaysia, and Indonesia, indicating strong regional adoption of enriched eBooks in EFL contexts. Smaller numbers of studies originate from Europe and the Middle East, including the United Kingdom, Spain, and Saudi Arabia, while North America and Africa remain minimally represented. This uneven geographical distribution highlights regional imbalances in enriched eBook research and suggests that findings may reflect context-specific educational priorities and access conditions (Figure 2).

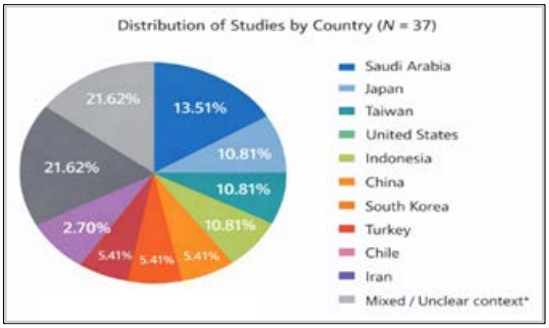


Figure 2. Geographical distribution of included studies by region (n = 37)

Year of Publication

Analysis of the publication, from the past ten years, do reveal a gradual increase of usage of enriched eBooks, as illustrated in Table 2. Though the research activity remained relatively low between 2015 and 2018, there was a steady rise from 2019 onwards. The most visible peaks occurred in 2021 and again in year 2024 and 2025, which reflect a growing scholarly interest in enriched eBooks, which also showed a broader adoption of digital and AI-supported learning technologies.

Table 2. *Distribution of included studies by publication year*

Publication Year	# Studies
2015	3
2016	1
2017	1
2018	3
2019	5
2020	2
2021	6
2022	2
2023	2
2024	6
2025	6

Participant Profile Patterns

Across the dataset, participant profiles, cluster within specific educational contexts. Most studies were conducted in EFL settings, while bilingual or multilingual contexts appear far less frequently. In terms of education level, tertiary learners represent the largest group of participants who adopted the usage of eBooks, and this was followed by primary and secondary levels. Moreover, the Teacher level education and teacher-focused sample levels, appear only in a smaller subset of studies, mainly in the later years of the reviewed period. This pattern suggests that enriched eBook research has increasingly prioritised mainly the higher education contexts, particularly after year 2020.

A comparison of participant profile patterns, across two publication periods, that is from 2015 to 2019 and then from 2020 to 2025, is provided in Table 3. This comparison shows a shift from a strong presence of school-based studies in 2015 to 2019, toward a stronger concentration on the tertiary learners in 2020 to 2025. This shift may reflect as increased access to digital platforms, and subsequently towards greater flexibility for technology integration in higher education settings.

Table 3. *Participant profiles by publication period (2015–2019 and 2020–2025) in enriched eBook research (n = 37)*

Publication Period	Total Studies (n)	Main Learning Contexts	Education Levels	Notable Patterns
2015–2019	15	Mainly EFL classroom settings; few ESL or bilingual studies	Primary and secondary levels more visible; limited tertiary and teacher education	Focused on foundational reading studies; early exploration of multimedia use
2020–2025	22	Predominantly EFL and tertiary contexts; growing use of online/blended modes	Strong dominance of tertiary learners; small but growing teacher education samples	Clear shift toward higher education, multimodal practice, and adaptive digital tools

Sample Size and Research Setting

The reviewed studies generally focused on small to medium sample sizes, with the majority involving fewer than 100 participants (Table 4). Only a limited number of studies focused on large samples that exceeded 200 participants, while a smaller proportion did not report their sample size. Regarding research setting, almost all studies were conducted in classroom or institution-based contexts, with only one study was conducted in a fully online learning environment (Table 5). These patterns indicate that enriched eBook research remains largely situated within the formal instructional settings rather than on fully online or informal learning contexts.

Language Skills Across Education Level, Context, and Design

Reading emerged as the most frequently targeted language skill, across participant education levels, learning contexts, and research designs. Studies conducted at the tertiary level, more often addressed integrated language skills, compared with school-based studies; while speaking and writing were examined less consistently across the contexts. In terms of research design, experimental and quasi-experimental studies, they primarily focused on reading-related

outcomes, whereas qualitative and mixed-methods studies occasionally expanded their scope, to include speaking and integrated skills (Table 6). Overall, these patterns indicate a strong dominance of reading, within the existing evidence base, with productive language skills remaining comparatively under-represented.

Table 4. *Distribution of studies by sample size range (n = 37)*

Sample Size Range	# Studies
1–10	2
11–30	11
31–60	7
61–100	7
101–200	6
201+	1
Not Reported (NR)	3

Table 5. *Distribution of studies by setting (n = 37)*

Learning Setting	# Studies
Classroom or institution based	36
Online	1

Table 6. *Distribution of studies by research design (n = 37)*

Research Design	# Studies
Experimental	12
Quasi-experimental	11
Qualitative	5
Non-experimental (survey or descriptive)	4
Experimental (randomized controlled trial)	2
Mixed methods	2

Table 7. *Distribution of studies by learning context (n = 37)*

Context	# Studies
EFL	29
English L1(ELA)	2
ESL	2
Bilingual/Multilingual	2
NR/Unclear	2

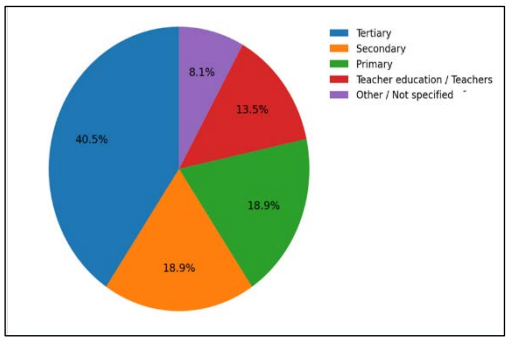


Figure 3. Distribution of Studies by Participant Education Level (n = 37)

Patterns in Language Skill Focus

Analysis conducted across two publication periods shows sustained dominance of reading, alongside broader skill coverage, in later studies (Table 8). In the 2015 to 2019 period, studies focus mainly on reading, with limited attention to listening and minimal inclusion of productive skills. In the 2020 to 2025 period, multi-skill coverage becomes more visible, with an increased attention to listening and writing and clearer inclusion of speaking. Integrated skill approaches also appeared more frequently towards the later period. These findings suggest a gradual shift toward more comprehensive language skill coverage, although reading continues to dominate the enriched eBook research (Figure 4; Table 8).

Table 8. *Language skill focus by publication period (2015–2019 and 2020–2025)*

Publication Period	Dominant Skills	Emerging Skills	Integrated or Multi-Skill Coverage	General Trend
2015–2019	Reading	Listening (limited)	Very rare; primarily receptive-skill focused	Reading remains the primary target, with minimal integration of productive skills
2020–2025	Reading, Listening, Writing	Speaking	More frequently reported, supported by richer multimedia and task integration	Gradual shift toward multi-skill and integrated learning, with broader inclusion of productive tasks



Figure 4. Distribution of language skills in enriched eBook studies (n = 37)

Patterns in eBook Type and Reported Feature Evolution

Across the 37 studies, enriched or enhanced eBooks form the largest category, followed by interactive eBooks and then the static or limited eBooks. Chronological patterns do indicate increasing attention to feature-rich designs, in the later years. Foundational features, such as audio support, learning platforms, quizzes, and visual or audiovisual multimedia, are reported consistently across the decade. More advanced features, including eReader-embedded text-to-speech, voice-related technologies, artificial intelligence-supported tools, and adaptive or personalised functions, become more visible in studies published between 2024 and 2025. An overview of eBook types, features, and associated language skills is presented in Table 9.

Table 9. *eBook types, features, and skills targeted*

eBook Type	Characteristics and Features	Skills Targeted
Static / Limited	Minimal interactivity; Digital text; images; basic navigation	Reading
	Limited multimedia; Text-only; audio-only	Reading, Listening
	Few learning supports; Dictionary; note-taking	Reading
Interactive	User interaction; Quizzes; hyperlinks; annotation; hotspots	Reading, Listening
	Platform-based; LMS; reading logs; forums	Reading, Writing
	Gamified engagement; Points; badges; progress indicators	Reading, Integrated
Enriched / Enhanced	Rich multimedia; Audio narration; video; animation; sound; music	Listening, Reading
	Intelligent and adaptive; AI chatbots; adaptive exercises; analytics; personalization	Integrated
	Productive support; Speech recognition; voice recording; writing templates; feedback	Speaking, Writing
	Collaborative learning; Peer discussion; co-authoring; social platforms	Integrated

Research Question 2: eBook Types, Digital Resources, and the Four Language Skills in English Language Learning

eBook Types and Language Skill Coverage

Across the 37 studies conducted, reading is the most frequently targeted language skill (30 studies; 81.1%), indicating that eBook-based interventions continue to be positioned primarily as reading-oriented learning resources, even when the additional features were incorporated. Listening appears in 6 studies (16.2%), while speaking (6 studies; 16.2%) and writing (7 studies; 18.9%) remain comparatively less represented. This distribution highlights a persistent imbalance between receptive and productive language skill outcomes in enriched eBook research (Table 11).

Table 10. *eBook types, features, skills targeted, and representative studies (n = 37)*

eBook Type	Characteristics and Features	Skills Targeted	Representative Studies (Author, Year)
Static / Limited	Minimal interactivity; digital text; images; basic navigation	Reading	Union & Green (2015); Jansen (2019); Andreyeva et al. (2019); Kim (2021); Park & Lee (2021)
	Limited multimedia; text-only or audio-only presentation	Reading, Listening	Jansen (2019); Kim (2021); Hsieh & Huang (2020); Sun et al. (2025)
	Few learning supports; dictionary; note-taking; basic glossing	Reading	Union & Green (2015); Andreyeva et al. (2019); Al-Ahdal et al. (2020); Fang et al. (2025)

Interactive	User interaction; quizzes; hyperlinks; annotation; hotspots	Reading, Listening	Yow & Priyashri (2019); Al-Ahdal et al. (2020); Al-Jarf (2021); Kara (2024); Fang et al. (2025)
	Platform-based use; LMS integration; reading logs; forums	Reading, Writing	Bikowski & Casal (2018); Al-Jarf (2021); Miles & Ari (2022); Takii et al. (2025)
	Gamified engagement; points; badges; progress indicators	Reading, Integrated	Lin et al. (2021); Kara (2024); Assylzhanova et al. (2024); Fang et al. (2025)
Enriched/ Enhanced	Rich multimedia; audio narration; video; animation; sound; music	Listening, Reading	Yow & Priyashri (2019); Lin et al. (2021); Kim (2021); Fang et al. (2025); Sun et al. (2025)
	Intelligent and adaptive features; analytics; personalization; AI-supported tools	Integrated	Miles & Ari (2022); Takii et al. (2025); Almadhia & Alanazi (2024); Li Li (2025)
	Productive skill support; voice recording; writing outputs; automated or instructor feedback	Speaking, Writing	Al-Jarf (2021); Lin et al. (2021); Kaban (2021); Ali et al. (2025)
	Collaborative learning; peer discussion; social platforms; co-authoring	Integrated	Bikowski & Casal (2018); Al-Jarf (2021); Xodabande & Hashemi (2023); Prasetianto et al. (2024)

Patterns by eBook type further clarify this concentration. Static or limited eBooks show the narrowest skill coverage, with reading reported across all static cases. Interactive eBooks demonstrate relatively broader coverage, including higher visibility of productive skills compared with static designs. Enriched or enhanced eBooks show the greatest design breadth; however, reading remains the most consistently reported skill even within this category. These findings indicate that while feature-rich designs expand opportunities for multi-skill learning, published implementations continue to prioritise reading outcomes more frequently than speaking or writing outcomes (Tables 10 and 11).

Table 11. *Distribution of language skills by eBook type (n=37)*

eBook type	n	Listening (L)	Reading (R)	Speaking (S)	Writing (W)
Static / Limited	6	1 (16.7%)	6 (100.0%)	2 (33.3%)	1 (16.7%)
Interactive	15	2 (13.3%)	10 (66.7%)	3 (20.0%)	5 (33.3%)
Enriched/ Enhanced	13	3 (23.1%)	12 (92.3%)	1 (7.7%)	1 (7.7%)
Other / Not eBook intervention	2	0 (0.0%)	2 (100.0%)	0 (0.0%)	0 (0.0%)
Other / Unclear (skill not reported)	1	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Total (all studies)	37	6 (16.2%)	30 (81.1%)	6 (16.2%)	7 (18.9%)

Note. Skill counts are not mutually exclusive; a study may be coded under more than one language skill when multiple outcomes were reported. “Other / Unclear” indicates that the skill focus was not reported clearly in the study.

Classification of Skill Breadth by eBook Type

To capture skill breadth more explicitly, studies were classified as single-skill, dual-skill, or integrated (three to four skills). Static or limited eBooks are dominated by single-skill designs, whereas enriched or enhanced eBooks show the strongest proportion of integrated skill coverage. Interactive eBooks occupy an intermediate position between these categories. This distribution

supports the interpretation of interactive eBooks as a transitional design type and enriched eBooks as the primary driver of multi-skill integration over the reviewed decade (Table 12).

Table 12. *Classification of studies by eBook type and language skill coverage (n = 37)*

eBook Type	Single-skill	Dual-skill	Integrated (3–4 skills)	Total
Static / Limited	5 (83.3%)	1 (16.7%)	0 (0.0%)	6
Interactive	6 (40.0%)	5 (33.3%)	4 (26.7%)	15
Enriched / Enhanced	2 (15.4%)	4 (30.8%)	7 (53.8%)	13
Other / Not eBook intervention	2 (100.0%)	0 (0.0%)	0 (0.0%)	2
Other / Unclear	1 (100.0%)	0 (0.0%)	0 (0.0%)	1
Total	16	10	11	37

Classification of eBook Features and Skill Alignment

To examine alignment between system components and language learning functions, reported features were organised into delivery systems, multimodal input, interaction supports, learning supports, and assessment and feedback functions. At the category level, several feature groups align with multiple language skills, particularly platform-based systems, adaptive or AI-supported functions, collaboration tools, external web resources, and assessment and feedback mechanisms (Table 13). At the specific-feature level, audio narration, video or animation, and text-to-speech are most commonly associated with listening and reading, whereas productive skills are more often linked to enabling mechanisms such as feedback systems, speech or voice-related tools, and writing support (Table 10 and Table 13).

This alignment profile helps explain the persistent dominance of receptive outcomes, as features that are more easily embedded at scale in eBooks tend to support input, comprehension scaffolding, and practice checking. In contrast, speaking and writing outcomes are more consistently reported when designs include the explicit production tasks and evaluation supports, which appear less frequently across the reviewed studies (Tables 10, 11, and 13).

Table 13. *Feature presence by eBook type across included studies (n = 37)*

Feature Category	Static / Limited (n = 6)	Interactive (n = 15)	Enriched / Enhanced (n = 13)
Core Reading & Support Features			
Annotation & Reading Support	2 (33.3%)	5 (33.3%)	3 (23.1%)
Dictionary / Glossary / Translation	2 (33.3%)	4 (26.7%)	3 (23.1%)
eReader Platforms / Devices	2 (33.3%)	4 (26.7%)	3 (23.1%)
Audio & Multimedia Features			
Audio & Speech Technologies	2 (33.3%)	5 (33.3%)	8 (61.5%)
Visual & Multimedia Elements	2 (33.3%)	6 (40.0%)	7 (53.8%)
Text-to-Speech (non-eReader)	1 (16.7%)	4 (26.7%)	4 (30.8%)
eReader-embedded TTS	0 (0.0%)	1 (6.7%)	5 (38.5%)
Speech / Voice Recognition	0 (0.0%)	1 (6.7%)	4 (30.8%)
Interaction, Gamification & Practice			
Interactive & Gamified Features	1 (16.7%)	9 (60.0%)	6 (46.2%)
Gamification (points, badges)	0 (0.0%)	4 (26.7%)	3 (23.1%)
Writing & Production Tools	0 (0.0%)	2 (13.3%)	2 (15.4%)
Collaboration & Communication	0 (0.0%)	2 (13.3%)	2 (15.4%)
Content Creation / Authoring	0 (0.0%)	1 (6.7%)	2 (15.4%)
Platforms, Integration & External Resources			

Apps / Platforms (LMS, reading platforms)	1 (16.7%)	7 (46.7%)	6 (46.2%)
External & Web-Based Resources	1 (16.7%)	7 (46.7%)	6 (46.2%)
Assessment, Analytics & Intelligence			
Assessment & Feedback	1 (16.7%)	8 (53.3%)	3 (23.1%)
Learning Logs / Analytics	0 (0.0%)	5 (33.3%)	5 (38.5%)
Personalization / Adaptive Learning	0 (0.0%)	2 (13.3%)	5 (38.5%)
Chatbot / AI-based Features	0 (0.0%)	1 (6.7%)	5 (38.5%)

Feature Distribution and Evolution Across eBook Types

Comparison of feature presence, across the eBook types, shows that enriched or enhanced eBooks report higher concentrations of audio and speech technologies and visual or multimedia elements, alongside clearer visibility of adaptive and AI-linked supports in later years. While the Interactive eBooks more consistently reported interaction-centred components, including quizzes, gamification, platform tools, and assessment and feedback mechanisms. Static or limited eBooks remain confined to a more lower feature density and are typically anchored in basic reading supports.

Comparison across publication periods further indicates continued use of foundational features such as audio support, platforms, quizzes, and multimedia, alongside stronger visibility of advanced functions in studies published between 2020 and 2025. These shifts reflect broader developments in data-supported and AI-enabled learning technologies and their gradual incorporation into enriched eBook designs (Figures 5 and 6).

Feature Co-occurrence Patterns and Overall Frequency

Feature co-occurrence patterns show that listening outcomes cluster around combinations of audio narration, text-to-speech, and video or animation. Reading outcomes most commonly combine text with visuals, annotation supports, dictionary or glossary tools, quizzes, and feedback. Speaking and writing outcomes occur less frequently and depend more heavily on enabling tools such as speech or voice recognition, recording tools, feedback systems, writing templates, and collaborative platforms. Overall, audio and speech technologies emerge as the most prevalent category, followed by platforms and external web-based resources, quizzes or tests, and assessment and feedback, while advanced features such as eReader-embedded text-to-speech, chatbot or AI-based supports, and speech recognition remain limited to a smaller subset of studies (Table 13).

Shifts in Type, Feature Focus, and Skill Breadth

Comparison across the two publication periods indicates continued use of foundational features such as audio support, platforms, quizzes, and multimedia, alongside stronger visibility of advanced functions in 2020 to 2025. Studies published from 2020 to 2025 report more frequent inclusion of tracking, analytics, adaptive support, eReader embedded text-to-speech, chatbot or AI-based functions, and speech or voice recognition, reflecting broader developments in data-supported and AI-enabled learning technologies. Figures 5 and 6 illustrate differences in feature focus across the two publication periods.

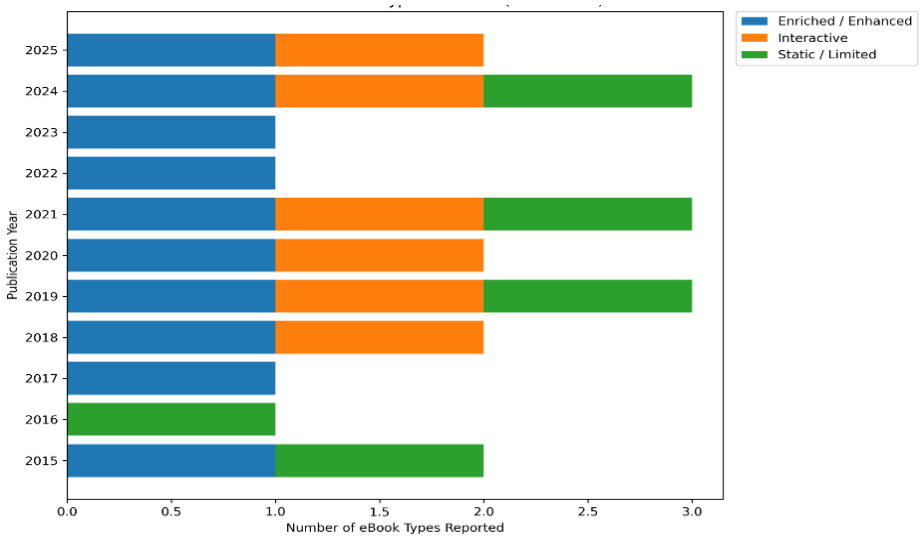


Figure 5. Distribution of enriched eBook features across publication periods

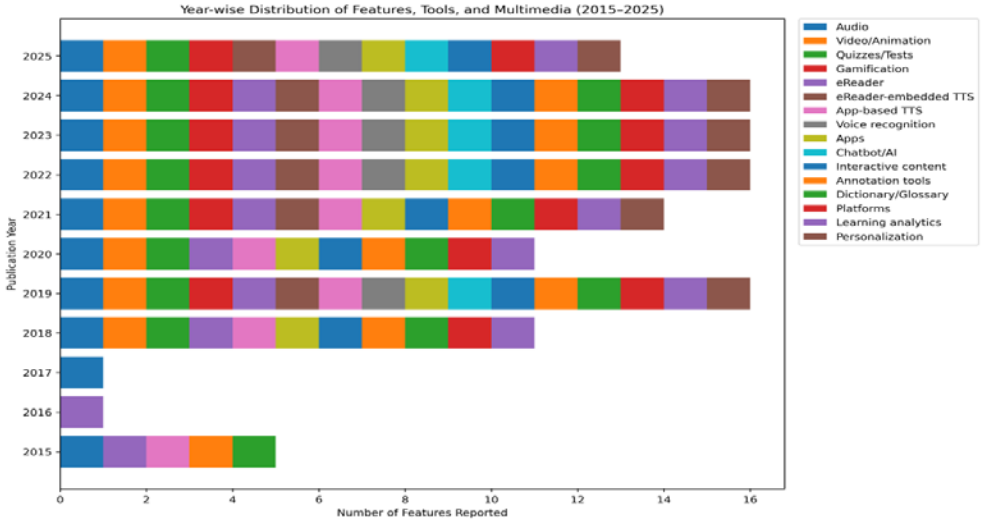


Figure 6. Comparison of basic and advanced eBook features by publication period

Summary of RQ1 and RQ2 Findings

Overall, the RQ1 and RQ2 findings demonstrate a clear association between eBook design type, feature configuration, and language skill coverage. Static designs focus mainly on reading, interactive designs extend skill development through task-based and platform-supported affordances, and enriched designs provide the strongest potential support for integrated language skill development when multimedia input is aligned with structured tasks, feedback mechanisms, and learner production opportunities.

Discussion

Discussion of RQ1: Patterns and Trends in Enriched eBook Research in English Language Learning

Findings related to RQ1 does reveal clear patterns in participant profiles and language skill focus across enriched eBook research in English learning. Static or limited eBooks remain

primarily aligned with reading, with only limited extension to other skills. Interactive eBooks function as a transitional category, in which features such as quizzes, hyperlinks, annotation tools, and platform-based supports are associated with broader skill coverage, including some productive and integrated outcomes (Sung et al., 2016). Enriched or enhanced eBooks demonstrate the widest skill coverage, particularly when multimedia resources and learning support tools are integrated within a single learning environment. However, receptive skills continue to be addressed more consistently than productive skills across enriched eBook research.

Voice-related tools, for example, allow learners to listen to model input, record their own speech, and compare outputs, thereby supporting pronunciation development and spoken language practice through repetition and self-monitoring (Santos et al., 2014). This aligns with findings on automated written corrective feedback, where learners "preferred using specific AWCF strategies over generic feedback" (Elmotri et al., 2025, p. 384), suggesting that enriched eBook feedback tools should prioritise explicit, actionable guidance rather than minimal error indication.

At the same time, the findings highlight an important distinction between feature availability and pedagogical integration. The presence of enriched features alone does not guarantee integrated skill pedagogy or balanced skill development. Several enriched interventions continue to target only one or two skills, indicating that enrichment is often operationalised through feature inclusion without consistent alignment to multi-skill learning tasks. This distinction is critical for interpretation, as feature richness may enhance learner engagement, yet integrated skill outcomes depend on how features are sequenced, scaffolded, and linked to learning activities and assessment processes.

The feature profile also helps explain why reading and listening remain more consistently represented than speaking and writing across studies. The most frequently reported features include input and comprehension supports such as audio narration, text-to-speech, video, quizzes, and external links, which naturally align with receptive learning processes (Zhang et al., 2020).This imbalance is consistent with wider English learning research, where reading comprehension is frequently targeted and shows measurable gains across technology-mediated interventions, including fully online learning designs and remote learning contexts (Diningrat et al., 2023; Yen, 2024).

In contrast, productive skill outcomes are more evident when studies incorporate enabling tools such as feedback systems, writing templates, revision supports, and structured performance tasks. These features appear less consistently across the reviewed literature, suggesting an important design implication: broader language skill coverage is most likely when enriched eBooks combine multimedia input with explicit feedback mechanisms and opportunities for learner production (Chuang & Jamiat, 2023; Zhang et al., 2020Multimedia-based digital resources can contribute to writing development when learners are supported to produce language and organise ideas, reinforcing the need for enriched eBooks to embed structured production tasks rather than relying on input-oriented features alone (Alobaid, 2020).

Discussion of RQ2: How eBook Type and Features Map to Skill Coverage

Building on the RQ1 patterns, the feature-to-skill mapping shows which tools most consistently extend coverage beyond receptive skills. Enriched designs that incorporate structured feedback mechanisms further extend support for speaking and writing by enabling learners to revise, reflect on, and improve their language production over time. This finding reinforces the role of feedback and task design as key mediators between feature presence and learning outcomes.

From an engagement perspective, evidence from virtual exchange and online learning research suggests that a balanced mix of collaborative and individual activities can shape cognitive and behavioural engagement and promote deeper learning approaches (Rahimi & Sevilla Pavón, 2025). Findings from online reading interventions further indicate that instructional design effects can vary according to learner characteristics, such as working memory capacity (Diningrat et al., 2023). These findings suggest that the effectiveness of enriched eBook features may not be uniform across learner profiles and contexts.

Recent syntheses of AI-mediated language learning and generative AI in EFL highlight the need for stronger teacher training, ethical guidance, and equitable access to digital tools (Luo & Chen, 2025). These considerations are directly relevant to enriched eBook adoption, as advanced features such as AI-supported feedback and adaptive systems may amplify existing inequalities if access and instructional support are uneven. Consequently, enriched eBook design should be evaluated not only in terms of feature richness but also in relation to pedagogical integration, accessibility, and instructional support.

Conclusion

Across the 37 included studies, enriched eBook research shows steady growth and a clear shift toward more feature-rich designs over the past decade. At the same time, the evidence base is still uneven in language skill coverage and in how outcomes are reported. Most interventions continue to prioritise reading, while far fewer studies report consistent outcomes for speaking and writing. Comparisons across design types indicate that broader skill coverage is more apparent when eBooks integrate interactive tasks and feedback mechanisms that prompt learner output, alongside input and comprehension supports.

However, cross-study synthesis remains constrained by inconsistent reporting of eBook design type, feature implementation, and skill-specific outcome measures. When studies do not document how features are implemented or how they align with instructional objectives, it becomes difficult to compare interventions meaningfully and to determine which design configurations are most effective, particularly for productive skills.

Future research should strengthen the field by differentiating eBook design types more clearly, mapping digital features to language skill outcomes more explicitly, and building stronger empirical evidence for speaking and writing development. Research should also take learner characteristics, learning contexts, and access conditions into account when evaluating the effectiveness of enriched eBooks. These priorities can help strengthen the evidence base and support more informed design and pedagogical decisions in enriched eBook-mediated English language learning.

Funding: There is no funding.
Acknowledgments: The authors would like to thank you those who help in this paper.
Conflicts of Interest: The authors declare that they have no competing interests.

Artificial Intelligence Statement:

During the preparation of this manuscript, we utilized ChatGPT, Zotero, Grammarly, and Graphy to refine our language and streamline the organization of our data. While these tools helped improve clarity and readability, the final content was thoroughly reviewed and edited by the authors. We remain fully responsible for the accuracy, originality, and integrity of this work.

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Appendix A: Summary of the 37 Reviewed Studies on eBook and Digital Textbook Use in EFL and Language Learning

Year	Paper (Author, Year)	eBook / digital reading focus	Purpose of the study
2025	Huang, Dong, & Dou (2025)	AI reading assistant integrated with digital reading (LLM-supported reading)	Examine acceptance of LLMs as reading tools using a UTAUT model.
2025	Widodo, Musyarofah, & Slamet (2025)	Gamified digital-interactive book (interactive eBook learning material)	Test effects on learning outcomes in self-paced learning.
2025	Hori et al. (2025)	Digital reading/learning application for EFL (child-focused)	Evaluate impacts on learning, satisfaction, and persistence.
2025	Sun et al. (2025)	Children's eBooks (digital storybooks with sound effects)	Investigate sound effects and incidental word learning.
2025	Ali et al. (2025)	AI-powered digital textbook (electronic textbook)	Explore students'/teachers' perceptions (Grade 12).
2025	Fang, Hsu, & Chen (2025)	eBook reading app (digital reading for young learners)	Examine effects on motivation and proficiency.
2024	Takii et al. (2024)	Extensive reading eBooks + recommender system	Develop/test explainable eBook recommendations for K–12 EFL.
2024	Kara (2024)	Digital reading platform texts + quizzes (Raz-Kids)	Examine teacher-generated quizzes for cultivating reading skills.
2024	Assylzhanova et al. (2024)	ICT-based interactive digital learning	Investigate effects on primary students' FL learning.
2024	Prasetianto et al. (2024)	Digital extensive reading (online/digital reading delivery)	Examine how digital extensive reading supports English learning.
2024	Almadhi & Alanazi (2024)	eBook reading (digital reading vs outcomes/attitudes)	Test effects on comprehension and reading attitudes.
2023	Al-Jarf (2023)	Digital reading (children's digital reading practices)	Describe/examine digital reading among children.
2023	Xodabande & Hashemi (2023)	Mobile e-textbooks (electronic textbooks for learning)	Examine impact on university vocabulary development.
2023	Lin, Lin, & Chang (2023)	Programming eBooks (digital book format + Scratch integration)	Investigate culture-based programming eBooks for schoolchildren.
2022	Miles & Ari (2022)	eBook library for digital reading + personalized plans	Evaluate personalized reading plans for engagement/comprehension.
2021	Kaban (2021)	Personalized digital reading (e-reading experiences)	Examine influence on engagement and online presence.
2021	Mouri et al. (2021)	Digital textbooks (log data from e-texts) → quiz generation	Use digital textbook logs to generate quizzes and examine utility.
2021	Park & Lee (2021)	eBooks vs printed books (digital reading comparison)	Compare effects on comprehension and grammar knowledge.
2021	Kaban (2021)	Gamified e-reading (gamified digital reading)	Examine effects on comprehension and attitudes.
2021	Al-Jarf (2021)	Mobile eBook reading (collaborative)	Evaluate collaborative mobile eBook reading for struggling readers.
2021	Kim (2021)	Digital reading modalities (eBook vs audiobook vs e-audio-book)	Compare modality effects on EFL comprehension.
2020	Al Rawahi (2020)	Technology-supported academic practice (digital context)	Explore affordances/support for teacher research in a language centre.
2020	Hsieh & Huang (2020)	Classroom eBook use (digital reading + listening)	Examine effects on EFL reading and listening.
2020	Li et al. (2020)	Digital writing tool (digital text production)	Test digital writing software for process writing performance.

2020	Al-Ahdal (2020)	eBook interaction logs (digital reading analytics)	Test whether eBook logs predict reading performance.
2019	Kasch (2019)	Multimodal digital text supports (UDL)	Experimentally test assistive multimodal design affordances.
2019	Andreyeva et al. (2019)	Computer-assisted language learning (digital learning)	Compare computer-based vs traditional FL teaching.
2019	Jansen (2019)	eReader + audio (digital reading with read-aloud)	Examine whether audio-enabled eReaders increase leisure reading.
2019	Yow & Priyashri (2019)	Enhanced eBooks (electronic features guiding print attention)	Test how eBook features direct attention to print.
2018	Bikowski & Casal (2018)	Interactive digital textbooks (eTextbooks)	Explore engagement using a learning-strategies framework.
2018	Mouri, Uosaki, & Ogata (2018)	eBooks + learning analytics (ubiquitous/seamless digital reading use)	Use eBook data to support seamless language learning.
2018	Nielen et al. (2018)	Digital guided reading (on-screen scaffolds/features)	Test effects on motivation and incidental vocabulary learning.
2018	Öztürk (2018)	Online/digital reading (strategies for reading on-screen)	Examine metacognitive online reading strategies.
2016	Charbonneau-Gowdy et al. (2016)	Technology-supported learning in teacher education (digital literacy context)	Examine tech-supported mentoring practices.
2015	Charbonneau-Gowdy (2015)	eReaders (digital reading for literacy development)	Propose/implement an eReader-based literacy model.
2015	Shadiev et al. (2015)	Mobile digital texts with annotations/support	Examine effects on achievement and cognitive load.
2015	Union, Union, & Green (2015)	eReaders for school/home reading	Examine eReader use and Grade 3 reading/ELA test scores.