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# Teachers' Content Knowledge and Pedagogical Content Knowledge of Reading Instruction: A Systematic Review (2019-2024)

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**Abstract:** Learning to read constitutes one of the most important cognitive abilities students acquire during their education, and teachers' knowledge of reading instruction is considered significant to teaching quality and students' achievement. This paper aims to systematically review the existing research on teacher knowledge of reading instruction over the past six years, following the PRISMA statement's guidelines, to identify the current research trends, areas of research, and research gaps. Three main research areas are identified in the 22 reviewed articles, namely (a) Teacher knowledge (TK) exploration, (b) TK assessment, and (c) TK development. More specifically, research on TK exploration includes sub-themes such as examining TK, investigating the relationship between TK and practice and student achievement, and influencing factors of TK. TK assessment includes research on the development and validation of more comprehensive measurement tools to assess teachers' content knowledge and pedagogical content knowledge of reading instruction. TK development involves the effectiveness of interventions on TK of reading instruction in teachers' professional development programs. Future studies are recommended to use a more diverse range of methods, including both quantitative and qualitative approaches to study teachers' knowledge in their classroom practice, and to focus on teachers' active role as knowledge constructors. Studies in L2 reading contexts are also recommended.

**Keywords:** *Content knowledge, pedagogical content knowledge, reading instruction, systematic review, teacher knowledge.*

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## Introduction

For both native and foreign language learners, reading is regarded as an essential cognitive skill that students develop throughout their education, and teachers' professional knowledge has been identified as an important factor for predicting the quality of reading instruction and students' reading ability (Hudson, 2023; Piasta et al., 2020). While extensive studies have examined teachers' knowledge of reading instruction at various educational levels and emphasized different aspects of the reading process, a systematic review in this field is relatively rare. Our review aims to fill this gap by evaluating the existing literature to provide an overview of current research and to encourage further inquiry.

### *Reading Instruction*

Reading instruction has been broadly understood as the pedagogical process through which teachers help learners develop the ability to extract and construct meaning from written texts (Blixen & Pannell, 2020; Clemens et al., 2016; Grabe, 2008; Jakobson et al., 2022; Kintsch, 2018). It encompasses the systematic teaching of decoding, fluency, vocabulary, and comprehension strategies that enable readers to become both accurate and strategic. Theoretical models like the Simple View of Reading (Gough & Tunmer, 1986) and Kintsch's (1998) construction-integration model demonstrate that reading comprehension depends on the interaction between automatic word recognition and higher-order understanding. These perspectives collectively suggest that reading instruction must address multiple levels of processing, rather than focusing on discrete subskills in isolation.

Building on these insights, Grabe's (2008) two-level model provides a useful framework for analyzing reading instruction. It distinguishes between lower-level processes, such as word recognition, lexical access, and syntactic parsing, and higher-level processes involving text comprehension and interpretation. Fluent automatic processing at the

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lower level is essential for freeing cognitive resources for meaning construction, and the two levels interact to achieve successful comprehension. Within this framework, reading instruction integrates teacher practices that develop both lower- and higher-level reading processes. Lower-level instruction focuses on linguistic efficiency through the teaching of phonological awareness, decoding, vocabulary, and fluency (Grabe, 2008; Wright & Cervetti, 2017). Higher-level instruction supports students' meaning-making through strategies such as summarizing, predicting, inferring, activating prior knowledge, and analyzing text structure (Duke & Pearson, 2002; Duke et al., 2011; Lee & Tsai, 2017). Effective instruction also involves explicit teaching of reading strategies within meaningful contexts to foster metacognitive awareness and self-regulated reading (Jakobson et al., 2022).

Applying this framework to reading instruction research allows a theoretically coherent examination of how teachers understand and teach reading. It allows researchers to examine which aspects of reading teachers emphasize, whether their pedagogical knowledge and practices concentrate more on code-related, form-focused instruction or meaning-related, comprehension-oriented instruction.

*Teacher Knowledge of Reading Instruction*

Teacher knowledge (TK) refers to the bodies of understanding, beliefs, and experiences that guide teachers' instructional decisions and classroom practices (Abdelhafez, 2014; Borg, 2015). Within this study, teacher knowledge is examined through the lens of Shulman's (1987) framework, which distinguishes between Content Knowledge (CK) and Pedagogical Content Knowledge (PCK). These two domains are selected as the focal constructs because they capture both the substantive understanding of reading as a domain and the practical ability to transform that understanding into effective pedagogy. Shulman (1987) argued that CK represents what teachers know about their subject matter, while PCK represents how they adapt and represent that knowledge to make it comprehensible to learners.

In the context of reading instruction, CK refers to teachers' understanding of the linguistic, cognitive, and discourse processes that underlie reading comprehension, namely, what reading is and how it works (Kehoe & McGinty, 2024; Luo et al., 2020). PCK, in contrast, denotes teachers' knowledge of how to teach these processes effectively, such as how to design lessons, select and teach strategies, scaffold understanding, and respond to learner difficulties (Carter, 2023; Van den Hurk et al., 2017). This study integrated teachers' CK and PCK into Grabe's two-level reading process framework (Grabe, 2008) (see Table 1). In this adapted framework, the lower-level CK includes knowledge of decoding, word recognition, vocabulary, sentence analysis and fluency development, and lower-level PCK involves the ability to teach linguistic-related knowledge and skills through systematic and form-focused instruction (Grabe, 2008; Wright & Cervetti, 2017); on the other hand, the higher level CK encompasses knowledge of reading comprehension processes and knowledge of comprehension strategies, such as text organization, inference-making, and meta-cognitive monitoring, and higher-level PCK involves the capacity to guide meaning construction through strategy-related instructions (Grabe, 2008; Jakobson et al., 2022). Together, CK and PCK represent the core of teachers' practical knowledge of reading instruction, capturing both what they know about reading and how they enact that knowledge across lower- and higher-level pedagogical processes.

*Table 1. Teachers' Knowledge of Two-level Reading Instruction*

| Levels of Reading Instruction | Typical Teacher CK and PCK |
|---|---|
| Lower-level reading instruction | CK: knowledge of decoding, word recognition, sentence parsing, and fluency.<br>PCK: knowledge of teaching decoding skills, vocabulary, fluency, and sentence parsing through form-focused instruction, such as teaching phoneme-grapheme correspondence and fluency modelling. |
| Higher-level reading instruction | CK: knowledge of the reading comprehension process and comprehension strategies.<br>PCK: knowledge of guiding meaning construction through strategy-related instructions, such as text structure instruction, explicit reading skills instruction, comprehension monitoring, and critical reading. |

Many scholars have studied teachers' content knowledge about the reading process and pedagogical content knowledge of reading instruction at different educational levels and concerning various aspects of the reading process (e.g., Blixen & Pannell, 2020; Dixon & Oakhill, 2024; Hudson, 2023; Troyer, 2022). However, a systematic review to synthesize existing findings in this field is rare. In the recent five years (2021-2024), most of the existing review articles focused on general education (e.g., Leijen et al., 2022; Sarkar et al., 2024) or specific subject areas such as science, mathematics, or geography (e.g., Jain et al., 2024; Smit et al., 2023) (see Table 2). Only a few reviews have concentrated on reading instruction, and even these have mainly addressed lower-level literacy teaching at the elementary stage (e.g., Hudson et al., 2021; Tortorelli et al., 2021). Consequently, there remains a lack of comprehensive synthesis that encompasses both lower-level and higher-level reading instruction and investigates teacher knowledge across different educational levels and in both first language (L1) and second language (L2) contexts. Furthermore, given that new empirical studies on teachers' knowledge in reading instruction have been appearing in recent years, a review focusing on the period 2019–2024 is both timely and necessary.

*Table 2. Review Articles on Teacher Knowledge (2020–2024)*

| No. | Researchers | Education Areas | Search Period |
|---|---|---|---|
| 1 | Cirilo and Colagrande (2021) | Chemistry | 2001-2020 |
| 2 | Tortorelli et al. (2021) | Reading instruction | 2009-2021 |
| 3 | Hudson et al. (2021) | Reading instruction | Up to 2021 |
| 4 | Dunekacke and Barenthien (2021) | Mathematics, science, and literature | Up to 2019 |
| 5 | Leijen et al. (2022) | General education | 1996-2016 |
| 6 | Smit et al. (2023) | Geography | 2000-2020 |
| 7 | Sarkar et al. (2024) | General education | 1987-2022 |
| 8 | Jain et al. (2024) | Nature of science | 1990-2022 |

*Research Questions*

Overall, reviews of teachers' knowledge at all professional stages, covering all aspects of reading instruction, are insufficient. This systematic literature review (SLR) is intended to synthesize and evaluate existing literature in this field to identify research trends, research focus, and research gaps, thereby providing a holistic picture of teacher knowledge. The research questions are as follows:

RQ 1: What trends can be found in research on teachers' knowledge of reading instruction?
RQ 2: What research areas have been explored by researchers?
RQ 3: What research gaps can be identified in the current literature on teachers' knowledge of reading instruction?

## Methodology

This research adopted a systematic literature review (SLR) as its main methodological approach. A SLR involves a structured and methodical analysis of published work, enabling scholars to explore the body of literature in depth (Page et al., 2021). This systematic review was conducted in accordance with the PRISMA 2020 guidelines, which provide a framework for conducting and reporting systematic reviews (Page et al., 2021). To be specific, the four phases outlined in the Statement were followed: identification, screening, eligibility, and inclusion (see Figure 1).

*Data Base*

This paper reviewed literature on teachers' knowledge of reading instruction published in peer-reviewed journals from 2019 to 2024. This time frame was chosen to address the need for timely synthesis in the dynamically changing area of reading education. Three databases were searched: Educational Resources Information Center (ERIC), Web of Science (WoS), and Scopus. The search process started with ERIC, a database known for its focus on educational resources, since the review centers on topics in education. WoS was also selected as one of the primary databases because it includes high-impact, peer-reviewed journals across education, applied linguistics, and teacher education. Finally, Scopus was also selected as a source to provide more authoritative articles and research-based studies in the field.

*Inclusion and Exclusion Criteria*

After finalizing the database selection, a set of inclusion and exclusion criteria was established to filter the relevant literature (see Table 3). Only studies that fully met the inclusion criteria were included. The inclusion and exclusion criteria were as follows:

*Table 3. Inclusion and Exclusion Criteria*

| Inclusion criteria | Exclusion criteria |
|---|---|
| 1. Journal articles in peer-reviewed publications | 1. Book chapters, dissertations, commentaries, conference presentations, or review articles |
| 2. Studies published in English | 2. Studies published in languages other than English |
| 3. Primary empirical studies | 3. Non-empirical in nature (i.e., conceptual paper, review paper, discussion paper, opinion piece) |
| 4. Studies published during 2019-2024 | 4. Studies published before 2019 or after 2024 |
| 5. Studies conducted at elementary, secondary, and tertiary educational levels | 5. Studies conducted at pre-school or kindergarten education levels |
| 6. Studies including pre-service and in-service teachers' knowledge or training of knowledge | 6. Studies concentrating on students' knowledge or usage of reading strategies, rather than teachers' knowledge; Studies only examining reading instruction methods without investigating teachers' knowledge of the methods |
| 7. Studies including teachers' knowledge of various components involved L1 or L2 reading instruction | 7. Studies that examine vocabulary or spelling instruction in isolation, without linking them to the topic of reading instruction |

*The Systematic Review Process*

The SLR process started with the identification of keywords to find potentially relevant studies. These studies were then screened and assessed for eligibility according to the inclusion and exclusion criteria. Finally, the remaining studies were included in the review (see Figure 1).

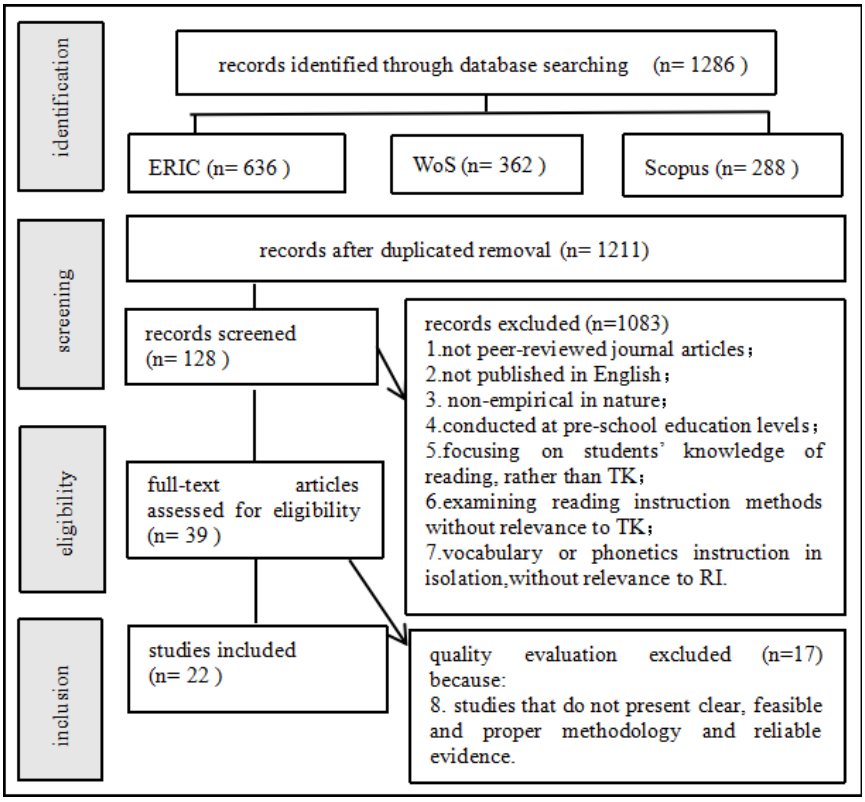


*Figure 1. The PRISMA Flow Diagram of the Literature Research and Review Process*

The first step was to decide on the keywords to be used in the research. Keywords were initially developed based on the research questions and related literature, and were then extended into more detailed and accurate search expressions by incorporating synonyms and abbreviations. Various search combinations were tried and adjusted to ensure the reliability of the search outcomes. For example, the key term "PCK" was incorporated as a commonly used representation of teachers' knowledge, and "literacy" was included as a synonym for "reading" to enhance the comprehensiveness of the search strategy. Finally, the search strings were tailored to the retrieval rules of Scopus, ERIC, and WoS, respectively. For the Scopus database, the following string was used: TITLE-ABS-KEY ("teacher knowledge" OR "pedagogical content knowledge" OR "content knowledge") AND TITLE-ABS-KEY ("reading instruction" OR "teaching reading" OR "reading comprehension" OR "literacy"). The search was limited to journal articles published in English, and the result was limited to the categories of "Social Sciences" and "Arts and Humanities". The ERIC database defaults to a full-domain match of search terms across titles, abstracts, keywords, and subject terms, eliminating the need for additional field qualifiers. Therefore, the string used in ERIC is ("teacher knowledge" OR "pedagogical content knowledge" OR "content knowledge") AND ("reading instruction" OR "teaching reading" OR "reading comprehension" OR "literacy"). The result was restricted to peer-reviewed journal articles. For the WoS database, the following search string was applied to the Topic (TS) field: TS= ("teacher knowledge" OR "pedagogical content knowledge" OR "content knowledge") AND ("reading instruction" OR "teaching reading" OR "reading comprehension" OR "literacy"). The result was limited to the category of "Education &Educational Research".

In total, the keyword research yielded 1286 studies: 636 from ERIC, 288 from Scopus, and 362 from WoS. After removing duplicate articles (n=75), 1211 studies remained for screening. As a first step, we reviewed the titles and abstracts to remove unrelated works (n=1183). Finally, 128 studies were considered closely linked to the research focus. While examining these articles, we observed that several articles explored teachers' knowledge of vocabulary instruction. Although vocabulary teaching is an essential component of reading comprehension instruction, studies that treated vocabulary instruction as a separate aspect of language learning rather than linking it to reading were excluded from the review. For example, Alamri and Awjah (2023) examined Saudi EFL teachers' pedagogical and content knowledge of vocabulary teaching, but did not connect it to reading instruction or comprehension outcomes. In contrast, Parrila et al. (2024) investigated teachers' language knowledge of phonological, phonetic, and morphological awareness and its relationship with Grade 1 students' literacy outcomes; since this study related teachers' decoding knowledge to reading comprehension, it was included in the review. After applying the exclusion rules, 39 articles were left as initial sources,

all available in full text. A final quality evaluation was then conducted to make sure the studies were reliable. Studies that do not present clear, feasible, and proper methodology and reliable evidence were removed from the selection. In the end, 22 studies were chosen for the final analysis.

*Data Analysis*

Following the content analysis approach (Chai et al., 2013), the 22 studies were further analyzed to reflect general trends in TK research in the field of reading instruction. The studies were coded on the following aspects: (1) regions where studies were conducted, (2) languages that teachers instructed, (3) education levels, (4) knowledge assessment methods, (5) knowledge domains, (6) topic-specific knowledge, and (7) research themes. (see Table 4 for Research Matrix).

To identify research themes, this study employed a two-step coding process: (a) scanning for research issues discussed and (b) categorizing them into overarching themes. First, each article's research purpose and key findings were reviewed to determine its primary focus, from which initial codes were developed. For instance, studies examining the relationship between teachers' knowledge and practice were coded as "linking TK with practice," while those developing assessment instruments were coded as "assessment of TK." Some studies used existing assessment tools merely to quantify teachers' knowledge rather than to build new assessment instruments; these were coded as "quantitative examination of TK." In the second step, related issues were compared and grouped into broader themes. For example, "linking TK with practice" and "quantitative examination of TK" were merged under the theme "TK exploration." Ultimately, three major research themes with five sub-themes were identified, as elaborated in the following section.

For the coding of topic-specific knowledge, the coding framework was developed based on Grabe's (2008) two-level reading process framework, which distinguishes between lower-level and higher-level reading processes. Accordingly, teachers' knowledge and instructional behaviors were categorized into lower-level dimensions and higher-level dimensions. The lower-level dimension includes code-related topics, such as phonological awareness, word recognition, decoding, vocabulary and fluency. On the contrary, the higher-level dimension includes meaning-related topics, such as reading comprehension, reading skills, reading strategies, inferences, and critical reading.

To enhance the credibility of the data analysis, two coders independently extracted and coded the data according to the predetermined coding framework. Any discrepancies were discussed until a consensus was achieved. In addition, analyst triangulation was implemented by cross-checking interpretations between the two coders to minimize subjectivity.

## Findings

*Trends in Teacher Knowledge Studies in Reading Instruction*

This section introduces the findings from the research trends in TK of reading instruction, including the distribution of publications by year and by region, language focus, education levels, knowledge domains, topic-specific knowledge, knowledge assessment methods, and research areas.

*a) Distribution of Publications by Year*

From 2019 to 2024, the research showed a fluctuating trend (see Figure 2). Although the lowest number of publications (n=1) appeared in 2021, there was a surge of interest in TK study in the next year 2022 (n=8). After this peak, the scholar's interest showed a slight drop, followed by a gradual rise to 5 in 2024. This indicates a potential recovery and continued research engagement in the field of TK of reading instruction.

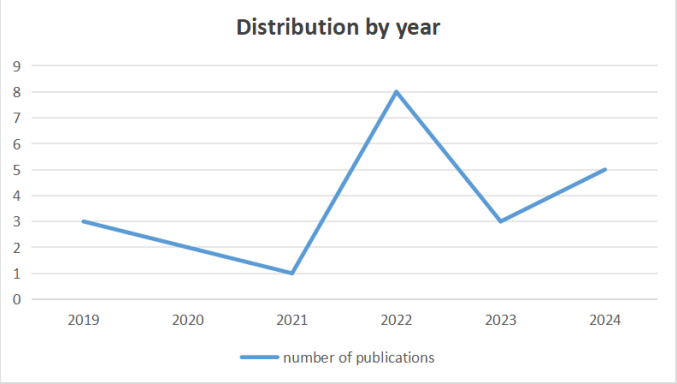


*Figure 2. Distribution of Publications by Year*

*Table 4. Research Matrix*

| No. | Author(s) | Country | Education Level | Research Theme | Assessment Method | Language | Knowledge Domain | Topic-specific TK |
|---|---|---|---|---|---|---|---|---|
| 1 | Ciampa and Gallagher (2019) | Canada and USA | Elementary | TK Development | Quanti (Survey) | English (L1) | CK/ PCK | GRI: RC strategies |
| 2 | Luo et al. (2020) | China | Elementary | TK Exploration | Quanti (Survey) | English (L2) | CK | LRI: PA/ PH/ MA |
| 3 | Wijekumar et al. (2019) | USA | Elementary | TK Exploration | MM (Survey/FG/CO) | English (L1) | PCK | HRI: RC strategies |
| 4 | Blixen and Pannell (2020) | UK | Elementary | TK Exploration | Quali (CO/SSI ) | English (L1) | CK/ PCK | HRI: Critical literacy Instruction |
| 5 | Moorhouse (2020) | China (Hong Kong) | Elementary | TK Development | Quanti (Survey) | English (L2) | CK/ PCK | GRI: literature Instruction |
| 6 | Mejang and Suksawas (2021) | Thailand | Secondary | TK Development | Quanti (Pre-/Post-test) | English (L2) | CK/ PCK | HRI: RC instruction |
| 7 | Alzaidi and Althaqafi (2022) | Saudi Arabia | Tertiary | TK Exploration | Quali (SSI) | English (L2) | PCK | HRI: Use of authentic texts in RC |
| 8 | Davis et al. (2022) | USA | Elementary | TK Assessment | Quanti (Survey) | English (L1) | CK/ PCK | GRI:Code/Meaning-related RI |
| 9 | Hudson (2023) | USA | Elementary | TK Exploration | Quanti (Survey) | English (L1) | CK/ PCK | HRI: RC instruction |
| 10 | Jakobson et al. (2022) | Estonia | Elementary/ Secondary | TK Exploration | Quali (SSI) | Estonian(L1) | CK/ PCK | GRI: Reading process and RC instruction |
| 11 | Jolly et al. (2022) | USA | Elementary | TK Development | Quanti (Survey) | English (L1) | CK/ PCK | GRI: Reading skills instruction |
| 12 | König et al. (2022) | Germany | Elementary | TK Exploration | Quanti (Survey) | German(L1) | CK/PCK | GRI: Linguistic Knowledge and RI strategies |
| 13 | Meeks et al. (2020) | Australia | Elementary/ Secondary | TK Exploration | Quanti (Survey) | English( L1) | CK/ PCK | GRI:PA/PH; FLU/VOC/COMP |
| 14 | Troyer (2022) | USA | Secondary | TK Exploration | Quanti (Survey) | English (L1) | CK/ PCK | GRI:PA/PH; FLU/VOC/COMP |
| 15 | Carter (2023) | UK | Elementary | TK Development | Quanti (Survey) | English (L1) | CK/ PCK | GRI: Reading process and RC instruction |
| 16 | Hudson et al. (2023) | USA | Elementary | TK Development | Quanti (Pre-/Post-test) | English (L1) | CK | HRI: Text structure knowledge |
| 17 | Widiati et al. (2023) | Indonesia | Secondary | TK Exploration | MM (Survey/SSI) | English(L2) | PCK | GRI: Literacy teaching strategies |
| 18 | Aguye and Berlie (2024) | Ethiopia | Secondary | TK Exploration | Quanti (SSI) | English(L2) | CK/PCK | HRI: RC instruction |
| 19 | Dixon and Oakhill (2024) | UK | Elementary | TK Assessment | Quanti (Survey) | English (L1) | CK/ PCK | GRI: Reading process and RC instruction |
| 20 | Hall et al. (2024) | USA | Elementary | TK Assessment | Quanti (Survey) | English (L1) | CK/ PCK | GRI:PA/PH; FLU/ OL/COMP |
| 21 | Kehoe and McGinty (2024) | USA | Elementary | TK Exploration | Quanti (Survey) | English (L1) | CK/ PCK | GRI:Code/Meaning-related RI |
| 22 | Parrila et al.(2024) | Australia | Elementary | TK Exploration | Quanti (Survey) | English (L1) | CK | LRI:PA/ PH/ MA |

Note: TK= teacher knowledge; IST= in-service teacher ; PST =pre-service teacher; CO=classroom observation; FG= focus group; SSI=semi-structured interview;L1= first language; L2= second language; CK= content knowledge; PCK= pedagogical content knowledge; RI= reading instruction;GRI= general reading instruction; LRI= lower-level reading instruction; HRI= higher-level reading instruction; RC= reading comprehension;PA= phonological awareness; PH= phonics; MA=morphological awareness; FLU= fluency; OL=oral language ; VOC=vocabulary ; COMP=comprehension

*b) Distribution of Publications by Region*

The review of 22 studies revealed a clear pattern of geographical distribution. North America held the largest proportion with nine studies, eight of which were from the United States. This was followed by Europe (n=5), including two from the United Kingdom. Asia accounted for four studies, with two from China. Oceania was represented by two studies, both from Australia. Africa and the Middle East each had one study (see Figure 3).

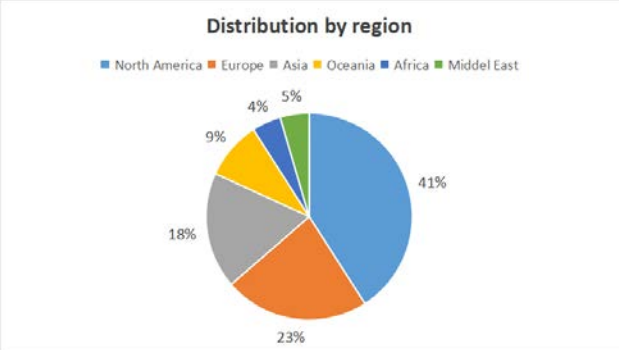


*Figure 3. Distribution of Publications by Region*

*c) Language Focus*

In terms of language focus, the majority of studies focused on L1 reading (n=16), with 14 specifically examining English as the first language (e.g., Carter, 2023; Dixon & Oakhill, 2024; Hall et al., 2024; Hudson et al., 2023; Kehoe & McGinty, 2024; Parrila et al., 2024; Troyer, 2022) and two (König et al., 2022; Widiati et al., 2023) exploring teachers' knowledge of reading instruction in German and Estonian, respectively. In contrast, research on L2 reading instruction was relatively limited (n=6) (Aguye & Berlie, 2024; Alzaidi & Althaqafi, 2022; Luo et al., 2020; Mejang & Suksawas, 2021; Moorhouse, 2020; Widiati et al., 2023), all of which centered on ESL or EFL teaching contexts.

*d) Education Levels*

Regarding education levels, a large proportion (n=15) concentrated on elementary education teachers' knowledge, accounting for about 68%; two covered both elementary and secondary education; four were dedicated to secondary education; and only one involved higher education (see Table 5 for related studies). This indicates that current research is mainly concentrated on reading instruction in basic education, particularly at the primary level. This trend may be closely related to the critical role of primary education in students' reading development and policy priorities. However, there is a noticeable lack of research at the higher education level, which, to some extent, overlooks the important role of university instructors.

*Table 5. Distribution of Publications by Education Levels*

| **Education level** | **Study Count** | **Related studies** |
|---|---|---|
| Elementary | 15 | Blixen and Pannell (2020); Carter (2023); Ciampa and Gallagher (2019); Davis et al. (2022); Dixon and Oakhill (2024); Hall et al. (2024); Hudson (2023); Hudson et al. (2023); Jolly et al. (2022); Kehoe and McGinty (2024); König et al. (2022); Luo et al. (2020); Moorhouse (2020); Parrila et al. (2024); Wijekumar et al. (2019) |
| Secondary | 4 | Aguye and Berlie (2024); Mejang and Suksawas (2021); Troyer (2022); Widiati et al. (2023) |
| Elementary & Secondary | 2 | Jakobson et al. (2022); Meeks et al. (2020) |
| Tertiary | 1 | Alzaidi and Althaqafi (2022) |

*e) Knowledge Domains*

Among the reviewed studies, 16 (e.g., Blixen & Pannell, 2020; Davis et al., 2022; Hudson, 2023; Jakobson et al., 2022; Jolly et al., 2022; Mejang & Suksawas, 2021; Moorhouse, 2020) focused on reading teachers' CK and PCK; three studies (Hudson et al., 2023; Luo et al., 2020; Parrila et al., 2024) investigated CK alone, while another three examined PCK (Alzaidi & Althaqafi, 2022; Widiati et al., 2023; Wijekumar et al., 2019) independently. The result indicates that most studies have conceptualized teachers' knowledge of reading instruction as an integrated construct, emphasizing both content knowledge and pedagogical knowledge.

*f) Topic-specific Knowledge*

The topic-specific knowledge was coded into three categories: lower-level reading instruction (RI) knowledge, higher-level RI knowledge, and general RI knowledge (encompassing both lower- and higher-level RI knowledge), based on Grabe's (2008) two-level reading process framework. The specific coding framework has been explained in the section of methodology.

Of the 22 reviewed articles, a total of 13 studies emphasized teachers' general reading instruction knowledge, accounting for about 59% (see Table 6 for related studies). Although these studies did not center on a specific reading topic, they covered instructional knowledge ranging from lower-level to higher-level reading skills. For example, studies have examined teachers' knowledge of the five key components of reading—phonemic awareness, phonics, fluency, vocabulary, and comprehension (e.g., Meeks et al., 2020), teachers' understanding of code-related and meaning-related instruction (Kehoe & McGinty, 2024), and their grasp of overall reading skill instruction (Carter, 2023). These studies emphasized a comprehensive knowledge framework that teachers used to address the various components of reading.

In addition, two studies focused specifically on lower-level reading instruction knowledge, mainly covering foundational areas such as phonemic awareness, phonics, and morphological awareness. Eight other studies concentrated on topics related to advanced-level reading comprehension instruction (see Table 6 for related studies). These included teachers' knowledge of reading comprehension strategies instruction, the use of authentic materials for reading comprehension, the mastery of classroom questioning strategies, and teachers' understanding of the use of text structure in main idea generation. The result shows that topics in higher-level reading instruction were more specific. Rather than addressing general reading skills, studies on higher-level reading instruction often investigate specific aspects of advanced comprehension, such as critical reading, knowledge of text structure, or the use of authentic materials.

*Table 6. Publications about Topic-Specific Knowledge*

| Topic-specific Knowledge | Study Count | Examples of Topics | Related Studies |
|---|---|---|---|
| General RI knowledge | 13 | phonemic awareness, phonics, fluency, vocabulary, and comprehension; code-related and meaning-related instruction; linguistic knowledge and reading instruction strategies. | Carter (2023); Ciampa and Gallagher (2019); Davis et al. (2022); Dixon and Oakhill (2024); Hall et al. (2024); Jakobson et al. (2022); Jolly et al. (2022); Kehoe and McGinty (2024); König et al. (2022); Meeks et al. (2020); Moorhouse (2020); Troyer (2022); Widiati et al. (2023) |
| Lower-level RI knowledge | 2 | phonemic awareness, phonics, and morphological awareness. | Luo et al. (2020); Parrila et al. (2024) |
| Higher-level RI knowledge | 7 | the use of authentic materials; classroom questioning strategies; the use of text structure in main idea generation; critical literature instruction; reading comprehension strategies. | Aguye and Berlie (2024); Alzaidi and Althaqafi (2022); Blixen and Pannell (2020); Hudson (2023); Hudson et al. (2023); Mejang and Suksawas (2021); Wijekumar et al. (2019) |

*g) Knowledge Assessment Methods*

Among the 22 studies reviewed, the majority of the studies (n=17) (for example, Ciampa & Gallagher, 2019; Luo et al., 2020; Mejang & Suksawas, 2021; Moorhouse, 2020) employed quantitative research methods to measure teachers' knowledge, usually using tools such as questionnaires or pre-tests and post-tests. Three studies (Alzaidi & Althaqafi, 2022; Blixen & Pannell, 2020; Jakobson et al., 2022) adopted qualitative methods, primarily using interviews to explore teachers' instructional knowledge in depth. The remaining two studies (Widiati et al., 2023; Wijekumar et al., 2019) used mixed-methods approaches to gain a more comprehensive understanding of how teacher knowledge is manifested and developed (see Figure 4 ).

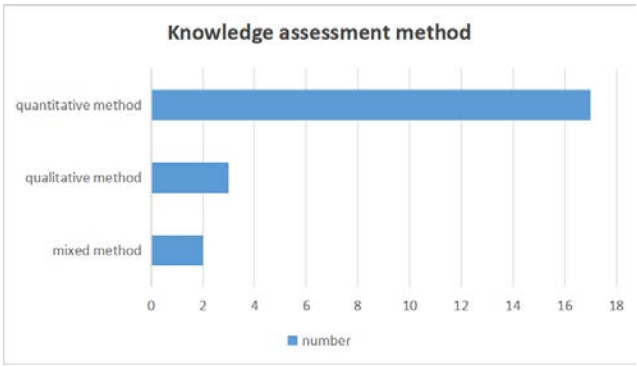


*Figure 4. Knowledge Assessment Methods*

*h) Research Areas*

As for research areas, the 22 articles fell into three study areas (see Table 7): a) TK exploration, b) TK assessment, and c) TK development. TK exploration consisted of studies that examined teachers' level of knowledge and the content of their TK (n=5), studies that link TK with teachers' practice and students' achievement (n=6), as well as studies that explored the influencing factors of the formation of teachers' knowledge (n=2). TK assessment included studies that aimed at developing TK assessment tools (n=3) while TK development involved the evaluation of the effects of interventions on TK development (n=6).

*Table 7. Research Areas*

| Research areas | Sub-themes | Study Count | Related Studies |
|---|---|---|---|
| TK Exploration (n=13) | Examining TK | 5 | Blixen and Pannell (2020); Jakobson et al. (2022); König et al. (2022); Luo et al. (2020); Meeks et al. (2020) |
| | Linking TK with practice and students' achievement | 6 | Aguye and Berlie (2024); Hudson (2023); Kehoe and McGinty (2024); Parrila et al. (2024); Troyer (2022); Widiati et al. (2023) |
| | Exploring the influencing factors of TK | 2 | Alzaidi and Althaqafi (2022); Wijekumar et al. (2019) |
| TK Assessment (n=3) | Developing TK assessment instruments | 3 | Davis et al. (2022); Dixon and Oakhill (2024); Hall et al. (2024) |
| TK Development (n=6) | Evaluating the interventions on TK development | 6 | Carter (2023); Ciampa and Gallagher (2019); Hudson et al. (2023); Jolly et al. (2022); Mejang and Suksawas (2021); Moorhouse (2020) |

*Three Research Areas*

This section introduces the findings in the research areas in detail. The three main research areas are TK exploration, TK assessment, and TK development. Sub-themes in each area are also discussed to offer a more comprehensive understanding of multiple aspects of studies on TK.

*TK Exploration (n=13)*

*a) Examining TK (N=5)*

There were five studies examining reading teachers' knowledge, two of which (Luo et al., 2020; Meeks et al., 2020) focused on early reading instruction, two (Blixen & Pannell, 2020; Jakobson et al., 2022) on specific higher-level reading comprehension strategies, and the remaining one (König et al., 2022) on the structural model of teachers' expertise. All the studies pointed to a lack of knowledge in reading instruction among teachers, which may, to some extent, affect their teaching practices.

Regarding TK in early reading instruction, several quantitative studies examined teachers' general language knowledge. Luo et al. (2020) found that Chinese EFL teachers' knowledge of basic linguistic constructs for reading instruction was limited; few participants were familiar with phonological awareness, limiting their ability to teach decoding explicitly. Similarly, Meeks et al. (2020) found that pre-service teachers had some understanding of early L1 reading components, e.g., phonemic awareness, phonics, fluency, vocabulary, and comprehension, but lacked pedagogical strategies for evidence-based practice, highlighting a gap between theoretical knowledge and classroom application.

Unlike Luo et al. (2020) and Meeks et al. (2020), who used quantitative methods to study early reading TK, Blixen and Pannell (2020) and Jakobson et al. (2022) employed qualitative approaches to examine teachers' knowledge of higher-order reading. Blixen and Pannell found that many Scottish teachers lacked a conceptual understanding of critical literacy, focusing on higher-order thinking while overlooking social inequality and cultural bias. Likewise, Jakobson et al. (2022) reported that Estonian teachers viewed reading mainly as a cognitive process, equating decoding with understanding and showing only implicit awareness of comprehension strategies. Overall, teachers' knowledge of reading instruction appeared largely tacit and conceptually limited.

While the above studies described and diagnosed teachers' knowledge of reading instruction, König et al. (2022) examined its structure. Using a standardized test with German pre-service L1 teachers, they validated a three-dimensional model, CK, PCK, and GPK, showing strong correlations among them and highlighting the importance of both CK and PCK for early literacy instruction.

In summary, the above studies found that teachers' knowledge base in reading instruction remained limited in both L1 and L2 reading contexts. Teachers' conceptual understanding and content knowledge of language constructs, reading comprehension processes, and critical literacy were found to be insufficient. Moreover, teachers also lacked pedagogical knowledge to teach reading comprehension strategies and implement evidence-based reading activities. Systematic training for both pre-service and in-service teachers is needed.

*b) Linking TK with Practice and Student Achievement (n=6)*

Scholars have not only examined teachers' knowledge but also examined the connections among teacher knowledge, instructional practice, and student achievement, seeking to understand these connections. To be specific, three studies (Parrila et al., 2024; Troyer, 2022; Widiati et al., 2023) investigated the influence of TK on teaching quality and students' achievement; the other three (Aguye & Berlie, 2024; Kehoe & McGinty, 2024; Widiati et al., 2023) explored the consistency between teachers' knowledge and practice of reading instruction.

Overall, teachers' pedagogical knowledge positively influenced instructional quality. In an L1 English reading context, Troyer (2022) found that teachers with strong language and literacy knowledge were more likely to ask higher-order questions linking texts to students' experiences, rather than lower-order memorization questions, effectively promoting deep reading engagement and critical thinking.

Troyer's (2022) findings were supported by Hudson (2023) and Parrila et al. (2024). Hudson found that upper elementary L1 teachers with stronger knowledge of reading comprehension strategies, such as text structure analysis and inferences, could better adjust instruction, provide accurate examples, and address student misunderstandings. Parrila et al. also reported that teachers' language and literacy knowledge predicted classroom instruction quality, though the effect was relatively weak.

However, findings on the relationship between TK and student achievement are mixed. Hudson (2023) found that higher-level TK indirectly improves students' reading performance by enhancing instructional quality, particularly with complex texts. In contrast, Parrila et al. (2024) reported no significant direct effect of TK on decoding or word reading. These results suggest that TK is necessary but not sufficient for student achievement, with its impact depending on factors such as instructional quality, student development, and task complexity.

Studies examining the alignment between teachers' knowledge and practice have consistently revealed a notable gap. In L2 contexts, Indonesian and Ethiopian EFL teachers were familiar with literacy strategies, such as story retelling and student–teacher conferences, and had moderate PCK. However, they rarely applied them in the classroom (Aguye & Berlie, 2024; Widiati et al., 2023). Similarly, in an L1 context, rural U.S. reading teachers, despite high self-efficacy and awareness of evidence-based practices, showed incomplete implementation of key instructional strategies (Kehoe & McGinty, 2024).

Several factors have been suggested as contributors to the knowledge and practice gap, most of which are associated with contextual or institutional conditions. For example, insufficient teacher training, limited instructional resources, and large class sizes have been suggested as potential moderators (Aguye & Berlie, 2024). Similarly, heavy teaching loads and excessive administrative responsibilities are hypothesized to contribute to the knowledge-practice discrepancy among Indonesian EFL teachers (Widiati et al., 2023). However, these contextual explanations are primarily drawn from L2 contexts (Aguye & Berlie, 2024; Widiati et al., 2023), where teachers often face challenges distinct from those in L1 environments—such as less exposure to the target language and inadequate curriculum support.
In summary, investigations revealed that teachers' knowledge could positively influence instructional quality. However, impacts on student outcomes diverged. A knowledge-practice gap was also identified among studies, despite theoretical awareness of evidence-based strategies; implementation was hindered by contextual or institutional constraints.

*c) Exploring Influencing Factors of TK (n=2)*

As for the influencing factors of TK, Alzaidi and Althaqafi (2022) reported that L2 (ESL) reading teachers' learning experience and teaching experience had a great influence on teachers' knowledge of using authentic texts in teaching

reading comprehension. For example, one Saudi Arabian ESL teacher believed that she used authentic texts because, in school education, she learned that focusing on authentic texts and materials was more prominent and efficient than relying entirely on the textbook. Wijekumar et al. (2019) echoed Alzaidi and Althaqafi, suggesting that teachers' learning experience, such as the training during pre-service education, might influence teachers' knowledge. Limited professional development opportunities and school or administrative decisions may also have constrained teachers' evidence-based knowledge of L1 (English) reading instruction (Wijekumar et al., 2019).

*TK Assessment (n=3)*

*Developing TK Assessment Instruments (n=3)*

While the aforementioned studies (for example, Ciampa & Gallagher, 2019; Hudson, 2023; Luo et al., 2020; Meeks et al., 2020) adapted existing instruments for quantitative measurements, three studies, conducted in L1 reading context, focused on the development and validation of instruments to assess TK from new perspectives (Davis et al., 2022; Dixon & Oakhill, 2024; Hall et al., 2024). Overall, these instruments were more inclusive and comprehensive and were designed for various purposes.

Early assessment tools focused mainly on foundational reading skills, such as phonemic awareness, decoding, and morphemic analysis, with limited attention to language comprehension and text-level understanding. The Knowledge for Enhancing Reading Development Inventory (KnERDI) (Davis et al., 2022) divided teacher knowledge into code-related word recognition and text-related meaning construction, emphasizing support for higher-order skills like inference and critical analysis. Building on this, Hall et al. (2024) developed the Teacher Understanding of Literacy Constructs and Evidence-Based Instructional Practices (TULIP) framework, refining teacher knowledge into sub-dimensions including phonics, decoding, reading fluency, oral language, and comprehension, through literature review, expert evaluation, field testing, and pilot studies.

Besides, the assessment tools also showed a shift from focusing on static knowledge to situational knowledge. Building on this shift, Dixon and Oakhill (2024) developed the Knowledge, Behaviour and Attitudes Test for Reading Comprehension (KBAT-RC), which expanded the scope of evaluation to include not only teachers' knowledge but also their instructional behaviors, motivations, and attitudes. The KBAT-RC tool emphasized teachers' judgment and reflection in real teaching contexts by adding open-ended and situational questions, and therefore complemented the shortcomings of earlier assessments, which lacked insight into teachers' instructional decision-making knowledge.

All three studies aimed to support teacher professional development through assessment tools, with slight differences in focus. Davis et al. (2022) developed an evaluative tool to check whether teachers met instructional standards; Hall et al. (2024) constructed a diagnostic tool to identify weaknesses in reading instruction knowledge, and Dixon and Oakhill (2024) emphasized both evaluation and reflective learning, helping teachers recognize strengths and gaps in their knowledge. Overall, these tools represent an advancement in assessment perspectives, moving beyond basic cognitive skills to include practical abilities and attitudes, and addressing earlier tools' limitations by diagnosing teachers' knowledge weaknesses.

*TK Development (n=6)*

*Evaluating the Interventions on TK Development (n=6)*

There were six studies (Carter, 2023; Ciampa & Gallagher, 2019; Hudson et al., 2023; Jolly et al., 2022; Mejang & Suksawas, 2021; Moorhouse, 2020) concerning how professional development programs were designed to help teachers develop knowledge of reading instruction in both L1 and L2 reading contexts. These development models, overall, were able to demonstrate effectiveness. Generally speaking, these intervention models shared three features, namely, the use of blended learning models driven by educational technology, the establishment of multi-level collaboration, and the emphasis on cultivating practical abilities and providing personalized support.

Two studies adopted technology-enhanced blended learning models to develop teachers' knowledge of reading instruction. Mejang and Suksawas (2021) implemented a three-phase "offline–online–offline" program in Thailand, where an instant messaging tool was used to support collaboration, lesson plan sharing, and video-based feedback. Similarly, Hudson et al. (2023) employed a Massively Open Online Virtual (MOOV) platform to help upper elementary teachers use text structures to guide students in identifying main ideas in L1 reading. This platform integrated synchronous discussions and expert demonstrations with asynchronous learning, effectively overcoming geographical barriers during the COVID-19 period.

Another feature of the professional development programs was that they all sought collaboration between teachers or other stakeholders. For example, the study by Mejang and Suksawas (2021) highlighted how Professional Learning Communities (PLCs) can promote collaboration among teachers in Thailand, enabling them to work together in lesson planning and achieve a positive cycle of practice–feedback–improvement. What's more, Carter (2023) and Jolly et al. (2022) extended the collaboration beyond the teacher level to the institutional level in the L1 reading context. Carter

(2023) established a tri-level partnership among universities, schools, and local education authorities. In this program, pre-service teachers provided tutoring for elementary students while also working with university reading experts to reinforce the connection between theory and practice.

The last feature of the training programs was the practice-oriented approach and personalized support. The one-to-one tutoring in Carter's (2023) program offered UK pre-service teachers a real classroom experience and helped them build confidence in "learning by doing." Ciampa and Gallagher's (2019) program structured literacy methods course integrates coursework and fieldwork. It combined theoretical instruction, scaffolded practicum experiences, and volunteer tutoring to foster L1 pre-service teachers' knowledge of literacy. Moorhouse (2020) also provided practice-oriented training to pre-service EFL teachers. However, unlike Carter's and Ciampa and Gallagher's systematic approach, this program invited pre-service teachers to read children's literature and encouraged them to consider how to teach from a reader's perspective. Thus, the development of PCK was emotion-driven.

Overall, professional development programs for reading teachers in the reviewed studies (Hudson et al., 2023; Mejang & Suksawas, 2021) were making greater use of technology. The training models (e.g., Carter, 2023; Jolly et al., 2022) were moving away from individual learning. Instead, they were focusing more on partnerships among teachers, institutions, and building shared resources. These programs also highlighted practical learning in real situations and were often designed to meet individual teachers' needs.

*Research Gaps*

Researchers have made significant contributions to the study of TK exploration, development, and assessment in reading instruction. However, some research gaps need to be further addressed.

First of all, as for the methods of assessing TK, quantitative surveys were used as the major instruments in the reviewed studies, while qualitative instruments, such as interviews and classroom observations, were rarely used. Observational data allow researchers to see how teachers enact content knowledge and pedagogical strategies in real time, how they respond to students, and how they make on-the-spot decisions. As Tseng et al. (2020) have proposed, teachers' knowledge can be further explored through classroom performance rather than through surveys or self-reports. It is recommended that a diverse range of methods, including both quantitative and qualitative approaches, be employed by researchers in future studies to obtain a holistic picture of reading teachers' knowledge.

Second, although several studies have reported the effectiveness of external interventions in developing reading teachers' knowledge, teachers' personal efforts and their own pathway of building knowledge were neglected. In other words, teachers' own role as active knowledge builders was not fully emphasized. As Clandinin (2022) has mentioned, teachers' knowledge is embedded in their life stories and lived experiences, and these experiences are important sources of their knowledge development. Thus, it is recommended that researchers start from an individual teacher's perspective to explore how they develop and construct understanding through their own professional journeys.

Third, numerous studies have contributed to the examination of reading teachers' CK and PCK. However, these two domains of knowledge have often been treated as separate constructs rather than as interconnected components of teachers' professional knowledge. Only a few studies have explored the interrelation between CK and PCK, for instance, examining whether teachers with stronger content knowledge also demonstrate greater pedagogical knowledge of reading instruction. This lack of integrative research leaves an important gap in understanding the correlation between CK and PCK, and how the two types of knowledge interact to shape teachers' practices. As Liu et al. (2022) argued, PCK should not be viewed as an isolated category but as a dynamic interplay between content and pedagogy, while Kramer et al. (2021) empirically identified a moderate correlation between the two. Therefore, future studies should more systematically investigate the relationship between CK and PCK in reading instruction, particularly how their interaction contributes to effective teaching and learning outcomes.

Lastly, based on the analysis of the research trend, most studies focused on L1 reading at the primary educational level; studies on L2 reading instruction were relatively limited. Since there is a great distinction between L1 and L2 reading in terms of linguistic demands, individual experience, and sociocultural influences, future studies are recommended to include the investigation of characteristics and developmental pathways of teachers' knowledge in multilingual and L2 contexts.

## Conclusion

This study reviews teacher knowledge studies in relation to reading instruction from 2019 to 2024. Of the 22 studies reviewed, there was a publication peak in 2022, with most studies conducted in North America about L1 reading in English. The included articles were categorized into three major areas: TK exploration, TK assessment, and TK development. More specifically, research on TK exploration suggested that teachers' CK and PCK about reading instruction were generally insufficient. Findings from the reviewed studies indicate a positive correlation between teachers' knowledge and the quality of their instruction, but a more mixed relationship between teachers' knowledge and students' achievement. Moreover, a knowledge-practice gap was identified in how teachers implemented their knowledge in classroom settings, largely influenced by contextual factors. The newly developed TK assessment

instruments in the reviewed studies were more inclusive and comprehensive and were designed for various purposes. In terms of TK development, the TK intervention models were characterized by the development of a blended learning model, the establishment of multi-level collaboration, and the emphasis on the cultivation of practical abilities.

This study has several limitations. It included only publications indexed in Scopus, WoS, and ERIC, which means that studies available in other databases were not covered. In addition, the search was limited to English-language sources, so research published in other languages may not have been captured. What's more, the review focused on the period from 2019 to 2024, limiting the generalizability of the findings across a longer time frame. Finally, this review was devoted to mapping the overall research landscape rather than conducting stratified or mechanism-based analyses. Future research could examine contextual moderators, e.g., L1/L2 settings and teacher stage, to enhance analytic depth.

This study also has implications for research on teacher knowledge, teacher education, and assessment developers. For research, it underscores the importance of employing more diversified methodological approaches that integrate quantitative and qualitative perspectives to investigate teachers' knowledge as enacted in real classroom contexts. For teacher education, the findings suggest that professional development programs could build technology-supported learning communities that foster collaboration, coaching, and reflective practice. Furthermore, it is suggested that teacher knowledge assessment incorporate situational, scenario-based tasks to capture teachers' adaptive expertise and their ability to apply knowledge flexibly across instructional situations.

**Generative AI Statement**

The author has not used generative AI or AI-supported technologies.

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