

Integration in reading literacy: a systematic review of pedagogical, professional, and engagement approaches

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ABSTRACT

This systematic literature review (SLR) following preferred reporting items for systematic reviews and meta-analyses (PRISMA) 2020 who explores integrated approaches to reading literacy across pedagogical integration, teacher development, and student engagement. From 1,108 retrieved articles, 59 article high-quality studies were selected for in-depth synthesis. Based on all studies published between 2020 and 2024, the findings reveal that multimodal instruction, inclusive pedagogy, and proposes a cohesive framework linking instructional innovation, teacher agency, and learner experience, offering actionable insights for educators and policymakers. The analysis identified three key thematic drivers of literacy improvement. First, integrated pedagogical practices such as multimodal, bilingual, and play-based instruction enhance literacy by making learning more inclusive, interactive, and context-responsive. Second, teacher professional development through targeted training in visual literacy, inclusive pedagogy, and digital tools strengthens instructional quality and prepares educators for evolving literacy demands. These approaches reflect current trends in instructional innovation and professional capacity building. Third, student engagement is significantly elevated through identity-driven learning, project-based tasks, and emotionally supportive environments that foster confidence, motivation, and deeper literacy outcomes. Together, these themes forms a new integration model that links teaching practices, teacher agency, and student experience into a cohesive literacy framework. The findings offer practical, evidence-based insights for policymakers, curriculum designers, and practitioners aiming to improve reading literacy across diverse settings.

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1. INTRODUCTION

Reading literacy serves as a fundamental skill that underpins students' academic success. However, many students struggle to acquire proficiency in this language skill which is essential for understanding academic content and succeeding in school [1]–[3]. In an effort to overcome language proficiency challenges, the Ministry of Education (MOE) Malaysia has implemented several key programs, including the Reading,

Writing, and Arithmetic Program, introduced in 2003, and the Literacy and Numeracy Screening (LINUS) Program, launched in 2010. Both programs aim to improve literacy skills among students, primarily due to the increasing complexity of the curriculum challenges faced by schools [4]. However, significant literacy gaps still persist among students, especially in rural areas where access to educational resources is limited [5], [6].

In response to the challenges in literacy, the MOE Malaysia launched the Primary Literacy and Numeracy (PLaN) program in 2020 [6]. To support this, the government also introduced the *Modul Latihan Intervensi Berfokus dan Terbeza* (MoLIB) [7], a focused and differentiated intervention module aimed at assisting teachers in enhancing students' literacy, supported with *Program Bantu Membaca* (our children programmed), *Kem Bijak Membaca* (smart reading camp), and *Program Anak Kita* (our children programmed). However, despite these efforts, substantial setbacks remain, particularly with year 1 students who continue to struggle in mastering the reading, writing, and arithmetic skills (3M) in 2022 [8]. But recently, a new issue has emerged regarding the increasing number of year 1 students who have not yet mastered the basic 3M skills, with a total of 122,062 students. Furthermore, the persistent 3M problem, which remains unresolved for many students from year 1 to year 3, continues to impact their literacy skills as they transition to secondary school [6]. Findings from Programme for International Student Assessment (PISA) 2022 show that only 42% of 15-year-old students achieved the minimum proficiency in reading compared to the Organisation for Economic Co-operation and Development (OECD) average of 74%, with almost none reaching advanced levels (Level 5+). Malaysia's mean reading score also declined from 415 in 2018 to 388 in 2022, reflecting an estimated 1.4 years of lost learning [9]. At the primary level, approximately 42-43% of students performed below regional and income-group benchmarks, indicating persistent structural weaknesses in reading comprehension and critical engagement. These statistics highlight systemic weaknesses in ensuring reading comprehension and critical engagement, underscoring the urgent need for targeted interventions to strengthen literacy outcomes. Additionally, the language syllabus has become increasingly challenging, requiring higher-order thinking skills (HOTS). For some students, Malay language is not their first language, further complicating their ability to comprehend academic content [10].

Several studies conducted show that contextually tailored interventions yield positive outcomes in bridging the literacy gap, particularly among low-performing student [11]–[14]. These studies emphasize that literacy challenges cannot be effectively addressed using a one-size-fits all approach, especially in linguistically and socioeconomically diverse educational contexts. For instance, interventions that integrate students' cultural backgrounds, home languages, and local realities have proven to be more impactful in improving reading comprehension and motivation. Moreover, programs that offer differentiated instruction, scaffolded learning tasks, and community involvement have shown encouraging results in increasing students' literacy engagement. These findings highlight the importance of adapting literacy instruction to specific classroom and community needs, rather than relying solely on generic or uniform strategies that may not resonate with all learners.

Previous studies in literacy approaches and strategies have highlighted various methods used to improve literacy skills among students. These include teacher-centered strategies, such as direct instruction through structured lectures, utilizing clear explanations, and example-driven content delivery [15], [16]. Practices like repetition exercises and memorization activities have also been widely implemented to reinforce foundational literacy skills [17]. Additionally, the consistent use of printed materials, including textbooks and workbooks, allows students to engage in independent exercises that strengthen their comprehension and retention [18]. However, this study argues that traditional methods lack the effectiveness and adaptability needed to produce significant improvements in literacy outcomes.

To close the literacy gap and ensure that all students, have equal opportunities for academic success, we must adopt a multi-faceted approach. This study explores how reading literacy is currently being integrated across various educational outcomes. The aim is to ensure that students can learn alongside their peers in mainstream classrooms, thereby reducing the number of learners with unresolved 3M issues as they transition to secondary school particularly in light of Malaysia's evolving curriculum and technological advancements. With the right strategies and support systems in place, Malaysia has the potential to close the literacy gap and ensure that all students succeed academically [19], [20].

To address these challenges, this article will focus on what is currently being integrated in reading literacy through several approaches to enhance student learning, framed around three overarching themes: i) pedagogical integration; ii) teacher professionalism development and capacity building; and iii) student engagement and literacy outcomes. By exploring these themes, this article aims to highlight the most effective integration that can help enhance readability while contributing valuable insights into how each method can help improve literacy outcomes, thereby supporting the long-term academic success of these students.

2. METHOD

This systematic literature review (SLR) adhered to the preferred reporting items for systematic reviews and meta-analyses (PRISMA) 2020 guidelines, ensuring transparency and rigor in synthesizing evidence [21]. The methodology was structured based on the framework by Liberati *et al.* [22] and Moher *et al.* [23] focusing on empirical studies published between 2020 and 2024 to identify effective practices for improving reading literacy. The selected timeframe ensured the inclusion of the most recent and relevant research in Figure 1.

The PRISMA process was conducted systematically in four distinct steps to ensure methodological rigor. First, during the identification phase, 1,108 records were retrieved from the selected databases. After removing 205 duplicate records, 903 articles to ensure they aligned with the inclusion criteria. This step resulted in the exclusion of 685 articles due to irrelevance, insufficient quality, or lack of focus on relevant student populations. In the eligibility phase, the full texts of 218 articles were reviewed to confirm their relevance and alignment with the inclusion. At this stage, 173 articles were excluded for focusing on non-target populations (e.g., university students), or non-relevant interventions, or methodological weaknesses. Finally, during the inclusion phase, 43 studies were identified as meeting all criteria and were included in the final synthesis. To ensure the robustness of the selected studies, a quality appraisal was conducted using the Critical Appraisal Skills Programme (CASP) checklist. Each study was assessed for clarity of aims, appropriateness of methodology, rigor in data collection and analysis, ethical considerations, and the validity of findings. These studies were deemed high-quality and provided valuable insights into effective strategies for improving reading literacy across various educational contexts. To ensure methodological precision, the inclusion and exclusion criteria applied during the screening process are summarized in Table 1. Data extraction was conducted systematically using Excel spreadsheets, capturing critical details such as publication year, participant demographics, methodology, country, school context, strategies, and key findings. This rigorous process ensured a comprehensive synthesis of high-quality evidence, offering actionable solutions for addressing literacy challenges through integrated educational approaches.

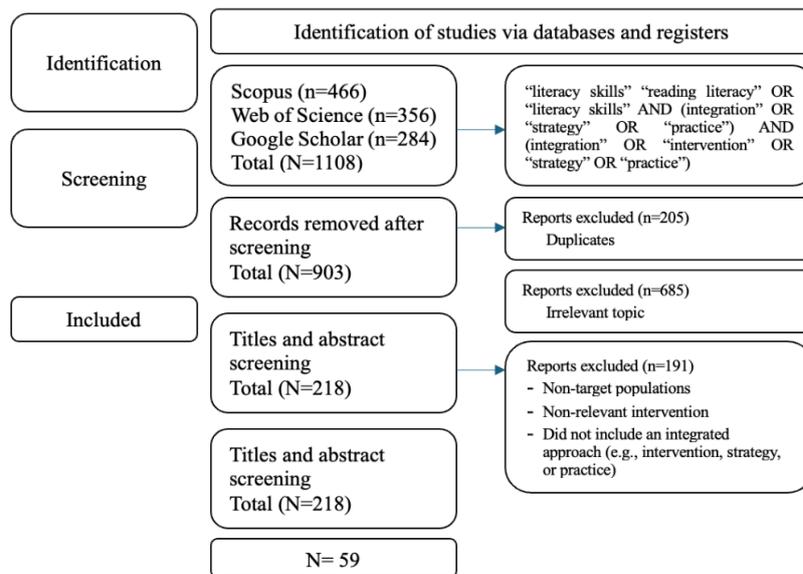


Figure 1. PRISMA 2020 flow diagram illustrating the selection process for studies included in the SLR

Table 1. Inclusion and exclusion criteria for study selection

Criteria	Inclusion	Exclusion
Publication year	2020-2024	Studies published before 2020
Study type	Empirical, peer-reviewed journal articles	Non-empirical (e.g., editorials commentaries, theoretical papers)
Population	Students and teachers in school contexts (primary, secondary, and higher education).	Non-school populations (e.g., adult literacy, workplace literacy).
Language	Published in English or Malay	Non-English/Malay publications
Focus area	Studies on reading literacy interventions, pedagogy, teacher development, or student engagement	Studies unrelated to literacy or without an integrated pedagogical focus.
Design quality	Studies with clear methodology and reported outcomes	Studies with weak methodological rigor or incomplete data

3. RESULTS AND DISCUSSION

3.1. Theme 1: pedagogical integration

This first theme discusses the first overarching theme identified from the review, which pedagogical integration. The theme centers on how literacy instruction is being transformed through innovative instructional strategies that blend content, technology and social cultural relevance to support diverse learners. Studies emphasize interdisciplinary and open-ended learning that fosters 21st century skills through projects involving digital tools, visual content, and independent exploration [24]. Other researchers highlight translanguaging strategies that leverage students' home languages, bilingual and project-based approaches to support both literacy and the integration of computational thinking, storytelling, and digital media to improve engagement and cognitive development [25]–[27]. There is also a clear emphasis on inclusive practices such as dialogic learning and play-based literacy, which enhance not only language outcomes but also identity development and student agency [28], [29]. All this finding can refer in Table 2 (in Appendix) [30]–[60].

3.2. Theme 2: teacher professional development and capacity building

The second theme in Table 3 focuses on how teachers are supported through professional development and capacity-building efforts to strengthen literacy instruction in diverse educational settings. The studies highlight initiatives such as inclusive pedagogy training [61], technology-integrated teaching for pre-service teachers [62], visual literacy and instructional design development [63], pedagogical reforms aligned with national standards [64], [65] and large-scale programs like MEMBACA II that enhance teacher leadership and systemic impact [66]. These findings reinforce the importance of empowering teachers through targeted professional development to drive meaningful and sustainable literacy improvement. In addition, Knowles' adult learning theory (Andragogy) also aligns with these findings, as it stresses self-directed, experiential, and problem-centered approaches that are essential in teachers' continuous professional growth. This method not only on improving teaching techniques but also reshaping teachers' professional identities and positioning them as change agents who co-construct literacy goals within evolving curricular and technological landscapes.

Table 3. Teacher professional development and capacity building

Citations	Integration to reading literacy	Teacher learning goal	Integration to reading literacy implementation	Student target	Country
[67]	Integrates reading literacy within remedial language instruction by addressing learners' cultural and linguistic diversity.	Strengthens teachers' ability to recognize and manage cultural challenges in remedial literacy teaching.	Applies culturally responsive instructional practices in remedial classrooms to support reading development.	Students requiring targeted support in reading and language learning.	Malaysia
[63]	Integrated visual literacy to enhance material design and engagement	Improve teachers' visual literacy and material development	Visual literacy training implemented through contrast, repetition, alignment, and proximity (CRAP) design principles in teacher professional program	English as a foreign language (EFL) primary school	Indonesia
[64]	Investigated English literacy acquisition	Explore teachers' pedagogical practices and literacy delivery.	Classroom instruction, literacy testing, and curriculum-based strategies	Primary school	Tanzania
[68]	Focused on building early language literacy awareness in Islamic boarding school students	Strengthen leadership and teacher roles in implementing literacy programs	Implemented through team teaching, activity monitoring, and resource optimization	Early age students	Indonesia
[69]	Promotes literacy development through mother tongue-based multilingual education (MTB-MLE)	Understand and implement MTB-MLE to enhance language and literacy development	Applied MTB-MLE through native language instruction, parent involvement, and culturally contextualized practices.	Elementary school	Philippines
[70]	Addressed future digital literacy needs through curriculum innovation	Prepare teachers to develop future-ready learners and integrate technology	Implemented via technology integration, critical thinking activities, and adaptable pedagogical strategies	Primary pre-service teachers	Hong Kong
[71]	Implemented R2L bilingual curriculum to enhance family literacy among Spanish-speaking mothers	Apply culturally and linguistically relevant pedagogy through bilingual instruction	Reading to learn (R2L) approach using preview-view-review cycle and genre-based tasks in bilingual English as a second language (ESL) instruction	Immigrant Spanish-speaking mothers	United States
[72]	Focused on supporting multilingual learners' literacy using pedagogical language knowledge (PLK)	Develop and apply PLK to support language and literacy through humanizing pedagogies.	Implemented through vocabulary support, discourse-level instruction, and leveraging students' home language resources	Multilingual students	United States

Across the reviewed studies, the most relevant contributions to teacher professionalism came from three main areas: inclusive pedagogy, digital teaching skills, and visual literacy training. These types of integration helped teachers design better lessons, use technology more confidently, and respond to students' diverse literacy needs more effectively. By mastering digital teaching skills, educators can extend literacy learning beyond the traditional classroom through interactive platforms and multimodal resources such as virtual classrooms, visual design tools, and multimodal learning environments that support interactive and personalized instruction. The next theme will focus on student engagement and literacy outcomes, highlighting how teacher-driven practices translate into real gains in student learning.

3.2. Theme 3: student engagement and literacy outcomes

This third theme focuses on how student engagement drives literacy development, particularly when learning is made relevant, inclusive and interactive. This studies reviewed highlight diverse strategies such as living literacies that center peer interaction and humanized learning environments [73], project-based and bilingual modules that connect language skills [74], and multimodal approaches like translanguaging and visual mapping that support identity expression and academic confidence [75]. Interventions such as the T-shape literacy model [76] and shared storytelling with wordless picturebooks [77] show how structured yet creative activities can enhance students' comprehension, writing, and narrative abilities. Additionally, themes of emotional resilience, home-school literacy connections, and culturally responsive teaching reveal the broader social-emotional and cultural dimensions that influence students' literacy engagement and success. An overview of the key pedagogical strategies, student engagement approaches, and literacy outcomes identified in this theme is summarized in Table 4.

Based on the collection of studies in this theme, the most impactful interventions include the use of living literacies, which promote peer-led and inclusive practices that disrupt rigid classroom norms [47]. The T-shape literacy model demonstrated significant improvements in students' literary analysis and creative writing skills, especially among underserved learners [50]. Furthermore, bilingual project-based learning supported dual-language literacy development [48], while adult-scaffolded storytelling with wordless picturebooks effectively enhanced children's narrative construction [51]. These findings highlight the importance of interactive, expressive, and student-centered strategies in improving engagement and outcomes.

The findings of this review can be better understood through several established theoretical perspectives. Pedagogical integration resonates with Vygotsky's sociocultural theory, which emphasizes that literacy develops through social interaction and cultural tools, such as language and multimodal resources. Overall, the studies in this theme reveal that meaningful and active student engagement is a critical factor in strengthening students' literacy skills. Strategies such as project-based learning, translanguaging, picturebook, storytelling, and approaches that support identity expression and emotional well-being have proven effective in enhancing motivation, comprehension and literacy achievement.

Table 4. Student engagement and literacy outcomes

Citations	Integration to reading literacy	Teacher learning goal	Integration to reading literacy implementation	Student target	Country
[73]	Reimagined school literacy using relational, embodied, and rhizomatic learning practices.	Understand and apply alternative literacy engagement to support student meaning-making.	Implemented through peer interactions, spontaneous literacy events, and rhizomatic learning practices.	Seventh-grade students	New York City
[76]	Enhanced students' close reading, synthesis, and creative writing using literary texts via T-shaped literacy model	Improve metalinguistic, literary and creative writing skills.	Applied T-shaped literacy model through repeated reading and writing sessions with digital tools.	Year 5-8 students (primary)	Indonesia
[74]	Developing a project-based learning module to improve bilingual literacy	Bilingual project-based module integrating literacy to support dual-language learning	Bilingual literacy were integrated through a validated module, used successfully in classroom with positive responses.	EFL students	South Korea
[77]	Examining how adult scaffolding during shared storytelling using wordless picturebooks	To understand how adult guidance during co-narration supports children's narrative and language development.	Shared storytelling with wordless picturebooks to scaffold children's narrative construction	Pre-service teacher	Portugal
[78]	The study compares the impact of syllabic versus alphabetic reading instruction methods in the Hausa language.	Syllabic instruction aligned with language structure to improve early reading outcomes.	Syllabic teaching was improve reading fluency showing better results than alphabet-based methods.	Early grade students	Nigeria

4. CONCLUSION

This review highlights three interconnected themes in reading literacy, pedagogy, teacher development, and student engagement. Pedagogical integration, including multimodal and bilingual strategies, shows promise in making literacy more inclusive and creative. However, such practices can only succeed when teachers are meaningfully engaged, gaining confidence, motivation, and identity through learning that connects with their lives. Taken together, the findings affirm that literacy growth requires more than isolated strategies. Effective progress depends on an ecosystem where pedagogy, teachers, and learners reinforce one another. This integrative view distinguishes the present review from earlier descriptive works and provides a clearer direction for practice. At the same time, the review is limited to studies published between 2020 and 2024, many of which are context-specific, meaning generalization should be approached with caution. Despite these boundaries, the synthesis offers practical implications. Policymakers must ensure reforms are matched with teacher training and learner needs. Schools and communities need to work together to provide differentiated support, especially in diverse contexts. By aligning innovation in classrooms with systemic backing, literacy initiatives can become more sustainable and inclusive, ultimately benefiting both teachers and learners.

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AUTHOR CONTRIBUTIONS STATEMENT

This journal uses the Contributor Roles Taxonomy (CRediT) to recognize individual author contributions, reduce authorship disputes, and facilitate collaboration.

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C : Conceptualization

M : Methodology

So : Software

Va : Validation

Fo : Formal analysis

I : Investigation

R : Resources

D : Data Curation

O : Writing - Original Draft

E : Writing - Review & Editing

Vi : Visualization

Su : Supervision

P : Project administration

Fu : Funding acquisition

CONFLICT OF INTEREST

Report on Household Income and Expenditure of M40 and B40 by State as depicted in Figure 1 is developed and owned by Jabatan Perangkaan Malaysia by Census. Reprinted or reused by permission. Link <https://open.dosm.gov.my/dashboard/household-income-expenditure>.

INFORMED CONSENT

Informed consent was not applicable for this study as it involved a systematic review of published literature and did not include human participants or the collection of identifiable personal data.

ETHICAL APPROVAL

Ethical approval was not required for this study as it involved a systematic review of publicly available literature and did not involve human participants or animals.

DATA AVAILABILITY

Data availability is not applicable to this study as no new data were created or analyzed; all data are derived from previously published literature.

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APPENDIX

Table 2. Pedagogical integration

Citation	Integration to reading literacy	Teacher learning goal	Integration to reading literacy implementation and period	Student target	Country
[30]	Integration of meaning-, code-and vocabulary-based reading.	To implement multifaceted literacy instruction across subjects.	Through examples in English, science, and social studies using skilled and strategic reading;	Middle and high school students	Not specified
[25]	Uses students' linguistic repertoires to enhance vocabulary and literacy.	Promote translanguaging and morphological strategies in literacy.	Through bilingual morpheme mapping, comparative analysis, and multilingual word walls.	Middle and high school students	Not specified (possibly multilingual context)
[31]	Uses spelling instruction as a foundation for reading fluency and comprehension	Support early intervention via evidence-based spelling and literacy instruction	Through spell-to-read, phonics, whole-word, and metalinguistic activities from K to high school.	Kindergarten to high school students.	United States
[32]	Uses digital multimodal composing (DMC)	Help educators understand how to support literacy in refugee youth with interrupted education.	Through in-school video production using multimodal tools to overcome barriers and promote fluency.	Plurilingual adolescent with interrupted formal education	Canada
[33]	Uses active learning activities (e.g., storytime, games, comprehension tasks)	Employ a comprehensive active learning plan to boost reading literacy.	Through game-based learning, story swap, interactive storytime, and reading tests (pre-post).	Grade 2 EFL students	Thailand
[28]	Builds oral narrative and comprehension skills as a foundation for reading literacy via structured supporting knowledge in language and literacy (SKILL) sessions.	Implement and evaluate SKILL, a structured language-literacy program.	30-min small-group sessions using SKILL over 5 months to enhance storytelling and comprehension.	Grades 1-4 students with language and literacy difficulties (LLDs)	United States
[34]	Uses translanguaging and metalinguistic strategies to affirm multilingual repertoires in academic literacy.	Promote humanizing, flexible, and inclusive pedagogy that values student voices.	Through pedagogies of voices (POV) and the TRANSLATE literacy curriculum in middle school classrooms.	Middle school multilingual students	United States
[35]	Indirectly promotes AI literacy which includes skills in comprehension, evaluation, and creation of meaning.	Understand the role of pedagogical approaches and tools in fostering AI-related literacies.	Through analysis of classroom instruction using project-/problem-based learning (PBL) and collaborative learning approaches.	K-12 students	China
[36]	Improves reading comprehension, vocabulary, and attention through dialogic literacy gatherings (DLGs).	Promote inclusive literacy practices for students with and without special educational needs (SEN).	Conducted DLGs among 2 nd grade students during COVID-19; exact duration	Grade 2 students with/without SEN	Spain
[37]	Enhances vocabulary awareness and science writing through a register-functional approach.	Understand English learners (ELs) literacy development in science through disciplinary writing practices.	Through science writing tasks and ethnographic interviews guided by register-functional and academic literacies frameworks.	High school ELs	United States
[38]	Enhances reading comprehension and vocabulary through digital storytelling tasks	Reinforce learner-centered and intercultural writing instruction using digital tools.	Through digital storytelling in a Greek elementary school (pre-post-test, journals, focus groups); period not specified.	Grade 5 L2 learners	Greece
[27]	Integrates reading literacy through bilingual project-based learning materials that support language.	Evaluate the effectiveness of bilingual PBL in improving literacy and numeracy.	Experimental study using bilingual PBL tasks (group work, paperwork); duration not specified.	Primary students (6-8 years old)	Indonesia
[39]	Integrates reading literacy combining self-selected book reading conferences.	Investigate how to blend reading workshops with textbook-based instruction.	Through workshop-style reading lessons integrated into Japanese language arts; includes reflective dialogues and surveys.	High school students	Japan

Table 2. Pedagogical integration (*continued*)

Citation	Integration to reading literacy	Teacher learning goal	Integration to reading literacy implementation and period	Student target	Country
[40]	Integrates reading literacy by scaffolding transition from local language to English	Understand practices and challenges in supporting literacy transition through instruction and materials.	Case study in four Zambian primary schools using phonics and learner-centered methods.	Grade 3-5 primary students	Zambia, Lusaka
[41]	Examines weaknesses in teaching reading comprehension strategies in English home language classrooms.	Highlight the need for explicit strategy-based instruction in comprehension	Teachers primarily tested learners instead of teaching comprehension strategies; limited application of explicit reading instruction.	Grade 9 English home language learners	South Africa
[42]	Uses multimodal texts (digital comic and audio-visual) to support comprehension and meaning making.	Explore how different modalities impact emergent readers' comprehension skills.	Teachers used digital comics and audio-visual texts, and had students narrate, interpret and discuss texts; duration not specified.	Grade 8 emergent readers	India
[43]	Integrates digital and critical media literacy to enhance comprehension and meaning-making in online environments.	Develop an asset-based culturally relevant digital reading curriculum responsive to students' lived literacies.	Teachers implemented a semester-long curriculum focused on digital reading, and social meaning-making.	Middle school students	United States
[44]	Integrates early grade reading intervention to improve oral fluency and comprehension in ESL learners.	Evaluate the impact of structured early grade reading programs in no-fee public schools.	Teachers implemented the whistle stop school (WSS) reading program over six years, with annual fluency and comprehension assessments.	ESL learners in early primary (foundation phase)	South Africa
[45]	Integrates vocabulary and word learning using retrieval and criterion-based intervention strategies.	Test the feasibility of applying structured word-learning methods for children with developmental language disorder (DLD).	Teachers used retrieval and criterion-based tasks to teach target words across sessions; learning assessed after 2 and 8 weeks.	Preschool and kindergarten children with DLD	United States
[46]	Uses a multisensory phonological intervention to support emergent reading across L1, L2, and L3.	Explore how phonological awareness in one language (English) transfers across others (Romanian, French).	Teachers applied twice-weekly multisensory reading interventions over two years and monitored outcomes in three languages.	One trilingual child at risk	Canada
[47]	Promotes explicit instruction in word structure and orthographic knowledge to support multilingual learners' literacy development.	Equip teachers with skills to teach linguistic and orthographic structures to achieve socially-just literacy access.	Demonstrates implementation of explicit word structure instruction using Spanish as an example, applicable to other L1s.	Multilingual learners (ELs)	United States.
[48]	Enhances reading and writing engagement through multilingual storytelling and translanguaging	Equip teachers to apply culturally responsive pedagogies and leverage students' linguistic resources.	Implementation of a multilingual storytelling project co-designed with a teacher to foster literacy in early education through oral and written practices.	Emergent bilinguals (age 6-7 years)	Australia
[49]	Integrates dialogic discussions into reading sessions to develop students' argumentation strategies	Equip teachers to facilitate interactive, student-centered reading discussions for literacy and critical thinking, such as reasoning, challenging, and responding.	Conducted reading sessions with small group dialogic discussions on Indonesian fiction and non-fiction texts, using personal experiences to sustain engagement.	Grade 4 students	Indonesia
[50]	Integrates progress-monitoring tools (DIBELS, easyCBM) to track and assess reading abilities in L2 English learners over time.	Understand how to use data-driven assessment tools to inform instructional strategies and monitor progress.	Phase 1 of a longitudinal study in private schools using standardized reading measures along sides socioeconomic status (SES) and curriculum effects.	Grades 1, 3, and 5 students (n=1003)	India
[51]	Integrates critical literacy through literature, enabling students to examine race, power, and oppression via texts and classroom discussions.	Learn to decenter personal knowledge/identity and use critical language to empower students' socio-political and critical development.	Year-long classroom research with two white teachers using curriculum and pedagogy that foregrounds race and justice in English language arts.	Urban high school students	United States

Table 2. Pedagogical integration (*continued*)

Citation	Integration to reading literacy	Teacher learning goal	Integration to reading literacy implementation and period	Student target	Country
[52]	Developed multimodal interactive learning environment (MILE) integrating	Use multimodal tools to scaffold comprehension strategies aligned with curriculum (e.g., visualization, summarizing)	Designed and tested MILE using 4C/1D model, involving 27 Grade 4 students in Abu Dhabi, applying cognitive reading strategies in Arabic reading instruction.	Grade 4 students	United Arab Emirates (UAE)
[53]	Focused on developing basic literacy (letter name and sound recognition) using digital tools.	Evaluate effectiveness of tablets compared to conventional materials.	Tablets used to teach letter names and sounds, improving motivation and literacy skills.	Kindergarten students	Greece
[54]	Combined digital technology with literacy to boost reading engagement.	Explore strategies to enhance literacy learning using digital tools.	Implemented through digital readers, multimedia platforms, and interactive apps to increase reading interest.	Elementary students	Indonesia
[55]	Focused on improving literacy competence through the guided reading (GR) model.	Understand how sociocultural factors influence literacy learning via GR.	Teachers guided students in reading activities using the GR model to enhance interpretive understanding	Elementary students	Indonesia
[56]	Profiles literacy engagement across multiple skills (reading, writing)	Identify demographic and engagement patterns affecting literacy	Used program for the international assessment data to analyze engagement and literacy levels	U.S. adults with low literacy skills	United States
[57]	Improving through dialogical reading and parental involvement	Support home-school collaboration and literacy strategies	Dialogical reading at home with parental support	Early childhood students	Indonesia
[58]	Identifying key influencing factors on reading literacy using data modelling	Understand the impact of family, individual, and school-level factors on reading outcomes	Model-based analysis, not classroom-based intervention	Secondary school students	China
[59]	Indirect—focuses on literacy through AI skills (knowledge, ethics, problem-solving)	Facilitate AI literacy acquisition and design-based learning	Student as AI literate designers (SaiLD) framework applied in Grade-5 classrooms	Grade-5 elementary students	Hong Kong
[60]	Oral literacy through poetry, rhythm, and roleplay to support reading and language	Use embodied literacy and oracy in teaching	Integrated rhythm, rhyme, and embodiment in oral literacy classes	6 years old additional language learners	Australia

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